

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

FEB. 28 and MAR. 6, 1936.*

I.—GENERAL; PLANT; MACHINERY.

Practical heat economy. K. SCHIEBL (Chem. Fabr., 1935, 8, 507—510).—A discussion of fuel economies in a works. E. S. H.

Thermal insulator for locomotive boilers. I. V. IZVEKOV (Stroit. Mat., 1934, No. 9, 64).—A mixture containing 15% of asbestos and 85% of $MgCO_3$ (from dolomite) is described. CH. ABS. (p)

Prevention of boiler scale and purification of feed-water with trisodium phosphate. P. VERTÈS (Ind. chim., 1934, 21, 886—889; Chem. Zentr., 1935, i, 2708—2709).—Details of the Na_3PO_4 required and of the range of application of the method are given. H. J. E.

Application of automatic control and regulating instruments in chemical industries. P. ÅGREN (Medd. Sverig. Kem. Industrikontor, 1935, 18, 121—147).—A lecture.

Flotation as applied to the chemical industry. W. CULLEN and H. LAVERS (Inst. Chem. Eng., Jan., 1936, Preprint, 12 pp.).—The theory and different types of flotation processes, the reagents and machines used, the flotation of pyrites, blende, and galena, of Au, Ag, and Cu ores, and of coal, graphite, C black, and S, and costs of treatment are discussed. D. K. M.

Dry dedusting of blast-furnace gas. A. I. VERHOTUROV (Iron Age, 1935, 135, No. 17, 19—21, 86, 88).—The use of a dry dust catcher, in conjunction with a cyclone-type cleaner, is described. CH. ABS. (e)

Very low temp.—See VII. **Pigment grinding.**—See XIII. **Determining true solids in solid and liquid products.**—See XVII.

PATENTS.

(A, c) **Furnace installations and (A, B) recuperators.** W. H. FITCH (B.P. 439,685—7, 12.6.34. U.S., [A, B] 12.6.33, [c] 28.7.33).—(A) A non-metallic tubular recuperator above a pulverised-coal (metallurgical) furnace and adjacent the stack is described. (B) Details of tubes and supporting blocks are claimed. (c) A non-reversing reverberatory furnace with burners along both sides and recuperators at each end is described. B. M. V.

Drying plants [for granular material]. A. VON LOM (B.P. 439,638, 11.6.34. Ger., 10.6.33).—The material is passed over a reciprocating permeable tray and subjected to localised upward currents of air of such strength that the lower layer is lifted to the top. B. M. V.

Drying plant [for pottery]. L. A. MITCHELL (B.P. 439,577, 11.6.34 and 27.2.35).—The articles are carried on a vertical conveyor up one side and down the other

of a heater forming a permeable wall between the runs. The loading station is below a baffle wall and other baffles are provided to control the circulation of air, which is forced by a fan. B. M. V.

Temperature-indicating and -controlling device. F. G. BLOCH (B.P. 439,889, 11.6.34. Czechoslov., 10.1.34).—Two adjustable limiting contacts are formed as dummy pointers which make contact with the active pointer of a pyrometer and initiate electrical controls. B. M. V.

Measurement of quantities of heat. SIEMENS & HALSKE A.-G. (B.P. 438,699, 27.5.35. Ger., 26.5.34).—Apparatus in which a transfer of material (e.g., vapour) is produced by a difference in temp. (t) is provided with a choke adjusted by a bimetallic couple so that the quantity of material transferred $\propto t^{1/3}$. B. M. V.

Plate heat-exchange apparatus applicable to milk pasteurisation. E. PRESTAGE (B.P. 440,331—2, 25.5.34).—(A) Each frame encloses a pair of thin plates having ribs (to induce zigzag flow) which coincide inside the plates and outside. On opening, the heating/cooling medium is retained in each frame while all milk surfaces are exposed. (B) The frames are mounted by hinges on one vertical edge to a column and are opened like a book. B. M. V.

Apparatus for softening and heating water. LEDA ELECTRIC CO., LTD., and A. NICHOLSON (B.P. 440,053, 2.10.34).—A lagged H_2O -heater, e.g., of the electric, displacement type, is surrounded by a jacket in which a softening agent is placed, the H_2O being fed uniformly around the top. A draw-off for cold, soft H_2O is also provided. B. M. V.

Pulverising device. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 439,968, 18.6.34).—The material (e.g., dye or the like) is mixed with quartz sand and subjected to an oscillating motion, e.g., that produced by rotation of an unbalanced mass attached to the container. B. M. V.

Machines for grinding material such as chocolate, paint, and such like. J. MCINTYRE (B.P. 439,895, 17.6.35).—At least one roller is constructed similarly to the commutator of a dynamo except that the two materials of the segments are hard and soft alternately. B. M. V.

Arrangement for securing the bowl liners of cone crushers. A./S. SYDVARANGER (B./P. 439,845, 26.3.35. Norw., 6.3.35).—A contracting ring of wedge section is used. B. M. V.

Rendering powdered materials fluid. N. AHLMANN (B.P. 439,819, 15.6.34).—Compressed air is admitted in an intermittent or pulsating manner without mechanical

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

agitation; spring-loaded valves suitable to effect the pulsation are described. B. M. V.

Rotary screening, sieving, and sorting devices. L. HERRMANN (B.P. 438,636, 22.1.35).—A trommel is provided with a stepped screening surface, all parts being perforated, and the treads and risers of the steps are helical so as to propel the oversize along the trommel. [Stat. ref.] B. M. V.

Separation and washing of materials. H. R. RAFTON, ASST. to RAFTON ENG. CORP. (U.S.P. 1,997,915, 16.4.35. Appl., 17.7.29).—An apparatus comprising 3 screens and a washing trough for the complete removal of grit from, *e.g.*, paper pigment etc. is described. B. M. V.

Separation of dry materials. I. L. BRAMWELL, C. W. HOLMES, and BIRTLEY CO., LTD. (B.P. 439,972, 18.6.34).—The feed of material to a pneumatic shaking table is effected by spraying by means of an air jet so that partial stratification is effected before the material reaches the bed. B. M. V.

Separation of materials according to their specific gravity. F. KRUPP GRUSONWERK A.-G. (B.P. 439,610, 5.4.35. Ger., 6.4.34).—An "air-buddle" comprises one or several stepped air-permeable decks which are reciprocated without differential acceleration in one or both horizontal directions, the upper layer being skimmed off to the next deck and the lower layer removed through suitable apertures. B. M. V.

Jigging machines for concentrating ores and other materials. S. D. WARE (B.P. 438,888, 17.5.34).—A submerged screen is reciprocated vertically by means of jumping cams and horizontally by a face cam, through springs which produce acceleration on the return stroke. B. M. V.

Rotary strainers. ANDALE CO., ASSEES. of D. R. McNEAL (B.P. 440,013, 18.4.35. U.S., 20.4.34).—A sealing ring for the circumference of a rotary screen is described. B. M. V.

Filters. FAIRLEEDE ENG., LTD., and H. D. FRY (B.P. 439,684, 9.6.34).—A zigzag strip of filter medium, too limp to be self-supporting, is supported on tension springs arranged as spokes between inner and outer cylindrical walls, which have no rigid connexion. On causing relative movement of the walls the filter medium is subjected to distortion by shearing and is thus kept clean. B. M. V.

Separator with frothless discharge of the centrifuged substance. RAMESOHL & SCHMIDT A.-G. (B.P. 440,240, 23.5.35. Ger., 28.5.34. Addn. to B.P. 410,445; B., 1934, 609).—Means for reducing the speed of the inner layer prior to entering the skimming device are described. B. M. V.

Mixer. H. E. McCrERY, ASST. to BLAW-KNOX CO. (U.S.P. 1,999,843, 30.4.35. Appl., 9.10.31).—Forms of mixing vanes attached to the interior of a horizontally rotating drum are described. B. M. V.

Kneading or mixing device. W. J. VAN ROSSEM and L. E. HARRISON, ASSTs. to ORAMOLD PRODUCTS CORP. (U.S.P. 1,998,692, 23.4.35. Appl., 10.10.33).—A pump, the piston of which is formed with adjustable apertures, is described. B. M. V.

Liquid and gas separator. M. F. WATERS, ASST. to HANLON-WATERS, INC. (U.S.P. 1,999,950, 30.4.35. Appl., 11.7.33).—A separator embodying trough-shaped vertical baffles is described. B. M. V.

Evaporating apparatus. R. J. SERPAS (U.S.P. 1,996,526, 2.4.35. Appl., 6.8.34).—A bubbling tower is used as an evaporator, adequate heating means being provided in the lower part. B. M. V.

Obtaining cream from rubber latex and other sap or concentrates of particles dispersed in liquids. J. E. NYROP, and KOEFOED, HAUBERG, MARSTRAND, & HELWEG A./S. TITAN (B.P. 439,846, 20.5.35).—A centrifugal separator yielding a viscous lighter product is fed also with a pre-separated quantity of that product to a zone within that occupied by the raw feed. B. M. V.

Aërating a liquid such as cream. HOBART MANUFG. CO., ASSEES. of R. E. STARK (B.P. 440,145, 18.12.34. U.S., 26.12.33).—The cream is mechanically whipped and simultaneously air is injected into the lower part, the air-inlet device comprising a no. of superposed discs with fine radial grooves on their surface. B. M. V.

Apparatus for separating dust from gases. SULZER FRÈRES SOC. ANON. (B.P. 439,618, 30.5.35. Switz., 2.6.34).—The outlet spiral of a centrifugal fan is provided with skimming devices, and the skimmed air is passed through a cyclone or other separator and then through a similar but smaller fan. B. M. V.

Centrifugal apparatus for separation of dust and grit from air and gases. O. B. JACOBSEN, and BUELL COMBUSTION CO., LTD. (B.P. 440,118, 21.6.34).—A cyclone separator comprising a no. of alternate cylindrical and conical sections is provided with linings spaced from the wall at each change of section. B. M. V.

Centrifugal apparatus for (A, B) separating and (A) collecting dust or other solid particles from air or gases. C. H. W. CHELTNAM (B.P. 439,740 and 439,814, [A] 9.6.34, [B] 15.6.34).—(A) Conc. dust-laden air in a cyclone separator is collected from the lower part of the cylindrical wall into a circumferential concentrate chamber, and thence led to a minor cyclone or other separator. (B) In a cyclone separator baffles are provided to prevent formation of vortex rings. B. M. V.

Rotary kilns. Insulating material.—See IX. **Colorimetric determinations. Pyrometers.**—See XI. **Hydrometer.**—See XVII.

II.—FUEL; GAS; TAR; MINERAL OILS.

Volatile matter of Pennsylvania anthracite. H. G. TURNER and W. L. KEENE (Ind. Eng. Chem., 1935, 27, 1373—1376).—Samples of anthracite (ultimate analyses given) have been carbonised by slow heating to 1036° under an initial pressure of < 1 mm. Hg. The yields and composition (75—79% of H₂) of gas are given. The possibility of making commercial H₂ in this way is indicated. D. K. M.

Binding process in the production of brown-coal briquettes without a binding agent. G. WINKLER

(Brennstoff-Chem., 1935, 16, 441—447).—The mechanical strength of brown-coal briquettes produced at a const. pressure passes through a max. as the H_2O content of the coal increases. The max. strength increases and the corresponding H_2O content decreases as the briquetting pressure is raised. In general, the d of the briquettes also passes through a max. as the H_2O content increases, the position of the max. approximating to that of max. strength. The smaller is the particle size of the coal, the stronger are the briquettes. The results are in accord with the Kegel-Fritsche "capillary theory" which attributes the binding action to the expulsion of H_2O from the capillaries under the increased pressure and the subsequent re-absorption, on releasing the pressure, of only part of the H_2O into the original capillaries, the remainder forming thin layers between the previously loose particles, holding them together by surface tension forces. A. B. M.

Carbonisation of coal. Effects of variation of rate of heating during the carbonisation of a typical coking coal. W. B. WARREN (Ind. Eng. Chem., 1935, 27, 1350—1354).—The yields of solid, liquid (tar and liquor), and gas (including free NH_3 and H_2S) obtained by carbonising Pittsburgh coal by heating to 700° at rates of 1.4° and 21.8° per min., and combinations of these, have been determined. The results suggest that the yield of liquid is increased and of solid decreased by rapid heating through the preplastic thermal range; the rate of heating through this range largely determines the composition of the gas, the more rapid rate giving the higher H_2 content. Slow rate of heating in the plastic range gives, and rapid rate in the pre- and post-plastic range tends to give, the harder coke. D. K. M.

Carbonisation of fats by the Bonnevie process. J. BOIZARD DE GUISE (Bull. Soc. d'Encour., 1935, 134, 571—581).—A detailed description of the process (carried out at $\gtrsim 450^\circ/15$ —20 mm. H_2O) is given. Results are given for various fats. The friable semi-coke may be used as pulverised fuel. Distillation of the primary oil gives mainly petrol (yield about 20%) and a gas oil (yield about 50%) which can be used in Diesel engines and is very suitable for aero-engines because of its low f.p. (-50°). J. W.

Removal of hydrogen sulphide from gas by oxidation by active charcoal. S. KAZARNOVSKI and K. PISAREV (J. Chem. Ind. Russ., 1935, 12, 913—921).—25% more O_2 is added to water-gas than is required for the reaction $2H_2S + O_2 \rightarrow 2H_2O + 2S$; NH_3 is added (15% of the wt. of H_2S present), and the mixture is passed through active C (from coke) at a rate and temp. ensuring a temp. of $\lessapprox 115$ — 120° in the reaction zone. The activity of the catalyst in the following layers is lowered by adsorption of H_2O , but this distils off as the reaction zone gradually proceeds through the whole layer of catalyst. The catalyst is reactivated by extraction with 9—18% aq. $(NH_4)_2S$, followed by steam, and the solvent is regenerated by distillation, leaving a residue of S. R. T.

Removal of toxic constituents from gas. A. SANDER (Chem.-Ztg., 1936, 60, 33—36, 55—57).—A review.

Prevention of gas explosions by controlling oxygen concentration. G. W. JONES and R. E. KENNEDY (Ind. Eng. Chem., 1935, 27, 1344—1346).—The min. O_2 concns., determined by the explosion-tube method, which permit flame propagation in mixtures of air and the following gases or vapours using CO_2 and N_2 , respectively, as diluent are: H_2 5.9, 5.0; CO 5.9, 5.6; CH_4 14.6, 12.1; C_2H_6 13.4, 11.0; C_3H_8 14.3, 11.4; C_4H_{10} 14.5, 12.1; C_5H_{12} 14.4, 12.1; C_6H_{14} 14.5, 11.9; C_2H_4 11.7, 10.0; C_3H_6 14.1, 11.9; natural gas 14.4, 12.0 vol.-%. A graph is given of the inflammability of C_6H_{14} in air when mixed with varying proportions of added N_2 and CO_2 . D. K. M.

Sulphur compounds in brown-coal tar. G. FREE (Chem.-Ztg., 1935, 59, 975—977).—The literature on the separation and identification of such S compounds is summarised. A. B. M.

Influence of bitumen addition to tar. BEWERSDORF (Teer u. Bitumen, 1935, 33, 151—157; Road Abs., 1936, 2, No. 689).—With increased % of bitumen in the tar, the compression and tensile strengths of bitumen increased and the penetration decreased. Bitumens of high drop point had the greatest influence. Pure tar specimens increased in strength progressively with time of storage, whilst specimens containing bitumen had higher early strength and penetration vals. T. W. P.

Asphalt. I. Improved ring-and-ball method for determination of softening points of asphalts. Y. UNO and M. ISHIDA (J. Soc. Chem. Ind., Japan, 1935, 38, 658 B).—Advantages of the new method (details not given) are outlined, and results are compared with those from other known methods. D. M. M.

Hydrogenation of high-temperature tar and tar distillates. C. M. CAWLEY (Gas J., 1935, 212, 571—572).—High-temp. tar is less suitable than low-temp. tar for conversion into motor spirit by hydrogenation-cracking under pressure and must be treated in two stages: (A) a liquid-phase treatment of the whole tar, followed by (B) a vapour-phase treatment of the middle oil produced in A. In A, carried out, e.g., at $450^\circ/200$ atm., the catalyst (MoO_3 , $SnCl_2$, etc.) is suspended in the tar; in B (450 — $550^\circ/200$ atm.) the catalyst may be supported on a porous carrier or used in pelleted form, and is maintained stationary while the vaporised material is passed over it. High-temp. creosote can be treated directly in the vapour phase. Some results of the hydrogenation of high- and low-temp. tars, and tar oils, are tabulated. A. B. M.

Occurrence, winning, and utilisation of Estonian shale. K. ANDRÉE (Brennstoff-Chem., 1935, 16, 461—466; cf. B., 1927, 899).—The geology of the Estonian shale deposits is briefly reviewed. Five mines are being worked at present, the greater part of the output, about 300,000 tons per annum, being utilised as fuel in industry and for goods locomotives. Its high ash content, which gives trouble due to dust, and the difficulty of reducing smoke production, with its accompanying unpleasant odour, are disadvantages of its direct use as fuel. Treatment of the shale by low-temp. carbonisation is rapidly being developed; the oil output from this source rose from 6180 tons in 1933 to 13,880 tons

in 1934. Much of this is at present exported to Germany and elsewhere. A. B. M.

X-Ray studies of solid paraffins of Fushun shale oils. I. Methods of procedure. II. Crude fractionation of the raw material. III. Finer fractionation by fractional crystallisation. IV. Comparison of the average mol. wts. obtained by cryoscopic and X-ray methods. I. SAKURADA, K. HUTINO, S. TSUNEOKA, and Y. MATSUSHITA (J. Soc. Chem. Ind., Japan, 1935, 38, 670—671 B, 671—674 B, 674—677 B, 677—678 B).—I. Thin films of paraffin obtained both by melting and by crystallisation from solution were X-rayed parallel, or nearly so, to the plane of the film and measurements of interference taken and compared.

II. The raw material was separated by distillation under diminished pressure and 14 principal and 6 intermediate fractions were obtained. These were divided into sub-fractions by crystallisation, and the latter examined by means of X-rays, the results being tabulated together with m.p.

III. Two of the crude fractions were selected, and each was divided into some 20 sub-fractions by crystallisation from EtOH and each of these was similarly examined.

IV. For a few fractions the mol. wts. were determined by cryoscopic methods in C_6H_6 solution and the average no. of C atoms was compared with that obtained by X-ray methods. The solid paraffins from the Fushun shale oils proved to consist exclusively of normal paraffins. D. M. M.

Hydrogenation of bituminous shales at ordinary pressures. J. BARLOT (Compt. rend., 1935, 201, 1137—1138).—Data are given for distillation range, calorific val., etc. for the products from hydrogenation of various shales at 500—600°/1 atm. in absence of catalyst. H. J. E.

Regeneration of used mineral oils. F. K. MAULER (Petroleum, 1936, 32, No. 3; Motorenbezt., 9, 2—5).—Used oil is thoroughly agitated with conc. H_2SO_4 , decolorised, neutralised by fuller's earth, and filtered. Plant for a continuous process is described. J. W.

Viscosity-temperature relation of Japanese petroleum oils. III—IV. T. KUROSAWA (J. Soc. Chem. Ind., Japan, 1935, 38, 621—622 B; cf. B., 1935, 1125).— η -temp. relations for various lubricating oils show that there is a transition temp. at which $dV/dt = 1$ when V and t are plotted on equal scales. The general equation $V = b/(t^n - a)$ is said to hold, but within the temp. range 10—150° the consts. a , b , and n vary. A relation is also worked out between the η vals. at different temp. D. M. M.

Application of ozone to examination of petroleum products. II. A. V. KIRSANOV, I. M. POLJAKOVA, and J. N. IVASCHTSCHENKO (J. Appl. Chem. Russ., 1935, 8, 1197—1209; cf. B., 1935, 709).—25% of the S content of Tschusov benzine is readily removed by treatment with O_3 , the remainder being more difficultly oxidised; repeated treatment with small quantities of O_3 in low concn. is the most effective. The rate of desulphuration is unaffected by presence of H_2O , CaO , H_2SO_4 , or $K_2Cr_2O_7$. Faragher and Morrell's method for the analysis

of the S-containing constituents of benzine is not applicable to ozonised benzine, as the Na_2PbO_3 adsorbs part of the oxidation products, as well as mercaptans. Ischimbay is more readily desulphurised than Tschusov petroleum, if the H_2S is previously removed. Ozonised benzine does not corrode Cu; its content of tarry matter varies inversely with the S content, attaining vals. of 0.018—0.051% after 12 months. R. T.

Cylinder wear measured by iron content of oil determined by the colorimeter. G. H. KELLER (Auto. Ind., 1935, 72, 484—485).—The oil sample is ashed, leached with HCl, and its Fe content determined colorimetrically with NH_4CNS . CH. ABS. (e)

Oxidation of paraffin. A. K. PLISSOV (J. Appl. Chem. Russ., 1935, 8, 1194—1196).—A reaction vessel is described, by the aid of which it is shown that the rate of oxidation of paraffin oil by air increases with rise in temp. and increase in H_2O content of the air, and in the air-oil interface. R. T.

Benzene in natural gas. H. H. SCHRENK, W. P. YANT, and S. J. PEARCE (U.S. Bur. Mines Rept. Invest. 3293, 1935, 2 pp.).—Two samples of natural gas contained 3 and 18 p.p.m., respectively, of C_6H_6 , as determined by the authors' method (B., 1936, 221). A. B. M.

Spontaneous ignition of petrol and benzene. D. HOLDE (Bull. Assoc. Chim. Sucr., 1936, 53, 30—50).—A summary (cf. B., 1915, 649). J. H. L.

Octane-number improvement in naphtha reforming. S. D. TURNER and E. J. LE ROI (Ind. Eng. Chem., 1935, 27, 1147—1149).—A curve has been drawn from cracking-plant data from which the C_8H_{18} no. of naphtha of the gasoline boiling range reformed by cracking can be obtained from the C_8H_{18} no. of the original naphtha and the amount of cracking, the latter being expressed in terms of equiv. cracking at 482° and obtained from a time-temp. curve on the assumption that the cracking rate doubles for each 13.9° rise in temp. A method of calculating the improvement in C_8H_{18} no. by cracking in a plant of a given size at a given rate is given, and its use as a basis of plant design indicated. D. K. M.

Ignition characteristics of light oil for high-speed Diesel [engines]. K. YAMAZAKI and S. ÔTA (J. Fuel Soc. Japan, 1935, 14, 134—137).—Diesel and ignition indexes have been correlated with calc. cetene nos. for a variety of Diesel fuels and in two cases with indicator diagrams. D. R. H.

Alcohol[petrol] motor fuel. T. SUWA (J. Fuel Soc. Japan, 1935, 14, 129—132).—Additions of EtOH (> 30%) increase the latent heat of vaporisation, decrease power, and raise fuel consumption. These disadvantages may be partly neutralised by advancing the ignition. Owing to improved antiknock properties, high-compression engines are suitable, and with retarded ignition fuel consumption was slightly lowered. Acceleration and startability improve slightly up to 10% of EtOH, and then deteriorate. D. R. H.

Tests of alcohol fuels. S. SAIJÔ (J. Fuel Soc. Japan, 1935, 14, 133—134).—94% EtOH mixed with 10% of

Et_2O showed a fuel consumption $50\% >$ that of petrol, owing to lower calorific val. For blending with petrol the EtOH must be 99.8% pure, and no great difference in behaviour was noted between this mixture and pure petrol. D. R. H.

Volatility of fuels containing ethyl alcohol. V. Total and partial vapour pressures of mixtures of ethyl alcohol and methylcyclohexane. VI. Total and partial vapour pressures of mixtures of ethyl alcohol and *n*-hexane. N. ISII (J. Soc. Chem. Ind., Japan, 1935, 38, 659—661B, 661—664B; cf. B., 1935, 484).—V. Total and partial v.p. for EtOH and methylcyclohexane in mixtures of the two were measured and curves plotted.

VI. Similar measurements were made on EtOH - C_6H_{12} mixtures. In both cases the vals. of the consts. *A* and *B* in the equation $\log P = A - B/T$ are tabulated. D. M. M.

Knock-ratings. I. The [lead tetra]ethyl effect. R. KOBAYASI, M. FURIHATA, and S. KAJIMOTO (J. Soc. Chem. Ind., Japan, 1935, 38, 654—657B).—The antiknock effects of PbEt_4 , C_6H_6 , and EtOH are compared for straight-run and cracked petrols and it is concluded that the reason for all the effects being smaller for cracked than for straight-run petrol is inherent in the main hydrocarbon constituents of the petrols and not due to S compounds or other impurities. The antiknock effect of PbEt_4 on petrol blended with benzol is also considered and the relative ratio between the effects of PbEt_4 and of benzol is calc. D. M. M.

Resin formation in light fuels. R. WELLER (Öl u. Kohle, 1934, 2, 527—531; Chem. Zentr., 1935, i, 2627—2628).—A review of the problem of fuel storage. J. S. A.

Flotation.—See I. Adsorption of PhOH by active charcoal. Nitrotoluenes from gasoline fractions.—See III. Asphaltic road materials. Bitumens for roads.—See IX. Protecting graphite electrodes.—See XI. [Asphalt emulsions for] finishing industries. Asphaltic plastics. Plastics from coal.—See XIII. Determining C_6H_6 in air.—See XXIII.

PATENTS.

(A) Treating the water in coal-washing systems. (B) Discharge and treatment of slurry from the main settling tank of a coal-washing system. B. NORTON (B.P. 440,036 and 440,096, 16.6.34).—The dirty H_2O is settled in a large tank and only the overflow therefrom is clarified, with the aid of reagent if necessary. The clear H_2O is used for sprays or run to waste. All sludge is returned to the coal-treatment plant, or (B) is allowed to settle overnight, then treated for removal of slime, and when it ceases to be high in ash is diverted to a point in the washery where clean fine coal is obtained. B. M. V.

Degasification of coal and other carbonaceous material *in situ*. L. RANNEY, Assr. to J. H. HAYES (U.S.P. 1,992,323, 26.2.35. Appl., 2.9.32. Renewed 16.7.34).—A series of tunnels is made in the coal deposit and sealed off from the air except for an offtake pipe through which the gas evolved is withdrawn, under suction if desired. The coal deposit is then heated,

sufficiently to raise its temp., e.g., by 10° , by introducing hot gas under pressure into an adjacent series of tunnels. A. B. M.

Carbonising retorts for use in coke and gas-producing chamber ovens. C. STILL GES.M.B.H. (B.P. 439,409, 15.5.35. Ger., 16.5.34).—Low- or medium-temp. coke is produced in Fe retorts which are suspended within the coking chambers of a coke-oven battery. The retorts are so designed that they can be charged through the existing charging holes and discharged into the bottom of the coking chambers, whence the coke is removed by the usual pushing machine. A. B. M.

Compound regenerative coking ovens. C. STILL GES.M.B.H. (B.P. 439,474, 19.7.35. Ger., 21.7.34).—A reversing-valve arrangement is described for supplying adjacent regenerators connected to different heating walls with different and appropriate quantities of air when it is desired to supply the adjacent heating walls with different types of gas, e.g., weak or strong gas. A. B. M.

Production of coke, gas, and by-products at low or intermediate temperatures. GAS CHAMBERS & COKE OVENS, LTD., and A. V. KEMP (B.P. 439,034, 21.4.34).—A coke-oven plant comprises a no. of oven chambers on both sides of each of which are hollow heating walls consisting of vertical flues. Combustion takes place, however, not in these flues, but in a parallel series of combustion chambers lying between adjacent heating walls, and therefore not in direct contact with the oven chambers. The hot gases pass from the combustion chambers down the adjacent flues on both sides thereof, and thence to the regenerator or recuperator system. A. B. M.

Treatment of wood for obtaining a dry fuel. R. SPATZ and R. SENNAC (B.P. 438,664, 18.5.34. Fr., 18.5.33).—Wood is carbonised at 280 – 600° , the solid product after cooling is pulverised, mixed with the whole of the condensed liquid products, and the mixture compressed into blocks and coked at 1000° . MeOH and AcOH are recovered from the volatile products of the last operation. A. B. M.

Production of products from coal varieties, tars, mineral oils, and the like. INTERNAT. HYDROGENATION PATENTS CO., LTD., Assees. of I. G. FARBENIND. A.-G. (B.P. 439,265, 27.12.34. Ger., 10.1.34. Cf. B.P. 306,564; B., 1929, 346).—Brown or bituminous coals, tars, etc. are treated with a halogen or anhyd. H halide, or are admixed with solid absorptive material, e.g., the initial material itself, which has been so treated, prior to their destructive hydrogenation under pressure. A. B. M.

Carbon black. P. BURGER (B.P. 438,883, 23.4.34. Ger., 26.4.33).—C black is converted into the form of thin plates similar in shape to fish scales, e.g., by passing it between rollers. Dust formation is prevented, and the material presents no difficulties in working up, or in the prep. of rubber etc. A. B. M.

Treatment of a graphite body. HYGRADE SYLVANIA CORP. (B.P. 439,058, 2.6.34. U.S., 2.6.33).—Synthetic graphite electrodes for electron-discharge tubes are heated at a glowing temp. in an oxidising atm. until substantially all non-graphitised carbonaceous material is removed. A. B. M.

Production of non-poisonous town gas. NON-POISONOUS GAS HOLDING CO., LTD. (B.P. 438,757, 4.1.35. Ger., 4.1.34).—Coal gas or carburetted water-gas having a higher calorific val. than normal town's gas is subjected in one operation to H_2O -vapour catalysis ($CO + H_2O = CO_2 + H_2$), whereby the CO content is reduced to $\geq 1\%$ and the calorific val. and d of the gas produced have approx. the desired vals. without having to remove the CO_2 or to have recourse to a CH_4 synthesis. A. B. M.

Purification of combustible gases, and particularly coal-distillation gases. W. C. HOLMES & CO., LTD., C. COOPER, and D. M. HENSHAW (B.P. 438,734, 2.6.34).—The gas is scrubbed with wash oil at about 0° , the quantity of oil used being sufficient to cool the gas to that temp. and to ensure that the temp. of the oil during $>$ half its travel through the washer is below its mean temp. in the washer. Improved absorption of benzol and of CS_2 is effected. A. B. M.

Cracking coal-tar oils and distillates. J. E. HACKFORD (B.P. 439,036, 29.3.34).—Coal-tar distillates are cracked in the vapour phase at 540 – 650° , and the product, after removal of the motor spirit and of any $C_{10}H_8$ which is produced and/or released during the process, is mixed with the crude stock to be cracked. The $C_{10}H_8$ may be separated by fractionation or other suitable methods; a tar acid or other solvent may be added to prevent the $C_{10}H_8$ from crystallising out during the process. A. B. M.

Tar composition. W. H. KERSHAW, ASSR. to TEXAS CO. (U.S.P. 1,992,752, 26.2.35. Appl., 31.7.31. Can., 22.7.30).—A composition having high ductility combined with quick-setting properties comprises a mixture of coal tar, water-gas tar, etc. with a petroleum pressure tar, i.e., a cracked petroleum residue, which is miscible with the tar and forms stable mixtures therewith in absence of a stabilising agent. A. B. M.

Increasing the viscosity of tars. C. A. AGTHE, ASSEE. of J. R. GEIGY A.-G. (B.P. 438,413 and Addn. B.P. 438,415, [A] 14.5.35, [B] 15.5.35. Ger., [A, B] 16.5.34).—The tar is heated, during or after distillation, with $< 5\%$ of (A) an org. sulphonyl chloride, e.g., cymenesulphonyl chloride, or (B) an org. NO_2 -derivative, e.g., o - $C_6H_3(NO_2)Cl \cdot SO_2Cl$. A. B. M.

Stabilisation of aqueous bitumen emulsions. J. R. GEIGY A.-G. (B.P. 438,162, 20.11.34. Ger., 20.11.33).—A neutral to alkaline solution of a CH_2O -phenol (or substituted phenol) condensation product, e.g., that obtained from dihydroxydiphenylsulphone and CH_2O in alkaline solution, is added to the emulsion. A. B. M.

Production of hydrocarbons by the cracking or destructive hydrogenation of carbonaceous materials. J. Y. JOHNSON. From I. G. FARBEIND. A.-G. (B.P. 439,366, 18.6.34).—Oils substantially free from asphalt, e.g., distillation or hydrogenation products of coals, tars, or mineral oils, are treated with dil. acid under such conditions that the org. N bases are removed but that the unsaturated constituents are unattacked, and the oils are then destructively hydrogenated in presence of suitable catalysts. The yield of light oils and the life of the catalyst are increased thereby. A. B. M.

Recovery of products from [crude] hydrocarbons. J. Y. JOHNSON. From I. G. FARBEIND. A.-G. (B.P. 439,491, 30.5.34).—Cyclic (I) and acyclic dienes, in crude hydrocarbon mixtures or products of cracking processes, are separated by treatment with a p -quinone (II), e.g., α -naphthoquinone, at $< 50^\circ$ (room temp.), (I) forming additive compounds which are anthraquinone derivatives. As different types of (I) react at different rates, separation may be effected by gradual addition of (II). From chloranil (III) and cyclopentadiene (IV) a substance $C_{11}H_6O_2Cl_4$, m.p. 146° , from (III) and methylcyclopentadiene a substance $C_{12}H_8O_2Cl_4$, m.p. 112 – 114° , and from p -benzoquinone and (IV) *biscyclopentadienequinone*, m.p. 155° , are obtained. A. W. B.

Treatment of hydrocarbon oils. A. L. MOND. From UNIVERSAL OIL PRODUCTS CO. (B.P. 439,430, 8.6.34).—Hot residuum from cracking hydrocarbon oils is treated with an alkaline material and a finely-divided metal capable of reacting therewith or with H_2O to form nascent H, e.g., hydroxides, oxides, or carbonates of the alkali or alkaline-earth metals, together with Na, K, Ca, Mg, etc. Unsaturated hydrocarbons are thereby partly saturated, and the resultant mixture is hydrogenated at such temp. and pressure as to give lower-boiling hydrocarbons. C. C.

Purification of hydrocarbon oils. C. W. STRATFORD (B.P. 439,250, 8.6.34).—S compounds are removed from hydrocarbon distillates, e.g., gasoline, by treating the latter in a series of acid contacting stages and separating the acid and oil between each stage by centrifuging. Acid from one stage is used in a previous stage. Finally the oil is subjected to a continuous treatment with doctor solution. C. C.

Production of knock-stable motor fuels. H. E. POTTS. From INTERNAT. HYDROGENATION PATENTS CO., LTD. (B.P. 439,314, 7.8.34).—Middle oils from carbonaceous materials are hydrogenated and simultaneously cracked in presence of catalysts, e.g., sulphides of metals of group VI, at 400 – 430° . Fractions of low antiknock val. boiling at $> 100^\circ$ or, as vapour, at 125° are subsequently dehydrogenated and/or reformed by heating, without a catalyst, at 475 – $560^\circ / > 70$ (> 100) atm. C. C.

CO_2 producer.—See VII. **Bituminous constructional materials.**—See IX. **Phenols from liquors.**—See XXIII.

III.—ORGANIC INTERMEDIATES.

Catalytic reduction of carbon dioxide to methane and higher hydrocarbons at atmospheric pressure. F. FISCHER, T. BAHR, and A. MEUSEL (Brennstoff-Chem., 1935, 16, 466–469).—By passing a mixture of CO_2 and H_2 over a Ru powder or Ru-asbestos catalyst the CO_2 was reduced to CH_4 ; the rate of reduction was measurable at 100° and rapid at 150° . The activity of the catalyst was increased by preheating in air, by pretreatment with $5N$ - HNO_3 , or by conversion into K ruthenate followed by reduction through the black dioxide to the metal. The catalyst was poisoned by H_2S . By using Ru + 2% of K_2CO_3 as catalyst the CO_2 was reduced at 180 – 300° (optimum about 225°) not only to CH_4 , but also to higher gaseous and liquid

hydrocarbons; the life of the catalyst was relatively short, but regeneration could be effected by heating in air (300–400°). The formation of the higher hydrocarbons with the alkaline Ru catalyst proceeds apparently by the intermediate production of CO. A. B. M.

New syntheses of *n*-heptane. N. A. ORLOV, S. A. GLINSKICH, and N. I. IGNATOVITSCH (J. Appl. Chem. Russ., 1935, 8, 1170–1175).—*n*-C₇H₁₆ of high purity is obtained in 8–12% yield by hydrogenation of furylacetaldehyde in xylene (MoS₃ catalyst; 1.5–2 hr. at 200–250°/100 atm.), in 30–35% yield from furylethylcarbinol (7:3 MoS₃-NiO or MoS₂-CoS; 20 min. at 240°/100 atm.), and in 58% yield from COPr^a₂ in decahydronaphthalene (7:3 MoS₃-CoO; 50 min. at 345°/100–200 atm.). R. T.

Chloroalkoxy-derivatives of ψ -butylene as solvents. M. V. LICHOSCHERSTOV and S. V. ALEXEEV (J. Appl. Chem. Russ., 1935, 8, 1226–1236).—A 1:3 mixture of (·CHMeCl)₂ and OR·CHMe·CHMeCl (R = Me, Et, Pr^a, Pr^b, Bu^a, or *iso*-C₅H₁₁) is obtained in 75% yield by chlorinating a mixture of CHMe·CHMe and ROH in aq. NaOH. The products are non-toxic, non-corrosive, and do not readily eliminate Cl; they may be used as solvents for fat and as diluents of cellulose lacquers. R. T.

Application of Denigès' reagent to the determination of *tert*-butyl alcohol in *isopropyl* alcohol. A. G. PUKIREV (J. Appl. Chem. Russ., 1935, 8, 1309–1312).—3 ml. of the reagent (HgO in conc. H₂SO₄) are added to 0.1 ml. of the solution of BuOH in Pr^aOH, and the turbidity or opalescence obtained after 10 min. at 50° is compared with that given by a series of standard solutions. The method is not applicable to concns. of < 0.5 mg.-% of BuOH. R. T.

[Determination of] sulphonated aliphatic alcohols. A. F. KERTESS (Text. Manuf., 1934, 60, 336).—Benzidine hydrochloride reacts with sulphonated aliphatic alcohols in liquors, forming a ppt. which is determined by titration with KOH. Ch. Abs. (p)

Synthesis of esters by dehydrogenation of alcohols at atmospheric pressure. B. N. DOLGOV, M. M. KOTON, and S. L. LETSCHUK (J. Chem. Ind. Russ., 1935, 12, 1066–1073).—Vaporised alcohol is passed over a Cu catalyst at 275°, when 28–44% yields of ester are obtained. The catalyst is most active when deposited on granular C, together with 0.2% of Ce; Ni, Th, La, Zr, U, Y, and V activate to a smaller extent than does Ce. The products of a single passage of EtOH through the catalyst consist of EtOAc (I) 28, MeCHO 15.5, AcOH 5.2, acetal 2.1, BuOAc traces, together with H₂, H₂O, and unchanged EtOH. Repeated passage of the reaction product leads to higher yields of (I) and AcOH, and lower yields of MeCHO; presence of H₂O in the EtOH vapour causes a rise in the AcOH yield at the expense of the (I). Analogous results were obtained using higher alcohols in place of EtOH. The mechanism of the process is discussed. R. T.

Analysis of organic accelerators and antioxidants. I. Colour reaction of antioxidants with concentrated sulphuric acid. H. ENDOH (J.

Soc. Chem. Ind., Japan, 1935, 38, 618–621 B).—The colour reactions of a large no. of commercial antioxidants with conc. H₂SO₄ are recorded and classified.

H. G. M.

Separation and utilisation of *o*- and *p*-nitrotoluene from mononitrotoluene prepared from the gasoline fraction of Syukkôkô crude. II. Preparation of toluidine from nitrotoluene. M. MIZUTA (J. Soc. Chem. Ind., Japan, 1935, 38, 629–630 B).—*o*- (I) and *p*-toluidine can be obtained by reduction (Sn-HCl) of *o*- and *p*-nitrotoluene from Syukkôkô crude with the same yield as from the pure nitrotoluenes, the quality of (I) from the former being superior to that from the latter. H. G. M.

Adsorption of phenol by active charcoals. B. N. RUTOVSKI and N. I. ANTROPOVA (J. Chem. Ind. Russ., 1935, 12, 940–947).—The adsorptive capacity for PhOH in effluent H₂O increases in the order bone < coal < birch < peat C, taking 1 pt. of C to 49 pts. of H₂O at 40°. PhOH is recovered from the saturated C by extraction in the adsorption tube with C₆H₆ (< 30% of the vol. of H₂O previously passed through), and the C is reactivated by passing steam at 170–180° for 1.5 hr.; permanent loss of activity of peat C commences after 11 operations, and much sooner for the other types of C. R. T.

Effect of sulphur on hydrogenation of phenol and tricresol. A. BOGNÁR (Magy. chem. Foly., 1934, 40, 105–112; Chem. Zentr., 1935, i, 2626).—The presence of S during high-pressure hydrogenation leads to more effective action of the catalyst and a higher yield of low-boiling saturated and hydroaromatic hydrocarbons.

J. S. A.

Colorimetric determination of cresols. E. V. ALEXEEVSKI and K. G. TARASOVA (J. Appl. Chem. Russ., 1935, 8, 1313–1318).—The coloration obtained by heating 10 ml. of dil. aq. solution with 3 ml. of Millon's reagent at 100° for 5 min., and filtering, is compared with that given by a standard solution containing equal pts. of *o*-, *m*-, and *p*-cresol. R. T.

Preparation of diphenylthiocarbamide. V. I. KUZNETZOV and P. M. ARONOVITSCH (J. Chem. Ind. Russ., 1935, 12, 953–954).—CS(NHPh)₂ is obtained in 99% yield from CS₂, NH₂Ph, and aq. NaOH when the reaction temp. is < 80°. R. T.

[Preparation of] β -naphthol-1 : 6-disulphonic acid. K. D. SCHTSCHERBATSCHEV (J. Appl. Chem. Russ., 1935, 8, 1216–1220).— β -Naphthol-1 : 6-disulphonic acid (I) is obtained in 90% yield from Schäffer's acid and 20% oleum at 25°, whilst at 45° the products contain R-acid 18, G-acid 42, and (I) 36%; at 60° the corresponding figures are 51, 31, and 15%. (I) yields β -naphthol-6-sulphonic acid when boiled with 30% H₂SO₄ for 1 hr. R. T.

Fluorescence of intermediates.—See IV. MeOH catalyst. —See VII. Corrosion by CH₂Cl-CH₂OH. —See X. Lacquer solvents. —See XIII. Abs. EtOH. —Gluconic acid. —See XVIII. Determining C₆H₆. —See XXIII.

PATENTS.

Refining of halogenated hydrocarbons. BRIT. THOMSON-HOUSTON CO., LTD. (B.P. 440,136, 17.10.34.

U.S., 18.10.33).—The electrical resistivity of chlorinated derivatives of C_6H_6 , Ph_2 , and olefines, used as dielectrics, is increased by contact with or percolation through absorbent material (fuller's earth at 75–100°).

H. A. P.

Manufacture of high-molecular true sulphonic acids. [Textile assistants.] W. J. TENNANT. From HENKEL & Co., G.M.B.H. (B.P. 440,103, 15.6.34).—Higher fatty acid esters of halogeno-alcohols are heated with sulphites. *E.g.*, β -chloroethyl laurate is heated (dry) with Na_2SO_3 and some KI at 150–180° to give β -sulphoethyl laurate, or chloroethyl oleate is heated at the b.p. with Na_2SO_3 and $NaHSO_3$ in aq. EtOH to give the corresponding oleate.

H. A. P.

Manufacture of carboxylic acid [alkyl] esters. W. W. GROVES. From MERRIMAC CHEM. CO. (B.P. 440,363, 28.6.34).—A crude alkyl sulphate, as obtained from an olefine and conc. H_2SO_4 (I), is heated with H_2O (stirring) until wholly hydrolysed to alkyl H sulphate (II), together with some of the corresponding alcohol (III) and (I). The product is then allowed to react with an aq. carboxylic acid and/or an inorg. salt thereof, there being always an excess of (II) or free (I). More (III) may be added to the reaction mixture if required. The ester formed is distilled off (*e.g.*, 94% recovery with EtOAc), together with H_2O and a small amount of ether, and the residual (I) is filtered and conc. for re-use.

E. J. B.

Production of concentrated lower aliphatic acids. BRIT. CELANESE, LTD. (B.P. 439,764, 31.10.34. U.S., 31.10.33).—Apparatus is claimed for continuous or batch operation, in which the dil. acid, *e.g.*, 30–40% aq. AcOH, is fed to an anhyd. salt of the acid, *e.g.*, NaOAc, at an elevated temp. (90–100°) and at such a rate that the salt remains dry throughout. The acid salt produced is then heated at a higher temp. (130–160°) to regenerate the anhyd. acid.

H. A. P.

Manufacture of substituted aldols. I. G. FARBEININD. A.-G. (B.P. 439,195, 1.6.34. Ger., 2.6.33).—A homologue of MeCHO is caused to undergo condensation by treatment with a small amount, *e.g.*, 0.2–2%, of an org. amine or salt thereof with a weak acid, whereby the corresponding aldol is produced (usually in > 90% yield of theory after < 3 days).

E. J. B.

Treatment of mixtures containing dichlorobenzenes. N. BENNETT, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 440,205, 22.6.34).—Mixtures of *o*- (I) and *p*- $C_6H_4Cl_2$ (II) are treated at $\geq 15^\circ$ with $ClSO_3H$. The (substantially) unchanged (II) and the sulphonyl chloride of (I) formed are separated, *e.g.*, by distillation or crystallisation.

E. J. B.

Manufacture of (A) [dihalogeno]diphenylmethane derivatives, (B) 1:4-dihalogenoanthraquinone-2-carboxylic acids. I. G. FARBEININD. A.-G. (B.P. 439,508–9, [A, B] 8.6.34. Ger., 9.6.33).—(A) 4'-Alkyl-diphenylmethane-2-carboxylic acids are treated with halogen or halogenating agents and a catalyst (I) in inert org. solvents. *E.g.*, 4'-methyl-diphenylmethane-2-carboxylic acid is treated with Cl_2 in $C_6H_5Cl_3$ at 20–30° [2% of (I)] or with Br in AcOH at 60° [1% of (I)] to give the 2':5'- Cl_2 , m.p. 135–136°, and 2':5'- Br_2 , m.p. 163–165°, derivatives. (B) 2':5'-Dihalogeno-

benzophenone-2:4'-dicarboxylic acids (prepared by oxidation of the above with alkaline $KMnO_4$) are treated with cyclising agents. *E.g.*, the Cl_2 -compound with weak oleum (1 equiv. of SO_3) at 156° gives 1:4-dichloro-anthraquinone-2-carboxylic acid, m.p. 244–246°.

H. A. P.

Synthesis of phenol. E. I. DU PONT DE NEMOURS & Co. (B.P. 439,056, 28.5.34. U.S., 26.5.33).— C_6H_6 and a slight (*e.g.*, 5%) mol. excess of SO_3 , both dissolved in liquid SO_2 , are added at approx. equal mol. speeds with stirring to a relatively large vol. of liquid SO_2 . The SO_2 is then distilled off from the $PhSO_3H$ formed, and the Na salt of the latter fused with NaOH. Acidification (SO_2) yields $PhOH$ (75–85%, on the C_6H_6). E. J. B.

Production of resorcinol. E. I. DU PONT DE NEMOURS & Co. (B.P. 439,053, 28.5.34. U.S., 26.5.33).— C_6H_6 is monosulphonated with SO_3 in liquid SO_2 at 10–35° in a sealed vessel. Sufficient further SO_3 to effect disulphonation is then added, the SO_2 distilled off, and the reaction completed at 100°. The product is neutralised and converted into *m*- $C_6H_4(OH)_2$ by alkali fusion; wasteful excesses of H_2SO_4 are thereby avoided.

A. W. B.

Production of aromatic hydroxy-compounds. J. Y. JOHNSON. From I. G. FARBEININD. A.-G. (B.P. 439,356, 2.6.34).—O-free aromatic compounds, *e.g.*, $PhCl$, $PhMe$, are treated with O_2 , in proportions above the upper explosion limit, in absence of oxidation catalysts at $> 500^\circ$ (650–750°). Cyclic operations are preferable.

A. W. B.

Manufacture of [5- and 8-]nitro-[α -]naphthylamines. IMPERIAL CHEM. INDUSTRIES, LTD., and H. H. HODGSON (B.P. 439,632, 11.5.34).— α -Naphthylphthalimide or its derivatives having NO_2 or Cl in the phthaloyl nucleus are nitrated (HNO_3 , *d* 1.45, at $< 15^\circ$), the product is hydrolysed (conc. aq. NH_3 at 120°), and the nitronaphthylamines are separated by crystallisation of their sulphates.

H. A. P.

Manufacture of substituted acid amides. I. G. FARBEININD. A.-G. (B.P. 439,807, 12.6.34. Ger., 13.6. and 18.11.33).—Quaternary salts of arylenoxazoles are hydrolysed with aq. alkalis; alternatively, the hydrolysis is effected with an alkali alkoxide and the acetal produced is further hydrolysed with acids. *E.g.*, 1-ethylbenzoxazole methosulphate is warmed with Na in abs. EtOH and the solution is acidified; *o*-propion-methylamidophenol is pptd. Other examples are the butyryl, palmityl, hexahydrobenzoyl, furoyl, and Ac, m.p. 151°, derivatives of *o*-OH- C_6H_4 -NHMe, 2-acetmethylamido- α -naphthol, m.p. 195°, and 4-chloro-2-acetmethylamidophenol, m.p. 161–162°. H. A. P.

Manufacture of hydroxy-compounds of the anthrapyrimidine series. J. Y. JOHNSON. From I. G. FARBEININD. A.-G. (B.P. 439,944, 31.1.35).—Anthrapyrimidines are heated with H_2SO_4 ($\leq 85^\circ$ at $> 90^\circ$) in presence, if desired, of H_3BO_3 . The residues replaceable by OH are H, halogen, and diazo. *E.g.*, 1:9-anthrapyrimidine (20 pts.) is converted by 96% H_2SO_4 (200 pts.) and H_3BO_3 (10 pts.) at 180–200° into the 4-OH-compound; the Cl-derivative of 5-amino-1:9-anthrapyrimidine, similarly, gives 5-aminohydroxy-1:9-anthrapyrimidine. OH-compounds are similarly

prepared from chloro-4-amino-, 5-amino-, dichloro-4-hydroxy- [chlorodihydroxy-, m.p. 333—335° (decomp.)], dichloro-5-amino- [chloro-5-amino-hydroxy-, m.p. 293°], 5-cyano- (hydroxy-1 : 9-anthrpyrimidine-5-carboxylic acid), and 5-amino-PyC-phenyl-1 : 9-anthrpyrimidine, 1 : 9 : 5 : 10-anthradihydropyrimidine, and 1 : 9-anthrpyrimidine-5-, -8-, and mixed -6- and -7-diazonium sulphates (OH-compounds, m.p. 272—274°, 230—231°, and 228—230°, respectively). H. A. P.

Manufacture of nitrogenous condensation products. COVITS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 439,380, 10.9.34).—Allophanyl chloride (I) is condensed with carboxyamides (ureas, urethanes), in presence of acid-binding agents or Cu salts if desired. The products are in most cases cyclised to triazine derivatives by alkaline condensing agents. *E.g.*, (I) and NH_2Bz in PhCl at 80—90° give benzoylbiuret, m.p. 214—215°, cyclised by warm aq. NaOH to 2-phenyl-4 : 6-diketo-1 : 3 : 5-triazine. Other examples are: *p*-chlorobenzoyl-, m.p. 216°, and cinnamoyl-biuret m.p. 218—219°; allophanylphenylurea, m.p. 196—197° (decomp.), and allophanylurethane, m.p. 189—190° (decomp.). H. A. P.

Manufacture of alkylated iminazoles of high mol. wt. SOC. CHEM. IND. IN BASLE (B.P. 439,261, 11.12.34. Switz., 15.12.33 and 16.11.34).—An aryleneiminazole (other than a benz- or naphth-iminazole having a μ -substituent (of $> \text{C}_3$) is treated with an alkylating agent or an alkylene oxide having $\leq \text{C}_7$. The products may be converted into quaternary salts and/or sulphonated. Examples are: 2-methyl-3-dodecyl-, -cetyl- (ethochloride; *Na* sulphonate), -octadecyl-, and -octadecenyl-, -stearylethyl-, -octadecylthioethyl-, and 2-phenyl-, 2-hydroxymethyl-, and 2-methoxymethyl-3-dodecyl-benziminazole hydrochlorides; 2-ethyl-3-octylbenziminazole hydrobromide; dodecyl 2-methylbenziminazolyl-3-acetate hydrochloride (2-methylbenziminazole and $\text{CH}_2\text{Cl}\cdot\text{CO}_2\cdot\text{C}_{12}\text{H}_{25}$ at 170—175°); 2-methylbenziminazolyl-3-acetmethyl-dodecylamide and 2-ethylbenziminazolyl-3-acetdodecylamide hydrochlorides, and *Na* 2-ethylthiol-3-dodecylbenziminazole-sulphonate. H. A. P.

Manufacture of [hetero]cyclic amines. SOC. CHEM. IND. IN BASLE (B.P. 439,722, 24.11.34. Switz., 25.11.33 and 30.6.34).—Reactive esters of *n*- ω -amino- or -alkylamino-alcohols having a chain of $\leq \text{C}_6$ are heated (in dil. solution) in an org. or aq. org. solvent or in an aq. solution of an org. hydrotropic salt. *E.g.*, a dil. ethereal solution of *o*-bromopentadecylamine (I) is boiled; cyclopentadecamethyleneimine (II), m.p. 48—49°, is formed. Other solvents used are aq. $\text{MeOH}\cdot\text{EtOH}$, Bu_2O , aq. BuOH , and aq. NaOBz ; alkalis may be added to take up HBr . Other examples describe the prep. of the *N*-*Me* derivative, b.p. 102—104°/0.1 mm. (hydrochloride, m.p. 215°; picrate, m.p. 94°), of (II), cyclo-octamethyleneimine, b.p. 70°/20 mm. (picrate, m.p. 148—149°, and -hexadecamethyleneimine, m.p. 59°, b.p. 126°/0.2 mm. (I) (hydrobromide, m.p. 158°) is prepared by hydrolysis ($\text{HBr}\cdot\text{AcOH}$) of *o*-bromopentadecylphthalimide, m.p. 69—70° (K phthalimide and $\alpha\text{-C}_{15}\text{H}_{30}\text{Br}_2$), and its *N*-*Me* derivative from its *p*- $\text{C}_6\text{H}_4\text{Me}\cdot\text{SO}_2$ compound. θ -Bromo-octyl-, m.p. 56°, and π -bromohexadecyl-phthalimide, m.p. 75°, and the respective

amines (hydrobromides, m.p. 145° and 164°), are described. H. A. P.

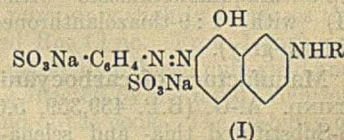
Manufacture of organic cyanogen compounds [cyanohydrins]. E. I. DU PONT DE NEMOURS & Co. (B.P. 439,054, 28.5.34. U.S., 26.5.33).—See U.S.P. 1,984,415; B., 1935, 1130.

Products from crude hydrocarbons.—See II. Dioxazine-dye intermediates.—See IV. Washing, and cleansing, preps. Treating waxes etc.—See XII. Phenols from liquors.—See XXIII.

IV.—DYESTUFFS.

Fast direct-cotton dyes. K. ODA (J. Soc. Chem. Ind., Japan, 1935, 38, 658 B).—Primuline when diazotised (ice-cooling) and coupled in alkaline solution with Orange II affords a red direct-cotton dye, fast to light and unaffected by acids. It can be used for animal and vegetable fibres. H. G. M.

Substantivity [of dyes]. E. SCHIRM (J. pr. Chem., 1935, [ii], 144, 69—92).—Chain-like structure, colloidal properties, and bipolarity are not the essential factors for the occurrence of substantivity in a dye. All substantive dyes contain a polymembered system of conjugated double linkings and the residual valencies, usually occurring at the ends of unsaturated systems, are the cause of substantivity. Only when the chain is sufficiently long are the forces sufficiently powerful to cause this effect (≤ 8 double linkings) and they then cause also the colloidal properties. In the simplest benzidine dyes a chain of 8 conjugated double linkings is present. The diminishing substantivity in the cases of J -, γ -, and H -acid is traced to the presence of 3 conjugated double linkings in series, 3 double linkings in which the central one is crossed, and 3 in which two are crossed, respectively. Similar considerations are applied to the oxazole, thiazole, and iminazole series. Enhanced substantivity caused by introduction of Bz is explained by the assumption of the enolised form $\text{NHBz} \rightarrow \text{N}:\text{CPh}\cdot\text{OH}$ and that due to carbamide formation to the presence of $\text{R}\cdot\text{N}:\text{C}(\text{OH})\cdot\text{NHR}$. Weakening or destruction of substantivity is caused by $\cdot\text{SO}_3\text{H}$ or, sometimes, NO_2 if SO_3H (NO_2) is attached to those C rings which, together with $\text{N}:\text{N}$ groups and auxochromes, form the activating system of conjugated double linkings. In every substantive dye it is essential that a certain portion of the complex of conjugated double linkings should be free from "disturbing" groups. Test of the hypothesis is applied by synthesis of a series of dyes of type (I); substantivity is strong when $\text{R} = \text{CHPh}\cdot\text{CH}\cdot\text{CO}$, or $\text{CHPh}\cdot\text{CH}\cdot\text{CH}\cdot\text{CH}\cdot\text{CO}$, very feeble when $\text{R} = \text{Bz}$, and is absent when $\text{R} = \text{CH}_2\text{Ph}\cdot\text{CH}_2\cdot\text{CO}$. Cinnamoyl- H -acid exceeds J -acid in substantive power. Substantivity combined with good fastness to acid and alkali is conferred by the introduction of $\text{CHPh}\cdot\text{CH}\cdot\text{CO}$, $\text{CHPh}\cdot\text{CH}\cdot\text{CH}\cdot\text{CH}\cdot\text{CO}$, or other unsaturated aliphatic, alicyclic, or fatty-aromatic residues into the free NH_2 of basic dyes such as rosaniline, safranin, etc. and dibasic acid radicals (fumaric, muconic) can be applied



similarly. The favourable action of basic at. groups on substantivity is attributed to the feebly acidic character of cellulose.

H. W.

Recent developments in dyestuffs. R. F. THOMSON (Chem. & Ind., 1936, 86—89).—A lecture, dealing with vat dyestuffs of the anthraquinone series.

Fluorescence of synthetic dyestuffs and of intermediates. M. P. MOUGEOT (Rev. Gén. Mat. Col., 1936, 40, 1—11).—The various forms of photoluminescence and theories of their mechanism are described. Certain dyestuffs and intermediates which exhibit strong fluorescence are listed and suggestions made for using this property in technical analysis.

S. M. N.

PATENTS.

Manufacture of dyes of the dioxazine series and of intermediates therefor. I. G. FARBERIND. A.-G. (B.P. 437,283, 26.4.34. Ger., 26.4.33).—Chloranil or other *p*-benzoquinone compound is condensed with an amine of a trinuclear ring-compound (other than anthracene) having no cyclic N, with or without an oxidant, a metal chloride, or an acylating agent, at $> 120^\circ$; the product may be sulphonated. The reaction may be effected in two stages by condensing at $< 120^\circ$ and subsequently heating in a high-boiling solvent at $> 120^\circ$. Products are thus obtained from 2-aminofluorene (violet), 2-aminodibenzfuran (reddish-violet), 3-aminophenanthrene (bluish-violet), and amino-dibenzdioxan (bluish-violet).

C. H.

Manufacture of vat dyes of the anthraquinone series. J. Y. JOHNSON. From I. G. FARBERIND. A.-G. (B.P. 436,951, 16.4.34).—2- β -Anthraquinonylanthraquinone-oxazoles, -thiazoles, or -iminazoles, carrying NH_2 in at least one anthraquinone nucleus, are acylated with cyclic carboxylic chlorides or bromides. Examples are: 2-(1':4'-diamino-2'-anthraquinonyl)- $\beta\beta$ -anthraquinoneoxazole (I) with BzCl (blue); the 1':5'-(NH_2)₂-compound with BzCl (ruby-red); 2-(1':4'-diamino-2'-anthraquinonyl)- $\beta\beta$ -anthraquinoneiminazole with anthraquinone- β -carboxylic chloride (grey); corresponding $\alpha\beta$ -anthraquinonethiazole with BzCl (bluish-green); (I) with 1:9-thiazolanthrone-2-carboxylic chloride (bluish-grey).

C. H.

Manufacture of carbocyanine dyes. I. G. FARBERIND. A.-G. (B.P. 439,359, 5.6.34. Ger., 10.6.33).— δ -Substituted thia- and seleno-carbocyanines are prepared, in presence of an alkaline condensing agent, from an α -methyl-thiazolium or -selenazolium salt and a carboxylic acid amide, which has ≤ 2 C atoms and its amido-group substituted or unsubstituted. The substituted acid amides, $o\text{-OH}\cdot\text{C}_6\text{H}_4\cdot\text{NMe}\cdot\text{CR}\cdot\text{O}$, obtained by fission of 1-substituted benzoxazolium salts, are particularly suitable, especially when acetalised. E.g., $o\text{-NaO}\cdot\text{C}_6\text{H}_4\cdot\text{NMe}\cdot\text{CET}(\text{OEt})_2$, from 1-ethylbenzoxazole methomethylsulphate and NaOEt , reacts with 1-methylbenz-thiazole (or -selenazole) ethiodide to give 2:2':8-triethylthia- (or -seleno-)carbocyanine iodide. 1-Propyl-, 1-pentadecyl-, 1-cyclohexyl-, and 1-furyl-benzoxazole methomethylsulphates are similarly ruptured and the products similarly employed to give, respectively, 2:2'-diethyl-8-propyl-, -8-pentadecyl-, -8-cyclohexyl-, and -8-furyl-thia- (or -seleno-)carbocyanine iodide. Where the 8-substituent

is a higher alkyl group, the dyes possess abnormally high solubility in org. solvents.

F. M. H.

Pulverising device [for dyes etc.].—See I.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

What is cotton? W. K. FARR and S. H. ECKERSON (Text. World, 1936, 86, 74).—Photomicrographs are given showing the progressive freeing of the cellulose from pectic binding substances in cotton fibres and its ultimate resolution into chains of spherical particles by treatment with HCl and suitable staining agents (Ru-red for pectic substances; $\text{H}_2\text{SO}_4 + \text{I}$ for cellulose).

A. J. H.

Manufacture of artificial wool. F. OHL (Kunstseide, 1935, 17, 78—82; Chem. Zentr., 1935, i, 2624).—A cellulose fibre is coated with a solution of primary cellulose acetate (I). On rapid hydrolysis a non-homogeneous surface of more or less hydrolysed (I), resembling the surface of wool, is given to the fibre.

J. S. A.

Recent analytical methods with special applications in textile analysis. I. W. GROTE (Amer. Dyestuff Rep., 1936, 25, 14—16 p).—A review, with special reference to micro- and p_H methods.

A. J. H.

Determination of stiffness in individual yarns. I. J. SAXL (Text. Res., 1936, 6, 152—156).—A horizontal loop of yarn is attached by its free ends to one end of a horizontal pivoted rod which carries at the other end a pointer which moves over a graduated scale; the rounded extremity of the loop is attached to one arm of a balance. Such apparatus allows measurement of the force necessary to remove any degree of deflexion of the loop of yarn, and load-deflexion curves are given for various types of viscose- and acetate-rayon yarns. Acetate yarn is less difficult to bend than is viscose yarn. The loading and unloading curves do not coincide, and this hysteresis indicates that an appreciable amount of work is expended in producing internal structural changes during bending.

A. J. H.

Determination of cellulose. A. I. LIUTENBERG and E. A. MIRER (J. Appl. Chem. Russ., 1935, 8, 1184—1193).—The "cellulose" extracted by the Henneberg-Stohmann method is of variable composition; the Kürschner-Hanak method (B., 1931, 44) is preferred.

R. T.

Nitration of cellulose by nitrogen pentoxide vapour. R. DALMON (Compt. rend., 1935, 201, 1123—1124).—A 99.3% yield of pure cellulose trinitrate was obtained by the action of excess of N_2O_5 vapour on cotton (5 g.), previously dried in vac. over P_2O_5 .

H. J. E.

Physical heterogeneity of cellulose nitrates, and the properties of fractions prepared from them. I. Z. ROGOVIN and S. GLAZMAN (J. Appl. Chem. Russ., 1935, 8, 1237—1247).—Commercial cellulose nitrate (I) may be separated into three chief fractions by fractional pptn. from COMe_2 . Fractions A and B account for about 90% of the (I), and have the same N content, whilst fraction C has a smaller N content, and more disintegration products. The structural η of conc. solutions of A is $>$ that of B, but the sp. η vals. do not differ significantly; the η of the original (I) is determined by A. Cellulose regenerated from A exhibits

less destruction than does that from *B*. The films given by (I) and by fractions *A* + *B* are of approx. the same strength. R. T.

Viscose. LXII. Use of diaphragm caustic soda in its manufacture. G. KITA [with T. SUDA and F. MATSUBARA] (*J. Soc. Chem. Ind., Japan*, 1935, **38**, 665—666 B).—Comparison of viscose made with electrolytic NaOH manufactured by the diaphragm process with silk made by using NaOH free from NaCl shows the presence of 2–3% of NaCl to be without detriment.

J. S. A.

Rapid determination of the viscosity of cellulose in cuprammonium solution. K. FABEL (*Kunstseide*, 1936, **18**, 5–7).—A cuprammonium solution (*C*) is prepared by neutralising, by addition of aq. NH_3 , a solution containing 65 g. of $\text{CuSO}_4 \cdot \text{H}_2\text{O}$ followed by the addition of 10 g. of NaOH, filtering the resulting ppt. of $\text{Cu}(\text{OH})_2$ and washing it until free from SO_4^{2-} , and then dissolving it with 1000–1050 c.c. of aq. NH_3 (*d* 0.900) and adding 2 g. of glucose as a stabiliser; the solution is adjusted to contain 12 g. of Cu and 200 g. of NH_3 per litre. Analytical methods are described. 0.5 g. of cellulose is dissolved in *C* within 5–10 min. and its η determined by its rate of flow through a U-shaped viscosimeter at 20°. A determination can be made within 1 hr.

A. J. H.

Suitability of rayon for motor-tyre yarns. A. B. SHEARER and H. HEGAN (*Silk J. & Rayon World*, Jan., 1936, **12**, 38–39).—Viscose-rayon yarn is suitable because it is free from fibre movement and slippage owing to the great length of its individual filaments, and especially because, unlike cotton yarn, it increases in strength by heating and drying (as the tyre becomes hot). A 260-denier viscose tyre yarn had tensile strengths of 2.7, 3.0, 3.33, and 3.5 g. per denier at R.H. 70, 40, 20, and 0%, respectively. Ordinary viscose yarns have 20% extensibility and a tensile strength of 2.1 g. per denier.

A. J. H.

Factor of cellulose quality. O. P. GOLOVA (*Iskusst. Vokn.*, 1934, **5**, No. 8, 52–53).—Russian pulp for viscose has more ash (with Cu and Fe) than have foreign products. Fe and Cu are determined by dipping pulp sheet in 5–6% HNO_3 , drying, and immersing in 8–10% aq. $\text{K}_4\text{Fe}(\text{CN})_6$ for 3–4 min. Blue and red spots are counted.

Ch. Abs. (p)

Pulping hemp chaff by the cold process. N. V. GOLUB and A. I. LURE (*Bumashn. Prom.*, 1935, **14**, No. 1, 56–61).—The chaff is macerated with CaO , $\text{CaO} + \text{NaOH}$, NaOH , and $\text{NaOH} + \text{Na}_2\text{S}$ with 8 pts. of liquor at 15–90°. The half-stuff is briquetted at 75 atm. pressure, and dried at room temp.

Ch. Abs. (p)

Improved wood pulping by the Sudakovprocess. (i) I. E. SCHTSCHEGLOV. (ii) O. E. JOFFE (*Tzent. Nauch.-Issledov. Inst. Bumashn. Prom. Mat.*, 1934, No. 3, 27–61, 62–72).—Preliminary technical details are described.

Ch. Abs. (p)

Properties and sulphate-pulping characteristics of compression wood. M. Y. PILLOW and M. W. BRAY (*Paper Trade J.*, 1935, **101**, TAPPI Sect., 361–364).—The physical and chemical characteristics of

compression wood (formed on the lower side of leaning trees, underside of branches, etc.) of loblolly pine are described, and the properties of sulphate pulp made from such wood are compared with those of pulp made from normal wood. The yield of pulp is smaller (42.4% against 48.5% for normal wood), its folding and tearing strengths are lower (owing to the much higher % of short fibres), and it hydrates more rapidly. Among chemical tests, both total cellulose and α -cellulose contents are about 7% lower, whilst the lignin content is about twice as high and the colour is darker, both of these properties contributing to the higher bleach consumption. Cuprammonium η is only half that of pulp from normal wood. Microscopical differences are also described.

H. A. H.

Production of beechwood pulp by the sulphite process. H. G. KLEIN and E. KURZHALS (*Zellstoff u. Papier*, 1935, **15**, 486–487).—Under the correct conditions of cooking, beechwood furnishes a sulphite pulp which may be satisfactorily bleached, but special care must be exercised in the barking in order to avoid the presence of shives. Owing to its denseness, initial impregnation of the wood is slow, but this does not appreciably lengthen the time of cooking as compared with spruce, since the rate of rise of temp. is greater and the total cooking period shorter (about 14 hr. for an easy-bleaching pulp). 1.1% CaO content of the liquor is sufficient to produce satisfactory results under suitable cooking conditions.

D. A. C.

Production of sulphite pulp with liquor contaminated with selenium. E. HÄGGLUND, C. H. BÄCKSTRÖM, M. KARANOVIĆ, L. RUNQUIST, and O. VINCENT (*Zellstoff u. Papier*, 1935, **15**, 482–486; 1936, **16**, 12–15).—The effect of small quantities of Se on the stability of sulphite cooking liquors and on the production and properties of the pulp are investigated. A large no. of curves are given. The stability of the liquors under cooking conditions increases with increase in base content, and the generation of H_2SO_4 is at the same time reduced. 0.5 mg. of Se per litre of liquor had no effect on its stability. 1 mg. per litre, provided that the liquor is chemically pure, only slightly decreases the pulp yield, strength, and Roe Cl no. From 1 to 2 mg. of Se per litre, however, markedly reduced pulp yield and strength, the latter being affected by the rapid evolution of H_2SO_4 towards the end of the cook. The stability of the commercial liquors and consequently the pulp yield and strength are reduced by much smaller quantities of Se, owing to the presence of terpenes, sugars, and many unknown substances which act as catalysts; 0.4 mg. of Se per litre in presence of 0.3 vol.-% of turpentine is sufficient to have very detrimental effects on the pulp. Recovered liquor is thus less stable than tower acid.

D. A. C.

Increased save-all recovery with chemical control [in paper manufacture]. A. R. BECHTEL (*Paper Trade J.*, 1936, **102**, TAPPI Sect., 1–5).—The method of coagulating, on a laboratory scale, the fine fibre in the back- H_2O , using a small % of hydrated CaO or other alkali, is described, whereby, by p_{H} control, the content of the supernatant liquid, after only 30 min. sedimentation, was reduced (in one case) from 539 to

76 p.p.m. The optimum p_H for such recovery depends on the alum content of the back- H_2O . H. A. H.

Production of paper from waste tanbark oak.

(i) A. O. GILLER. (ii) Y. MARSCHAK (Tzent. Nauch.-Issledov. Inst. Bumashn. Prom. Mat., 1934, No. 3, 72—93, 93—122).—The material yields low-grade paper, even if pulp is mixed with 40% of pine pulp. Sulphate is preferable to sulphite-pulping. CH. ABS. (p)

Sulphate pulping of waste tanbark oak for production of high-grade paper. I. A. MEDVEDEV (Tzent. Nauch.-Issledov. Inst. Bumashn. Prom. Mat., 1934, No. 3, 122—137; cf. preceding abstract).—Material from which fine bark waste is screened out is cooked with 30% alkali at 5 atm. for 5 hr. or at 8 atm. for 4 hr. Multi-stage bleaching gives best results. Printing paper is prepared from the pulp mixed with pine pulp. CH. ABS. (p)

Chalk as a [paper] filler. P. ZOROV (Bumashn. Prom., 1935, 14, No. 1, 33—43).—Results of practical trials with a variety of papers are described, and compared with those in which kaolin is used. CH. ABS. (p)

Effect of loading on the fastness to light of coloured papers. S. PESTALOZZI (Zellstoff u. Papier, 1935, 15, 496—498).—The influence of different fillers on the fastness to sunlight of paper containing different yellow dyes is investigated. The fastness depends on the degree of reactivity of dye and loading, which is considered to be catalytic, but the fading of some acid-sensitive dyes may be accelerated by decrease in p_H , especially when using alkaline fillers. In most cases chalk, talc, blanc fixe, and china clay had very little effect, whereas Ti-, satin-, and Zn-white produced appreciable fading. D. A. C.

Retention of pigments in paper. J. H. HASLAM and F. A. STEELE (Paper Trade J., 1936, 102, TAPPI Sect., 22—25).—The retention of fillers in paper is due to filtration effects, coflocculation, and mechanical attachment. Comparative tests made on the British pulp-evaluation machine, mostly with ZnS as filler, show that the filtration effect is very small and that mechanical attachment accounts for about 45% of the pigment retained under laboratory conditions (estimated as $\approx 30\%$ under commercial conditions with recirculating white- H_2O). This is directly measurable by redispersing the formed sheet, and repeatedly stirring and draining until no further removal of pigment is effected. Much of the mechanically attached pigment is inside the fibre. Coflocculation is the most important mechanism in filler retention. A special cell containing a capillary tube, fitted as a microscope extension, is described, whereby the course of coflocculation can be observed under varying p_H and velocity of flow conditions. Such factors as degree of beating, basis wt., consistency, drainage time, and addition of starch and of alum are investigated. H. A. H.

Burst, tensile, and stretch tests [for paper]. J. D'A. CLARK (Paper Trade J., 1936, 102, TAPPI Sect., 26—28).—It is proposed that the speed of the moving jaw and/or the wt. of the pendulum of the Schopper tensile-testing machine should be adjusted to cause rupture of the paper strip to occur between 10 and

30 sec. from the time of application of the load, and that the rate of application of pressure in the Mullen bursting test should be such that the burst occurs in 2.0 sec. (± 0.2 sec.), or if the bursting pressure (B) is > 50 lb./sq. in., within 0.2 sec. of $B/30$ sec. H. A. H.

Tensile and bursting tests [for paper]. R. C. GRIFFIN and R. W. MCKINLEY (Paper Trade J., 1936, 102, TAPPI Sect., 20—21).—Where great accuracy is required, Clark's recommendations (see preceding abstract) should be followed. H. A. H.

Surface changes of paper during printing.

S. V. UTSCHASTKINA and V. J. MATVEEV (Zellstoff u. Papier, 1935, 15, 494—496).—The ability of rag (linen) (I), bleached (II) and specially purified sulphite papers (III) to elongate on soaking in H_2O , and shrink on air-drying are investigated by cutting sheets by means of a template and measuring the length changes in both directions. In general, (I) showed lesser changes than (II) and (III). Rise in the drying temp. in each case markedly increased both elongation and shrinkage of (II) and (III), whereas addition of loading decreased them. 3% of resin size gave the smallest changes. Elongation of (III) increased on beating much more rapidly than that of (II), but its shrinkage on drying remained practically unchanged. (II) changes least when it is rapidly beaten to 50—52° S.R. The stretch of both (II) and (III) after soaking was very sensitive to changes in the humidity of the conditioning atm. before soaking. D. A. C.

Determination of the acidity and alkalinity of paper. K. BERNDT (Zellstoff u. Papier, 1935, 15, 487—491; 1936, 16, 15—18).—Different methods of p_H measurement are described and their results compared. Their application in the paper-mill laboratory and usefulness as mill-control methods are discussed. The need for standardised conditions is indicated in a comparison table which shows that Tödt's surface-indicator method (suitable for white or lightly-coloured papers only) gives lower results than do extraction methods, and titration after 1 hr. hot extraction gives higher results than 24 hr. cold extraction. The effects of p_H on ageing, and of external influences altering the p_H of paper, are reviewed. Wulff's membrane colorimeter, having an accuracy of 0.1—0.2 p_H and a range of 1.4—12.6, is held to be generally very useful since it is equally applicable to turbid and coloured liquids. D. A. C.

Al_2O_3 [for paper].—See VII. Lignin in wood. **Wood mannan.**—See IX. **Bronze joints for Cu [pulp digesters].**—See X. **Plastics from wood-pulp waste.**—See XIII.

PATENTS.

Manufacture of highly acetylated cellulose. CELLULOSE ACETATE SILK CO., LTD., D. HAYES, H. WOOD, and F. TAYLOR (B.P. 439,245, 30.5.34).—After pretreatment at a relatively high temp. (85—90°) with sufficient $AcOH$ for saturation, the cellulose is drained and acetylated with Ac_2O in presence of a small quantity of H_2SO_4 and the min. amount of anti-solvent, e.g., C_6H_6 . The unstable sulphuric esters are then removed by controlled hydrolysis in a medium, e.g., $C_6H_6 + AcOH$

+ H_2O , which keeps the fibres in a swollen condition and avoids hydrolysis or ripening of the cellulose acetate. F. R. E.

Saponification of organic esters of cellulose. BRIT. CELANESE, LTD., R. W. MONCRIEFF, and F. B. HILL (B.P. 440,034, 16.6.34).—The materials are treated with an org. base (aq. NH_2Me), in presence of an accelerator (Cu salt) if desired, until $\frac{1}{2}$ Ac per $\text{C}_6\text{H}_{10}\text{O}_5$ unit remains. The desired hydrolysis is then completed by treatment with aq. NaOH . F. R. E.

Manufacture and treatment of cellulose derivatives. BRIT. CELANESE, LTD. (B.P. 440,075, 2.3.35. U.S., 2.3.34).—Cellulose esters, before or after stabilisation, are freed from heavy-metal compounds by immersing for some time in a cold, dil., aq. solution of KCN , NaCN , or NH_4CN , and afterwards washing free from cyanide. F. R. E.

Utilisation of cool gases in connexion with the manufacture of artificial filaments. BRIT. CELANESE, LTD. (B.P. 438,923, 1.2.35. U.S., 8.2.34).—In the dry-spinning process, the cooled evaporative medium from which the solvent has been recovered is employed to cool fresh air by indirect heat exchange with H_2O , which also serves to moisten the air so that it can be used as a conditioning medium. F. R. E.

Production of crêped or crisped artificial yarns. ZELLSTOFFFABR. WALDHOF, and H. RADESTOCK (B.P. 439,341, 27.2.35. Ger., 9.7.34, 19.12.34, and 17.1.35).—Crêping is produced during spinning by a rapid succession of extensions and shortenings of the winding stretch, i.e., the distance of the moved winding-on device from the nearest thread-feed member. The crêped thread is then after-fixed in an acid bath (5–7% H_2SO_4), and washed and dried before further treatment. F. R. E.

Treatment of materials comprising filaments, threads, ribbons, and the like of organic esters of cellulose. BRIT. CELANESE, LTD., R. W. MONCRIEFF, and F. B. HILL (B.P. 438,877, 21.2.34).—Materials which have been stretched and/or twisted under the influence of steam or hot H_2O (cf. B.P. 438,584–91; B., 1936, 142) are non-superficially hydrolysed to a small extent (3–6%) by means of an aq. liquor of low alkalinity (NaOH + gelatin, Na silicate, aliphatic mono- or di-amines). The treated materials show improved handle. F. R. E.

Treatment of artificial filaments, threads, yarns, fabrics, and the like. H. DREYFUS (B.P. 439,235, 28.2.34).—Materials composed of cellulose-derivative yarns which have been crêpe-twisted and/or stretched in presence of steam or hot H_2O (cf. B.P. 437,019, 438,584–91, 438,654–6; B., 1936, 95, 142) are subjected to a mild treatment with solvents, swelling or softening agents, which may be of low volatility and/or softening power or may be rapidly removed by washing so that the filaments are not completely penetrated. F. R. E.

Production of foils and like planiform structures from formylcellulose. WOLFF & Co. KOMM. GES. AUF AKT. (B.P. 439,793, 14.6.35. Ger., 16.6.34).—The formylating mixture containing HCO_2H (I), dehydrating agent (ZnCl_2), H_2O -insol. plasticiser, and formylcellulose, preferably with some free OH groups

to lower the ϵ , after pouring to give the desired structure, is freed wholly or partly from (I) by evaporation at $< 70^\circ$ and then coagulated. In order to diminish ϵ further, a small quantity of a H_2O -sol. substance (glycerin) may be added to the formed materials before drying. Apparatus is claimed. F. R. E.

(A) **Finishing of [viscose] artificial silk.** (B) **Manufacture of [finished] viscose artificial silk.** I. G. FARBENIND. A.-G. (B.P. 439,743 and 439,816, [A] 13.6.34, [B] 15.6.34. [A, B] Ger., 28.7.33).—Spun threads which have been de-acidified and, if desired, after-finished on the spool are (A) dried, drawn off, and thoroughly wetted, (B) drawn off without drying and then twisted to form a self-supporting winding or a cake, which is finally after-treated, if not previously done, and dried. F. R. E.

Papermaking. [Imitation hand-made paper.] W. P. McCORKINDALE, and AMER. WRITING PAPER CO., INC. (B.P. 439,012, 27.3.35. U.S., 4.4.34).—Means of forming paper sheets under suction on a perforated member, and of transferring them to carriers where they are dried by heat are claimed. The deckle-edge of hand-made paper is thus simulated. H. A. H.

Manufacture of tissue paper. K. and R. VON CSIPKAY, F. and E. MIKULECZKY, and L. VON PIETTE-RIVAGE (B.P. 439,024, 6.7.35. Czechoslov., 21.12.34).—2–3% of natural or artificial rubber, together with a vulcanising agent and/or accelerator, is incorporated in the fibrous furnish for the manufacture of tissue paper intended for crêping or coating, whereby a high wet strength is conferred on the resulting paper, which also remains flat under widely varying humidity conditions. H. A. H.

Production of a mirror polish on paper, fabric, and similar material. ATLAS AGO CHEM. FABR. A.-G. (B.P. 439,460, 10.4.35. Ger., 12.5.34).—Highly-calendered paper is coated with a fusible material (e.g., wax, resin, rubber), then with a layer of heat-resistant varnish, and finally heated by lightly pressing against a mirror-polished cylinder. D. A. C.

Manufacture of artificial leather. N. V. VEREENIGD INDUSTRIEEL BEZIT No. 7 (B.P. 439,108, 22.5.34. Ger., 20.5.33).—A loosely-coherent fleece of cellulose fibres, after boiling with aq. NaOH , is sprayed with an adhesive (rubber dispersion free from fillers) to cause the fibres to stick together without diminishing their permeability, and is then impregnated with a non-viscous dispersion of rubber containing fillers so that the final product contains 38–60% of rubber. After drying, the material is calendered and vulcanised. F. R. E.

Manufacture of artificial leather. A. BÜNGER, C. A. VORSTEHER, JUN. and SEN. (VEREIN. SCHNÜRRIEMEN-WERKE VORSTEHER & BÜNGER) (B.P. 439,340, 22.2.35. Ger., 22.2.34).—Fibre fleece is impregnated with an aq. rubber dispersion while being alternately compressed and relieved from pressure in rapid succession. After coagulation of the rubber, the H_2O is removed from the material by pressure or drying. F. R. E.

Manufacture of nitrocellulose. E. I. DU PONT DE NEMOURS & Co. (B.P. 440,203, 21.6.34. U.S., 21.6.33).—See U.S.P. 1,965,577; B., 1935, 351.

Crimping or serrating textile fibrous material. LINEN INDUSTRY RES. ASSOC., J. A. MATTHEW, and H. R. NEILL (B.P. 439,741, 12.6.34).

Fireproofing materials. Finishing (etc.) cellulose hydrate films etc.—See VI. **Plastic compositions. Moulded fibrous materials.**—See XIII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Silk-processing developments during 1935. ANON. (Silk J. & Rayon World, Jan., 1936, 12, 40—41).—Bleaching, degumming, and dyeing processes are reviewed. A. J. H.

Influence of bleaching and dyeing conditions on light-fastness of dyed cellulose acetate matt silk. J. ROLLAND (Rev. gén. Teint., 1934, 12, 927—929; Chem. Zentr., 1935, i, 2444).—All traces of SO_2 , used, e.g., for removing MnO_2 formed in the KMnO_4 bleach, must be destroyed. $\text{H}_2\text{C}_2\text{O}_4$ is suitable for removing MnO_2 . H. J. E.

Progress in the dyeing of wool piece goods. W. JAECK (Textilber., 1936, 17, 54—58).—The most suitable dyes for dyeing various shades on wool, wool + Vistra (staple viscose fibre), and wool + acetate rayon materials are specified. A. J. H.

Dyeing of wool yarn in yellow and green shades fast to light and sea-water. L. JACKEL (Textilber., 1936, 17, 49).—Suitable yellow, blue, and green dyes are described. A. J. H.

Dyeing of half-wool materials with Immedial [sulphur] dyes. R. HAYNN (Textilber., 1936, 17, 58—60).—Immedial dyes (I. G.) (a new range of stabilised preps. containing the leuco-derivatives of S dyes) are especially suitable for dyeing in fast shades the cellulose fibre (e.g., cotton or viscose rayon) in half-wool materials since they can be applied without adversely affecting the wool from a cold bath containing $\geq 2\%$ of Na_2CO_3 and $\geq 5\%$ of NH_3 ; Na_2SO_4 is added to aid exhaustion. In dyeing very dark shades (e.g., black, navy-blue, and brown) the further addition of 5—10 g. of Protectol II N per litre is recommended. The wool is dyed before or after with suitable acid or Cr-mordant dyes. Numerous dyeing recipes are given. A. J. H.

Dyeing of astrakhan. C. T. CHOLSTRON (Silk J. & Rayon World, Jan., 1936, 12, 39).—Methods and suitable dyes for woven and knitted astrakhan fabrics containing wool, viscose rayon, and cotton are briefly described. A. J. H.

Mordanting and dyeing processes. XXIV. **Dyeing of weighted and unweighted natural silk.** E. ELÖD and N. BALLA (Monatsh. Seide Kunstseide, 1935, 40, 57—61; Chem. Zentr., 1935, i, 2734).—The dye taken up depends on the p_H , part of the basic groups of the silk appearing to become reactive only at high p_H . Difficulties in dyeing weighted silks in weak acid baths are attributed to alkaline components of the weighting material. H. J. E.

Dyeing of felt for insulating purposes. G. RICE (Text. Colorist, 1936, 58, 29—30).—Dyeing methods, using direct cotton dyes and neutral-dyeing acid dyes, are described for felts which consist of wool + cotton and wool + flax noils. A. J. H.

Dyeing and finishing of corset fabric. S. FOULTON (Text. Colorist, 1936, 58, 25—26).—The usual kiering and chemicking processes are used for preparing for dyeing the jean and nankeen cotton fabric which is usually employed for corsets. Dyeing is effected by padding with direct dyes which are fast to perspiration (e.g., Benzo Fast Copper dyes). In finishing, the fabric is filled with a paste containing, per 20 gals., wheat starch (5 lb.), farina (4.5), and china clay (18).

A. J. H.

Developments in the application of sulphur dyes. J. L. CRIST (Amer. Dyestuff Rep., 1936, 25, 11—13p).—The production of bronzy shades when dyeing cotton with blue S dyes is prevented by adding to the dye liquor (prepared in the usual manner with Na_2S and NaOH) $\text{Na}_2\text{S}_2\text{O}_4$ (0.25 to 0.33, on wt. of dye) or NaHSO_3 (0.5%); the resulting shade also has increased depth (due to lowering of the p_H of the dye liquor with consequent better dye exhaustion) and brightness. For exhausting S-dye liquors, $(\text{NH}_4)_2\text{SO}_4$ has much greater efficiency than NaCl , but the resulting shades are duller and NH_3 and H_2S are liberated. NaHSO_3 is nearly as efficient as $(\text{NH}_4)_2\text{SO}_4$, but has not its disadvantages. Oxidation of the dye on the fabric during dyeing is much retarded by the addition of glucose to the dye liquor. A. J. H.

Behaviour of aromatic oxygen carriers in aniline-black dyeing. E. JUSTIN-MUELLER (Textilber., 1936, 17, 75—76).—It is confirmed that a Sunder and Lantz process in which 0.05 pt. of NaNO_2 is added to 185 pts. of a "prussiate" aniline-black padding liquor allows 20% less NH_2Ph to be used without decrease in the intensity of the resulting black shade. Also, the fabric is black instead of the usual dark green colour as it emerges from the ager. These results are explained by assuming the formation of aminoazobenzene in the padding liquor and its subsequent oxidation to amino-azoxybenzene, which reacts with NH_2Ph forming aniline-black. The catalytic action of $p\text{-C}_6\text{H}_4(\text{NH}_2)_2$ is also explained by formation of an intermediate azoxy-compound. A. J. H.

Colorability of Bemberg and rayon silks with substantive and indanthrene dyes. H. SPEIER (Kunstseide, 1935, 17, 54—59; Chem. Zentr., 1935, i, 2601).—The white content, colour, and lustre for rayon silk are in general $>$ for Bemberg silk. Colour is higher but lustre figures are lower for substantive than for indanthrene dyes. J. S. A.

Measurement and specification of colour-tolerance for dyed textiles. R. D. NUTTING (Amer. Dyestuff Rep., 1936, 25, 1—4, 24).—Exact data and numerous colour curves are given showing the colour differences, as measured with the Hardy recording photo-electric spectrophotometer using a MgO standard, between cotton and wool fabrics dyed commercially satisfactorily at different works to match the same patterns. It is suggested that tolerance limits in matching should be established and adopted in the dyeing industry. A. J. H.

Printing of cotton. S. I. PARKER (Amer. Dyestuff Rep., 1936, 25, 6—10p).—Methods and machinery used

are outlined; the prep. of a printing roller is described in detail. A. J. H.

Warp sizing [of cotton yarns]. P. SEYDEL (Dyer, 1936, 75, 21, 22, 70—71).—The selection and blending of the size ingredients are discussed in relation to the natural fats, waxes, and nitrogenous contents of raw cotton. The prep. of flour-starch sizes is described. A. J. H.

Sizing, desizing, and degumming [of textiles] with enzymes. J. EVANS (Text. Manuf., 1934, 60, 330—331).—Use of malt, pancreatic, and bacterial diastases is described. CH. ABS. (p)

Testing of waterproof impregnated textiles. BUNDESMANN (Textilber., 1935, 16, 128—131; Chem. Zentr., 1935, i, 2752).—Apparatus and a method of measuring absorbed and transmitted H_2O are described. H. J. E.

Determination of degree of mercerisation. L. P. MICHEL (Rev. gén. Teint., 1934, 12, 495—499, 593—597, 679—683, 745—749; Chem. Zentr., 1935, i, 2752).—A comprehensive review. H. J. E.

Improvised electric dryer for dyed samples. H. L. BOSDON (Dyer, 1936, 75, 23—24). A. J. H.

PATENTS.

Dyeing. IMPERIAL CHEM. INDUSTRIES, LTD., J. G. EVANS, H. A. PIGGOTT, and C. S. WOOLVIN (B.P. 437,273, 19.4.34).—Dyeings on cellulosic, wool, and/or silk textile materials are treated with a dil. anthraquinone solution of a ternary sulphonium or quaternary PH_4 salt, containing an alkyl $> C_9$ to improve fastness. C. H.

Dyeing of cellulose esters and ethers. IMPERIAL CHEM. INDUSTRIES, LTD., L. P. RENDELL, and H. A. THOMAS (B.P. 437,274, 20.4.34).—The material is first mordanted with an anthraquinone solution of a quaternary NH_4 or PH_4 or ternary sulphonium salt carrying a saturated or unsaturated aliphatic chain $> C_9$, e.g., $C_{18}H_{37}NMe_3SO_4Me$, cetylpyridinium bromide, $(C_{16}H_{33})_2NMe_2Br$, or $C_{16}H_{33}SMe_2SO_4Me$, and then dyed with a direct, acid, or chrome dye. C. H.

Production of [dyed] artificial materials. BRIT. CELANESE, LTD. (B.P. 439,260, 29.10.34. U.S., 27.10.33).—A solution of a cellulose ester or ether containing a dye of the Nigrosine or Induline type, which has previously been refluxed with alcoholic NaOH, is formed into the required shape. F. R. E.

Dyeing of animal fibres. J. W. LEITCH & CO., LTD., A. E. EVEREST, and J. A. WALLWORK (B.P. 437,049, 18.5.34).—The materials, dyed by coupling the fibre with suitable diazo compounds, are treated with warm aq. solutions of compounds of Cr, Cu, Ni, and/or Co, rinsed, and dried. The colour is thereby altered. Examples are: silk dyed with diazotised 5-nitro-o-anisidine (yellow), coppered (brown); wool with β -diazonaphthalene (orange-brown), chromed (dark brown). C. H.

Dyeing or printing of animal fibres. J. Y. JOHN-SON. From I. G. FARBENIND. A.-G. (B.P. 439,675, 12.3.34).—Dyeing or printing is carried out in presence of quaternary PH_4 or ternary SH_3 compounds having at least one aryl radical or alkyl radical of $< C_6$, e.g.,

$SMeEt-C_{16}H_{32}-SO_4Me$. The agent may be used as a pretreatment agent or added to the dyebath or printing paste (+ a dispersing agent). It is claimed that the process allows the use of less acid with complex metal compounds of acid wool dyes. H. A. P.

Development of dyeings on the fibre. DEUTS. HYDRIERWERKE A.-G. (B.P. 439,135, 21.9.34. Ger., 21.9.33).—Increased fastness in dyeings effected by coupling on the fibre is obtained if the end-component contains acid groups and the coupling component contains quaternary NH_4 groups, or vice versa. The end- and coupling components need not both be dyes, and the quaternary NH_4 groups may, preferably, be greater in no. than the acid groups. An example is Primuline $\rightarrow p-CH_2Ac \cdot CO \cdot NH \cdot C_6H_4 \cdot NMe_3 \cdot SO_4Me$. 19 other examples are given. A. W. B.

Mercerising liquors. J. R. GEIGY SOC. ANON. (B.P. 439,436, 5.9.34. Ger., 7.9.33).—Improved wetting agents for alkaline baths are prepared from a *p*-cymene-sulphonamide (I), a mono- or di-carboxylic acid of a mono- or poly-cyclic terpene, and a "solution promoter," e.g., PhOH or homologues, EtOH, or a sulphonated oil. In some cases a small amount of a C_6H_6 hydrocarbon, preferably *p*-cymene (II), may be added. E.g., 15 g. of a mixture of bornylenecarboxylic acid 5%, (I) 10%, crude cresol 74.68%, EtOH 10%, and (II) 0.52% is used per litre of NaOH (*d* 1.26), and will wet raw cotton in a few sec. E. J. B.

Obtaining effects or designs on yarns, threads, or fabrics composed of or containing cellulose esters or ethers. L. S. E. ELLIS. From SOC. POUR LA FABR. DE LA SOIE ARTIF. "RHODIASETA" (B.P. 439,124, 30.5. and 20.8.34).—The destruction of ethers or esters of cellulose, in admixture with cellulose or other fibres, is effected by treatment with org. peroxides, e.g., Bz_2O_2 , which may be applied in printing pastes, and heating, e.g., at 115°, or steaming. A. W. B.

Manufacture of dressed textile materials. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 439,294, 4.6.34).—Fabrics are treated (for 10—15 min.) with an alkaline, neutral, or feebly acid solution of an aldehyde corresponding to an aliphatic multivalent carboxylic acid or polyhydric alcohol, e.g., glyoxal (15%) neutralised by $BaCO_3$, or as $NaHSO_3$ compound, and are then squeezed and heat-treated at 70—120° to yield a soft, crease-resisting material. E. J. B.

Removal of size dressing and the like from textiles. RÖHM & HAAS A.-G. (B.P. 439,398, 22.3.35. Ger., 22.3.34).—In the desizing of materials by steeping (at 45—55°) in pancreatic amylase solution, the addition of small amounts of H_2O -sol. (Na or K) chromate or dichromate promotes the action and increases heat-resistance. They also act as disinfectants by preventing souring of the bath by micro-organisms and do not form ppts. with the usual Ca salts of the size. E. J. B.

Treatment of fibrous materials for rendering them impermeable to liquids and fireproof. BRICK TRUST, LTD., Assees. of Y. A. R. LEROY (B.P. 440,026, 15.5.34. Fr., 16.5.33).—Paper etc. is impregnated (a) with an insol. salt of a higher fatty acid, e.g., Zn stearate, by pptn., and (b) at 30—75° (50°), i.e., at a temp. at

which the latter loses its H_2O -repelling properties, with a fireproofing solution (10%) comprising borax 1, Na_3PO_4 5, $(\text{NH}_4)_2\text{HPO}_4$ 2, Na_2WO_4 1.5, and POCl_3 [treated with NH_3 to yield $\text{PO}(\text{NH}_2)_3$] 0.5%, in H_2O 90%, which also contains a protein substance (gelatin) that is subsequently hardened *e.g.*, by CH_2O . The resulting materials are fire-, gas-, and liquid-proof. E. J. B.

Manufacture of textile fabrics coated or impregnated with polymerisation products. W. W. GROVES. From DEUTS. CELLULOID-FABR. (B.P. 439,884, 7.6.34. Addn. to B.P. 437,604; B., 1936, 110).—Vinyl chloride, polymerised alone or with an acrylic acid derivative (other than a salt), is applied as in B.P. 437,604 (*loc. cit.*) to textile fabrics to produce stiff materials. E. J. B.

Treatment [weighting] of artificial filaments, yarns, ribbons, and similar materials. BRIT. CELANESE, LTD., D. FINLAYSON, and C. E. STAFFORD (B.P. 439,203, 2.6.34).—Materials composed of org. derivatives of cellulose, while in swollen condition, are allowed to absorb a weighting substance from a liquid medium and simultaneously stretched. It may be incorporated in one or two stages; in the latter case the swelling agent (*e.g.*, HCO_2H) is added to the first component (*e.g.*, SnCl_2) and the stretched materials are then treated with the second component (*e.g.*, Na_3PO_4 , with or without NaOH) and simultaneously or subsequently hydrolysed. F. R. E.

Finishing and softening of cellulose hydrate films, foils, and the like. DEUTS. HYDRIERWERKE A.-G. (B.P. 439,084, 31.1.35. Ger., 31.1. and 31.3.34).—Impregnation with aq., alcoholic, or aq.-alcoholic solutions of esters or ethers, which may contain NH_2 -groups, of glycerol or cyclic ethers containing OH groups and/or O atoms in the ring, *e.g.*, $\text{CH}_2(\text{OMe})\cdot\text{CH}(\text{OH})\cdot\text{CH}_2\cdot\text{OH}$, $\text{CH}_2(\text{OC}_2\text{H}_5)\cdot\text{CH}(\text{OH})\cdot\text{CH}_2\cdot\text{OH}$, furfuryl alcohol, furfuryl Me ether, is claimed. The hygroscopicity which is characteristic of glycerol finishes is thereby eliminated. A. W. B.

Treatment of [knitted] fabrics [to facilitate rolling]. BRIT. CELANESE, LTD., A. F. GUYLER, and W. H. BOALER (B.P. 439,181, 30.5.34).

Manufacture of [perforated] air-porous water-proof fabrics. DUX CHEM. SOLUTIONS CO., LTD., and C. J. HEALEY (B.P. 438,891, 18.5.34).

Textile assistants.—See III. Washing, and cleansing, preps.—See XII. Plastic compositions.—See XIII.

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

Washing out Gay Lussac towers in the tower sulphuric acid process. G. F. FROLOVA and F. A. KUZJAK (J. Chem. Ind. Russ., 1936, 12, 921–923).—Directions are given for washing out the choked towers without interrupting the process as a whole, and a balance of the losses involved is given. R. T.

Mechanism of sulphuric acid formation in the lead-chamber process. A. ABEL (Oesterr. Chem.-Ztg., 1936, 39, 2–5).—The yields of N_2O and NO in the reaction between SO_2 and HNO_2 have been studied as

functions of concn. N_2O is formed especially at higher $[\text{SO}_2]$ and $[\text{HNO}_2]$ and constitutes the loss of catalyst in the Pb-chamber process. It is suggested that the initial reaction is $\text{SO}_2 + \text{HNO}_2 = \text{SO}_3 + \text{HNO}$, followed by decom. of the HNO into N_2O and H_2O or its reaction with HNO_2 to form NO and H_2O , according to the $[\text{HNO}_2]$. J. W. S.

Preparation of chemically pure hydrochloric acid. T. V. POLJANSKI (J. Chem. Ind. Russ., 1935, 12, 924–926).—Aq. HCl containing HCl 37.95, $\text{SO}_4^{''} < 0.0002$, $\text{SO}_3^{''} < 0.0006$, $\text{Cl}_2 < 0.002$, Fe 0.000025, and As 0.000005% is prepared by passing the HCl successively through conc. HCl , active C at room temp., and then at 250–300°, active C wetted with conc. HCl , C at room temp., and finally absorbing in H_2O . R. T.

Rapid gravimetric determination of silicic acid. N. A. TANANAEV and M. K. BUTSCHKOV (Z. anal. Chem., 1935, 103, 349–353).—Glass, clay, and similar materials are fused with NaKCO_3 , and the melt is chilled as a thin layer by pouring it out on a polished steel surface. The melt is dissolved in conc. HNO_3 and the insol. SiO_2 collected, gelatin being added to assist filtration. Limestone etc. is treated with HNO_3 , the insol. residue being then fused with NaKCO_3 and treated as above. J. S. A.

Siderite as a basic material for the catalytic synthesis of ammonia. J. A. FELDMAN, K. N. IVANOV, and A. I. NAUMOVA (J. Chem. Ind. Russ., 1935, 12, 1036–1038).—Siderite (I) yields as active catalysts as does magnetite. No advantage is gained by purifying the (I), or by adding MgCO_3 . R. T.

Quality of lime [most suitable] for preparation of bleaching powder. M. E. POZIN (J. Chem. Ind. Russ., 1935, 12, 926–932).—The active Cl content is not significantly affected by the presence of up to 7% of excess H_2O in the $\text{Ca}(\text{OH})_2$ (I), or by a deficit of 1%; an excess of 0.5% is preferable for technical reasons. The rate of sedimentation of (I) suspensions falls with time after slaking, so that the best conditions for chlorination are attained by storing the (I) for some days before use. R. T.

Chemical utilisation of potash salts. B. WAESER (Chem.-Ztg., 1936, 60, 93–96).—A review.

Production of hydrated sodium silicates and dry silicate paints. B. I. GRIBOV and V. G. AUGUST (Za. Lako. Ind., 1934, No. 2, 26–33).—Stable granulated Na_2SiO_3 (15–30% H_2O) was obtained by evaporating waterglass of d 1.45, and by centrifugal atomisation at 70° at the top, and at 45° at the bottom, of the dryer. Paints were obtained by mixing the hydrated Na_2SiO_3 with pigments and fillers. CH. ABS. (e)

Improvement of superphosphate. P. A. BARANOV (J. Chem. Ind. Russ., 1935, 12, 932–936).—The quality of superphosphate is greatly improved by mixing in 5–10% of bone meal, or, to a smaller extent, of phosphite meal; the advantages claimed are higher assimilable P_2O_5 content, reduction of excess acidity, and better keeping properties. R. T.

Physical and chemical properties of superphosphate in connexion with drying. P. A. BARANOV and P. A. RUZANOV (J. Chem. Ind. Russ., 1935, 12, 1054–1057).—Drying at 400° for 3 min. with intensive

mixing gives a drier product than at 150° for 10 min.; the fall in assimilable P_2O_5 is the same in both cases. A satisfactory product is also obtained by drying at 400° for 0.5 min. R. T.

Determination of iron and aluminium oxides in natural calcium phosphates. H. TERLET and A. BRIAU (Ann. Falsif., 1935, 28, 605—608).—Fe and Al phosphates are completely pptd. from slightly acid (AcOH) solution at 60—70°. The ratios $Fe_2O_3 : P_2O_5$ and $Al_2O_3 : P_2O_5$ in the ppt. = 1.1 approx. The method is applicable to material of low Al content. SiO_2 and F compounds interfere and must be removed. E. C. S.

Preparation of magnesium and barium fluorides. N. S. NIKOLAEV and S. M. KAMORGORODSKI (J. Chem. Ind. Russ., 1935, 12, 1047—1050).—Products of the approx. composition $NaF.MgF_2$ are obtained from aq. $MgCl_2$ and suspensions or solutions of NaF, at temp. of from 20° to the b.p. In presence of 1—5% H_2SO_4 the MgF_2 content of the ppt. attains 85%, whilst when NaF suspension is added to aq. Na_2CO_3 the ppt. contains MgF_2 67 and Na_2CO_3 33%. 90% MgF_2 is obtained from HF and $MgCO_3$ or MgO . Aq. BaS and NaF yield 92—97% BaF_2 . R. T.

Utility of [calcium] carbide residue. J. T. DONAHOE (Amer. Welding Soc. J., 1935, 14, 25—28).—The residual $Ca(OH)_2$ has a specially fine particle size. Advantages of its use for mortar and plaster whitewash, plant and tree sprays, and for miscellaneous agricultural purposes are reviewed. CH. ABS. (e)

Sulphatising action of chlorine on mixtures of copper sulphate, oxide, and sulphide with ferric oxide. D. M. TSCHISHIKOV and G. S. BALICHINA (J. Chem. Ind. Russ., 1935, 12, 1038—1041).—Oxidation by Cl_2 of sulphide-S to SO_4^{--} in Cu_2S-CuO mixtures is catalysed by Fe_2O_3 at 100—300°, and inhibited at > 100° by anhyd. $CuSO_4$. The SO_4^{--} content of roasted pyrites is increased 50—85% by chlorination before extraction. R. T.

Properties of the methyl alcohol catalyst copper-zinc oxide-chromic oxide. D. A. POSPECHOV (Mem. Inst. Chem. Ukrain. Acad. Sci., 1935, 2, 157—173).—The catalyst (60 : 35.6 : 4.4 Cu-ZnO- Cr_2O_3) is highly active for 1 : 2 CO- H_2 mixtures at 192—230°/100 atm. At high rates of flow and at 200—300° the ZnO undergoes reduction, yielding Cr_2O_3 impregnated with brass; the condensate contains little MeOH, the yields of which rise with diminishing rates of flow. The results suggest that a higher Cu content is indicated, in order to prevent local overheating of the catalyst, with its consequent inactivation. R. T.

Extraction of manganese from ores by chemical means. A. V. KIRSANOV and J. V. KLIMENKO (J. Appl. Chem. Russ., 1935, 8, 1152—1156).— SO_2 is passed to saturation through a suspension of the powdered ore, converting the MnO_2 into MnS_2O_6 , which is changed into $MnSO_4$ by adding fresh ore; MnO present is dissolved by the H_2SO_4 produced to yield also $MnSO_4$. The $MnSO_4$ is pptd. by aq. NH_3 , the ppt. of $Mn(OH)_2$ is collected, and residual Mn is pptd. as $Mn(OH)_3$ by aerating the solution. The filtrate is conc., when $(NH_4)_2SO_4$ crystallises out, and Ni and Co remain in

the mother-liquor. 90—95% of the Mn content of the ore is recovered by the above process. R. T.

Extraction of feldspar from German rocks by flotation. H. ZIERGIEBEL (Keram. Rundsch., 1935, 43, 3—5; Chem. Zentr., 1935, i, 2577).—To separate feldspar from mica and SiO_2 , which behave similarly towards flotation, selective grinding based on their varying hardness is employed. The optimum particle size is 60—100 μ . J. S. A.

Lepidolite as commercial product. ANON. (Ind. chim., 1935, 22, 91; Chem. Zentr., 1935, i, 2868).—Analyses of French lepidolites are cited in connexion with the growing use of Li in the glass, enamel, and ceramic industries. J. S. A.

Use of alumina from nephelite products under industrial conditions. V. A. GRABOVSKI and M. V. MURETOV (Tzent. Nauch.-Issledov. Inst. Bumashn. Prom. Mat., 1934, No. 3, 3—9).—Refined nephelite tailings from the production of apatite, when treated in the cold with 2N- H_2SO_4 for 1 hr., yielded 17—18% of Al_2O_3 (H_2SO_4 consumption 0.9 ton of 100% H_2SO_4 per ton of tailings). The product gave good results in paper-sizing. CH. ABS. (e)

Preparation of cryolite from solutions of sodium fluoride and aluminium fluoride. V. S. JATLOV and E. M. KORZON (J. Chem. Ind. Russ., 1935, 12, 1050—1054).— Na_2SiF_6 is added to 20% aq. Na_2CO_3 at 100°, and the ppt. of SiO_2 is collected and washed, when the filtrate + washings contain 98% of the F originally introduced. Cryolite is obtained by adding microcryst. AlF_3 to the aq. NaF at 55—60°. The ppt. contains about 1% of SO_4^{--} , not totally removed by six washings. R. T.

Preparation of zirconium dioxide from Chibin eudialites. V. E. TISCHTSCHENKO and A. P. SIDORKINA (J. Appl. Chem. Russ., 1935, 8, 1117—1125).—Eudialite concentrate is extracted with 7.5—10 pts. of 40—50% H_2SO_4 at 150°, and 1.5 times the amount of H_3PO_4 theoretically required to ppt. $ZrO(H_2PO_4)_2$ (I) is added; Ti is not pptd. unless < 300 g. of H_2SO_4 are present per g. of TiO_2 . (I) is collected, washed with 5% HCl, dried at 90—100°, and fused with Na_2CO_3 [4 mols. per mol. of (I); 1 hr. at 1000°]. The melt is leached with boiling H_2O , and the ppt. of ZrO_2 is washed and calcined. The extract, containing Na_3PO_4 , is returned to the process. R. T.

Applicability of potentiometric titration to the separate determination of the various oxides of vanadium in ores. V. E. LEVENSON and A. T. KORTSCHMAREV (J. Appl. Chem. Russ., 1935, 8, 1291—1303).—The possibility of the potentiometric titration of the components of a mixture containing V^{II-V} , U^{IV} , U^{VI} , Ti^{III-IV} , Fe^{II-III} , Zr^{IV-V} , and Ce^{III-IV} is demonstrated. The procedure suggested is, in general, applicable to all systems such as the above. R. T.

Development of the mineral wool industry in America. C. F. FRYLING and O. WHITE (Chem.-Ztg., 1936, 60, 38).—The nature, composition, properties, applications, and manufacture of the wool are described and discussed; the costs of the product and of the

necessary plant, the nature of the raw and accessory materials, and the power consumption are indicated.

I. A. P.

Preparation of hydrogen and hydrogen-nitrogen mixture by the explosive oxidation of methane. N. I. KOBOZEV, J. S. KAZARNOVSKI, and L. I. KASHTANOV (J. Chem. Ind. Russ., 1935, 12, 1030–1036).—The product of explosion of 1:1 O_2 - CH_4 mixtures contains equal vols. of CO and H_2 , and gives, when converted, 2.32 vols. of H_2 per vol. of CH_4 taken. 1:3 N_2 - H_2 mixtures are obtained by performing the reaction with 3:2 O_2 - N_2 mixture, and the energy liberated by the explosion suffices for its prep. from air. The composition of the reaction product corresponds to that which would be expected for the equilibrium mixture, on thermodynamic grounds.

R. T.

"I-S" diagrams for hydrogen, carbon monoxide, nitrogen, nitrogen + hydrogen, and carbon monoxide + hydrogen. N. I. GUELPERINE and I. M. NAIDITCH (Chim. et Ind., 1935, 34, 1279–1288; cf. B., 1936, 18).—The diagrams for the systems N_2 , $N_2 + 3H_2$, and $CO + 2H_2$ are further considered.

E. S. H.

Industry of very low temperatures and of the rare gases. E. MATHIAS (Bull. Internat. Inst. Refrig., 1934, 15, 91–108 A).—A review.

CH. ABS. (e)

Solvents for extraction of iodine and bromine from their dilute solutions. A. G. BAITSHIKOV (J. Chem. Ind. Russ., 1935, 12, 1062–1066).—The partition coeff. of Br and I between org. solvents and H_2O is greatly depressed by presence of NaCl. The best results for extraction are obtained with 8.5:1.5 CCl_4 - C_6H_6 .

R. T.

Iodine in Chinese common salt. H. WANG and F. W. CHENG (J. Chinese Chem. Soc., 1935, 3, 343–354).—The I content of 132 samples of Chinese NaCl from various sources is reported. The authors' method (B., 1935, 990) was used in the determinations.

A. J. M.

Flotation.—See I. H_2S from gas.—See II. CH_4 etc. from CO_2 .—See III. Al_2O_3 from clay.—See VIII. Dnieper Al_2O_3 . Effect of alkaline detergents on metals. Metal-pickling solutions.—See X. H_2O decomp.—See XI. White Pb. Acid-resistant "Faolit."—See XIII. Granular $(NH_4)_2SO_4$. Conc. fertilisers. Determining Ca in fertilisers.—See XVI. Detecting CCl_4 in preps.—See XX.

PATENTS.

Plant for production of carbon dioxide. "KODIGEN" A.-G. F. KOMPRIMIERTE GASE IN VADUZ, and D. BURGER (B.P. 439,976, 19.6.34).—Coke or the like is burned in a boiler to which alkali carbonate solution is fed, that solution having absorbed CO_2 from the flue gases. A plant in one constructional unit with auxiliary heat exchangers is claimed.

B. M. V.

Gas producers.—See XI.

VIII.—GLASS; CERAMICS.

Continuous and repeated melting of glass. K. FUWA (J. Japan. Ceram. Assoc., 1934, 42, 200).—The Al_2O_3 and Fe_2O_3 content of glass increases abruptly

after a certain time of melting, owing to pot corrosion. The glass becomes non-uniform as a result.

CH. ABS. (e)

Micro-analysis of glass. V, VI. Detection of minute amounts of cobalt and nickel in glass. W. GEILMANN and O. MEYER-HOISSEN (Glastechn. Ber., 1934, 12, 302–307; Chem. Zentr., 1935, i, 2714–2715; cf. B., 1932, 228).—The limits of detection of Co as $Co[Hg(CNS)_4]$ and by the microcosmic and borax beads were 0.1, 5, and 1×10^{-6} g, respectively. The Co may first be conc. by dissolution of the glass in HF and subsequent electrolysis. 0.1×10^{-6} g. of Co can be detected in presence of 0.5 mg. of Fe. Ni must be removed by dicyanodiamine sulphate, and Cu as CuS . In presence of large amounts of Zn, $MnSO_4$ is added, and the Co pptd. with $Mn(OH)_4$, dissolved, and electrolysed. Ni is also conc. by electrolysis, and detected by Ac_2 dioxime or, better, by cyclohexanedione dioxime, Zn being removed as ZnS .

H. J. E.

Glass-silvering solution. I. K. NAKANISHI (J. Japan. Ceram. Assoc., 1934, 42, 11–20).—Excess of $AgNO_3$ in the $AgNO_3$ -aq. NH_3 solution retards mirror formation and reduces brilliance.

CH. ABS. (e)

How the continuous enamelling furnace affects copperheads. H. L. COOK (Bull. Amer. Ceram. Soc., 1935, 14, 393–395).—Copperheading is more pronounced in a continuous than in a box-type furnace because the former does not seal over the metal so readily. The use of a continuous furnace demands a modified frit and pickling technique. It is not known why excessive pickling time causes copperheads, nor why they are diminished by a cyanide neutralisation.

J. A. S.

Corrosion of refractory material of enamel stoves. ANON. (Keram. Rund., 1934, 42, 597–599; Chem. Zentr., 1935, i, 2712).— SiO_2 and Al_2O_3 refractories were unsuitable for the parts of the stove exposed to fumes. Sillimanite containing mullite gave good results, as did muffles made of SiC with a min. of binder.

H. J. E.

Purification of clay of the Tartar Republic and extraction of alumina. A. E. MAKOVETZKI and O. S. CHOIVANSKAJA (Trans. Kirov. Inst. Chem. Tech. Kazan, 1935, No. 3, 107–132).—Tests on the extraction of Al_2O_3 from enriched and non-enriched clays by heating with $(NH_4)_2SO_4$ (I) at 400° are described. At 200° (I) yields NH_4HSO_4 . The salts obtained are extracted by boiling with 10% H_2SO_4 .

CH. ABS. (e)

Firing of ceramic products. I. O. KRAUSE and E. KEETMAN (Sprechsaal Keram., 1935, 68, 1; Chem. Zentr., 1935, i, 2713).—The construction of a heating furnace, using Mo resistance wire, for tests under reproducible conditions is described.

H. J. E.

Consistometer. G. HAMMER (Sprechsaal Keram., 1934, 67, 653–655, 669–672; Chem. Zentr., 1935, i, 2871).—A viscosimeter for glazes or ceramic masses is described.

J. S. A.

Refractory problems in basic alloy-steel production. G. SOLER (Bull. Amer. Ceram. Soc., 1935, 14, 383–388).—The selection of refractories suitable for the various types of furnace is discussed.

J. A. S.

Refractories for the electrothermic zinc industry. W. B. MACBRIDE (Bull. Amer. Ceram. Soc., 1935, 14, 389—393).—In the furnace in which the charge (Zn sinter + coke) acts as the resistor, it was found that the refractory must have a low porosity to prevent penetration of Zn vapour, and a high softening point, electrical resistance at high temp., and resistance to spalling, slagging, and the action of CO. A low- Al_2O_3 brick with a porosity of 14—16% was the most satisfactory. Linings of magnesite, SiC , and mullite were not suitable. A low porosity is essential to prevent disruption of the material by the expansion of the Zn as it solidifies in the pores. J. A. S.

Determining SiO_2 . Lepidolite.—See VII. Cement dust.—See IX.

PATENTS.

Airtight envelopes comprising ceramic materials. GEN. ELECTRIC CO., LTD. From PATENT-TREUHAND-GES. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 440,123, 31.7.34).—A glass bulb has, at the points of entry of lead-in wires, a ceramic material hermetically sealed to it and them, the material comprising alkaline-earth, Ti, and Zr oxides with, if desired, impurities which lower the sintering temp. B. M. V.

Manufacture of refractory bricks, slabs, and the like. J. ERNOULD, and SOC. DES HAUTS-FOURNEAUX DE LA CHIERS (B.P. 440,010—11, 10.4.35).—Products consisting essentially of CaO or $\text{CaO} + \text{MgO}$ and having a high resistance to heat and hydration are made by moulding under pressure a mixture of CaO or dolomite, respectively, with an oxide of Fe, Cr, or Al and firing at 1350—1500°. J. A. S.

Abrasive sheet material. H. H. MORGAN, A. A. DRUMMOND, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 439,289, 30.5.34).—An oil-modified phenol-aldehyde resin is used as binder. S. M.

Drying pottery.—See I.

IX.—BUILDING MATERIALS.

Theoretical heat requirement for burning of cement. B. YOUNG (Tonind.-Ztg., 1935, 59, 270; Chem. Zentr., 1935, i, 2870).—From the heats of dissolution at room temp., the heat of reaction for $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2 = 42.5$ g.-cal. per g. of CaCO_3 . J. S. A.

Preparation of a specification for high-early-strength Portland cement. G. R. GAUSE (J. Res. Nat. Bur. Stand., 1935, 15, 421—439).—Examination of 28 commercial cements of this type showed wide variations in composition and properties. In no case did the 1- or 3-day strengths of the cements equal the 7- or 28-day strengths, respectively, of normal Portland cements. Requirements for a specification for high-early-strength cements are discussed together with appropriate tests. A. R. P.

Chemistry of Portland cement. II. Hydrated calcium salts. L. FORSÉN (Zement, 1935, 24, 77—82; Chem. Zentr., 1935, i, 2713; cf. B., 1935, 1095, 1143).—By treatment of neutral Ca salts with aq. $\text{Ca}(\text{OH})_2$, cryst. salts of the composition $\text{CaO}, \text{CaX}_2, 3\text{H}_2\text{O}$ ($\text{X} = \text{NO}_3, \text{NO}_2, \text{ClO}_3, \text{ClO}_4, \text{CrO}_4$) were obtained. On drying,

these salts lose $2\text{H}_2\text{O}$. The action of dry HCl on $\text{Ca}(\text{OH})_2$ yields $\text{CaO}, \text{CaCl}_2, 3\text{H}_2\text{O}$. Bleaching powder is a mixture of 2 mols. of $\text{Ca}(\text{OH})\text{Cl}$ with the neutral salts $\text{Ca}(\text{OCl})\text{Cl}$ and $\text{Ca}(\text{OCl})_2$, or their hydrates. Photomicrographs are given and the formulæ discussed. Hydrated $2\text{CaO}, \text{SiO}_2$ is $[\text{Ca}(\text{OH})\text{OH}_2]_2[\text{Si}(\text{OH})_6]$.

H. J. E.

Hydrates of calcium silicate. Theory of hardening of siliceous cements. H. KÜHL and A. MANN (Tonind.-Ztg., 1934, 58, 862—1016, 22 pp.; Chem. Zentr., 1935, i, 2579—2580).—The reactions of $\text{CaO}-\text{SiO}_2$ melts on shaking with H_2O at 20° and 40° are discussed in relation to the hardening of cements. J. S. A.

Setting and hardening of Portland cement. K. KOYANAGI (Zement, 1934, 23, 705—708; Chem. Zentr., 1935, i, 2714).—The $3\text{CaO}, \text{Al}_2\text{O}_3, 10.5\text{H}_2\text{O}$ and $3\text{CaO}, \text{Al}_2\text{O}_3, 3\text{CaSO}_4, 31.5\text{H}_2\text{O}$ crystals, formed on treating cement with excess of H_2O , become finer as the $[\text{CaO}]$ of the solution increases. $\text{Ca}(\text{OH})_2$ always forms large crystals, but they are smaller and appear earlier on addition of CaCl_2 . H. J. E.

Special Portland cements. III. Composition of mangan[ic oxide]-chrom[ic oxide] Portland cement. K. AKIYAMA (J. Soc. Chem. Ind., Japan, 1935, 38, 698—701 B; cf. B., 1935, 307, 271).—Strength tests on burnt commercial raw mixes containing varying proportions of chromite and Mn ore show that optimum conditions are attained with 1—2% in the clinker.

T. W. P.

High-grade, sea-water-resistant cement. W. TAO (Tonind.-Ztg., 1935, 59, 178—179; Chem. Zentr., 1935, i, 2870).—Addition of slate clay, burned at 600°, to Portland-cement mortar raised the strength and resistance to sea- H_2O . Conversion of $3\text{CaO}, \text{Al}_2\text{O}_3$ into $4\text{CaO}, \text{Al}_2\text{O}_3, \text{Fe}_2\text{O}_3$ by suitable additions is advantageous. J. S. A.

Influence of catalysts in production of high-strength cements. W. WATSON and Q. L. CRADDOCK (Cement, 1936, 9, 13—19).—Literature on the influence of fluxing agents in cement burning, and of admixtures to the finished cement, is reviewed. Excluding the addition of $\text{CaSO}_4, 2\text{H}_2\text{O}$, no great improvements have been brought about by admixtures, but it is thought that investigations on fluxing agents may show more promise.

T. W. P.

Constitution of aluminate cements. A. TRAVERS (Ciment, 1934, 39, 293—295, 327—331; Chem. Zentr., 1935, i, 2713—2714).—A discussion. H. J. E.

Ore cement or iron cement. IV. S. NAGAI and K. NOMI (J. Soc. Chem. Ind., Japan, 1935, 38, 666—670 B; cf. B., 1935, 902).—By burning different proportions of limestone, clay, ganister, and Cu slag, Fe-, Kalicrete-, and Kühl-cements were obtained. Quickest reaction took place in the last-named case. Soundness and tensile and compressive strengths were determined. T. W. P.

Relationship of mill charge to surface area of cement. W. R. CHANDLER (Cement, 1936, 9, 20—24, 26).—A sedimentation method for particle-size determination is described. Results are given for the sp. surfaces and physical properties of cements from the same clinker, and ground for the same time, when the charge

in the ball mill is varied. Increased fineness is obtained by mixing the sizes of the balls. T. W. P.

Fineness of cement raw mixture. I. Elutriation of particles by means of Shōne's apparatus. II. Fineness and chemical composition of the raw mixture. Y. SANADA and G. NISHI (J. Soc. Chem. Ind., Japan, 1935, 38, 22, 622—624).—I. Results for the elutriation of ground quartz in an improved Shōne's apparatus are given.

II. For any one works, the various granulometric fractions show different chemical analyses. Differences also exist through use of different raw materials and grinding mills. T. W. P.

Utilisation of cement dust. II. Melting behaviour of the system SiO_2 - Na_2O -dust. S. KONDŌ and C. KAWASHIMA (J. Japan. Ceram. Assoc., 1933, 41, 703; cf. B., 1933, 749).—Tests are described on glass manufacture from cement dust collected in the Cottrell treaters of rotary kilns. CH. ABS. (c)

Choice of sands for production of lime mortar. W. MARSCHNER (Tonind.-Ztg., 1934, 58, 1056—1057; Chem. Zentr., 1935, i, 2580).—Sand with angular grains of mixed size is recommended, so that the binding material serves only to cement the grains together, and not as a filler. J. S. A.

Properties of trass. M. STILLER (Zement, 1935, 24, 82—83; Chem. Zentr., 1935, i, 2424).—Large amounts of K_2CO_3 and smaller amounts of Na_2CO_3 can be leached from mortars containing trass. Alkali silicates and aluminates are the chief agents in the hardening of trass mortars. H. J. E.

Influence of pozzuolanic admixtures on the strength and permeability of concrete. H. HAAVARDSHOLM (Bet. u. Eis., 1935, 34, 236—241; Road Abs., 1936, 2, No. 695).—Pozzuolanic admixtures increase the strength of concrete, particularly when moist-cured, and reduce the permeability. The latter depends more on the total cement and pozzuolana used than on the richness of the mix. T. W. P.

Tests on the elasticity, adhesion, and bond-resistance of concrete prepared with Portland cement and trass cement. W. RÜTH (Diss., Darmstadt, 1935, 55 pp.; Road Abs., 1936, 2, No. 697).—A comparison is made of a cement when used alone and with 30% admixture of trass. The latter mixture, when used in concrete, gave higher resistance to abrasion and impact, had good workability, and permitted satisfactory placing and embedding of reinforcement. T. W. P.

Determining the abrasion-resistance of concrete from that of the mortar and aggregates. A. POGANY (Zement, 1935, 24, 522—524; Road Abs., 1936, 2, No. 698).—Abrasion-resistance of a concrete with a hard, dense aggregate bears no relation to the abrasion-resistance of the aggregate alone. Vals. obtained in drag-abrasion tests vary with the regularity of feeding abrasive to the machine and with the power developed by the driving motor. T. W. P.

General principles of predetermination of the strength of concrete. O. STERN (Tonind.-Ztg., 1934, 58, 1147; Chem. Zentr., 1935, i, 2871).—The work of Kathrein (*ibid.*, 1035) is supplemented. J. S. A.

Sodium silicate as protective medium for concrete. C. R. PLATZMANN (Tonind.-Ztg., 1934, 58, 1234—1235; Chem. Zentr., 1935, i, 2871).—Addition of Na silicate to the mix, rather than subsequent treatment of the cement, leads to marked efflorescence and incomplete protection. J. S. A.

Effect of graining of magnesite stones on their properties. H. SALMANG and P. NEMITZ (Sprechsaal Keram., 1934, 67, 717—719, 729—731, 745—747, 759—761, 775—778; Chem. Zentr., 1935, i, 2578).—Fine grain size coupled with high moulding pressure leads to improvement of mechanical properties. Shrinkage, thermal expansion, etc. may be modified by appropriate choice of grain size. J. S. A.

Evaluation of the bitumens used in road construction on the basis of their absolute viscosity. J. CSAGOLY (Asphalt u. Teer, 1935, 35, 667—672, 687—690; Road Abs., 1936, 2, No. 684).—The η -temp. curves for different bitumens were obtained from the 3 temp. at which $\eta = 50, 1$, and 0.5 poises. For bitumens from the same source a relation exists between these vals. and other properties. The uses of graphical data for determining suitable bitumens are discussed. T. W. P.

Liquid asphaltic road materials. R. H. LEWIS and W. O'B. HILLMANN (Publ. Roads, 1935, 16, 97—117; Road Abs., 1936, 2, No. 683).—The weathering of thin films of such materials of the slow-curing type produces residues which differ from those from the usual laboratory tests. Data are given on a series of materials tested by laboratory methods and in thin films. The conclusions from the tests are discussed. T. W. P.

Laboratory investigations into the slipperiness of roads. R. N. J. SAAL (Chem. & Ind., 1936, 3—7).—A laboratory apparatus is described for the determination of the coeff. of friction between road surfaces and tyres, based on a mathematical development. Results are similar to those found in actual practice. T. W. P.

Determination of lignin in wood. P. KLASON (Svensk Kem. Tidskr., 1935, 47, 298—300).—Wood is treated with 66% H_2SO_4 to remove carbohydrates. The residual lignin contains approx. 6% of combined H_2SO_4 , which is removed by heating with $0.1N\text{-HCl}$. It is then dried and determined by combustion. M. H. M. A.

Wood substances. II. Determination of wood mannan, and the mannan content of various angiosperms. K. NISHIDA, H. HASHIMA, and T. FUKAMIZU (J. Cellulose Inst., Tokyo, 1935, 11, 330—335; cf. B., 1935, 547).—When analysed by Nishida's method mannan (0.27—0.71%) is found in angiosperms which yield none by Schorger's method. Wood mannan is decomposed only slowly by dil. acids, and the highest yield of sugar is obtained by boiling for 44—45 hr. with 5% H_2SO_4 . The hydrazone solution should be stored in an ice-chest for 1—2 days for conifers and 1—3 weeks for deciduous trees. A. G.

Occurrence and distribution of starch in wood of the red-tulip oak (*Tarrietia argyrodendron*, var. *peralata*). H. B. WILSON (J. Counc. Sci. Ind. Res., Australia, 1935, 8, 305—307).—Starch occurred in the fine bands of the longitudinal parenchyma of the outer

zone in lighter-coloured wood, but not in the true wood or in the rays. Observations are discussed in relation to the activities and control of the powder-post beetle.

A. G. P.

Wood preservation. J. S. REMINGTON (Paint Manuf., 1936, 6, 8—10).—The use of "cuprinol" and synthetic resins for preventing dry rot is discussed. For priming wood the following composition is recommended: 35% leaded ZnO (160 lb.), bleached diatomite (20 lb.), raw linseed oil (5 gals.), and white spirit containing 3% of Cu naphthenate (1—1½ gals.). S. M.

Bitumen-tar mixtures.—See II. **Determining SiO₂. CaC₂ residues.**—See VII. **Clay soils.**—See XVI.

PATENTS.

Rotary kilns for burning cement or similar materials. M. VOGEL-JØRGENSEN (B.P. 440,349, 26.6.34).—The feed slurry is sprayed on a dense curtain of chains in an enlargement of the upper end of the kiln.

B. M. V.

Manufacture of Portland cement and the like. M. R. A. TAKOLANDER (B.P. 439,198, 1.6.34).—In the wet process, the H₂O content of the slurry can be reduced, without affecting its η or consistence, by adjusting the p_H to between 7.5 and 10 and adding small quantities of auxiliary colloids.

T. W. P.

Manufacture of an insulating and incombustible product. G. EVERS and B. DAIRAINÉ (B.P. 439,598, 9.1.35).—A mixture of mineral wool 88, asbestos fibre 8, and agglutinant 4% (approx.) is pressed in a perforated mould and heated therein (350—450°/16 hr.), then removed, and completely dried at 200—250°/40 hr.

B. M. V.

Manufacture of bituminous constructional materials. J. R. GEIGY A.-G. (B.P. 438,188, 13.5.35, Ger., 11.5.34).—A material which will set with H₂O, e.g., cement, is mixed with a bituminous emulsion stabilised as described in B.P. 438,162 (B., 1936, 180), and, if desired, with sand or other aggregate. Hardened masses resistant to deformation and fracture, suitable for floorings, filling agents in hydraulic structures, etc., are produced.

A. B. M.

Manufacture of articles having a facing of natural marble. L. VERBAENDERT (B.P. 440,299, 23.2.35).

Manufacture of plaster board. D. ANDERSON & SON, LTD., and A. REYNOLDS (B.P. 440,064, 29.12.34).

Wall construction and wallboards [with curved edges]. L. MELLERSH-JACKSON. From GYPSUM, LIME, & ALABASTINE, CANADA, LTD. (B.P. 439,998, 22.9.34).

Tar composition.—See II. **Casting metals.**—See X. **Plastic compositions.**—See XIII.

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

Basic cupola-furnace operation. C. HEIKEN (Giesserei, 1934, 21, 453—456; Chem. Zentr., 1935, i, 2427).—The Fe was richer in C and poorer in Si and S than under normal operating conditions. Removal of S is influenced unfavourably by addition of a high-% Si alloy in place of hematite Fe. The addition of

steel scrap should be 40—60%. The Fe produced contained 0.04—0.06% S. H. J. E.

Relation between open-hearth slag charged in a blast furnace and the phosphorus concentration in pig iron produced. S. FUKABORI (Tetsu-to-Hagane, 1935, 21, 1—5).—Data are recorded.

CH. ABS. (e)

Silica and alumina in iron ores. T. L. JOSEPH and W. F. HOLBROOK (Blast Furnace and Steel Plant, 1935, 23, 313—316).—Tests on the desulphurisation of 16 slag specimens are described. The max. desulphurisation was at 15—16% Al₂O₃, according to the basicity. Except for highly-basic slag, the substitution of Al₂O₃ for SiO₂ improved desulphurisation at 1440—1560°.

CH. ABS. (e)

Properties of cold-blast charcoal pig iron. K. MIYASHITA (Tetsu-to-Hagane, 1935, 21, 5—13).—The relation between the mechanical properties and melting conditions of various pig irons was studied. The superior qualities of cold-blast charcoal pig Fe are attributed to its low N content.

CH. ABS. (e)

Complete reduction of manganous oxide in liquid iron. E. DIEPSCHLAG (Metallwirts., 1935, 14, 107; Chem. Zentr., 1935, i, 2876).—Reduction of MnO in Fe at 1675° by addition of 5—7% of C was quant., and was not affected by the presence of SiO₂ although introduction of Si occurs thereby. Loss of Mn occurs by volatilisation.

J. S. A.

Fluidity of slag in steel refining. II. Removal of phosphorus. L. LOSANA (Metall. ital., 1934, 26, 851—860; Chem. Zentr., 1935, i, 2428).—The rôle of CaO is discussed. Changes in composition of the molten steel under a CaO slag at various temp. are recorded and correlated with the slag η . Removal of P was quickest with the least viscous slag.

H. J. E.

Relation between nature of flakes and methods of steel production. V. M. ZAMORUEV (Domez, 1935, No. 1, 31—41).—A discussion.

CH. ABS. (e)

Kinetics of the transformation of austenite. IV. Magnetic investigations on carbon steels. H. LANGE (Mitt. K.-Wilh. Inst. Eisenforsch., 1933, 15, 263—269; Chem. Zentr., 1935, i, 2880).—It is concluded from the disappearance of the Curie point, in relation to the temp. of isothermal transformation, that at < 400° the formation of Fe carbide proceeds through a series of compounds of different C contents.

J. S. A.

Hardening characteristics and other properties of commercial 1%-carbon tool steels. T. G. DIGGS and L. JORDAN (J. Res. Nat. Bur. Stand., 1935, 15, 385—407).—The effect of initial structure on the austenitic grain size, grain growth, and crit. cooling rates of two commercial steels containing C 1.05—1.06, Mn 0.28—0.26, P 0.019—0.013, S 0.013—0.011, Si 0.22—0.19, Cr 0.08—0.09, Ni 0.13—0.10, Al 0.004—0.013, and N 0.009—0.007% has been studied and their behaviour compared in the transformation range; in addition, determinations have been made of their relative rates of spheroidisation, Charpy impact strengths, susceptibility to grinding cracks, hardness on quenching at different rates, performance as lathe tools, and the effect of rate of heating to hardening temp. on

depth of hardening. The results are shown in tables and graphs, together with characteristic microstructures.

A. R. P.

Statistical investigations of the structure [of metals and alloys]. E. SCHEIL (*Z. Metallk.*, 1935, 27, 199—208).—Mathematical methods of determining the average grain size, proportion of non-metallic constituents, *e.g.*, inclusions of sulphides, oxides, or slag particles, and degree of deformation are discussed with especial reference to Fe and steel.

A. R. P.

Metallographic films. E. O. BERNHARDT and H. J. WIESTER (*Z. Ver. deuts. Ing.*, 1935, 79, 7—11; *Chem. Zentr.*, 1935, i, 2593).—The technique of microscopical kinematographic recording of recrystallisation, grain growth, etc. is described and applied to the austenite-martensite transformation.

J. S. A.

Examination of a Roman chisel from Chesterholm. C. E. PEARSON and J. A. SMYTHE (*Proc. Univ. Durham Phil. Soc.*, 1934, 9, 141—145).—Analysis gave Mn nil, Si 0.038, P 0.016, and S 0.011%. Metallographic results are discussed.

CH. ABS. (e)

Welding of high-tensile steel. K. L. ZEYEN (*Stahl u. Eisen*, 1935, 55, 901—906).—The possibilities of welding plain-C and also alloyed high-tensile steels are considered. By the use of covered electrodes, steels with C as high as 0.55% can be successfully welded. A high Mn content counteracts the tendency of the high-C steel welds to develop cracks. Chemical homogeneity of the welding rods and base metal is essential for success in welding stainless steels.

W. P. R.

Brittleness in steel. C. L. SHAPIRO (*Iron Age*, 1935, 135, No. 8, 12—17; No. 9, 26—29, 73—75; No. 11, 21—25, 76).—Factors concerned are comprehensively reviewed.

CH. ABS. (e)

Effect of size and shape of test-piece on torsion strength of steel. R. MALLÄNDER and W. BAUERSFELD (*Tech. Mitt. Krupp*, 1934, 2, 143—152; *Chem. Zentr.*, 1935, i, 2586—2587).—The effects of alteration in diam. and cross-sectional area on the measured torsion strength are discussed. For small specimens the strength is > for large.

J. S. A.

Difficulties in the preparation of steel castings. G. DELBART (*Bull. Assoc. techn. Fond.*, 1934, 8, 561—570; *Chem. Zentr.*, 1935, i, 2719).—A review and discussion.

H. J. E.

Cylinder casting for air-cooled motors, with special reference to copper additions. H. KOPP (*Mitt. Forsch.-Anst. Konz. Gutehoffnungshütte*, 1935, 3, 192—198; *Chem. Zentr.*, 1935, i, 2718).—Tests with cast Fe containing C 3.24—3.34, Si 1.8, Mn 0.75, P 0.35, S 0.1, and Cu 0—2.36% are described. Cu increases the hardness and lowers the thermal conductivity of the Fe. It has the same effects as has Ni, and has no advantages for cylinders.

H. J. E.

Properties of some cast alloy steels. T. N. ARMSTRONG (*Trans. Amer. Soc. Met.*, 1935, 23, 286—311).—The mechanical properties of 25 alloy steels and of one plain C steel are compared.

CH. ABS. (e)

Lightly-alloyed nickel-free constructional steel. E. HOUDREMENT and H. KALLEN (*Tech. Mitt. Krupp*, 1934, 2, 117—126; *Chem. Zentr.*, 1935, i, 2721).—The

composition, heat-treatment, and properties of steels containing Mn, Mn + Si, Mn + Mo, Cr, Cr + Mo, Cr + W, Cr + V, and Cr + Mo + V are described.

H. J. E.

Heating of steel alloys. N. Y. TAITZ (*Domez*, 1935, No. 1, 41—60).—Changes in Cr-Mo and stainless steels on heating are discussed.

CH. ABS. (e)

Heat-resistant nickel-chromium-iron alloys. ANON. (*Metallbörse*, 1934, 24, 1529—1530, 1561—1562; *Chem. Zentr.*, 1935, i, 2589).—The influence of composition of, and of addition of C and S to, Ni-Cr alloys with 0—60% of Fe is summarised.

J. S. A.

Ductility of chromium-nickel austenitic steels at elevated temperatures. H. D. NEWELL (*Trans. Amer. Soc. Met.*, 1935, 23, 225—243). Tests at 540—920° are described. Lack of ductility (*D*) is associated with the austenitic face-centred structure, whereas α -Fe gives a high *D*. Addition of elements tending to form ferrite improves the hot *D*. Si improves *D* at high temp., even where the structure remains wholly austenitic. Ferrite-forming elements (Ti), which confer grain refinement without stiffening the matrix, improve *D* > do Mo and V, which stiffen the matrix without refining the structure. V increases short-time strength considerably. Nb did not improve the *D* of 18 : 8-steel.

CH. ABS. (e)

Cold-drawn steel-spring wire. E. J. P. FISHER (*Wire and Wire Prod.*, 1934, 9, 287—297).—A review of the heat-treatment, equipment, and drawing practice.

CH. ABS. (e)

Changes in properties of steel wire on storage at room temperature or below. K. LIEBERKNECHT (*Mitt. Forsch.-Inst. Verein. Stahlwerke*, 1934, 4, 83—112; *Chem. Zentr.*, 1935, i, 2882).—Prolonged storage at room temp. or tempering for 1 hr. at 250° considerably alters the mechanical properties of unalloyed drawn-steel wire, the previous history being of importance. The effects of storage and of tempering are essentially similar. Tests at 0° and —20° show a distinct effect of low temp. on these properties. The rate of attack by HCl is greatly influenced by temp. and pretreatment. (Cf. B., 1935, 310.)

J. S. A.

Corrosion-testing of steels at high temperatures. HOUDREMENT (*Chal. et Ind.*, 1934, 15, 150—158; *Chem. Zentr.*, 1935, i, 2727).—A review of methods and results.

H. J. E.

Heat-treatment of high-speed steels. VOGELIN (*Durferit-Mitt.*, 1935, 4, 16—26; *Chem. Zentr.*, 1935, i, 2880).—The employment of special heat-treatment baths in order to improve the mechanical performance of such steel is discussed.

J. S. A.

Salt baths [for steels]. C. ALBRECHT (*Durferit-Mitt.*, 1934, 3, 58—88; *Chem. Zentr.*, 1935, i, 2585—2586).—Technical procedure and the use of salt baths for cementation and hardening are discussed.

J. S. A.

Salt baths and arrangements for graduated hardening. C. ALBRECHT (*TZ prakt. Metallbearb.*, 1934, 44, 422—423; *Chem. Zentr.*, 1935, i, 2585).—A salt bath for hardening plain and low-alloy steels is described.

J. S. A.

Replacement of lead baths by salt baths [in metal-hardening]. GIESSEN (Durferrit-Mitt., 1935, 4, 27—31; Chem. Zentr., 1935, i, 2880).—The advantages of salt baths are discussed. J. S. A.

Velocity of hardening during precipitation hardening. E. SÖHNCHEN (Metallwirts., 1935, 14, 205—208; Chem. Zentr., 1935, i, 2879—2880).—Addition of one or more elements to heat-treatable binary alloys exercises a marked effect on hardening. The mechanism of the effect, and its significance, are discussed. J. S. A.

Influence of chemical composition and grain size on precipitation hardening. E. SÖHNCHEN (Metallwirts., 1934, 13, 655—661; Chem. Zentr., 1935, i, 2725).—The effects of foreign metals and of grain size are discussed for low-C and Cu steels and for Cu-Be and Al-Cu alloys. H. J. E.

Effects of special elements on the velocity of expansion due to martensitisation during quenching of steel. T. MURAKAMI and A. HATTA (Tetsu-to-Hagane, 1934, 20, 649—657; cf. B., 1934, 581).—An automatic recording apparatus for the expansion-time curve during quenching was constructed. Data for 4 C steels and 32 steels containing < 2% of Mn, Ni, Co, V, Cr, Si, W, or Mo, with approx. eutectoid C content, are recorded. The quenching temp. was 850—1100°, the medium being oil. The temp. of commencement of martensitisation generally fell as the quenching temp. was raised. CH. ABS. (e)

Nitriding of cast iron. V. O. HOMERBERG (Ind. Heating, 1935, 2, 19—22).—A review. CH. ABS. (e)

Nitralloy steel and nitriding. J. McCONE (J. Inst. Prod. Eng., 1934, 13, 349—375).—Parts to be surface-hardened are made from Cr-Al steel (Cr 1.4—1.8, Al 0.9—1.3%). Portions to be kept soft are first protected by tinning. The steel is then heated in NH_3 at 500°. Heating for 90 and 20 hr. gives a case depth of 0.030 and 0.008 in., respectively. CH. ABS. (e)

Cyaniding of iron for separators. A. P. SELISKI and V. V. TSCHERNUISHEV (Vestn. Metall., 1934, 14, No. 6, 87—94).—Increase in [NaCN] in the bath above 30% has little effect on the depth of the nitrided layer, but increases its hardness (optimum temp. 830—850°). The max. hardness of the nitrided layer corresponds to the presence of martensite at the metal surface. When the [CN] of the bath increases, the N distributes itself in the deeper portions of the nitrided layer and prevents diffusion of C. CH. ABS. (e)

Catalysts for cementation of iron. K. IWASE and W. OTA (Kinz.-no-Kenk., 1934, 11, 413—421).—Tests were made at 950° with chlorides of alkali and alkaline-earth metals. The effect of temp. on the C content of the surface and the depth of C penetration was studied. A 1:1 mixture of NaCl and Na_2CO_3 is a more powerful catalyst than BaCO_3 . No free cementite is formed at the surface of a specimen with a solid carburising material. CH. ABS. (e)

Metallic cementation. II. Cementation of metal by means of antimony dust. T. KASÉ (Kinz.-no-Kenk., 1934, 251—262; cf. B., 1935, 191).—Sb diffuses into Fe at > 350°, the treated surface having good resistance to 10% H_2SO_4 or HCl. CH. ABS. (e)

Effect of silicon on a chilled roll. K. TANIGUCHI (Rept. Res. Lab. Nippon Seitetsu, Yawata Iron Works, 1933, No. 131, 1—8).—As the Si content was increased to 1.7% the hardness of the chilled part increased and the depth of chill decreased. With > 1.7% of Si the hardness decreased until the chill disappeared. CH. ABS. (e)

Influence of manganese on mechanical properties of rolled steels. III. M. Jô and S. NAGAI (Rept. Res. Lab. Nippon Seitetsu, Yawata Iron Works, 1934, No. 137, 1—20; cf. B., 1934, 148).—With const. [Mn] the tensile strength of the annealed steels rises with increasing [C]. The rate of increase is more gradual than that for rolled steels. The tensile strength of the annealed steel (kg./sq. mm.), $T_A = 0.333C + 0.005 \times C.Mn + 0.01Mn + 31$, where $C = \% C \times 100$, and $Mn = \% Mn \times 100$. This formula applies to steels with 0.2—1.00% Mn. CH. ABS. (e)

Physico-chemical conditions in the application of oxygen-enriched air to non-ferrous metallurgy. A. N. VOLISKI (Tzvet. Met., 1934, No. 4, 61—69).—A review of applications in the production of Cu matte, the roasting of sulphide ores, bessemerisation, the reduction with C in a blast furnace, fuel combustion, and hydrometallurgical processes. CH. ABS. (e)

Bessemerisation of copper matte with oxygen-enriched air. S. K. TONAKANOV (Tzvet. Met., 1934, No. 6, 37—52).—Blowing with a 38% O_2 mixture reduced the duration of the reaction in the converter 3.7 times for a poor matte and 3 times for a rich matte, as compared with ordinary air-bessemerisation. The ratio $\text{Fe}^{II}:\text{Fe}^{III}$ was approx. the same as in an ordinary air blow. The resulting Cu was normal and contained no more Cu_2O than usual. CH. ABS. (e)

Copper from magnetic-separation tailings of Mt. Vuisokaja (Urals) ore. S. I. MITROFANOV and N. V. ERMOLAEV (Tzvet. Met., 1934, No. 2, 45—55).—Analytical and flotation results for two samples are recorded. CH. ABS. (e)

Flotation of copper-containing tailings from the magnetic separation of ore from the Granev mine in Vuisogorsk. N. ERMOLAEV (Nov. Tech., Seri. Gorn. Prom., 1935, No. 4, 15—16).—Up to 80% of the Cu can be removed from the tailings by concn. and flotation, using 0.15 kg. of K ethylxanthate, 0.04 kg. of pine oil, and up to 5 kg. of CaO per ton of ore. 48—47% of Au and 24—47% of Ag can be extracted from the Cu concentrate. CH. ABS. (e)

Combined method of processing copper pyrites from the Bliavui-Cherson deposits. BOCHARNIKOV (Nov. Tech., Seri. Gorn. Prom., 1935, No. 2, 13—14).—In the flotation of the ore 90% of the Cu, 45% of the S, and 20—30% of the Au (< 0.6 g. per ton) were extracted. Cu was recovered with Fe sponge. CH. ABS. (e)

Fatty acid and soap flotation applied to oxidised copper ore. M. RAY (Eng. Min. J., 1935, 136, 221—222).—The optimum results were obtained with a mixture of saturated and unsaturated acids. The soaps react similarly to their fatty acids. Results of tests on a malachite ore are given. CH. ABS. (e)

Separation of copper and lead from copper-lead concentrates by flotation. V. K. SMIRNOV (Tzvet. Met., 1934, No. 4, 37—49).—The ore (Cu 1·5, Pb 7·09, Zn 10·49%) was ground wet with H_2O , Na_2CO_3 , NaCN, and $ZnSO_4$ until 92% passed 200-mesh. The pulp was conc. by flotation with ethylxanthate and pine tar. The concentrate was agitated with $K_2Cr_2O_7$ in acid medium and floated with small amounts of pine oil. The $K_2Cr_2O_7$ consumption was 0·4 kg. per ton in a medium of p_H 8. A Cu concentrate containing Cu 18—20, Pb 8—10, Zn 11—19%, and a Pb concentrate containing Cu 0·8—2·5, Pb 50—55, Zn 6—9, Fe 5—7% were obtained. These concentrates held 87—95 and 88—92% of the original Cu and Pb, respectively. CH. ABS. (e)

Inflammability of sulphide dust in mining pyrite ore. V. M. OGIEVSKI and V. A. SCHAPATIN (Tzvet. Met., 1934, No. 8, 27—34).—Ignition of the dust (Fe 33·14—37·50, Cu 1·91—2·03, S 45·90—47·61%) can occur under conditions similar to those in the mines. CH. ABS. (e)

Treatment of brass scrap and crude (80—90%) copper at the Moscow Molotov plant. G. A. SCHACHOV (Tzvet. Met., 1934, No. 5, 100—114).—Advantages of Bessemer converters, compared with tilting open-hearth furnaces, are described. CH. ABS. (e)

Antique colouring [of metals]. G. GROSS (Z. Metallk., 1935, 27, 238—241).—In the colouring of Cu and its alloys with solutions containing $Pb(OAc)_2$ (I) and $Na_2S_2O_3$ (II) the best results are obtained with a solution containing (I) 25, (II) 240, and argol 30 g. per litre; ageing improves the rate of colouring, and at 20° a thicker, more adherent, and more resistant film is obtained in less time than at the usual operating temp. (80—95°). A. R. P.

Bronze joints for copper. H. L. FETHERSTON (Amer. Weld. Soc. J., 1935, 14, 2—4).—Corrosion-resistance tests of bronze welds for paper-pulp digester lines exposed to high $[H_2SO_3]$ and $[SO_2]$ show that the weld is not attacked more than the Cu pipe itself. Electrolytic action at the welded metallic junction was negligible. CH. ABS. (e)

Hardenable bronzes on a copper-nickel-tin basis. VI. Additivity of cold-work hardness and precipitation hardness. E. FETZ (Z. Physik, 1935, 97, 690—698).—Tests on bronzes with Ni 2·5—3 and Sn 10—8% have shown that the effects of cold-work and pptn.-heat-treatment on the hardness are additive irrespective of which is applied first and in spite of the fact that the hardness produced by pptn.-treatment is < that obtainable by cold-work. With increasing degree of cold-work the additive hardness due to pptn. decreases; this effect is ascribed to directional diffusion and a vectorial growth of the crystal nuclei. Work-hardening of the quenched bronzes considerably increases the rate of pptn.-hardening owing to the increase in total lattice energy. These results are contrary to Dahl's theory (B., 1930, 286) that both hardening processes are due to lattice distortion and stresses, but confirm the theory of Geiss and van Liempt (B., 1924, 600) that work-hardening is due to distortion of the outer electronic shell. A. R. P.

Tinless bronze. M. REZKOV (Vestn. Stand., 1935, No. 1, 21—26).—Data for Al-, Si-, and Mn-bronzes are summarised. Mn-bronze has good heat-resistance. Its tensile strength drops from 36 to 26 kg./sq. mm. at 400°. CH. ABS. (e)

Gold and silver bronzes. H. KAHN (Ind. Finishing, 1935, 11, No. 6, 9—12).—Data on composition, storage, etc. are summarised. CH. ABS. (e)

Extraction of zinc by the dry way. V. TAFEL (Z. Ver. deuts. Ing., 1935, 79, 110—113; Chem. Zentr., 1935, i, 2883).—Blende is roasted to ZnO , which is reduced to the metal. The procedure involved and the utilisation of the sulphurous gases are discussed. J. S. A.

Effect of size and uniformity of grain of roasted concentrate on extraction of zinc by the distillation process. G. SCHTEINGART (Tzvet. Met., 1934, No. 2, 73—86).—When the grain size was < 7—8 mm., Zn recovery increased by 3—5%. CH. ABS. (e)

Hydrometallurgical treatment of residues from zinc distillation. V. S. SOKOLOV (Tzvet. Met., 1934, No. 3, 88—90).—Residues from Zn distillation were 92·56—96·15% sol. in H_2SO_4 (d 1·070—1·125). The insol. residue contained Zn, Cu, and Pb. CH. ABS. (e)

Extraction of zinc from condensation potsherds by means of sulphuric acid. G. M. SCHTEINGART (Tzvet. Met., 1934, No. 5, 52—61).—The Zn is dissolved off the surface by H_2SO_4 . This is superior to the method of mechanical concn. CH. ABS. (e)

Melting zinc dust under fluxes. N. N. MURACH and G. K. MARKAROV (Tzvet. Met., 1934, No. 2, 107—108).—Both NH_4Cl and mixtures of $NaHSO_4$ and alkali or alkaline-earth chloride were satisfactory fluxes for Zn dust. CH. ABS. (e)

Effect of rapid cooling on distribution of lead in cast zinc. M. D. ZUDIN (Tzvet. Met., 1934, No. 5, 115—120).—Rapid cooling of Zn ingots results in a finer cryst. grain and more uniform distribution of Pb. CH. ABS. (e)

Zinc-base alloys. W. CLAUS (Z. Ver. deuts. Ing., 1935, 79, 385—386; Chem. Zentr., 1935, i, 2884).—The use of Zn alloys as spray-casting materials is discussed. Alloys rich in Cu have high mechanical properties; those low in Cu show freedom from ageing at high temp. Intergranular corrosion is hindered by the use of pure metals and by addition of 0·02—0·12% of Mg. Pb should be completely absent to inhibit vol. changes, Sn must be < 0·001%, and Cd < 0·005%; 0·03% of Li is beneficial. J. S. A.

Combination method for dressing tin ore of the Chaptcherang sulphide zone. S. M. JASUKEVITSCH and V. J. CHUMAROV (Tzvet. Met., 1934, No. 6, 25—37).—Tests with various methods of concn. are described. CH. ABS. (e)

Tin from Chaptcheranginsk and Scherlovogorsk concentrates (East Siberia). V. A. VANIUKOV, N. N. MURACH, and G. K. MARKAROV (Tzvet. Met., 1934, No. 3, 61—78).—Analyses of concentrates are given. The method of extracting Sn is described. The W could either be recovered from the slag, or conc. as a separate layer between the liquid Sn and the slag by means of Na_2CO_3 . CH. ABS. (e)

Use of pure oxygen in lead refining. D. M. SCHICHKOV and M. N. SOKOLOV (Tzvet. Met., 1934, No. 7, 59–73).—O₂ was blown through the molten Pb. At 350–500° the removal of Zn, As, Sb, and Sn took a considerable time, and much PbO was formed. At 860–900° impurities were removed in 5–10 min.; PbO formation was only 4.0–5.5%. CH. ABS. (e)

Utilisation of chlorides obtained in the refining of lead with chloride. V. S. SOKOLOV (Tzvet. Met., 1934, No. 6, 72–78).—The chloride mixture (Pb 15.45–35.50, Zn 25.40–40.70, Cl 26.20–37.50, Fe 0.75–1.30%) when leached with twice its wt. of hot H₂O yielded ZnCl₂. CH. ABS. (e)

Temperature-viscosity relations of lead slags. G. SITZ and K. ENDELL (Metall u. Erz, 1935, 32, 75–77; Chem. Zentr., 1935, i, 2884; cf. B., 1935, 551).—Above 1300°, all Pb slags are sufficiently fluid to flow freely from the furnace, differences in η appearing only below 1300°. The relation of η to the system CaO–SiO₂–Fe₂O₃–FeO shows a “valley” of min. η along the line CaO : SiO₂ = 1 : 2, η increasing below 1300° the greater is the deviation from this composition. J. S. A.

Utilisation of low-grade Alabama manganese ores. C. A. BASORE and E. M. EILAND (Ala. Polytech. Inst. Exp. Sta. Bull., 1935, No. 7, 16 pp.).—The deposits are described. The Mn is extracted by leaching with excess of 1% aq. SO₂. The solution is evaporated to dryness, and the residue heated for 5 min. at 200° to decompose Mn₂S₂O₆. CH. ABS. (e)

Determination of total manganese in manganese ores and sludges. A. T. TSCHERNY (J. Appl. Chem. Russ., 1935, 8, 1304–1308).—The ore is treated with conc. HCl, the solution diluted, and NH₄F, excess of ZnO, and ZnSO₄ are added to the boiling solution, which is then titrated at 100° with KMnO₄. R. T.

Exploitation of the gold-arsenic ores from the Dshetuigar deposit. REUTOVSKI (Nov. Tech. Seri. Gorn. Prom., 1935, No. 2, 9–10).—The ore contained sulphides of Au (23.9 g. per ton), Ag (16.6 g. per ton), and As (2.2% of total wt.), together with Pb and Zn. The production of concentrates by flotation and the treatment of tailings are described. CH. ABS. (e)

Treating Nevijansk ore for recovery of gold. REUTOVSKI (Nov. Tech. Seri. Gorn. Prom., 1935, No. 8, 13–14).—The cyanide process is used. CH. ABS. (e)

Metallurgy of gold and platinum among the Pre-Columbian Indians. P. BERGSØE (Nature, 1936, 137, 29).—New finds of half-finished objects of Au and Pt from Ecuador are described. These are either wrought or made from plate or wire and some show evidence of having been melted on wood charcoal with the help of a blowpipe. Pt grains were apparently joined together by the addition of some Au and alternate heating and hammering into thin plates. L. S. T.

Determination of gold and silver in cyanide sludges. V. G. AGEENKOV, S. M. ANISIMOV, and M. P. VERCHOVTZEV (Sovet. Zolotoprom., 1934, No. 9–10, 33–38).—Current methods yield very inaccurate results. CH. ABS. (p)

Effect of low temperatures on structure and mechanical properties of antifricion alloys. S. S.

NEKRUITUI and B. D. GROZIN (Tzvet. Met., 1934, No. 3, 91–104).—Low temp. (to –50°) have no harmful effects on Sn- or Ca-babbitts, but below this temp. a softening effect is produced, owing to decomp. of Sn–Sb and Pb₃Ca crystals in the Sharpe or Ca-babbitts, respectively.

CH. ABS. (e)

Electrical heat-treatment of light metals. E. F. RUSS (Metallwirts., 1934, 13, 931–933; Chem. Zentr., 1935, i, 2433).—A furnace for the heat-treatment of light metal specimens in a stream of electrically-heated air is described. H. J. E.

Activity of the Dnieper Aluminium Combine during nine months of 1934. A. I. SHELEZNOV (Legk. Met., 1935, 4, No. 1, 13–25).—Artificial cryolite with a NaF : AlF₃ ratio of 2.3–7 gave good results. Alloys of Al with Si, Ti, or Cu were produced by adding Al–Si, TiO₂, or Cu scrap to the electrolyte. Increase in the c.d. from 1.18 to 1.35 amp. per sq. cm. decreased the efficiency by 10% and made operation difficult. Substitution of magnesite for graphite linings increased the output 2–3% and decreased the consumption of raw materials and electrical energy by 2–3%. Si–Al (Si 77–78, Al 20–21, Fe 1–1.5%) was produced by the reduction of kaolin in an electric furnace. CH. ABS. (e)

Preliminary results of the operation of the Dnieper alumina plant. A. M. FRENKEL (Legk. Met., 1935, 4, No. 1, 4–12).—Low-grade bauxites after crushing and agglomeration are fused with coke and limestone in an electric furnace. Fe and Si compounds are reduced to Fe–Si, and Al enters the slag. The latter (Al₂O₃ 42–48, CaO 43–49, SiO₂ 5–8%) is leached, and Al₂O₃ recovered by pptn. with CO₂. The output was 1250 tons of Al₂O₃ monthly (SiO₂ 0.3%). Segregation of Ti out of the Fe–Si caused crusts in the electric furnace, which had to be periodically removed. CH. ABS. (e)

Refining of metals by evaporation in high vacuum. Chromium, aluminium, silicon, and beryllium. W. KROLL (Metallwirts., 1934, 13, 725–731, 789; Chem. Zentr., 1935, i, 2428–2429).—A method of distilling Cr, Al, Si, and Be in large quantities by an induction furnace is described. The separation of Cr from Al and Fe is not sharp. In distilling Al, Mn passes over with the first fraction, and Si, Fe, Cu, and Ti are conc. in the residue. Be is readily distilled. Cu, Si, Al, and Mn tend to pass over with it. The (decreasing) order of volatility is Mn, Be, Al, Si, Cr, Fe, and Ti. H. J. E.

Fatigue strength of light-metal castings. W. LINICUS and E. SCHEUER (Metallwirts., 1934, 13, 829–836, 849–855; Chem. Zentr., 1935, i, 2886).—The strength of Al–Si alloys towards repeated flexion has been investigated with particular reference to the mode of casting. Only eutectic silumin gave uniform results; fatigue strength differs from static strength in being dependent chiefly on the concn. of the mixed crystals. Heat-treatment and hardening have little effect, as also has simultaneous corrosion. J. S. A.

Aluminium in building construction. E. HERRMANN (Aluminium, 1935, 17, 20–28; Chem. Zentr., 1935, i, 2724).—A review of the applications of Al and its alloys. H. J. E.

Determination of the durability of aldreid and pure aluminium. IRMANN and W. MÜLLER (Aluminium, 1935, 17, 7—10; Chem. Zentr., 1935, i, 2724).—Tests prolonged over 1 year gave somewhat higher vals. than Sauerwald's rapid-testing method (cf. Wärme, 1934, 57, 267). H. J. E.

Copper fragments on aluminium wires. M. BOSSHARD (Aluminium, 1935, 17, 16; Chem. Zentr., 1935, i, 2591).—Superficial contamination of Al with Cu fragments picked up during wire drawing etc. causes corrosion and deterioration of mechanical properties. Removal of any Cu by treatment with fused NaOH + NaNO₃, or with 30—50% HNO₃, is recommended. J. S. A.

Velocity of corrosion of duralumin. G. TAMMANN and W. BOEHME (Z. anorg. Chem., 1935, 226, 82—86).—Measurements of the rate of dissolution in 0.9N-HCl of specimens of duralumin which have received different kinds of heat-treatment show that the main factor is the presence of crystallites of Al₂Cu (I), which form local voltaic elements with the residual metal. The max. rate, obtained after heating for 1 hr. at 300°, corresponds with the largest observed increase in the lattice parameter caused by separation of (I). Heating at higher temp. promotes dissolution of (I), and, on quenching, a solid solution is formed which does not give rise to local elements and thus results in a diminished rate of corrosion. F. L. U.

Determination of magnesium in duralumin. G. S. SMITH (Analyst, 1935, 60, 812—814).—The sample is dissolved in 10% NaOH, the washed residue boiled with hot H₂SO₄ (d 1.2) to extract Mg(OH)₂, and the filtered solution treated with ZnO and KMnO₄, excess of the latter being destroyed by addition of EtOH. Mg(OH)₂ is then pptd. from the filtrate with NaOH and NaCN, Zn, Cu, and Ni being thus retained in solution, the washed ppt. is dissolved in dil. H₂SO₄, and the Mg pptd. as MgNH₄PO₄ as usual. A. R. P.

Effect of alkaline detergents on metals. Aluminium, copper, tin, and zinc. C. L. BAKER (Ind. Eng. Chem., 1935, 27, 1358—1364).—The following were determined: (1) max. concn. of Na₃PO₄, 12H₂O, Na₂CO₃, NaOH, and Na₂SiO₃.5H₂O which did not etch tinplate at 60° in a given time, (2) wt. loss from Sn, Cu, and Zn surfaces under the same conditions, (3) wt. loss from Al surfaces in the same detergents, together with Na stearate. Tests with higher-SiO₂ silicates are also included. Apart from the case of Zn, in which least corrosion occurred with Na₂CO₃, in all cases best results were obtained with the silicates, safety increasing with SiO₂ content. With Al reasonable safe ranges of concn. occur with Na silicate solutions. This is perhaps due to the deposition of a SiO₂ film of mol. thickness. A high-SiO₂ solution can be secured by lowering the p_H of a Na silicate solution by means of acid salts such as Na₂HPO₄. C. I.

Rocks containing alkalis from the technical viewpoint. J. GYÖRKI (Földt. Közl., 1933, 63, 189—192; Chem. Zentr., 1935, i, 2422).—Extraction of alkali metals from phonolites is not technically practicable. J. S. A.

History of Flin Flon mine up to construction. R. E. PHELAN (Trans. Canad. Inst. Min. Met., 1935, 55—70).—A review of operating conditions. CH. ABS. (e)

Complex treatment of polymetal sulphide ore of the Takeli (Middle Asia) deposit with gaseous chlorine. D. M. TSCHISHIKOV and A. S. SCHACHOV (Tsvet. Met., 1934, No. 2, 62—72).—The ore contains As 6.56, Pb 2.76, Zn 2.92, Fe₂O₃ 10.70, S 2.60, Cu 0.15, Al₂O₃ 14.20, CaO 2.65, MgO 1.27, CO₂ 1.63, SiO₂ 47.50, H₂O 0.32%, and Ag 315 g. per ton (Au trace). Treatment of the ore with Cl₂ at 500° and extraction with H₂O and with saturated aq. NaCl yielded 93.95, 92—93, and 90% of its Zn, Pb, and Ag, respectively. CH. ABS. (e)

Methods of taking average samples of ores and non-metallic minerals under laboratory conditions. S. T. VOLKOV and L. V. TIMOFEEV (Trans. Inst. Econ. Min. U.S.S.R., 1934, No. 60, 5—36). CH. ABS. (e)

Losses of metal in extraction. A. GÖTTE (Metall u. Erz, 1935, 32, 1—3; Chem. Zentr., 1935, i, 2875—2876).—The recovery of metal is discussed from particles of ore which, from their nature (e.g., porosity and consequent low *d*), are rejected during mechanical concn. Milling and sorting on the basis of relative hardness are advocated. J. S. A.

Flotation. I. Determination of foam effect of flotation media. M. MORTENSON (Kong. Norske Vid. Selsk. Forhandl., 1934, 7, 11—13; Chem. Zentr., 1935, i, 2875).—A method is described for the determination of foam-forming properties of flotation media. The presence of electrolytes exerts a marked effect. J. S. A.

Solution for cleaning metallic parts before painting. N. NEZNAMOV (Nov. Tech. Seri. Gorn. Prom., 1935, No. 7, 11).—The solution contains 28% aq. NH₃, 1, EtOH 26, and H₂O 25 litres. CH. ABS. (p)

Safe pickling solutions for cleaning assembled [metal] apparatus. M. J. VAN DER WAL (Chem. Weekblad, 1935, 32, 709—713).—The velocity of dissolution of clean and rusty Fe, and of Al, Zn, Cu, brass, and bronze plates, in HCl of various concns. and in commercial pickling solutions containing HCl and traces of org. compounds added to inhibit corrosion of the metal surface without inhibiting the removal of rust etc. has been determined over a range of temp. The nature of the added compounds has not been determined with any certainty; in one case it appears to be a plant extract, in another a CH₂O polymeride, and in another (CH₂)₆N₄. All the pickling solutions show a marked superiority over plain HCl for cleaning Fe and Al, particularly so in dil. solution (1—2% HCl) at room temp. and provided that the period of contact with cleaning agent is not too long. Cu, brass, and bronze are not seriously attacked by HCl under suitable conditions, and the org. compounds tend to accelerate corrosion. None of the solutions can be used for cleaning Zn, which is attacked rapidly. The patent literature is reviewed. D. R. D.

Reconditioning [metal]-pickling solutions. S. F. SPANGLER (Iron Age, 1935, 135, No. 15, 11, 64—66).—H₂SO₄ and Fe oxide are prepared from spent pickle liquor by (1) neutralisation and evaporation of the

sulphate solution in a rotary dehydrator, producing nearly anhyd. FeSO_4 ; (2) decomp. of FeSO_4 in a rotary roaster, producing SO_2 and Fe oxide cinder, part of which is used for neutralisation in step (1); (3) conversion of SO_2 into H_2SO_4 with a V catalyst.

CH. ABS. (e)

Corrosion under conditions of ethylene chlorohydrin production. E. V. ISKRA (J. Chem. Ind. Russ., 1935, 12, 947—953).—The reaction mixture (H_2O 81.5—83.5, $\text{CH}_2\text{Cl}\cdot\text{CH}_2\cdot\text{OH}$ 7—7.5, polychlorides 5—6%, and excess of Cl_2) is strongly corrosive to Pb at temp. $> 20^\circ$, and of a no. of alloys tested only ferrosilicon (13—17% Si) is resistant. Of a series of refractory coatings an asbestos-resin plaster gave the best results, whilst none of the lacquers tested gave satisfactory results. R. T.

Blackening of metals. KLEMENTIEV (Nov. Tech. Seri. Gorn. Prom., 1935, No. 7, 9—10).—The articles are immersed in a saturated HNO_3 solution of Cu at 50 — 60° , removed, dried, and heated until the residue becomes black. The surface is then brushed and the process repeated several times.

CH. ABS. (e)

Elimination of the effect of sheet thickness in the Erichsen test. A. VON VEGESACK (Z. Metallk., 1935, 27, 227—235).—The depth of penetration (D) of the standard tool in the Erichsen test is related to the thickness (T) of the sheet tested by $D = D_N(T/1.0743)^{1/4}$ where D_N is the depth of penetration in a sheet of normal thickness (1.073 mm.).

A. R. P.

Protection of iron by directly applied electro-deposits of zinc and cadmium. F. PIETRAFESA (Metall. ital., 1934, 26, 937—948; Chem. Zentr., 1935, i, 2726).—The protective action of Cd against 20% salt-spray is $>$ that of Zn. For 60 days' exposure the crit. thicknesses of the coatings were 0.0075 and 0.015 mm., respectively. Cd is most effective when pptd. from an alkaline bath, and Zn from an acid bath. H. J. E.

Cathodic protection of pipe-lines from soil corrosion. II. S. EWING (Nat. Gas, 1935, 16, 16—20; cf. B., 1935, 1048).—Methods of testing and of calculating the current distribution in soil-buried pipes are described. Costs are discussed.

CH. ABS. (e)

Behaviour of antimony in the electrolytic refining of copper. S. A. PLETENEV and V. V. KUZNETZOVA (Tzvet. Met., 1934, No. 4, 49—61).—The presence of > 25 mg. of Cl' per litre does not affect the solubility (S) of Sb in aq. CuSO_4 . Higher concns. increase S . S is doubled by increasing the $[\text{H}_2\text{SO}_4]$ from 100 to 200 g. per litre. Small amounts of As increase S , but larger amounts diminish it. Fall in temp. from 50° to 18° lowers S by 20%.

CH. ABS. (e)

Direct electrolytic production of copper sheets. A. A. BULACH (Tzvet. Met., 1934, No. 7, 101—115).—Electrodeposition of Cu plate on a rotating drum was carried out successfully from aq. CuSO_4 (150—200 g. of H_2SO_4 per litre), at a c.d. of 500—5000 amp. per sq. m. Addition of colloids is not desirable. For plate thicknesses > 0.50 mm. special compression rollers are necessary.

CH. ABS. (e)

Treatment of electrolytic [copper] sludge at Nishnekuishtuinsk plant. N. N. BARABOSCHKIN and A. I. GAEV (Tzvet. Met., 1934, No. 7, 35—58).—Results

for the application of the Baraboschkin process for extracting Au, Ag, and other metals are described (cf. B., 1927, 194).

CH. ABS. (e)

Stability of lead-alloy anodes in the electrolytic production of zinc. P. S. TROV and I. N. NIKONOV (Tzvet. Met., 1934, No. 6, 53—62).—Pb-Bi anodes (Bi 0.5—10%) were less stable than pure Pb anodes. Alloys with 0.5—10% of Sb were more stable than was Pb at 400° , and less stable than was Pb at 1000 amp. per sq. m. At high c.d. Pb-As alloys were less stable than was Pb. Addition of Ag increased the stability considerably (max. at 2.5% of Ag, when the life of the anode was increased approx. 20-fold).

CH. ABS. (e)

Effect of anode composition on zinc electrolysis. V. G. AGEENKOV and S. L. SOSUNOV (Tzvet. Met., 1934, No. 5, 61—74).—In the electrolysis of Zn ore from a H_2SO_4 bath, addition of Ag (0.46—2.0%) to the Pb anode improves its resistance and lowers the [Pb] in the deposited Zn. Addition of 0.28—1.06% of Ca intensifies the effects due to Ag. Both Ag and Ca improve the mechanical strength of the Pb anode.

CH. ABS. (e)

Treatment of impurities in the production of electrolytic zinc. W. FROELICH (Metal Ind., 1935, 46, 403—406).—A review.

CH. ABS. (e)

Mechanical properties of electrolytic zinc. M. D. ZUDIN (Tzvet. Met., 1934, No. 7, 116—126).—Pure electrolytic Zn assumes a fine-cryst. structure when rolled at 70 — 80° . This is retained up to 200° . At 200 — 250° the crystals grow and the mechanical strength is reduced.

CH. ABS. (e)

Special zinc for manufacture of sheet for battery elements. A. BURKHARDT and G. SACHS (Metallwirts., 1934, 13, 809—813; Chem. Zentr., 1935, i, 2883—2884).—The suitability of Zn sheet is tested by a modification of the Kohen method. Fusion and casting of the Zn are carried out at $> 10^\circ$ above the m.p. Uniform distribution of the impurities is thereby attained, leading to favourable Kohen tests.

J. S. A.

Electrolytic lead-plating in fused mixture of lead, aluminium, and sodium chlorides. V. A. PLOTNIKOV, I. L. KATZNELSON, and N. N. GRATZIANSKI (Mem. Inst. Chem. Ukrain. Acad. Sci., 1935, 2, 149—156).—Fe surfaces are electrolytically Pb-plated in a bath containing fused 1:9.5:11 PbCl_2 - NaCl - AlCl_3 at 330 — 350° (c.d. 2 amp. per sq. dm., for 50—70 min.), 70% of the current being utilised for Pb deposition. The layer of Pb is 0.05—0.06 mm. thick, does not break until bent to an angle of 30° , and does not separate from the Fe at the bends.

R. T.

Development of electrolytic production of antimony in France up to 1925. A. VON ZEERLEDER (Z. Elektrochem., 1936, 42, 27—31).—A review.

Electrolytic tinning. M. CYMBOLISTE (Chim. et Ind., 1935, 34, 1270—1278).—Mainly a discussion of the advantages of alkaline baths containing Sn^{IV} over alkaline or acid baths containing Sn^{II} . The influence of addition agents on deposits from Na_2SnO_3 solutions has been studied.

E. S. H.

Electroplating bismuth on metals. G. S. VOZDVISCHENSKI, M. I. KAMALETDINOV, and N. J. TSCHUSAINOV

(Trans. Butlerov Inst. Chem. Tech. Kazan, 1934, No. 1, 102—107).—Tests on the deposition of Bi on brass from a $\text{Bi}(\text{NO}_3)_3\text{--HNO}_3$ bath [29—93 g. of $\text{Bi}(\text{NO}_3)_3$ per litre] are described. The Bi deposit was smooth and adhered firmly to Fe, steel, Cu, and brass. When polished, it resembled Ni. It resisted corrosion by conc. H_2SO_4 , conc. HCl, 15% HNO_3 , H_2O , moist air, sea- H_2O , 0.1N-NaOH, and N-KOH. CH. ABS. (e)

Aluminium plating of nickelin. N. N. GRATZIANSKI (Mem. Inst. Chem. Ukrain. Acad. Sci., 1935, 2, 141—148).—Nickelin (I) is Al-plated by electrodeposition from fused $\text{AlCl}_3\text{--NaCl}$ (1 amp./sq. dm. at 250°), and a surface oxide layer is formed on the Al. The product so obtained has a lower conductivity than unplated (I), and is 4—6 times as resistant to oxidation at higher temp. R. T.

Technological developments in the plating industry. C. B. F. YOUNG (Metal Clean. Finish., 1935, 7, 165—168).—A comprehensive review. CH. ABS. (e)

Bright [electrolytic] deposits of metals. M. SCHLÖTTER (Z. Metallk., 1935, 27, 236—237).—Practically no electroplated metals are perfectly pure. The grain size and rate of crystal growth (R) are determined to a considerable extent by the nature of the anion of the electrolyte; with increasing mol. vol. of the anion R decreases owing to the formation of a larger no. of nuclei and the resulting deposit has a much finer grain size. The physical and chemical properties of electro-deposits may be profoundly affected by adsorption of halogens, oxides, or sulphides in the lattice structure, e.g., in the deposition of Ag and Cu from complex iodides, and Cr from CrO_3 solutions. Bright Ni deposits contain black NiO in a high-dispersed form which renders them non-passive and capable of taking a satisfactory outer coating of Cr, whereas the deposition of Cr on the purer matt deposits of Ni is difficult. A. R. P.

Flotation. Dedusting blast-furnace gas.—See I. Glass-silvering solution. Refractories in steel and zinc production.—See VIII. Melting furnace. Protecting brass screws etc.—See XI. Protection of underground pipes. Painting Mg alloys.—See XIII. Corrosion by milk. Metals for food industries.—See XIX.

PATENTS.

Condensation of magnesium vapours. MAGNESIUM PRODUCTS, INC. (B.P. 440,274, 9.7.34. U.S., 8.7.33).—A mixture of Mg vapour and CO is rapidly chilled by impingement on a H_2O -cooled surface, e.g., a rotating drum provided with a scraper; the residual gas is then passed through settling chambers and finally through a liquid seal. B. M. V.

[Metallic] packing-material for perishable goods. ALUMINIUMWERK TSCHUELIN G.M.B.H., and K. CREAMER (B.P. 439,603, 15.2.35).—Al foil (already coated by known means, or bare) is coated on both sides with resin (natural, with optional additions of cellulose derivatives, softeners, or hardeners) of such a nature that the foil adheres all over to the article being wrapped, without any air bubbles. B. M. V.

Casting [of metals]. E. G. ÅKERLUND and O. ELMQVIST (B.P. 440,296, 3.12.34).

Plastic compositions.—See XIII.

XI.—ELECTROTECHNICS.

Electric melting furnace [for metals]. E. F. RUSS (Aluminium, 1935, 17, 136—141).—A tilt furnace has a circular vertical trough (T) around the primary coil, which is always filled with Al and serves as a secondary. T connects at the top with the chamber into which the charge is fed. The melting capacity is 3—5 times > that of a fuel-fired hearth furnace of equal capacity. The saving in energy consumption is 30—50%. CH. ABS. (e)

Protecting graphite electrodes from oxidation in electric furnaces. G. F. MORENKO (Domez, 1935, No. 1, 61—62).—Coatings made of liquid glass on graphite electrodes were stable below $800\text{--}900^\circ$. Those made of a mixture of liquid glass with sand were stable up to 1500° . In both cases the coating was damaged as the electrode was passed through the holder. Coatings of Al, Cu, or Fe were most successful. Fe and steel coatings 0.2 mm. thick prevented oxidation up to $1000\text{--}1100^\circ$. CH. ABS. (e)

Protection of brass screws and soldered parts of accumulators from oxidation. W. SEITZ (Z. techn. Physik, 1935, 16, 12—13; Chem. Zentr., 1935, i, 2707).—The metal parts are protected from corrosion by H_2SO_4 by bored Zn blocks, by pieces of white marble, or by glass tubes containing NaHCO_3 . H. J. E.

Practical potentials of water decomposition. N. P. ESAULOV (Chimstr., 1935, 7, 71—75).—The performance of the Fauser cell is discussed. CH. ABS. (e)

Storage-battery charging. J. L. WOODBRIDGE (Elec. Eng., 1935, 54, 516—525).—Data affecting charging conditions are given and discussed. CH. ABS. (e)

Determining V oxides in ores.—See VII. Firing of ceramic products. Refractories in steel and zinc production.—See VIII. Welding steel. Heat-treating light metals. Dnieper Al and Al_2O_3 . Protecting Fe and pipe-lines. Electro-Cu. Treating Cu sludge. Electro-Zn. Zn sheet. Pb-plating. Sb. Tinning. Bi-plating. Al-plating nickelin. Plating-industry developments. Bright electro-deposits.—See X. Electrophoresis of latex.—See XIV. Determining κ of molasses, and p_H in the sugar industry.—See XVII.

PATENTS.

Induction furnace with an open iron yoke. SIEMENS & HALSKE A.-G. (B.P. 439,590, 25.10.34. Ger., 6.2.34).—The crucible is star-shaped in plan and pole pieces extend between the points of the star to a radial distance from the centre $\frac{1}{2}$ the λ of the electro-magnetic radiation. The exciting coils, preferably polyphase, are wound on a ring yoke. B. M. V.

Electric storage batteries. N. V. PHILIPS' GLOEI-LAMPENFABR. (B.P. 439,917, 21.12.34. Ger., 14.3.34).—Bipolar plates comprising discs made of a mixture of

synthetic resin and graphite are filled with solutions of one or more sol. Pb salts, *e.g.*, Pb boro- or silico-fluoride.

J. S. G. T.

Manufacture of storage-battery plates. Y. TACHIHARA, Assee. of Nihon Denchi Kabushiki Kaisha (B.P. 439,822, 15.6.34. Jap., 9.8.33).—Prior to (and, if desired, intermediately to several stages of) forming, the grid filled with paste is immersed in $H_2S_2O_8$. B. M. V.

Dry-plate rectifiers. GEN. ELECTRIC CO., LTD., and R. W. REES (B.P. 440,369, 29.6.34).—A film of highly-insulating material, *e.g.*, Al_2O_3 , is deposited on one surface of the non-metallic layer separating the electrodes. [Stat. ref.] J. S. G. T.

Manufacture of electrodes for electrolytic condensers. S. G. S. DICKER. From N. V. MAAT. TOT EXPLOIT. VAN UITVINDINGEN (B.P. 439,789, 26.9.34).—The electrode surface, *e.g.*, of Al, is increased by etching with a solution of HNO_3 and $C_5H_{11}OH$. J. S. G. T.

Production of electrodes for electrolytic condensers and like apparatus. MAGNAVON CO., Assees. of J. J. BARRETT (B.P. 440,221, 12.11.34. U.S., 11.11.33).—Electrodes, after being washed, *e.g.*, in aq. HF, NaOH, or HNO_3 , are etched in aq. $CuCl_2$. [Stat. ref.]

J. S. G. T.

Electrolytes for use in electrolytic condensers. F. C. STEPHAN, and TELEGRAPH CONDENSER CO., LTD. (B.P. 439,788, 28.5.35).—An electrolyte produced by heating $O[C_2H_4OH]_2$ Et ether with H_3BO_3 , a base containing aq. NH_3 , NaOH, or KOH and an ethanol-amine, and having pH 6.0–6.8 is claimed. J. S. G. T.

[High-pressure] electrolytic gas producers. L. SCHIRMER (B.P. 440,247, 12.7.35).—Electrodes and diaphragms conform substantially in shape and size to the cross-section of the electrolyser vessel so that there are no unused spaces in the completed assembly.

J. S. G. T.

Photo-cells. SÜDDEUTS. APPARATE-FABR. G.M.B.H. (B.P. 439,942, 11.10.35. Ger., 17.10.34).—A semi-conducting coating, *e.g.*, of Se, is firmly welded to a base-plate made of a light metal, *e.g.*, Al, covered by a metal of the Fe group, *e.g.*, Ni.

J. S. G. T.

Manufacture of [selenium] photoelectric cells. BRIT. THOMSON-HOUSTON CO., LTD. (B.P. 439,774, 18.3.35. U.S., 21.3.34).—A Se film coated with a film of a group II metal, *e.g.*, Cd, is coated with a film of non-oxidisable metal, *e.g.*, Pt.

J. S. G. T.

Cathode-ray tubes. J. L. BAIRD, and BAIRD TELEVISION, LTD. (B.P. 440,386, 13.10.34).—A luminescent screen comprising a mixture of an incandescing substance with a fluorescing and/or phosphorescing and/or thermo- or tribo-luminescing substance is claimed. Examples of suitable incandescing substances are finely-divided C or (sputtered) metals alone or with Pt-black or spongy Pt; as fluorescent materials fluorspar, troostite, $BaPt(CN)_6$, or KUO_2SO_4 may be used, and ZnS containing traces of Mn salts forms a useful substance capable of exhibiting tribo- or thermo-luminescence.

J. S. G. T.

Apparatus for carrying out colorimetric determinations. H. C. S. DE WHALLEY, J. D. ATKINSON, and TATE & LYLE, LTD. (B.P. 440,365, 28.6.34).—The test

solution and a reagent, *e.g.*, H_2O from sugar refineries and Molisch's reagent, are automatically mixed and delivered to a cell in which they are viewed by a lamp and photo-electric cell.

B. M. V.

[Radiation] pyrometers. W. J. CLARK, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 440,188, 23.5.34).—The pyrometer comprises a photo-electric cell of the type which converts radiant into electrical energy without an external source of power, though the use of an amplifier is not excluded. A condensing lens or mirror is so placed that every point in the sensitive surface of the cell (or in the aperture of a stop placed close to it) receives radiation from the hot surface of which the temp. is to be measured, irrespective of the distance of the apparatus. A glass screen, and beyond that a flush of cool air, may be provided.

B. M. V.

Electrolytic condensers. H. BARON. From SIEMENS & HALSKA A.-G. (B.P. 440,366, 29.6.34).

Electrolytic condensers. DUBILIER CONDENSER CO. (1925), LTD., Assees. of W. DUBILIER and J. OPPENHEIMER (B.P. 438,950, 8.4.35. Ger., 9.6.34).

Electron-discharge devices. STANDARD TELEPHONES & CABLES, LTD., Assees. of J. O. McNALLY (B.P. 439,159, 27.7.35. U.S., 7.9.34).

Electron emitters for [high-frequency] electron-discharge devices. STANDARD TELEPHONES & CABLES, LTD., Assees. of E. A. VEAZIE (B.P. 440,094, 27.7.35. U.S., 5.9.34).

Electric incandescence lamps. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 440,192, 14.6.34. Holl., 24.6.33).

Permanent magnets. C. A. and A. C. GARDNER (B.P. 440,279, 8.8.34).

Heating H_2O . Temp. control.—See I. Refining halogenated hydrocarbons.—See III. Treating rubber.—See XIV.

XII.—FATS; OILS; WAXES.

Size of liver of *Teleostei*, and their fat and vitamin-A content. S. SCHMIDT-NIELSEN, A. FLOOD, and J. STENE (Kong. Norske Vid. Selsk. Forhandl., 1934, 7, 70–73; Chem. Zentr., 1935, i, 2619–2620; cf. A., 1935, 414).—An improved technique of fat extraction is described. Small livers low in fat contain more vitamin-A than do fat livers. Within any one species there is great variability.

J. S. A.

Refining of soya oil to preserve its food value. A. A. HORVATH (Food Ind., Aug., 1935, 2 pp.).—A brief account of recent methods; the vitamin content of solvent-extracted soya-bean oil is emphasised.

E. L.

Refining of whale oil. R. DIETERLE (Seifensieder-Ztg., 1935, 62, 160–161; Chem. Zentr., 1935, i, 2749).—The oil is deacidified and bleached before hydrogenation, after which it is further submitted to suitable deacidifying, bleaching, and deodorising treatments; acid oil is recovered from the soap stock by acidifying with H_2SO_4 , and the oily bleaching-earth residues are extracted with light petroleum.

E. L.

Analysis of Argentine grape-stone oil. R. ROUZAUT (Rev. Fac. Quim. Ind. Agric., 1934, 3, 192—195).—A close similarity with the oil from other countries was observed. d , n_D , m.p., η , sap. and I vals., solubility, and other properties are recorded. F. R. G.

Polyethenoid acids of the *n*-octadecane (C_{18}) series present in aquatic animal oils. T. G. GREEN and T. P. HILDITCH (J.S.C.I., 1936, 55, 4—8 T).—The unsaturated C_{18} acids of whale oil consist mainly of octadecenoic acids (about 90%), chiefly oleic acid with small proportions of an isomeride. About 3% is tetraethenoid ["stearidonic acid" (I), $C_{18}H_{28}O_2$]. The remainder (7%) may contain octadecadienoic acids. The unsaturated C_{18} acids of cod-liver oil include about 70% of monoethenoid acids (chiefly oleic, with small proportions of an isomeric acid $C_{18}H_{34}O_2$) and < 10% of (I). Linolenic acid (II) is not present in either oil, and ordinary linoleic acid (III), if present, is in extremely small amounts. The unsaturated C_{18} acids from the fat of grass-feeding carp contained smaller proportions of (I) but definite amounts of (II) and (III). Cryst. hexa- and tetra-bromostearic acids were isolated in quantities respectively equiv. to about 11% and 6% of the total C_{18} acids. These findings were confirmed by the isolation of hexa- and tetra-hydroxystearic acids after oxidation of the unsaturated acids with aq. alkaline $KMnO_4$. The octadecenoic acid in this carp oil appeared to be wholly oleic acid, and gave without difficulty Δ^9 -dihydroxystearic acid, m.p. 129—130°. The unsaturated C_{18} acids from the fatty matter present in the grasses fed to the carp contained (II) and probably (III), but only traces of (I).

Manufacture of soap. C. M. ADCOCK (Ind. Chem., 1935, 11, 181—182, 190).—Semi-large-scale plant is described whereby oils are saponified with NaOH or Na_2CO_3 in a continuous process by passing the mixed reactants rapidly (reaction time about 30 sec.) under pressure (800—1500 lb./sq. in.) through a narrow reaction tube which is heated externally to about 300°; the saponified product is cooled, and dried if required, by spraying. E. L.

Different behaviour towards soap of the total and permanent hardness of calcareous water. E. JUSTIN-MUELLER (J. Pharm. Chim., 1935, [viii], 22, 563—565).—Hard tap- H_2O with a few drops of soap solution gives a ppt., but after being boiled and filtered a homogeneous disperse system which is pptd. by NaOH is formed. J. L. D.

Carbonisation of fats.—See II. **Solvents.**—See III. **Variability of [oil-bearing] plants.**—See XVI. **Butter. Vegetable oils [as nutrients].**—See XIX.

PATENTS.

Treatment of seeds containing oil and fat, and cereals. M. NEUFELD & Co. (B.P. 440,193, 15.6.34. Ger., 22.9.33 and 7.6.34).—Cereal and oil seeds are prepared for human or animal food by swelling the uncrushed grains at $\geq 70^\circ$ by steeping in H_2O (or acidulated or medicated H_2O etc.) and passing them by suitable apparatus (claimed) between co-acting, heated, revolving cylinders, whereby the seeds are crushed and rapidly dried; the temp. of the cylinders

and time of contact can be regulated so as to afford a heat-treatment (for flavouring) after the drying if required. E. L.

Obtaining a highly swellable body from [wool] waxes. H. COHN and C. SIEBERT (B.P. 439,269, 14.2.35. Ger., 14.2.34).—The wax, particularly wool wax, is saponified at room temp. with a solution of EtOH-KOH containing light petroleum; the EtOH-insol. products (sterols etc.) are removed, and the EtOH solution is poured into H_2O in order to ppt. the desired swellable mass (chiefly H_2O -insol. K soaps of higher fatty acids), which is washed with H_2O and dried if required. The product, which can spontaneously absorb large amounts of H_2O , is useful in the prep. of salves, emulsions, etc. E. L.

Treatment of waxes, fats, or mixtures of higher fatty acid esters, or of higher alcohols. EDELEANU GES.M.B.H. (B.P. 439,128, 11.7.34. Ger., 12.7.33 and 14.6.34).—The more and the less saturated constituents of fats, waxes, fatty acid esters, or higher alcohols containing $> C_7$ are separated by dissolving the whole material at a raised temp. (25—50°) in a suitable solvent from which the more saturated compounds are pptd. on cooling to, e.g., -15° to 15° ; liquid SO_2 , PhOH, $\beta\beta'-(C_2H_4Cl)_2O$, aliphatic, aromatic, hydroaromatic, or chlorinated hydrocarbons, ketones, alcohols, esters, and CS_2 are among the suggested solvents. E. L.

Manufacture of washing preparations and the like. LEVER BROS., LTD., R. FURNESS, and A. FAIRBOURNE (B.P. 439,435, 4.9.34 and 16.2.35).—Products in loose powder form are obtained by mixing H_2O -sol. higher fatty or cycloaliphatic esters of polyglycerol with 2—4 pts. (by wt.) of a sol. sulphate, e.g., of Na, K, NH_4 , or Mg, or mixtures thereof, and drying. Alkali meta- and/or pyro-phosphates may also be added. A. W. B.

Cleansing and like agents. W. J. TENNANT. From HENKEL & Co., G.M.B.H. (B.P. 439,493, 1.6.34).—Mixtures of alkali or org.-base meta- (I) and pyrophosphates (II), (II) being substantially > 10 wt.-% of (I), incorporated with cleansing, foaming, or penetrating agents other than per-compounds, are claimed. A. W. B.

Textile assistants.—See III. **Resinous substances similar to lac.**—See XIII.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Aluminium-bronze paints. F. J. PETERS (Farbe u. Lack, 1936, 4—6, 15—16; cf. B., 1934, 1019).—Eleven samples of Al-bronze (I) in nine varnish media were brushed on sand-blasted Fe plates and exposed for 7 years. Those spread in a nitrocellulose lacquer or on a white-Pb (II) undercoat failed rapidly; all other 2-coat systems on pigment-in-oil undercoats remained satisfactory. With only one coat and no primer a black discoloration developed which was removable with dil. NaOH, the metal beneath being scarcely attacked; microscopical examination showed that rusting was restricted to exposed areas (brush furrows) through which, in presence of moisture, Fe ions probably migrated to produce a protective oxide. When spread on the even surface of a primer the pigment scales overlap and complete the film, particularly with two coats. H_2O -

absorption data after accelerated weathering were of the same order as those for Pb_3O_4 and (II); it is inferred that these data are not a measure of rust prevention (cf. B., 1934, 70). When (I) contained scales of varying sizes good protection was afforded without a primer; otherwise the various samples were equally efficient.

S. M.

Specifications for protection of underground pipes. K. H. LOGAN (Ind. Eng. Chem., 1935, 27, 1354—1357).—General conclusions based on research since 1922 on pipe coatings are summarised. Knowledge on these matters is not yet on a quant. basis, but no known coating gives complete protection in any soil, and the economic aspect of their use is still guesswork. Specifications for coatings are discussed.

C. I.

Antifouling paints. S. OSHIMA (J. Soc. Chem. Ind., Japan, 1935, 38, 664 B).—Test data on panels submerged in Osaka harbour for 4–6 summer months show that Hg, unaccompanied by Cu, has no toxic properties for preventing fouling by growth.

T. W. P.

Tint retention [in paints]. C. D. HOLLEY (Paint, Oil and Chem. Rev., 1935, 97, No. 25, 9–10).—Exposure tests (details reported) indicate that the fading of pale-coloured paints containing a white pigment tinted with a coloured pigment is frequently due to chalking, the pigment coming to the surface and presenting a paler appearance when it is no longer covered by an oil film. The defect is remedied by choosing white pigments which do not chalk badly, or media (e.g., alkyd-resin media) which inhibit chalking.

D. R. D.

Surface preparation and painting of magnesium alloys. A. W. WINSTON, J. B. REID, and W. H. GROSS (Ind. Eng. Chem., 1935, 27, 1333–1337).—Paint does not adhere well to untreated Mg-alloy surfaces, nor is mechanical roughening or weathering beneficial. The best chemical prep. is a dip of 15–120 sec. duration at room temp. in an aq. solution containing 1.5 lb. of $\text{Na}_2\text{Cr}_2\text{O}_7$ and 1.5 pints of conc. HNO_3 per gal., followed by rinsing in cold and then in warm H_2O . When the bath concn. has fallen to about half its HNO_3 content it should be brought back to the original val. Iridescent coatings are produced by air-exposure before washing. The protective effect is due to both etching and passivation. The best primer pigment for good protection is ZnCrO_4 . Many common pigments promote corrosion. The vehicle and the primer-vehicle ratio both affect adhesion. Finishes based on phenolic-type resins have good resistance to H_2O and sea- H_2O .

C. I.

Chemical developments in finishing industries. J. M. FAIN (Metal Clean. and Finish., 1935, 7, 117–120, 135–136).—Properties and applications of asphalt emulsions and rubber-base paints are described.

CH. ABS. (p)

Preparation of precipitated white lead. A. V. PAMFILOV and E. I. IVANTSHEVA (J. Appl. Chem. Russ., 1935, 8, 1157–1163).— PbO is added to aq. AcOH until the solution contains 180 g. of $\text{Pb}(\text{OAc})_2$ + 90 g. of excess PbO per litre, and CO_2 is passed until the d of the solution falls from 1.20 to 1.14, corresponding with a fall in p_{H} of from 7.6 to 6.4. The product so obtained is in no way inferior to that given by the dry process.

R. T.

Lithopone and other zinc sulphide pigments. H. MILLS (Oil and Col. Trades J., 1936, 89, 213–218).—The manufacture of lithopone and other ZnS - BaSO_4 pigments and pure ZnS of high hiding power and tinting strength for pigment purposes is described and their properties and use as paint pigments are discussed.

D. R. D.

Stone mills for pigment grinding. W. KLENK (Farben-Ztg., 1935, 40, 1293–1294).—The advantages of stone over other types of mills for coarse or fine dry-grinding of pigments are indicated. Details of facing the stones are given, and the general operations are discussed.

S. S. W.

Colour-permanence in printing inks. J. S. TURNER (Amer. Ink Maker, 1936, 14, No. 1, 19–21).—Factors affecting colour-permanence are discussed and about 50 pigments are classified into four groups according to their light-fastness.

D. R. D.

Synthetic finishes. R. J. LEDWITH (Oil and Col. Trades J., 1936, 89, 292–293).—A brief account of the composition and properties of alkyd-resin finishes is given.

D. R. D.

Analysis of lacquer [solvents]. R. C. MARTIN (Metal Clean. and Finish., 1935, 7, 185–188).—Methods for chemical analysis and technical testing are given.

CH. ABS. (p)

Plastic masses from low-grade coal. S. I. VOLFKOVITSCH (Nov. Tech. Seri. Gorn. Prom., 1935, No. 3, 3).—Soft coal is treated with NH_3 at 6–8 atm., $(\text{NH}_4)_2\text{CO}_3$ is distilled off, and the plastic masses formed are completely sol. in H_2O . Their N content is up to 20%; they may be used as fertilisers with or without partial neutralisation with H_3PO_4 .

CH. ABS. (p)

Asphaltic plastic masses. S. SCHAPIRO (Nov. Tech. Seri. Gorn. Prom., 1935, No. 7, 6).—Material resembling linoleum is prepared by heating < 50 pts. of petroleum asphalt with 5 pts. of FeCl_3 for 1 hr. at 300° with gradual addition of 50 pts. of tung oil. The product is suitable for tiles, insulation, etc.

CH. ABS. (p)

Plastic masses from wood-pulp waste. A. P. ROSHDESTVENSKI (Nov. Tech. Seri. Gorn. Prom., 1935, No. 5, 6–8).—Pine chips are autoclaved with 1% aq. NaOH at 145–160° until 150% of H_2O is incorporated. The product is disintegrated and treated with a paraffin-resin soap- NaOH emulsion, dried, and pressed. The final product has d 0.17–0.19, heat-conductivity factor 0.049 at 47°, and absorbs 4–4.5% of H_2O from moist air.

CH. ABS. (p)

“Faolit,” a new acid-resistant plastic mass. S. SCHAPIRO (Nov. Tech. Seri. Gorn. Prom., 1935, No. 7, 6).—A PhOH - CH_2O mixture is heated at 100° for 24 hr. with 0.1% NaOH and dried in vac. (40–80 mm.) at 60–90°. The mass is mixed with chrysotile. Containers coated with the material were resistant to HCl .

CH. ABS. (p)

Preparation of oil-soluble resin from polyhydric alcohol and polybasic acid. J. C. WEE (J. Chinese Chem. Soc., 1935, 3, 321–324).— β -Dichloropropanol when heated with castor-oil soap at 180° yields an oil which when treated at 200–210° during 3 hr. with $\text{o-C}_6\text{H}_4(\text{CO}_2)_2\text{O}$ (I) affords a plastic resinous mass sol.

in oil in all proportions. Castor oil, dehydrated glycerin, and NaOH, when heated in an atm. of CO_2 at 250–260° (3 hr.) and then with (I) at 200–210° (3 hr.), afford a slow-drying resin, sol. in CHCl_3 , Et_2O , COMe_2 , PhMe, and C_6H_6 –EtOH, and suitable for varnish blending.

H. G. M.

Behaviour of [oil-modified glyptal] resins in nitrocellulose lacquers. A. KRAUS (Farben-Ztg., 1936, 41, 56–57).—Various proportions of a drying-oil glyptal and two non-drying-oil glyptals were incorporated with a nitrocellulose base containing plasticiser, the resulting clear lacquers being submitted to normal exposure on sand-blasted steel in April, 1935. An interim report shows that a nitrocellulose-resin ratio of 1 : < 1 gives clear lacquers of poor durability. The optimum ratio is 1 : 1.5, higher proportions of resin not leading to improved durability. Pigmented lacquers on similar lines have been exposed for 1½ years, and are still in good condition.

S. S. W.

Plasticisers in cellulose esters. T. H. DURRANS (Oil and Col. Trades J., 1936, 89, 296–297).—A review.

D. R. D.

Sulphitation of lac. R. BHATTACHARYA and L. C. VERMAN (London Shellac Res. Bur., 1936, Tech. Paper No. 6, 20 pp.).—Lac can be dispersed in cold aq. H_2SO_3 , but not in liquid SO_2 ; the wax content is filtered off. Slow gelation ensues on keeping in consequence of loss of SO_2 and its oxidation to H_2SO_4 ; the gel is also pptd. by heat and addition of electrolytes. Glycerol, $\text{N}(\text{C}_2\text{H}_4\text{OH})_3$, PhOH, etc. act as stabilisers. Six SO_2 mols. are probably linked to each lac mol. by means of O atoms in C–O–C groups. The H_2SO_3 dispersions can be used as spirit varnishes; baking at 120° improves the film. Moulding powders are obtained by introducing fillers and air-drying the mixture. Dispersions may also be prepared by (a) treating a solution of lac in Na_2CO_3 with cold aq. NaHSO_3 , and (b) heating the lac in aq. NaHSO_3 at 60–80°. The (b) products do not gel even when heated, and films made from them are H_2O -sol. but become resistant to H_2O , acids, and alkalis when baked; they may be used as H_2O -paint media. Since other common resins are insol. in aq. H_2SO_3 and NaHSO_3 , the reaction can be used for testing and evaluating lac samples.

S. M.

Solvents.—See III. Hydrated Na silicates [for paints]. CaC_2 residues.—See VII. Cleaning metal parts.—See X.

PATENTS.

Metal-base liquid compositions such as paints, enamels, lacquers, and oil primers. C. D. RYDER (B.P. 439,946, 9.5.34. Austral., 10.5.33).—20–75% of finely-divided stainless steel (passing 100-mesh) is incorporated in self-drying paint etc. vehicles.

S. S. W.

Manufacture of intaglio printing inks. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 439,524, 22.8.34).—Solutions in petroleum hydrocarbons [of high b.p. (130–180°) and flash point (> 30°)] of resins, e.g., polybasic acid-polyhydric alcohol, hardened rosin, and cyclohexanone types, are emulsified with dyes and H_2O , as aq. dye pastes if desired, in presence of emulsifying agents, e.g., reaction products of high-mol. aliphatic

or cycloaliphatic carboxylic acids or alcohols with alkyl-ene oxides, polyglycols, amino- or hydroxy-alkyl-sulphonic acids.

S. S. W.

Prevention of offset of ink in printing operations. J. A. PAASCHE (B.P. 439,078, 29.11.34).—Newly printed sheets are sprayed with a mist coat of a protective material dissolved or suspended in a non-inflammable solvent mixture, e.g., gum arabic-wood alcohol- CCl_4 , or gum arabic-glucose-EtOH- H_2O , the fine solid deposit being sufficient to avoid offset without interfering with subsequent printing operations. Suitable apparatus is described and illustrated for effecting substantially complete evaporation of volatile matter in the time of travel of the spray to the sheets.

S. S. W.

Manufacture of composition enamels [for photo-engraving plates]. J. J. MURRAY (B.P. 439,093, 15.3.35).—A mixture of thin liquid fish glue, conc. aq. NH_3 , CrO_3 , EtOH, and H_2O is irradiated by a 1000-watt incandescence lamp for approx. 4 hr. and then heated for 1 hr. at approx. 127° under 20 lb. pressure, giving an enamel of exceptional keeping qualities, especially adapted for half-tone printing.

S. S. W.

Manufacture of lacquers, covering and coating compositions, plastic masses, foils, threads, and moulded articles. W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 440,259, 13.6.34).—Abietinol and derivatives are used as solvents, plasticisers, etc.

S. M.

[Plastic] compositions of matter. I. G. FARBENIND. A.-G. (B.P. 439,899, 9.7.34. Ger., 8. and 22.7.33).—Polymerides of aliphatic hydrocarbons having a branched C chain (isobutylene) are prepared at Δ –10° in presence of a Friedel-Crafts catalyst, e.g., BF_3 . Wax, fillers, sugar, etc. may be incorporated for making sealing preps., chewing gum, adhesives, coatings for wood or metals, waterproofing paper or fabrics, etc.

S. M.

Production of plastic materials. W. J. TENNANT. From J. C. PATRICK (B.P. 439,355, 31.5.34).— $\omega\omega'$ -Dihalogeno-ethers [excluding $\beta\beta'$ -($\text{C}_2\text{H}_4\text{Cl}_2\text{O}$)] are condensed with H_2O -sol. polysulphides [Na_2S_4 or CaS_4 in aq. EtOH in presence of a dispersing agent, e.g., pptd. $\text{Mg}(\text{OH})_2$] to give rubber-like substances. The use of ethylene glycol bis- β -chloroethyl ether is specifically claimed.

H. A. P.

Manufacture of articles from plastic materials. KODAK, LTD. (B.P. 439,344, 4.3.35. Fr., 13.12.34).—The solidification of films, threads, etc. deposited from solutions of cellulose nitrate, resins, etc. is accelerated by maintaining a considerable temp. difference between the extraction agent and the support. E.g., air at 80–100° is passed over a film of the solution which is spread on a chilled surface.

S. M.

Manufacture of moulding powders [from methylacrylonitrile]. TRIPLEX SAFETY GLASS Co., LTD., and J. WILSON (B.P. 439,169, 25.5.34. Cf. B.P. 421,397; B., 1935, 195).—A mixture of non-emulsified CH_2CMeCN (100 pts.) and a plasticiser (Δ 20 pts.) is polymerised and the product powdered. Bz_2O_2 or other catalyst and other polymerisable substances may be added. Ten examples are given.

S. M.

Making moulded articles from impregnated fibrous materials. F. WOLFF (B.P. 439,046, 28.5.34).—Cotton, hemp, or other fibrous material is felted or loosely webbed into ductile sheets, tapes, etc., which are then impregnated with an artificial resin or bitumen etc.; the product is dried and pressed, using dies or moulds. Relative displacement of the fibres takes place under pressure and is increased by adding a substance which evolves a gas, *e.g.*, excess of CH_2O . The material is preferably pretreated to increase its elasticity, plasticity, and absorptivity. S. M.

Manufacture of condensation products of formaldehyde-urea type. W. KRAUS (B.P. 438,887, 17.5.34. Ger., 18.5.33).—Resins which after prolonged storing or heating do not harden and either remain H_2O -sol. or yield reversible gels are obtained by condensing at $< 70^\circ$ urea (I) (1–10 mols.), CH_2O (II) (1–20 mols.), and $(\text{CH}_2)_6\text{N}_4$ (1 mol.) in absence of acid. If an acid catalyst is used the proportions of (I) and (II) are reduced. The m.p. of the gel or the η of the solution increases with the p_{H} of the medium. Gel formation is also controlled by addition of starch, gum arabic, etc. 16 examples are given. [Stat. ref.] S. M.

Manufacture of condensation products from urea, formaldehyde, and hexamethylenetetramine. Soc. CHEM. IND. IN BASLE, Assees. of W. KRAUS (B.P. 439,932, 29.5.35. Switz., 29.5.34. Cf. B.P. 438,887; preceding abstract).—Non-hardenable resins which are made by heating a mixture of urea (1 mol.), CH_2O (< 1 mol.), and $(\text{CH}_2)_6\text{N}_4$ (< 0.1 mol.), with or without an acid catalyst, are converted into hardenable products by condensation with more CH_2O (0.5 mol.). S. M.

Polymerisation of acrylic esters. O. RÖHM (B.P. 439,390, 3.12.34. Ger., 2.12.33).—Acrylic esters are polymerised by known methods in presence of $> 20\%$ (approx. 1% or less) of one or more "moderating agents" of the unsaturated cyclic terpene group, *e.g.*, turpentine or melissene oil, rosin. S. S. W.

Manufacture of a covering, resembling linoleum, for floors and like surfaces. H. JAEGER (B.P. 439,922, 28.1.35).—Known fillers incorporating binders if desired, *e.g.*, disintegrated paper, poppy seeds, pine cones, etc., and further oxidisable binding materials and colouring matter as required, are mixed in the cold and applied to a base (cardboard), the composite material being compressed or rolled and then slightly heated (45°) to oxidise the binder. S. S. W.

Improving natural resins and gums by distillation. E. W. FAWCETT, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 440,190, 13.6.34).—Products having reduced colour are obtained by the process of B.P. 437,895 (B., 1936, 47); the resin is preferably dispersed in a non-volatile medium, *e.g.*, stand oil. S. M.

Manufacture of resinous substances similar in composition and properties to lac. E. E. DUTT (B.P. 439,835, 16.6.34).—The husks of oil-bearing fruits and seeds, *e.g.*, olive, are rendered oil-free and hydrolysed with a weak org. base which is a solvent for the resin, *e.g.*, NH_2Ph , $\text{C}_5\text{H}_5\text{N}$; the product is washed with H_2O and the solvent distilled off. S. M.

Production of artificial [resinous] masses. E. POLLAK (B.P. 439,270, 18.2.35. Austr., 19.2. and 17.4.34).—Urea (6 mols.) is heated in aq. solution with $(\text{CH}_2)_6\text{N}_4$ ($1\frac{1}{2}$ mols.) for 40–50 hr. or 18–24 hr. if an acid or sol. salt, *e.g.*, HNO_3 , NH_4Cl , is added. The soft resinous product is heated at 110 – 130° after extracting by-products with, *e.g.*, EtOH , $\text{C}_2\text{H}_2\text{Cl}_4$, to yield a hard mass which, after removal of H_2O -insol. constituents, can be condensed with CH_2O (3 mols.) in weakly acid aq. solution at 60 – 140° . A resistant, transparent resin is obtained. S. M.

Production of artificial resins. H. D. ELKINGTON. From A. NOWACK A.-G., and R. HESSEN (B.P. 439,378, 17.8.34).—Cloudiness in phenol-aldehyde and other heat-hardenable resins is avoided by moulding an intimate mixture of a resolite with a larger proportion of a resite. The latter is prepared by heating a resolite or resitole in thin layers or powder form, both components being free from H_2O and volatile matter. The mixing is preferably effected under heat and pressure. S. M.

Casting of articles from synthetic resins. L. NAST and J. C. VREDENBURG (B.P. 440,043, 4.7.34).—As moulds, rigid, thin, non-metallic, thermoplastic materials excluding glass, *e.g.*, celluloid, cellulose acetate, coated on the inside if desired with glycerin, paraffin oil, or a metal spray (Cu, Sn), to improve flow of resin and assist removal of the moulded article, are employed. S. S. W.

Manufacture of moulding plastics. E. I. DU PONT DE NEMOURS & Co. (B.P. 440,741, 6.7.34. U.S., 6.7.33).—See U.S.P. 1,978,533; B., 1935, 915.

Manufacture of [preliminarily moulded] multi-coloured patterned articles. BISONIT GES.M.B.H., Assees. of K. GULLICH (B.P. 438,941, 7.5.35. Ger., 8.5.34).

Grinding paint.—See I. Abrasive sheet.—See VIII. Packing perishable goods.—See X.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Importance of p_{H} in the electrophoresis of [rubber] latex. M. DÉRIBÉRE (Caoutchouc et Gutta-Percha, 1936, 33, 17,397–17,398).—The influence of p_{H} on the direction of electrophoresis, on the rate of deposition, and on the character of the rubber deposit is reviewed. D. F. T.

Organic catalysts. XI. **Vulcanisation accelerators.** W. LANGENBECK and H. C. RHEIM (Ber., 1935, 68, [B], 2304–2306).—"Vulkacit DM" [dibenzothiazyl 2:2'-disulphide (I), $(\text{C}_6\text{H}_4 \begin{smallmatrix} \diagup \text{N} \diagdown \\ \text{S} \end{smallmatrix} \text{C}\cdot\text{S})_2$], is freely sol. in molten S and melts containing much or little S crystallise when cooled, whereas those with 25–55% of S do so incompletely or remain completely resinous. From all the products (I) is obtained unchanged after extraction with CS_2 so that only unstable additive compounds, if any, are present. Examination of the m.-p. diagram indicates two maxima, one corresponding to a compound of (I) and S_2 , whereas the other is insufficiently defined. H. W.

Colour reactions of accelerators etc.—See III. [Rubber-base paints for] finishing industries.—See XIII.

PATENTS.

Preparation of dry rubber in finely-divided solid condition by spraying latex in a drying atmosphere. RUBBER-LATEX-POEDER-COMP. N.V., and M. J. STAM (B.P. 439,777, 8.4.35).—Latex before spraying is mixed with a substance [e.g., CH_2O , $\text{Mg}(\text{HCO}_3)_2$, or water-glass] or substances [e.g., dissolved starch and CH_2O or PhOH , or protein and a tanning agent, or sugar and $\text{Ca}(\text{OH})_2$] which in the process of spraying and drying, and possibly by reaction with the serum solids, will form a new substance as an insol. or sparingly sol. coating around the spray-dried rubber particles.

D. F. T.

Treatment of rubber and like latices and compositions, and manufacture therefrom of articles of various kinds. PREMIER WATERPROOF & RUBBER CO., LTD., L. R. RIDGWAY, and S. DEARNALEY (B.P. 439,364, 8.6.34).—Aq. dispersions of rubber are gelled by solutions of the HCl or analogous salts of mono-, di-, or tri-ethanolamines (or mixtures or homologues of these), or of the corresponding quaternary NH_4 compounds. The gelation process may be aided by rise of temp.

D. F. T.

Production of artificial dispersions of or containing rubber. INTERNAT. LATEX PROCESSES, LTD., D. F. TWISS, and W. McCOWAN (B.P. 439,505, 8.6.34).—For conversion into artificial latex by successive introduction of H_2O and phase-inversion, the rubber used is first mixed with rubber-sol. fusible or fluid compounding ingredients by a diffusion process; hydrophilic or colloid substances to assist the later process of dispersion in H_2O may be introduced or formed concurrently with or after the introduction of the rubber-sol. ingredients. [Stat. ref.]

D. F. T.

Treatment of rubber. ELECTRICAL RESEARCH PRODUCTS, INC., Assees. of A. R. KEMP (B.P. 439,275, 2.4.35. U.S., 3.4.34).—The under- H_2O electrical insulating properties of rubber are improved by treating it with aq. NH_3 [$< 15\%$ (28–29%) of NH_3] at 110–200°; the rubber is then washed and freed from NH_3 by steam-distillation.

D. F. T.

Impermeable coating for rubber. MICHELIN & Co. (B.P. 439,322, 21.9.34. Fr., 9.11.33).—The inner tube for a pneumatic tyre is coated internally with tanned gelatin, which may also contain a wetting agent, a powder capable of increasing the heat-resistance (clay, C black), and polyglycerol. The treatment with tannin may be effected after application of the gelatin to the rubber.

D. F. T.

Vulcanisation of rubber. R. T. VANDERBILT CO., INC., Assees. of P. I. MURRILL (B.P. 439,215, 1.10.34. U.S., 20.6.34).—The H_2O -insol., heavy-metal (Zn or Pb) salts of the higher alkyl- or aralkyl-dithiocarbamic acids ($\text{C} < 4$ and > 7 ; e.g., the Bu_2 , di-amyl or -benzyl derivatives) are used to accelerate the vulcanisation of rubber or latex.

D. F. T.

Manufacture of elastic rubber thread. T. L. SHEPHERD (B.P. 440,256, 21.3.34).—Rubber thread, the

surface of which has been slightly roughened or grooved, is covered with a coating of adhesive material (rubber, varnish, etc.) which is, or may be rendered, insol. in H_2O . Comminuted material of fibrous or granular character, dyed if desired, may be incorporated in the coating material and may also be applied during the twisting together of several strands of the treated thread. The outer skin of the coating may optionally be subsequently removed; also, to facilitate weaving, an inextensible winding may be applied to the treated thread and destroyed by subsequent chemical or heat treatment.

D. F. T.

Cream from rubber latex.—See I. Artificial leather.—See V. Treating leather.—See XV.

XV.—LEATHER; GLUE.

Action of formaldehyde on hide powder. L. S. TS'AI and K. Y. TAN (J. Chinese Chem. Soc., 1935, 3, 296–300).—The amounts of CH_2O which combine with hide powder, when this is left at 45° over CH_2O solutions with various partial pressures of CH_2O and then dried by heating to const. wt. at 100°/30 mm., accord with the Freundlich adsorption isotherm. Complications due to hydrolysis of the powder in aq. solution are avoided by the foregoing method.

H. G. M.

Tungsten tannage. V. CASABURI and E. SIMONCINI (J. Soc. Leather Trades' Chem., 1936, 20, 2–9).—Pelt has been tanned with $\text{H}_7[\text{P}(\text{W}_2\text{O}_7)_6]$, $\text{H}_8\text{Si}(\text{W}_2\text{O}_7)_6$, $\text{H}_9\text{B}(\text{W}_2\text{O}_7)_6$, and $\text{H}_{12}(\text{W}_2\text{O}_7)_6$, respectively, and the products have been analysed. Satisfactory leathers were obtained which contained $> 40\%$ WO_3 . Combination W tannages have been obtained with salts of Cr, Fe, and Al, respectively, with vegetable tannins, and with synthetic tannins.

D. W.

Influence of some sulphur-containing tanning materials on the deterioration of vegetable-tanned leathers by sulphuric acid. E. L. WALLACE, J. R. KANAGY, and C. L. CRITCHFIELD (J. Res. Nat. Bur. Stand., 1935, 15, 369–376).—The use of synthetic tanning material, sulphite-cellulose and sulphited extracts in conjunction with chestnut and quebracho extracts for tanning causes no appreciable deterioration of the leather. Loss of tensile strength and degree of decomp. of leather during storage are a function of the pH of a H_2O extract of the sample and not of the total acidity calc. from the S content or determined by the Procter-Searle method; they start, however, at pH 3 and are greater when chestnut extract is used than when quebracho is used in the tanning.

A. R. P.

Cleansers and deleterious effects on white upper leathers. J. MICHELMAN (Hide and Leather, 1935, 89, No. 15, 17, 23–24).—Infiltration of mineral matter from cleansers into leather increased with the alkalinity of the cleaner. Deterioration results from neutralisation of acid, replacement of $\text{SO}_4^{''}$ by $\text{PO}_4^{'''}$, and overloading of leather with mineral matter.

CH. ABS. (p)

Comparative wear of chrome-tanned, vegetable-tanned, and retanned sole leather. R. C. BOWKER and W. E. EMLEY (J. Res. Nat. Bur. Stand., 1935, 15, 363–367).—From tests made on about 1000 soles the durability of various sole leathers is as follows: vegetable

leather 1, heavy retanned chrome 1.22, filled chrome 1.37, medium retanned chrome 1.48, light retanned chrome 1.75, chrome leather 1.77. In general, the durability is the greater the greater is the % of hide substance, the higher the Cr content, and the lower the % of H_2O -sol. matter; grease and insol. ash have little effect. A. R. P.

Determination of wear-resistance of sole leather. J. N. GERSSEN (Ned. Leder-Ind., 1934, Tech. Bijbl., 1353—1357, 1361—1363; Chem. Zentr., 1935, i, 2633).—A testing machine to simulate varying weather conditions is described. J. S. A.

Action of micro-organisms on vegetable tanning materials. II. Factors influencing biological activity. W. P. DOELGER, R. PARTRIDGE, and L. SCHREIBER (J. Amer. Leather Chem. Assoc., 1935, 30, 586—600; cf. B., 1935, 419).—The growth of micro-organisms in tan liquors is largely inhibited by the high acidity and the tannins themselves. < 10% of the contaminating organisms grow actively in tan liquors. *Acetobacter aceti* and *Streptococcus lacticus* were the most frequent organisms, but *Lactobacilli* and some of the *B. coli-aërogenes* group were also isolated from commercial tan liquors. Of the yeasts, *Pichia membranæ-faciens*, *Torula*, and one resembling *Mycoderma cerevisiae* have been isolated in wrinkled colonies and true yeasts resembling *Saccharomyces cerevisiae* and *ellipsoideus* and some *Torula* have been isolated in smooth colonies, besides a preponderance of wild yeasts. *Aspergillus niger* and *Penicillium glaucum* are the most frequently occurring moulds. The fermentable non-tans are gradually diminished in an inactive "rocker" by the organisms, and the acids are diminished by the acid-destroying bacteria and yeasts. In a used rocker system, the transference and gradual strengthening of the liquors replenishes the non-tans and thereby the acid content is maintained. Max. lactic acid and AcOH production, respectively, were obtained in oak-bark extract liquors at 25—30°. Yeasts were more active in the stronger liquors and bacteria in the weaker ones, and both were observed to a much greater extent than were moulds. D. W.

Protein-liquefying compounds as softeners [for gelatin]. J. EGGERT (Gelatine, Leim, Klebst., 1934, 2, 243—245; Chem. Zentr., 1935, i, 2481).—To avoid the disadvantages of glycerol as a softener for gelatin, supplementary use of fructose, dextrin, soaps, oils, etc. is examined. $CaCl_2$, Ca saccharate, $C_{10}H_7SO_3Na$, NH_4CNS , etc. serve as protein liquefiers. A. G. P.

Casein and blood-albumin glues. P. KÜSTNER (Gelatine, Leim, Klebst., 1934, 2, 254—256; Chem. Zentr., 1935, i, 2481).—Suitable consistency in casein-albumin glues is maintained by small additions of plant phosphatides, e.g., soya-bean mucilage. A. G. P.

PATENTS.

Treatment of leather with rubber. O. C. HART-RIDGE and A. McLENNAN (B.P. 439,833, 12.6.35. Appl., 16.6.34).—Leather is impregnated with a mixture of rubber, gutta-percha, or balata, a cold-vulcanising agent, e.g., pptd. S solution, a gum, resin, or gum-resin, a

colouring medium, solvent naphtha, and light petroleum or other hydrocarbon distillate. D. W.

Improvement of gelatin. C. FREUDENBERG GES.M.B.H. (B.P. 439,784, 7.5.35. Ger., 4.5.34).—Gelatin is swollen in a non-aq. medium sol. in H_2O , e.g., glycerol and MeOH, the bulk of the swelling agent is then removed, and the residue incorporated with a H_2O -insol. softening agent, e.g., castor oil. D. W.

Artificial leather.—See V. Plastic compositions. —See XIII.

XVI.—AGRICULTURE.

Survey of soils in the district of (i) Philippine Milling Co., Mendoro, (ii) Cebu Sugar Co., Cebu, (iii) Hind Sugar Co., Manaoag, Pangasinan, (iv) Central Don Pedro, Nasugbu, Batangas, (v) Central Colatagan, Batangas. M. M. ALICANTE (Rep. Res. Bur. Philippine Sugar Assoc. [1932—3], 1933, 69—72, 73—77, 77—79, 79—84, 84—87).—The nature, origin, and important chemical characteristics of these soils are recorded. CH. ABS. (p)

Physical properties of clay soils and some aspects of their mechanical behaviour. L. F. COOLING (Chem. & Ind., 1936, 25—31).—Tests for particle-size distribution, plasticity, shrinkage, and H_2O relationships, to characterise clay soils in connexion with foundation problems, are discussed. Results are given on compressive strengths and compressibilities of some clays. The characteristic behaviour of foundations in clay soils depends on the high compressibility and low permeability to H_2O of the clay. T. W. P.

Influence of temperature on the suction force of soils. W. HOLDHEIDE (Jahrb. wiss. Bot., 1935, 81, 747—768).—Rising temp. lowers the suction force of highly org. soils > that of mineral soils. Vals. for marls are permanently altered by temp. changes. Peat is less sensitive. The effects are attributed to the H_2O of imbibition of the colloids. A. G. P.

Phosphate status of Ashburton soils. E. B. KIDSON (New Zealand J. Sci. Tech., 1935, 17, 453—464).—Soils examined were either of old loess having little available PO_4''' , or of recent loess and alluvium of high available PO_4''' content. Differences are attributable to the lower degree of weathering in the later deposits. A. G. P.

Influence of liming on the easily-assimilable potassium in soils. K. KVAPIL (Věstn. čechoslov. Akad. Zemed., 1934, 10, 690—694; Chem. Zentr., 1935, i, 2582).—Liming tends to increase the proportion of difficultly-sol. (non-exchangeable) K in soils. A. G. P.

Determination of potash requirements of soils by the Dirks and Scheffer method. C. FRASCHINA (Landw. Jahrb. Schweiz, 1934, 48, 905—908; Chem. Zentr., 1935, i, 2582).—The method yielded results agreeing with pot-culture tests in 80% and with field trials in 75% of the cases examined. A. G. P.

Granular ammonium sulphate [fertiliser]. M. M. ALICANTE (Rep. Res. Bur. Philippine Sugar Assoc. [1932—3], 1933, 87—88).—Properties of the granular non-hygroscopic form of the salt are described. CH. ABS. (p)

Preparation of concentrated fertilisers by treating phosphorites with nitric acid. G. I. GORSCHTEIN and T. I. CHACHARINA (J. Chem. Ind. Russ., 1935, 12, 1057—1061).—The product obtained by adding aq. NH_3 to a HNO_3 extract of phosphorite, and evaporating the mixture to dryness, rapidly deteriorates on storing, the ratio P_A/P_T (P_A = assimilable P_2O_5 , P_T = total P_2O_5) falling from 0.92 to 0.27 within a few hr. of prep. The following procedure gives better results: the phosphorite is heated at 700° for 30 min., and then extracted with the theoretical amount of 25% HNO_3 , and 5% less NH_3 than is required for the reaction $\text{H}_3\text{PO}_4 + \text{Ca}(\text{NO}_3)_2 + 2\text{NH}_3 \rightarrow \text{CaHPO}_4 + 2\text{NH}_4\text{NO}_3$ is added to the extract at $13-25^\circ$, when 98% of the P is pptd. ($P_A/P_T = 0.9$); the P_A/P_T ratio falls to 0.83 after drying. The filtrate, containing $\text{Ca}(\text{NO}_3)_2$ 15.5 and NH_4NO_3 15.2%, is treated with $(\text{NH}_4)_2\text{CO}_3$ at $40-50^\circ$, to yield a readily filterable suspension of CaCO_3 in aq. NH_4NO_3 .

R. T.

Most suitable nutrient ratio for lime-bearing Nitrophoska. E. BLANCK and H. SCHORSTEIN (J. Landw., 1935, 83, 327—333).—The most effective ratio for oats was $\text{N}:\text{P}_2\text{O}_5:\text{K}_2\text{O} = 1:1:1.75$.

A. G. P.

Phosphoric acid [fertilisers] in pond culture. G. MESECK (Phosphorsäure, 1934, 4, 673—675; Chem. Zentr., 1935, i, 2582).—Among fertilisers applied to ponds, P gave the best returns in fish growth. Methods of application and effects are discussed.

A. G. P.

Manurial trials with Nitrophosphat-Lonza. F. KELLER (Landw. Jahrb. Schweiz, 1934, 48, 898—904; Chem. Zentr., 1935, i, 2852).—The fertiliser was as effective as or superior to an equiv. mixture of superphosphate and $\text{Ca}(\text{NO}_3)_2$. It is particularly serviceable as a top-dressing.

A. G. P.

Determination of ammonia-nitrogen in presence of urea in fertilisers. J. HAAS (Chem. Obzor, 1935, 10, 44—48).—Folin's aëration method (cold) is suitable for NH_3 . Hydrolysis of urea is prevented by addition of EtOH.

CH. ABS. (p)

Comparative investigation of the application of Kaminski's method for determining calcium in fertilisers. H. PULVER (Landw. Jahrb. Schweiz, 1934, 48, 911—912; Chem. Zentr., 1935, i, 2874).—Results agree with those obtained by the acetate method.

J. S. A.

Microbiological examination of decomposition of forest litter. II. Tannin-decomposing organisms. C. STAPP and H. BORTELS (Zentr. Bakt. Par., 1935, II, 93, 45—56; cf. A., 1934, 1035).—In soils examined, tannin decomp. was effected principally by species of *Aspergillus* and *Penicillium*.

A. G. P.

Nature and importance of new humus and carbonaceous manures. O. ENGELS (Kunstdüng. u. Leim, 1934, 31, 223—228, 259—263, 290—293, 319—322; Chem. Zentr., 1935, i, 2716).—Proprietary humus preps., leather and horn meal, and artificial farmyard manure are discussed.

A. G. P.

Storage of stall manure. W. TRZCIŃSKI (Roczn. nauk roln., 1934, 33, 383—407; Chem. Zentr., 1934, j, 2581).—The N losses from hot-fermented manure were

> those from compressed cold-fermented stacks. Both types gave similar results with pot-cultured barley.

A. G. P.

Effect of frost on wheat at progressive stages of maturity. III. Milling and baking quality. R. NEWTON and A. G. MCCALLA (Canad. J. Res., 1935, 13, C, 263—282; cf. A., 1935, 1288).—Flour yields and baking quality of wheat matured to the stage at which the dry-matter content reaches 58% of the grain is not greatly affected by freezing. Both qualities deteriorate if freezing occurs at an earlier stage. The extent of frost injury increases with immaturity and with the severity of the exposure.

A. G. P.

Nutrient intake and water economy of field beans. W. BRUNS (J. Landw., 1935, 83, 285—325).—Manuring with K increased the growth and nodulation of all varieties. The intake of K is high until blooming and may continue so until pod formation if generous supplies are available. The intake of Ca and Mg proceeds actively throughout vegetative growth and slackens a few weeks before ripening. Assimilation of K and of Ca are inversely related. In general, the course of intake of P and N follows that of dry-matter production. Transpiration rates show varietal differences. K effects a H_2O economy.

A. G. P.

Application of fertilisers for cotton at autumn ploughing. D. V. CHARKOV (Bor'ba za Chlopok, 1934, No. 8—9, 47—56).—The effects of P fertilisers and $(\text{NH}_4)_2\text{SO}_4$ applied in autumn are < those of spring applications.

CH. ABS. (p)

Cultivation of the opium poppy in Denmark. H. BAGGESGAARD-RASMUSSEN and K. SALOMONSEN (Dansk Tidsskr. Farm., 1936, 10, 1—15).—In 1935 *Papaver somniferum* was grown at Jyderup (N.E. Zealand) on a field fertilised with stable manure. The plants flourished better on moor soil than on sandy humus. Their dried opium contained 23.8% of morphine and the haulm 0.25%, determined by Jespersen's method (B., 1936, 219). The high morphine content is attributed to manuring and care in cultivation.

M. H. M. A.

(i) Planting sugar-canes in holes. (ii) Planting varieties P.O.J. 36 and P.O.J. 213 in alternate rows and in the same row: yields obtained. W. E. CROSS (Rev. Ind. Agric. Tucuman, 1934, 24, 97—105, 106—122).—(i) Planting in rows or in holes did not affect the total solids, sucrose, reducing sugars, or purity of cane produced.

(ii) Field data and yields are recorded. CH. ABS. (p)

Effect of mosaic on yields of varieties P.O.J. 36, 213, and 2725 (sugar cane). W. E. CROSS (Rev. Ind. Agric. Tucuman, 1934, 24, 57—76).—Infected stocks grown through six generations showed no significant change in stalk-wt. yield, total solids, sucrose, reducing sugars, or purity of juice, as compared with healthy stock.

CH. ABS. (p)

Smoke injury to shade trees. O. E. JENNINGS (10th Nat. Shade Tree Conf. Proc. Ann. Meet., 1934, 44—48).—Leaves with deficient H_2O supply are more seriously injured by SO_2 . Dust or soot is injurious if leaves are sufficiently covered to prevent access to light. Clogging of stomata is less harmful.

CH. ABS. (p)

Chemical variability in plants and its significance for selection and systematics. V. I. NILOV (Bull. Appl. Bot. U.S.S.R., 1934, [4], No. 11, 21—40).—Variety, species, and family relationships are discussed, largely in relation to oil-bearing plants. The difficulty of hybridisation is influenced by variations in chemical constituents. CH. ABS. (p)

Chalk- and gypsum-plants. O. H. VOLK (Ber. deut. Bot. Ges., 1935, 53, 796—806).—The distribution of plant species is examined in relation to the CaCO_3 and CaSO_4 content of soils. Localised variations of p_H in calcareous soils are sufficient to explain the presence in them of plants normally associated with the neutral-acid soil types. A. G. P.

Physiology of lime-chlorosis of lupins. H. SCHANDER (Ber. deut. Bot. Ges., 1935, 53, 807—810).—The sensitivity of lupins to an unfavourably alkaline reaction increases with the salt concn. of the nutrient. Root excretions assist in regulating the p_H of soil in immediate contact with plant roots. A. G. P.

Heart malady of beets. F. GUILBERT (Bull. Assoc. Chim. Sucr., 1936, 53, 23—30).—Although the disease is caused primarily by infection of seed with *Phoma betæ*, it develops only in beets grown in soils rich in CaO and of high p_H val. Preventive measures suggested are treatment of soils with B compounds, humus, and fertilisers to render them neutral and more moist, and control of seed of those beet varieties which are most subject to the disease. J. H. L.

Control of the bronze beetle (*Eucolapsis Brunnea*). W. COTTIER (New Zealand J. Sci. Tech., 1935, 17, 433—453).—Pb arsenate (I) is an effective poison if good coverage is obtained. Casein spreaders do not increase its efficiency. Paris-green has a more rapid action than (I). Excessive amounts of oil are necessary for good coverage. Fungicidal preps. of Cu or S probably have a supplementary toxic action. A. G. P.

Red locust in Natal. I, II. A. LEA (S. Afr. Sugar J., 1935, 19, 41, 43, 45, 47, 49, 51, 53, 97, 99, 101, 103, 105, 107).—The most effective spray for small hoppers is Na_2HAsO_3 , but cane may be injured. Na_2SiF_6 is non-injurious to cane, but somewhat less toxic to large hoppers. BaSiF_6 is safer in use and is probably an alternative stomach poison. CH. ABS. (p).

Control methods [for locusts]. F. P. GOSCO (Repts. Res. Bur. Philippine Sugar Assoc. [1932—3], 1933, 94—97).—NaF was more effective than Ca arsenate or As_2O_3 , and functions as a contact or as a stomach poison. Foliage is readily burned. Moderate rainfall does not seriously impair the action of NaF. Promising results are reported for Na_2SiF_6 with rice bran and molasses. Derris is effective in laboratory trials, but not in the field. CH. ABS. (p)

Foot rot in sheep. H. MARSH and E. A. TUNNICLIFF (Montana Agric. Exp. Sta. Bull., 1934, No. 285, 29 pp.).—Best control was obtained with 30% aq. CuSO_4 . SbCl_3 and 10% aq. CuSO_4 were less effective and 10% aq. NaOH was of little use. A. G. P.

Oil of chenopodium and chenopodium plants for eradication of round worms in swine. F. LE BLANC, T. WRIGHT, and J. B. TAYLOR (S. Dakota State

Coll. Agric. Exp. Sta. Bull., 1934, No. 283, 19 pp.).—Satisfactory control was obtained by administration of chenopodium oil with castor oil or by use of chenopodium plants as forage. A. G. P.

CaC_2 residues.—See VII. **Protecting pipe-lines from soil corrosion.**—See X. **Plastics [as fertiliser] from coal.**—See XIII. **Quality of butter. Growth of sheep.**—See XIX. **Sewage sludge [as fertiliser].**—See XXIII.

XVII.—SUGARS; STARCHES; GUMS.

Sucrose, beet pulp . . . , and adsorption? ANON. (Bull. Assoc. Chim. Sucr., 1935, 52, 775—779).—A discussion. Perârd, Martraire, and others found that in the determination of sugar in pulped beets by hot aq. digestion, differences between the results obtained with and without addition of sucrose (I) to the pulp were $< \equiv$ the added (I). The discrepancy increases with the quantity of (I) added, and according to Cazaubon it is not due to the use of basic Pb acetate. Adsorption of (I) by the pulp is a possible explanation, which, however, suggests that results are probably low even when no (I) is added. J. H. L.

Purification of [sugar]-cane juices. H. C. P. GEERLIGS (Bull. Assoc. Chim. Sucr., 1935, 52, 825—830).—The general principles of colloid flocculation underlying defecation and other methods of clarification are described. J. H. L.

Application of physical chemistry in the purification of raw sugar juices. E. J. HUGEL (Bull. Assoc. Chim. Sucr., 1936, 53, 3—19).—The flocculation of colloids of beet juice by electrolytes may take place at widely different p_H vals. according to the type of electrolyte used. Their flocculation by colloids of opposite electrical charge shows no such anomalies, provided the oppositely charged colloids are of the same degree of dispersion. The action of Salfosol (cf. B., 1934, 599) is of the latter type, and some factory data on its effects are cited. J. H. L.

Conditions to be followed when using active carbon in [beet]-sugar manufacture. I. F. ZELIKMAN and K. K. LIUBITZKI (Nauch. Zapiski Sach. Prom., 1934, 51, 84—93).—Active carbons, and particularly C pastes, are best used without being first mixed with H_2O . The relation between the C content of suspensions and their d is not the same for different kinds of C. Prolonged contact (> 3 hr.) of C with beet juices may cause darkening. Addition of kieselguhr is recommended when filtrates from C are not clear. J. H. L.

One-bodied evaporating plant with [beet]-juice evaporation in suspension. M. A. KONDAK, P. A. VETSCHERSKI, N. I. KORENEV, and P. P. NARBUT (Nauch. Zapiski Sach. Prom., 1934, 51, 65—75).—A system of evaporation by superheated steam, not yet tested practically, is described, with detailed calculations. The steam is used repeatedly, after superheating independently of the boiler, which is of small capacity. The plant required is much smaller than that now used. J. H. L.

Determination of electrical conductivity of [beet] molasses. K. P. VOLKOV and R. S. CHAIMOVITSCH

(Nauch. Zapiski Sach. Prom., 1934, 51, 43—55).—The sulphated ash content of Ukrainian molasses may be calc. with sufficient accuracy from the κ of solutions containing 0.4 g. of sample per 100 c.c., by multiplying by 20,705, this being the average of vals. ranging from 20,055 to 21,227 for 19 samples. Proportionality between κ and ash content is less close for carbonate ash than for sulphated ash, and less close for concn. than for dil. solutions of molasses. On titration of molasses solutions with mineral acids the κ curves show flexion, with a flatter portion corresponding to the displacement of org. acids from their salts by the mineral acid, and a steeper portion beyond. The flexion is most pronounced when 5% solutions are titrated with $N\text{-HCl}$ or, better, with $2N\text{-H}_2\text{SO}_4$. By adjusting the molasses concn. and adding sucrose, to obtain always the same concn. of ash and sucrose in the solutions tested, the κ curves can be used to compare the ratio of org. to inorg. acid salts in different molasses. The samples tested by the authors were very similar in this respect. J. H. L.

[Beet] molasses and the saline quotient. R. DUTILLOX (Bull. Assoc. Chim. Sucr., 1935, 52, 760—766).—The saline quotient of beet molasses (sucrose/ash) depends on many factors, and is not a sure guide as to whether or not the quantity of molasses produced is unnecessarily large. A better criterion is the ratio of molasses to total sugar crystallised (reckoned as white sugar). According to Saillard, this ratio is about 1 : 3 in normal working. J. H. L.

Molasses as an indicator of sugar-factory working conditions. H. CLAASSEN (Zentr. Zuckerind., 1935, 43, 131; Chem. Zentr., 1935, i, 2743).—Most molasses with a high content of lime ash are feebly alkaline or even acid. The molasses contains almost the whole of the sol. material other than sugar, and serves as a check on operating conditions. H. J. E.

Use of p_H determinations in the sugar industry. P. ORTH (Bull. Assoc. Chim. Sucr., 1935, 52, 729—752).—Results of p_H determinations, by different methods, on some beet-sugar factory products are discussed. With most such products the p_H val. does not accurately represent the $[H^+]$, but it is none the less useful in certain cases as an empirical means of control of acidity or alkalinity. For this purpose it is a more sensitive means of control than are titration vals. in some cases, but not in others. With heavily-buffered products, e.g., molasses at all p_H vals., and for lightly-buffered products outside the range p_H 6—8.5, titration vals. are more sensitive than p_H vals. to slight changes in acidity or alkalinity. In beet-sugar factories titration is the better method of control for first carbonatation or pre-liming, but p_H determinations are recommended for the control of sulphitation and second carbonatation; in the latter cases the colorimetric method is sufficiently accurate provided it is well standardised, buffer solutions checked electrometrically being used for colour standards in preference to permanent colour standards. In cane-sugar factories and refineries there is much more scope for p_H determinations than in beet-sugar factories, the juices and syrups being maintained nearer to the neutral point in the former than in the latter. The choice of methods for determining p_H is discussed at length; errors may

occur with the H electrode if constituents of the solutions undergo hydrogenation, and with the quinhydrone method if this substance reacts with constituents of the solutions, as appears to be the case with low-grade beet products in solutions more alkaline than p_H 8.

J. H. L.

Determination of (A) true solids in solid and liquid products, (B) solids in sugar solutions and [beet] sugar-factory products. P. MORIZOT (Bull. Assoc. Chim. Sucr., 1935, 52, 830—832, 833—839).—(A) A special oven with oil- or glycerin-jacketed base and sides is covered by a plate having 6 adjustable openings through which inverted Soxhlet tubes containing weighed samples can be suspended with their cylindrical portions (diam. 30 mm.) inside the oven and their narrow ends outside and connected by rubber tubes to taps leading to a vac. pump. By thus drawing air at 105—110° through the tubes, samples of flour and sugar products can be much more rapidly dried than in capsules.

(B) Beet massecuites and molasses are diluted 1 : 3 with H_2O and absorbed on cotton-wool plugs previously heated and weighed in the tubes; drying can be completed in 1½ hr. J. H. L.

Bacteriological standards for refined cane sugars. W. L. OWEN and R. L. MOBLEY (Facts about Sugar, 1934, Reprint, No. 12, 2 pp.).—Standards in respect of heat-resisting bacteria have already been proposed (B., 1932, 319, 1132). Non-thermophilic bacteria, yeasts, and mould spores are occasionally present in large nos. and may then impair the keeping qualities of the sugar and its suitability for certain industrial uses. Out of 41 samples of granulated sugars, 18 contained no mould spores in 1 g., but one contained 150 and another 690; 13 contained no yeasts in 1 g., 27 contained 5—60, and one contained 6000; 9 contained ≥ 5 non-thermophilic bacteria in 1 g., 27 contained 10—40, and 5 contained 70—150. As these organisms are destroyed by the refinery processes, the sugar must become infected during centrifuging or at a later stage. The following standards are suggested: the % of mould infections of any lot of refined sugars should be ≥ 20 , and no sample should contain > 10 per g.; $\geq 20\%$ should contain viable yeast cells and no sample should contain > 50 per g.; for non-thermophilic bacteria the corresponding limits should be 50% and 100 per g. J. H. L.

Sugar storage. I. F. ZELIKMAN and A. S. RAISER (Nauch. Zapiski Sach. Prom., 1934, 51, 1—42).—Absorption of H_2O is the chief cause of deterioration and is accelerated by the presence of molasses, invert sugar, or caramelisation products in the stored sugar. At 15—25° the limits of R.H. above which absorption occurs are 70% for white (sand) sugar and 85% for refined sugar. Stores should be kept warm, or if this is not possible the sugar should be introduced while still warm. Ventilation should be carefully controlled, especially in early spring. J. H. L.

Yield and purity of fructose derived from the calcium laevulate process. R. F. JACKSON and J. A. MATHEWS (J. Res. Nat. Bur. Stand., 1935, 15, 341—356).—Variations in the yield of fructose (I obtained by the CaO process from sugar mixture obtained by hydrolysis of natural juices are shown t

be due to the solvent action of other sugars, especially glucose and the difructose anhydrides derived from inulin, on the *Ca* lævulate. Data showing the magnitude of this solvent action and the distribution of the various sugars in the mother-liquor, wash- H_2O , and lævulate cake are tabulated. Loss of (I) may also occur by conversion into glucose during carbonation of the cake, especially if the solution is warm and treatment with CO_2 is continued until appreciable amounts of $\text{Ca}(\text{HCO}_3)_2$ dissolve; subsequent boiling to decompose the latter and ppt. CaCO_3 also causes a considerable conversion into glucose. The best results are obtained by passing CO_2 through the cold suspension until it ceases to colour phenolphthalein, then to add $\text{Ca}(\text{OH})_2$ until a faint pink is produced. Evaporation of the filtered solution after removal of dissolved *Ca* with $\text{H}_2\text{C}_2\text{O}_4$ affords a syrup containing 99% of (I). A. R. P.

Purification of starch milk and manufacture of potato starch. W. KRÖNER and G. KNOBLICH (Chem. Fabr., 1935, 8, 510—512).—The operations involved in potato-starch manufacture are critically discussed. A new continuous procedure is described, whereby starch milk is washed free from fibre and other impurities by a countercurrent process in an inclined tube of special design, and in which also a complete washing of the separated starch from sol. materials is achieved. The process can be employed for the direct manufacture of potato starch. Whilst very complete disintegration of the potatoes is possible, sieving is rendered unnecessary. I. A. P.

Sugar canes. Heart malady of beets.—See XVI. **EtOH from saccharine materials.**—See XVIII. **Photometry of milk [for lactose].**—See XIX. **Treating wastes.**—See XXIII.

PATENTS.

Crystallisation of dextrose. INTERNAT. PATENTS DEVELOPMENT CO. (B.P. 438,244, 4.3.35. U.S., 24.8.34).—In a form of the process of B.P. 366,974 (B., 1932, 397) in which seed crystals are formed in or introduced into a small quantity of syrup in a crystalliser and the main syrup charge is introduced incrementally, the supersaturation of the massecuite is reduced at any intermediate stage in the crystallisation by using syrup of low *d* for one or more of the increments. This modification renders the crystals more easily purgeable in the centrifuges. J. H. L.

Production of starch. E. and G. JAHN and M. G. and R. J. SANFT (JAHN & Co.) (B.P. 439,262, 14.12.34. Ger., 7.9.34).—In the manufacture of starch from potatoes, cassava, etc., as soon as the material has been pulped it is passed in a diluted state, without chemical treatment and preferably with the min. contact with air, to centrifugal separators to separate the fruit H_2O , which contains deleterious sol. matters, from the solids. Subsequent washing-out and purification of the starch are facilitated and an improved product is obtained. J. H. L.

Hydrometer or saccharometer. T. S. S. and F. L. S. MURRAY (B.P. 440,310, 11.5.35).—The shape of the body of the float is described and claimed. B. M. V.

Colorimetric determinations [of sugar-factory H_2O].—See XI. **Spray-drying molasses. Sweet-stuffs.**—See XIX.

XVIII.—FERMENTATION INDUSTRIES.

Barley and malt studies. I. Developing new varieties of barley for malting and their properties. J. G. DICKSON, H. L. SHANDS, A. D. DICKSON, and B. A. BURKHART (Cereal Chem., 1935, 12, 596—609).—An account is given of the malting equipment and procedure used in testing barley for malting quality at Wisconsin Agric. Exp. Sta., and a programme for the development of new malting varieties of barley for the United States outlined. E. A. F.

Report of the Committee on Standardisation of Methods for Brewing and Malting Control. D. A. COLEMAN (Cereal Chem., 1935, 12, 575—595).—The results are presented of physical (e.g., acrospire growth, mellowness, and bushel wt.) and chemical (moisture, extract yield, and diastatic activity) determinations on malt carried out with a view of determining the variability amongst different analysts, using different techniques. The tentative methods of analysis of the Malt Analysis Standardisation Committee (Chicago) are to be adopted as tentative methods for study, and the moisture-determination method (cf. following abstract) of this Committee as the tentative official method of the A.A.C.C. E. A. F.

Determination of moisture in barley malt. D. A. COLEMAN and S. R. SNIDER (Cereal Chem., 1935, 12, 621—645).—The vac.-desiccator method was selected as the reference method for malt-moisture determinations, owing to absence of caramelisation or decomp. phenomena which commonly accompany the oven methods, and because it is considered that in this method all hygroscopic or unbound H_2O is removed and the H_2O of crystallisation and of constitution left untouched. Ten methods of determining moisture were studied, and the variance between replicate determinations in these methods are given. The described standard (103—104°) air-oven method of the Malt Analysis Standardisation Committee (Chicago) gave results in excellent agreement with the reference method. The Bidwell-Sterling distillation method (a recommended procedure for which is given) is superior to the Brown-Duvel method. The dielectric and conductivity methods are unsuitable. The Labconco mill is superior to the Seck mill, which is again superior to the Hobart mill for grinding malt samples for moisture determinations. E. A. F.

Yeast and fermentation. P. PETIT (Brass. et Malt., 1935, 14, 209; Woch. Brau., 1936, 53, 14—15).—It is emphasised that the results of yeast-development experiments in artificial media must differ from those obtained in brewery practice. Any useful analytical process for determining the proportion of assimilable N in wort must reproduce as far as possible brewery conditions. The N metabolism of yeast and the diffusion of nitrogenous substances from the cells are discussed, with especial reference to their effect on the stability and foaming properties of the beer. I. A. P.

Generation period of yeast cells in relation to the medium. J. FUCHS (Woch. Brau., 1936, 53, 17—19).—

Beer wort contains growth-promoting material (M) which is capable of reducing the generation period [calc. from $G = t \log 2 / (\log b - \log a)$, where t = time, b and a are final and initial cell nos.] of yeast cells; different worts contain M in different amounts, which is further confirmed by studying the increase in dry wt. of yeast in the different worts. The multiplication of yeast is influenced unfavourably both by total wort sediment and by cooling-sediment alone. Culture (bottom) yeasts are so adapted to growth in hopped wort that G is not reduced by cultivation in unhopped wort, but the hop principles increase G for wild yeasts and torula, which are not so adapted. Barley-meal extract contains a small amount of M , but results with an extract of barley husk are inconclusive; with neither of these types of extract, however, does any poisoning action appear to be of significance. I. A. P.

Action of copper on yeast. B. LAMPE (Brennerei-Ztg., 1935, 52, 6—7; Chem. Zentr., 1935, i, 2614).—20 mg. of Cu per litre hinder the growth of yeast, and 100—150 mg. per litre strongly alter the form and mortality of the cells. The action \propto acid content. J. S. A.

Oxidation-reduction potential and its application to brewing. M. VAN LAER (Bull. Assoc. anc. Elèves Inst. supér. Ferment. Gand, 1935, 36, 5—9; Chem. Zentr., 1935, i, 2458).—Determinations of r_H of mash, wort, and beer are recorded. Fermentation with English top and bottom yeasts produces a decrease in r_H from 21.24, 24.36 to 11.06, 11.77, respectively. A. G. P.

Turbidity phenomena and depths of colour [in beers]. G. JAKOB (Woch. Brau., 1936, 53, 9—11).—When unhopped worts are cooled, the temp. at which turbidity first appears falls with the % of extract present, but at similar extract contents the temp. for bright worts are consistently $>$ those for dark worts. The after-mash yields less turbidity material relative to its concn. than the first-mash. Worts from wheat malt and from naked barley malt show a higher temp. for turbidity appearance than those from normal barley malt. After hop-boiling, the separation temp. is high and much less dependent on concn.; it may, however, be influenced by p_H . Low-temp. fermentation or cold storage favours the production of beers which filter bright. With rise of temp. the colour of worts tends to darken, but the change is probably not completely reversible. Beers assume a permanent increase of colour on heating. I. A. P.

[Determination of] foam [in beer]. I. Description of method. J. BLOM and P. PRIP (Woch. Brau., 1936, 53, 11—13).—Foam in beer is determined at intervals by a gravimetric method with described apparatus involving the use of CO_2 under pressure. The collapse of foam follows approx. the law for a unimol. reaction. "Foam no." (= observed velocity coeff. for this reaction $\times 100$) gives a measure of the stability of foam; figures for this of < 200 , 200—220, and > 220 correspond, respectively, to good, fair, and poor stability. I. A. P.

Influence of refining on the composition of must and wine. MADER (Wein u. Rebe, 1935, 16, 259—272;

Chem. Zentr., 1935, i, 2459).—The P content is increased and N content lowered. A. G. P.

Fermentation of over-sulphured grape must. A. OSTERWALDER (Landw. Jahrb. Schweiz, 1934, 48, 1101—1131; Chem. Zentr., 1935, i, 2744).—Use of a SO_2 -resistant yeast, *Sacc. oviformis*, var. *sulfurosore-sistens*, is described. A. G. P.

Clarification of wine. J. RIBÉREAU-GAYON and E. PEYNAUD (Rev. viticult., 1935, 81, 5—411 [70 pp.]; 82, 8—13; Chem. Zentr., 1935, i, 2458—2459).—Protein-tannin pptn. is examined in relation to p_H and temp. The technique of fining red and white wines is discussed. A. G. P.

"Coffee wines." H. ASTRUC and A. CASTEL (Ann. Falsif., 1935, 28, 599—604).—The d^{15}_4 , % of EtOH, extract, ash, tartaric acid, K, sugar, tannin, and K_2SO_4 , and the acidity of 6 examples of this class of wine are given. Their fermentation and distinctive characteristics are described. E. C. S.

Effect of extractives on distillation of volatile acids of wine. P. JAULMES (Ann. Falsif., 1935, 28, 590—599; cf. B., 1932, 204; 1935, 330).—Data are given for the change in the absorption coeff. of AcOH due to dissolved tartaric acid, tartrates, glucose, invert sugar, and glycerol. The influence of these substances and of colloidal matter on the coeff. is insufficient to interfere with the determination of volatile acids. Defecation with CaO at 100° serves no useful purpose and is liable to cause the formation of volatile acids from sugars. E. C. S.

Volatile acids of wine. P. JAULMES (Bull. Pharm. Sud-Est, 1934, 38, 452—456; Chem. Zentr., 1935, i, 2459).—In the examination of French red wines correction for SO_2 in the distillate and use of a rectifying column to prevent the passing over of lactic acid (I) are unnecessary, except for wines of high (I) content or white wines containing much SO_2 . A. G. P.

Analysis of vinegar. W. RUZICKA (Chem.-Ztg., 1936, 60, 48—49).—The usual method of determining the I val. of vinegar, using excess of I in alkaline solution, gives too high results. The methods of Margosches *et al.* (B., 1925, 77) and of Lieb and Lanyer (A., 1929, 593) are trustworthy. The significance of the differences between the vals. for acidity obtained by direct and by iodometric titration is discussed. E. C. S.

Alcoholic fermentation of saccharine materials. D. SIDERSKY (Bull. Assoc. Chim. Sucr., 1935, 52, 753—759).—In laboratory fermentations the yield of EtOH from beet molasses is about 60 litres per 100 kg. of Clerget sucrose present, which agrees fairly well with the industrial yield. In a carefully controlled distillery working fresh beets the yield was 60.1 litres per 100 kg. of sugar extracted. A recent method of recovering EtOH from CO_2 evolved in open vats, by means of active C, yielded 0.4% on sugar fermented. J. H. L.

Dehydration of alcohol by the gypsum process. USINES DE MELLE (Bull. Assoc. Chim. Sucr., 1935, 52, 780—782).—A reply to recent criticisms (A., 1935, 1108) of the azeotropic process of dehydration. Interruption or working entails no serious derangement. Regarding fire risks, mixtures of air with petrol or C_6H_6 vapour

are inflammable over a much smaller range of composition than mixtures of air with EtOH vapour. By recent recuperators the loss of C_6H_6 can economically be reduced to 0.02% of the EtOH produced. The total loss of EtOH is about 0.2% of the total quantity produced. When dehydration is considered in conjunction with the preceding distillation and rectification, the total steam consumption is less for the azeotropic process than for the gypsum process, and the total cost for cooling is about the same in both cases. J. H. L.

Continuous production of gluconic acid by means of *B. gluconicum* (Hermann). S. HERMANN and P. NEUSCHUL (Zentr. Bakt. Par., 1935, II, 93, 25—31).—The method is described. A. G. P.

Drying of spent wash in distilleries. E. LÜHDER (Chem.-Ztg., 1936, 60, 37—38).—Processes for increasing the dry-matter content of the wash to 90% are described, and their economic utility for different classes of distilleries is discussed. I. A. P.

Sizing etc. of textiles.—See VI. **Treating beer slop.**—See XXIII.

PATENTS.

Brewing process and apparatus. F. P. SIEBEL, SEN. (B.P. 438,920, 23.1.35).—Ground malt with, if desired, gelatinised or flaked adjuncts is mashed with H_2O in a steam-jacketed digester provided with a stirrer, whereby the material is kept in suspension throughout the digestion process (2 hr.). The temp. is regulated as required to facilitate the action of the enzymes present. The whole mash is passed through a grain separator, and after adding, e.g., kieselguhr as a filter aid, filter-press treatment follows, the wort then returning to the digester where hop boiling may be carried out. In an apparatus figured, two digesters are provided and are linked with the rest of the system; thus they can be used at will for carrying out different treatments of the same brew, or the digestion and boiling treatments of successive brews. The process effects a saving of time, plant, and power, but shows a high degree of conversion of the desirable mash constituents. I. A. P.

Maturing and ageing of raw alcoholic liquors. FLORIDA CANE PRODUCTS CORP. (B.P. 439,962, 18.6.34, U.S., 22.6.33).—Raw spirit contained in a bunged oak vessel with a charred inner surface is treated with an aq. mixture of a strong acid (H_2SO_4) and an oxidising agent ($KMnO_4$) at an elevated temp., ≥ 60 — 65.5° , for a period dependent on the temp. (e.g., rye or bourbon, 3 days at 48.9°). Poisonous constituents are eliminated, partly in gaseous form and partly by absorption by the wood. Sufficient H_2O_2 is then added to restore the original colour of the liquor and to stop further chemical and physical action. Maturing follows, rum and brandy being stored for 3 weeks at 48.9° , then at 37.8° and 26.7° for one week each, and finally being allowed to cool to normal temp. in a further week. Rye and bourbon require rather longer periods at these temp. Redistillation is unnecessary. The products are comparable with those aged naturally for approx. 4 years. I. A. P.

XIX.—FOODS.

Carotenoid pigments in wheat with special reference to varieties and strains. W. W. WORZELLA

and G. H. CUTLER (Cereal Chem., 1935, 12, 708—713).—The carotenoid pigments in the finely-ground, whole-wheat meal from 29 wheat varieties and 72 hybrid strains grown under uniform environmental conditions were determined, using the Bailey-Ferrari technique (B., 1929, 1029; 1933, 810). The finer is the granulation of the meal, the greater is the amount of pigments extracted, but the difference was less in the case of the soft than the semi-hard and hard varieties. Carotenoid pigmentation is an inherited varietal characteristic. The five varieties containing most carotenoid pigments were closely related to hard wheats. E. A. F.

Simple method for determining the "yellowness" and "grade" of wheat flours. A. G. SIMPSON (Cereal Chem., 1935, 12, 569—574).—A method is described for determining the "yellowness" or degree of bleaching (by means of the carotene concn.) and grade (by the amount of flavones) of wheat flours based on the extraction of the carotene pigments with 100% $COMe_2$, followed by extraction of the flavones (cf. B., 1933, 408; 1934, 39) with 80% $COMe_2$, addition of NH_3 to give a clear yellow solution (the shade of which depends on the flour grade), and determination of the two extracts in a colorimeter. The flavone determination is claimed to be at least as accurate as an ash determination, and can be used for determining the grade of "improved" or self-raising flours. The flavone figures serve as an approx. estimate of the distribution of bran and germ in the mill-streams. E. A. F.

Determination of gluten in grain and flour. J. ŽÁKOVÁ and J. ŽÁK (Chem. Listy, 1935, 29, 337—340, 354—358).—Various methods are described, and a detailed description of the experimental conditions is given. R. T.

Definition and measurement of "flour strength" as an inherent property of wheat. M. J. BLISH and R. M. SANDSTEDT (Cereal Chem., 1935, 12, 653—664).—Wheats of equal protein content have essentially the same baking potentialities, in terms of loaf vol., even though they do not all respond equally to any single baking formula or procedure. Consequently, for all practical purposes, protein content and inherent "flour strength" are one and the same thing, regardless of variety or inherent differences in gluten properties. "Strength," as an inherent property, must be determined by the protein test, not by the baking test. E. A. F.

Ripening processes in bread cereals (wheat). K. SCHMORL (Mühlenlab., 1936, 6, 11—15).—Bushel wt., d , and H_2O content of wheat, flour acidity, and meal conductivity increase as ripening proceeds. The reasons for these increases are discussed. The flour from unripe grain possesses too low a stability and enzymic activity, too long a period of dough development, and too high a H_2O content. E. A. F.

Testing of [wheat-flour-mill] streams. E. GALTER (Mühlenlab., 1936, 6, 1—12).—The quality of the various flour streams (break-flour, semolina, and dunst) from the milling of Manitoba I, Hungarian, and Austrian wheats was determined by means of the farinograph, using as criterion a quality val. obtained from the "Konstanz" (= the time in min. from the beginning

of the curve up to the cutting point of the central line of the farinogram with the "490" line), the dough softening after 15 min., and the band breadth of the farinogram. This "Konstanz" is applicable to flours of approx. equal ash contents. The decrease in baking quality, in the order break-flours, semolinas, dunsts, is the greatest in the case of Manitoba and the least with the Austrian wheat. All the curves tend to approach each other in the final dunsts; this is not due to the relatively large amounts of bran particles in these streams. An explanation is given of the greater injury effected in the milling of unconditioned vitreous wheats as compared with soft wheats. The relation between baking quality (scored as above) and flour colour (as determined from the conductivity) of Austrian wheat is not strictly linear. Practically all break-flours are of better, and final dunsts of lower, baking quality than corresponds to their colour. E. A. F.

Experimental flour mill for 100-gram wheat samples. W. F. GEDDES and B. FRISSELL (Cereal Chem., 1935, 12, 691—695).—A description, with illustrations, is given of the mill used for the tests described in the following article. E. A. F.

Experimental milling and baking technique requiring 100 grams of wheat. W. F. GEDDES and T. R. AITKEN (Cereal Chem., 1935, 12, 696—707).—Experimental milling and baking techniques for use with a 100-g. experimental mill (cf. preceding abstract) are outlined. The miniature mill gave a lower flour yield and a lower recovery of total products. The resultant flours were equal in protein content, higher in ash and carotene contents, and higher (but not significantly so) in diastatic activity than those from the Allis-Chalmers experimental mill. The flours exhibit similar baking behaviours to those from the regular-sized Allis mill. E. A. F.

Test-dough mixer calibration. Q. LANDIS and J. FREILICH (Cereal Chem., 1935, 12, 665—667).—Two methods of calibration are described: (1) use of the Brabender Farinograph as a direct calibration instrument, (2) use of a calibrated mixer or a previously calibrated flour of known development energy val. (B., 1933, 425) as indirect comparison. E. A. F.

Soft winter wheat studies. IV. Factors producing variations in wholemeal "time" data. E. G. BAYFIELD (Cereal Chem., 1935, 12, 559—568; cf. B., 1935, 425).—The Pelshenke (B., 1931, 943; 1933, 281) and Cutler-Worzella (B., 1933, 601) procedures yield different results in the whole-wheat meal fermentation-time test. With 150-c.c. low-form beakers a dough ball from 4 g. of flour will yield better results than a larger dough if large ranges of wheat strength are being tested. Increasing the diam. of the beaker increased the time with the 10-g. balls. Provided a proper size of vessel was used, the time increased with decreasing size of dough ball and increasing moisture in the meal. Granulation influences the test, a medium fine meal being best. Grain samples which had been heated to eliminate insects gave erratic results, which are higher than those from unheated samples. Increases in time due to ageing of the meal were within the

experimental error, provided the tests were made within a few days of grinding. E. A. F.

Changes in stored corn [maize] meal. C. O. WILLITS and F. J. KOKOSKI (Ind. Eng. Chem., 1935, 27, 1494—1496).—Maize meal with < 8% of H₂O may be stored for a year at 37° without change in the crude fat content; with < 14% of H₂O the storage temp. must be > 18°. The acidity may increase without change in crude fat. E. C. S.

Biochemistry of bread-making. Carbohydrate sequence. C. H. BAILEY and R. C. SHERWOOD (Ind. Eng. Chem., 1935, 27, 1426—1430).—A review. The functions of α - and β -amylase in relation to the production and fermentation of reducing sugar are discussed. E. C. S.

Correlation of experimental and commercial [wheat-bread] baking tests. J. FREILICH, S. McHUGH, and C. N. FREY (Cereal Chem., 1935, 12, 668—691).—In comparative tests using bakery and laboratory methods with the same straight-dough formula and ingredients, it was possible so to adjust laboratory conditions in mixing or fermentation as to produce results equiv. to those obtained in the bakery, as indicated by loaf characteristics. With the exception of hand-moulding and laboratory baking, this was also generally true for the other steps in the baking procedure. Combinations of laboratory mixing and fermentation could be made to reproduce bakery processes in straight-dough tests if both doughs were subsequently handled in exactly the same way. The differences between hand- and machine-moulded bread were so great that machine-moulding must be used in the laboratory to duplicate bakery-moulding. The marked differences between bread baked in laboratory and in bakery ovens was partly due to differences in their construction. E. A. F.

Photometric methods for examination of milk and dairy products. C. URBACH (Lait, 1935, 15, 129—141; Chem. Zentr., 1935, i, 2462).—Use of the step-photometer for determining lactose in milk is described. A. G. P.

Determination of chlorides in milk. A. MASSOT and H. LESTRA (Ann. Falsif., 1935, 28, 608—610).—Modifications of Denigès' and Laudat's methods are described, and a new method depending on removal of proteins with a 3:1 mixture of EtOH and COMe₂ is outlined. E. C. S.

Increasing the vitamin-D potency of dairy products. W. E. KRAUSS and R. M. BETHKE (Bimonth. Bull. Ohio Agric. Exp. Stat., 1935, 20, 52—60).—A discussion. NUTR. ABS. (m)

Corrosion of metals in the manufacture of condensed milk. G. GÉNIN (Lait, 1935, 15, 159—167; Chem. Zentr., 1935, i, 2461).—Corrosion is more marked at certain temp. In evaporators normal milk is more corrosive than are sweetened products, especially when Cu is used. Containers of Ni or monel metal are more readily attacked during intermittent than during continuous working. A. G. P.

Solidified milk. A. MANTOVANI (Rev. Fac. Quím. Ind. Agric., 1934, 3, 34—53).—Solidification in this

layers instead of in large blocks preserves the chemical and physical characteristics of the milk and arrests the development of micro-organisms. F. R. G.

Approximate determination of milk solids, including lactic acid, in condensed buttermilk and related products. J. W. E. HARRISON (J. Assoc. Off. Agric. Chem., 1935, 18, 645—646).—ZnO is added to prevent loss of lactic acid. The further procedure is according to the official method for solids in milk ("Methods of Analysis," A.O.A.C., 1930, 5, 214).

E. C. S.

Use of aqueous glycerol in the f.-p. test for milk. E. L. K. DAGNEAUX (Chem. Weekblad, 1935, 32, 731).—Aq. glycerol (10 vol-%), precooled to -5° in a refrigerator, is used as cooling agent in place of the usual ice-NaCl freezing mixture. D. R. D.

Influence of nutrition on the quality of butter. T. STORCÅRDS (Karjatalous, 1935, 11, 12—15; Chem. Zentr., 1935, i, 2461).—Many fresh, fermented, and spoiled fodders impart defective flavour or odour to butter. Hard butter in winter is associated with feeding hay, oats, and soya-bean meal. A.I.V. silage improves butter quality. A. G. P.

Effect of forage plants in producing oiliness in butter and on the iodine value of the butter fat. B. PLATON, P. HERMANSSON, H. EDIN, and L. HANSSON (Rept. Centr. Agric. Res. Inst., Stockholm, 1935, No. 451, 48 pp.).—Excessive feeding of fresh young clover, lucerne, or sugar-beet tops to dairy cows produces a fishy flavour in the butter, the first two having the more pronounced effect. This trouble may be minimised by using supplements of dried beet pulp, grain, hay, or straw, or largely counteracted by repeated pasteurisation at a suitable temp. Lucerne in bud, or young clover in bud or flower, when comprising the whole ration, gives a butter fat with a high I val. Feeding sugar-beet tops does not have this effect. NUTR. ABS. (m)

Fishy flavour in butter. I. Present position. W. RITTER. **II. Metal content of cream and butter.** W. RITTER and M. CHRISTEN (Schweiz. Milch-Ztg., 1934, No. 101/5, 36 pp.; 1935, No. 5, 9 pp.; Chem. Zentr., 1935, i, 2461).—I. The literature is discussed.

II. With increasing Cu content of milk, cream, and butter, the tendency towards chemical defects (fishy or metallic flavours) increases. Other factors, notably bacterial activity, are also concerned. A. G. P.

Loss of iron, copper, and manganese from vegetables cooked by different methods. F. B. CULP and J. E. COPENHAVER (J. Home Econ., 1935, 27, 308—314).—Spinach, mustard, cabbage, and turnip lost more mineral when boiled than when cooked by steaming or by pressure methods. CH. ABS. (p)

Determination of vitamins in common Chinese foods. C. Y. CHEN (Res. Coun. Nat. Univ. Peiping Agric. Sci. Ser., 1934, 1, 38 pp.).—High vals. for vitamin-A and -C were obtained in cabbage, coriander, and spinach, and for -A, -B, and -C in sweet potato. The -C val. of coriander was nearly = that of orange juice.

CH. ABS. (p)

Composition of lucerne hay and the feeding of lucerne meal. L. URBÁNYI (Mezőg. Kutat., 1935, 8,

1—6; Chem. Zentr., 1935, i, 2746).—The composition and vitamin-D content of lucerne hay varies considerably with the method of storage. The high fibre and low P content render the hay or meal unsuitable as a substitute for bran. A. G. P.

Supplementary relations between proteins of mottled gram beans and certain other cereals. T. Y. LO (Nat. Peiping Univ. Coll. Agric. Nutr. Bull., 1935, B, 2, 1—12).—Biological vals. for a no. of cereal proteins are recorded. A supplementary relation is recorded between proteins of mottled gram bean and those of glutinous and non-glutinous varieties of millet. CH. ABS. (p)

Ripening of tomatoes by ethylene gas. KOCHS and G. SIEGEL (Obst- u. Gemüse-Verwertg.-Ind., 1935, 22, 83—85, 102—103; Chem. Zentr., 1935, i, 2460).—Reddening of green tomatoes is accelerated (by several days) by C_2H_4 . Fruit ripened after picking, with or without C_2H_4 , is equal to naturally ripened and superior to imported produce. A. G. P.

[Storage of] tomatoes. Z. SÁNDOR (Mezőg. Kutat., 1935, 8, 7—26; Chem. Zentr., 1935, i, 2616).—The effect of storage on raw and cooked tomatoes, both sealed and open to light and air, is discussed. J. S. A.

Tomato refractometer in practice. H. ZSCHÄBITZ (Obst- u. Gemüse-Verwertg.-Ind., 1935, 22, 103—104; Chem. Zentr., 1935, i, 2462).—Differences between the results of the refractometer and drying methods are more marked in the less ripe fruit. This is attributed to the higher acid and lower sugar contents of the latter. A. G. P.

Apple investigations in Tasmania. VII. Safe limit of carbon dioxide concentration under ordinary cool-storage conditions. W. M. CARNE and D. MARTIN (J. Coun. Sci. Ind. Res., Australia, 1935, 8, 271—276; cf. B., 1935, 747).—For the storage of apples at 0° for 8 weeks, 2% of CO_2 in the atm. of the chamber gives the most satisfactory results. A. G. P.

Breakdown in Tasmanian apples. W. M. CARNE and D. MARTIN (J. Coun. Sci. Ind. Res., Australia, 1935, 8, 265—270).—Storage and climatic factors influencing the severity of breakdown are examined. Susceptibility is associated with high acidity, high sol. carbohydrate content, and slow rate of starch degradation in the fruit. Detailed technique of handling and storage must depend on seasonal conditions during growth and the wt. of crop per tree. A. G. P.

Latex test for maturity of papaya fruits. H. P. TRAUB, T. R. ROBINSON, and H. E. STEVENS (Science, 1935, 82, 569—570).—The change in colour of the exuded juice can be used as a maturity test. L. S. T.

Vitamin content of important foods in the child's diet. C. R. FELLERS (Amer. J. Publ. Health, 1935, 25, 1340—1345).—Fresh and canned citrous fruits are good antiscorbutics, whilst non-acid vegetables lose their activity on cooking or canning. Milk does not lose any of its vitamin-D activity on pasteurising or evaporating and canning. P. G. M.

Quality in foods. A. SREENIVASAN and V. SUBRAHMANYAN (Current Sci., 1935, 4, 378—384).—A review.

Freezing of foodstuffs. R. HEISS (Angew. Chem., 1936, 49, 17—21).—Experiments on the refrigeration of meat and milk show the desirability of rapid cooling. Meat should be stored at $\geq -17^{\circ}$. E. S. H.

Metallic apparatus for food industries and for cooking. A. BEYTHIEN (Chem.-Ztg., 1936, 60, 107—109).—A brief review of the effects of foods on various metals.

Improvement in the fat quality of bacon pigs receiving linseed cake by supplementary feeding of barley and skim milk. T. ABOL (Arb. Abt. Tierzucht West.-Russ. Versuchs-Stat., Siczewka, 1931, 38—46; Bied. Zentr., 1935, A, 5, 359—360).—When fed in amounts $< 10\%$ of the ration linseed cake produced no adverse effects. In a 10% ration replacement by skim milk caused a hardening of the fat. Small amounts of linseed cake accelerate the fattening process.

A. G. P.

Physiological aspects of the phosphorus metabolism of sheep. H. R. MARSTON (J. Coun. Sci. Ind. Res., Australia, 1935, 8, 293—304).—An address. Practical aspects of grazing and feeding, together with fluorosis, are discussed.

A. G. P.

Effect of sulphur in the diet on the growth and wool production of sheep. P. J. DU TOIT, A. I. MALAN, J. W. GROENEWALD and M. L. BOTHA (Onderstepoort J. Vet. Sci., 1935, 4, 229—239).—Cysteine (I), a sulphate mixture, or KSCN, as a separate supplement to a basal ration, had no significant effect on wool growth. No correlation was found between total (I) intake and the (I) in the wool shorn.

NUTR. ABS. (m)

Nutritive value of some vegetable oils in N. China. T. Y. LO (Nat. Peiping Univ. Coll. Agric. Nutr. Bull., 1935, B, 2, 57—67).—When fed at a 10% level and as sole sources of vitamin-A and -D, the maintenance vals. decrease in the order soya-bean, peanut, linseed, sesame, mustard-seed, and hemp-seed oils.

CH. ABS. (p)

Packing perishable goods.—See X. **Vitamin-A in Teleostei.** Soya-bean oil.—See XII. **Casein glue**—See XV. **Effect of frost on wheat.** **Chenopodium plants [as forage].**—See XVI. **Determining true solids [in flour etc.].**—See XVII. **Barley for malting.**—See XVIII. **Treating wastes.**—See XXIII.

PATENTS.

Cheese preparations. L. CLASSEY, and APLIN & BARRETT, LTD. (B.P. 439,246, 2.6.34).—Malt extract is added to cheeses of the Cheddar, Cheshire, or Gruyère variety in order to give a product of greater food and digestive val. With Cheddar cheese the best results are obtained by addition of 10% of malt, the latter being incorporated with the cheese during manufacture at $\geq 63^{\circ}$, so as to avoid destruction of the malt-diatase.

E. B. H.

Manufacture of sweetstuffs. DEUTS. STAERKE-VERKAUFS-GENOSSENSCHAFT (B.P. 439,141, 25.1.35. Ger., 15.3.34).—The sweetness of fondant and similar sweets is decreased by working additional dry commercial glucose into the cooked and cryst. base. The cooking temp. is also considerably lower.

E. B. H.

Spray drying of molasses and other viscous foodstuffs. C. ARNOLD. From MOLASKA CORP. (B.P. 439,595,

17.12.34).—After concn. under vac./ 65° until about 95% of the H_2O has been removed the molasses is sprayed downwards, together with hot ($190-200^{\circ}$) air in quantity to remove all the H_2O without becoming saturated; the air is then removed at an intermediate level and the molasses passes straight on to a hopper-shaped cold zone ($\geq 32^{\circ}$, R.H. 40%) which has separate means for supply and withdrawal of air. The sugars and minerals in the product are not chemically changed.

B. M. V.

Withering of tea. J. A. MAIN (B.P. 439,742, 12.6.34).—The rate of withering is caused to be uniform throughout a loft by by-passing fresh air to points where withering would normally be slower, the amount of air passing over the tea being progressively increased at successive places.

B. M. V.

Making coffee infusions more digestible. H. MERKEL (B.P. 439,017, 18.4.35).—The pH of coffee infusions is adjusted to $6.4-6.9$ by addition, before or after making, of alkaline substances (Na_3PO_4). KBr and lecithin may also be added to increase digestibility.

E. B. H.

Food for poultry. S. SOKAL. From DEUTS. PENTOSINWERKE G.M.B.H. (B.P. 439,122, 29.5.34).—To produce eggs with uniform colour of yolks, the fowls are fed with poultry food with an emulsion added containing 0.1% of oil-sol. colour dissolved in any suitable way and an aq. mixture containing mineral salts of nutritive val., e.g., Ca hypophosphite or phosphate.

E. B. H.

Treatment [scraping] of dough [from mould rollers] in the manufacture of biscuits and the like. T. & T. VICARS, LTD., and E. W. CROSLAND (B.P. 439,564, 10.5.34).

Manufacture of cereal food product [fibrous biscuits]. A. A. THORNTON. From LOOSE-WILES BISCUIT CO. (B.P. 440,790, 5.7.35).

Milk pasteurisation. Grinding chocolate. Aërating cream.—See I. **Treating cereals.**—See XII.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Determination of carbon tetrachloride in pharmaceutical preparations. C. STAINER and J. MASSART (J. Pharm. Belg., 1934, 16, 289—293; Chem. Zentr., 1935, i, 2849).—A modification of the François-Séguin method (B., 1929, 222) is proposed, which avoids loss during the hydrolysis.

H. N. R.

Determination of glycerol in galenical and opotherapeutic preparations. M. FATOME (J. Pharm. Chim., 1936, [viii], 23, 23—34).—Modifications of the HIO_4 method for the determination of glycerol in presence of sugar (A., 1935, 605) give accurate results when applied to the above preps.

E. H. S.

Analysis and evaluation of inositolphosphoric acid preparations. K. LINDENFELD (Rocz. Farm., 1934, 12, 37—59; Chem. Zentr., 1935, i, 2849; cf. A., 1934, 1215).— H_2O is determined by drying the prep. at 105° for $2\frac{1}{2}$ hr. Hydrolysis is carried out with $20\% HCO_2H$ at $160-170^{\circ}$ for 2 hr., the inositol being isolated and weighed. Determination of C is facilitated by mixing in the boat with $K_2Cr_2O_7$.

H. N. R.

Preparation of plant extracts. W. BRANDRUP (Pharm. Zentr., 1936, 77, 17—19).—It is suggested that

fluid extracts should be prepared having the ratio 1:2 instead of 1:1 and that a modified percolation process is the most suitable. E. H. S.

Comparison of methods for determination of alkaloids in medicinal drugs and galenical preparations. K. RAHESOO (Pharmacia, 1934, 14, 58—61; Chem. Zentr., 1935, i, 2849—2850).—A large no. of methods, including those of several pharmacopœias, are compared critically. H. N. R.

[Extraction and determination of morphine in the haulm of] Danish-grown opium poppies. J. C. JESPERSEN (Dansk Tidsskr. Farm., 1936, 10, 16—24).—The dried, powdered material is extracted with boiling aq. EtOH containing 0.5% of AcOH and the extract evaporated to $\frac{1}{3}$ in vac. It is treated with Pb(OAc)₂, filtered, and Pb⁺⁺ pptd. with H₂S. Accompanying alkaloids are removed from the alkaline solution with CHCl₃-Et₂O (1:3). NH₄Cl is then added to the solution and morphine (I) extracted with CHCl₃-Pr^oOH (3:1). The solvent is distilled off, and (I) titrated against 0.1N-acid (with Me-red). Results are reproducible and no loss of (I) occurs at any stage. The purity of the extracted (I) is < 95%. M. H. M. A.

Cultivated stramonium. P. N. TSAO and S. Y. CHEN (J. Chinese Chem. Soc., 1935, 3, 372—376).—The vals. for total ash (15.18%) and total alkaloids (0.195%) obtained for the dried leaves are < those recorded in the Chinese and other Pharmacopœias. H. G. M.

Kola nut cultivated in Brazil. V. VARGAS (Bol. assoc. brasil. pharm., 1934, 15, 250—255).—The fresh nut contains H₂O 40, caffeine 1.41, theobromine traces, and minerals 1.96%. CH. ABS. (p)

Chemistry of Australian-grown tobacco. N. F. B. HALL and J. C. EARL (J. Coun. Sci. Ind. Res., Australia, 1935, 8, 277—280).—Tobacco smoke having an objectionable aroma is characterised by alkalinity, high proportions of tar, and the probable presence of the lower amines. Smoke from good-quality tobaccos is neutral or slightly acid. High-N leaf tends to give smoke of inferior aroma. A. G. P.

***Psilocaulon absimile*, N.E. Br., as a stock poison.** II. Isolation of the toxic alkaloidal constituent and its identification as piperidine hydrochloride. C. RIMINGTON (S. Afr. J. Sci., 1934, 31, 184—193).—Dry plant matter contains the equiv. of 4.5% of piperidine hydrochloride, causing acute cattle-poisoning. Chronic poisoning is caused by H₂C₂O₄, of which the plant contains 8.6%. CH. ABS. (p)

Anæsthetics, especially cocaine and novocaine, in connexion with illicit traffic. C. OFFERHAUS and C. G. BAERT (Pharm. Weekblad, 1933, 70, 506—516, 525—539, 617—631, 655—667, 826—843, 973—997, 1125—1137, 1193—1201, 1298—1311; 1934, 71, 666—675, 817—823, 1050—1053, 1337—1342, 1364—1370, 1401—1408; 1935, 72, 82—90, 801—808, 1411—1435, 1443—1464).—The following anæsthetics: acaine, æthocaine, allylcocaine, alypine, anæsthesine, benzoylecgonine, butelline, cocaine, cycloform, diocaine, ecgonine, α - and β -eucaines, holocaine, larocaine, nirvanine, novocaine, nycaine, orthoform, orthoform-new, pantocaine, percaïne, propæsine, psicaine, psicaine-new,

suroform, stovaine, subcutine, tropacaine, and tutocaine, have been examined in order to evolve a scheme for identifying the constituents of smuggled drugs and particularly for detecting with certainty small amounts of cocaine in these preps. The microscopical appearance, luminescence phenomena, capillary tests with wool-violet, optical activity (particularly in connexion with inactive mixtures of two or more oppositely active drugs), and the titrimetric behaviour towards alkalis and Br-H₂O are described. Details are given of colour and pptn. reactions on a macro-scale with HNO₃, KOH, NH₃, Cl₂ and PdCl₂, I, KI, KI-I, ZnCl₂, HgCl₂, FeCl₃, HClO₄, KMnO₄, K₂Cr₂O₇, and CrO₃, conc. H₂SO₄ [alone and with V₂O₅, CeO₂, TiO₂, PhCHO, furfuraldehyde, NMe₂·C₆H₄·CHO, PhOH, and *m*-C₆H₄(OH)₂], Denigès' reagent (CH₂O + H₂SO₄, positive with cocaine and not with novocaine), the diazo reaction after nitration and subsequent reduction, lignin, Young's reagent [Co(CNS)₂ followed by SnCl₂], which gives a ppt. with cocaine and not with novocaine, and phloroglucinol + HCl, which is not sp. for the allyl or propenyl group as is sometimes suggested. Microchemical tests are described with the drugs mentioned above and PtCl₄, PtI₄, AuCl₃, AuBr₃, picric acid, 1% KMnO₄ solution, K₄Fe(CN)₆, HClO₄, K₂Cr₂O₇ in 25% HCl, styphnic acid, C₆H₃(NO₂)₂·CO₂NH₄, Na-Co-Pb and Cu-Pb nitrites, CuCl₂, HgCl₂, FeCl₃, PdCl₂, various bases including borax, and arrhenal. The platinichloride (barbed needles like teeth; sensitivity 1:6000) is the most characteristic microcryst. ppt. obtained with cocaine. In the approved procedure, the chief constituent of the drug is identified by the following "group" properties and reactions: anæsthetic properties (numbing of the tongue), taste, appearance, solubility in H₂O, EtOH, and 0.5N-HCl, reactions for acid radicals (including SO₄^{''}, NO₃['], Cl['], tartaric, and phenylsulphonic), reaction towards litmus, K₂Cr₂O₇ + conc. HCl (violet colour with primary amines; yellow resin with Bz compounds), lignin and acids, Denigès' reagent at various temp. (phenols, phenol ethers, and Bz compounds), and FeCl₃; the m.p. and $[\alpha]$ are also determined. Cocaine is always identified as the characteristic platinichloride, which is isolated from the drug, according to the constituents present, either directly, or after partial dissolution in H₂O, EtOH, or acids, or, in certain cases, after pptn. as the resinous perchlorate. This method of identification has never been found to fail. The only case where doubt can arise is where nycaine is present, but this drug is scarcely ever met with in illicit products. S. C.

Composition of oil of Ukrainian *Mentha crispa*. T. S. KUSNER and F. L. GRINBERG (J. Appl. Chem. Russ., 1935, 8, 1221—1225).—Cineole, linalool (56—65%), carvone (12—13%), and limonene were identified. R. T.

Vitamin-A in *Teleostei*.—See XII. Poppy cultivation. **Chenopodium oil.**—See XVI. Papaya fruits. —See XIX.

PATENTS.

Preparation of therapeutic and diagnostic means for treatment of tumours. J. AMAN (B.P. 439,433, 1.8.34).—From the cultures of cocci from non-malignant animal tumours, e.g., staphylococci from the papillomata

of bullocks, are selected those which have a greasy, shining appearance, *i.e.*, similar to that of a fat, and the virulence of these is then increased by passing them several times through the body of an animal. The cocci are then worked up in the known manner for vaccines, serum, etc. E. H. S.

Conversion of alkali salts of phenylalkylbarbituric acids into stable calcium compounds. R. GRÜTER (B.P. 439,539, 5.3.35. Ger., 5.3.34).—Double decomp. is effected in the dry state by rubbing with CaBr_2 hydrate and mixing the product with partly or, preferably, wholly dehydrated CaBr_2 to which may be added other anhyd. bromides. The reaction may be accelerated by rapid heating to 80–90°. A. W. B.

Manufacture of a [water-]soluble salt of 3:6-diamino-10-methylacridinium. MAY & BAKER, LTD., and R. W. E. STICKINGS (B.P. 439,902, 23.8.34).—The prep. by metathesis of the *methanesulphonate* (+0.5H₂O) is claimed; this forms a thermally-stable, neutral solution in twice its wt. of H₂O at 20°. H. A. P.

Conditioning of tobacco. J. Y. JOHNSON. From PROCTOR & SCHWARTZ, INC. (B.P. 440,231, 25.2.35).—The leaves are conveyed in a pendant position in perforated containers on a conveyor through a chamber divided into two stages in which air is moistened with steam and/or H₂O and through which the air is drawn in the same general direction as the travel of the containers. B. M. V.

Manufacture of a practically tasteless quinine compound. F. HOFFMANN-LA ROCHE & Co. A.-G. (B.P. 439,937, 24.7.35. Ger., 18.8.34).—The *quinine* salt, m.p. 195°, of 3-hydroxy- β -naphthylxyacetic acid (I) is claimed; the free *acid* (I), m.p. 157°, is prepared by interaction of 2:3-C₁₀H₆(OH)₂ with CH₂Cl-CO₂H and KOH in H₂O. H. A. P.

Manufacture of stable solutions of diaminodihydroxyarsenobenzene and its derivatives. F. HOFFMANN-LA ROCHE & Co. A.-G. (B.P. 439,935, 8.6.35. Switz., 6.7.34).—Air-oxidation of solutions of (3:3'-) diamino-(4:4'-)dihydroxyarsenobenzene and its derivatives is inhibited by addition of ascorbic acid or its salts. H. A. P.

Wool-wax prep.—See XII.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Cellulose acetate films: production of undeformable films. A. CHARRIOU and (MLLE.) S. VALETTE (Chim. et Ind., 1936, 35, 12–21).—A detailed account of work already noted (B., 1935, 1069).

Peptisation emulsions. A. STEIGMANN (Phot. Ind., 1936, 34, 10–11).—A discussion. The relation of the gradation obtained to the intensity of the exposing light is still not understood. Nitrobenzimidazole, when added to the emulsions, decreases the gradation and sensitivity; when added to the developer, greater contrast is often obtained. Other properties are considered. J. L.

Light-sensitive polysulphide colloid system. A. STEIGMANN (Phot. Ind., 1935, 33, 94; Chem. Zentr.,

1935, i, 2634).—The deep-red melt from cholesterol and S flowers, and also stabilised H polysulphide, form photosensitive systems. J. S. A.

Yellow film of photographic emulsions. A. STEIGMANN (Phot. Korr., 1935, 71, 23–24; Chem. Zentr., 1935, i, 2759–2760).—The effect is attributed to S-containing degradation products of proteins. H. J. E.

Distortion of photographic layers. Behaviour of films on development. G. BERNDT (Z. Instrumentenk., 1934, 54, 452–455; Chem. Zentr., 1935, i, 2760).—Data are recorded for the shrinkage of films exposed at 25° and 50° to atm. of 30 or 100% R.H. H. J. E.

Dry [photographic] plate reducers. E. L. TURNER and W. J. SMITH (Penrose's Ann., 1935, 37, 127–129).—Tests with Na₂S₂O₃–K₃Fe(CN)₆, KMnO₄, K₂Cr₂O₇, Ce(SO₄)₂, Haddon's reducer, FeCl₃, Belitzski's reducer, and (NH₄)₂S₂O₈ are described. CH. ABS. (e)

Effect of uniform auxiliary exposure on the characteristic curve. F. FORMSTECHE (Phot. Ind., 1934, 32, 843–844).—A discussion. CH. ABS. (e)

Optimum [photographic] development. F. FORMSTECHE (Phot. Ind., 1934, 32, 1032).—A discussion. CH. ABS. (e)

Systematic reproduction in two-colour printing. F. J. TRITTON (Penrose's Ann., 1935, 37, 115–118).—Seven pairs of filters, with the appropriate inks, are described. CH. ABS. (e)

Dye retouching [in photography]. H. M. CARTWRIGHT (Penrose's Ann., 1935, 37, 100–102).—The use of Neococcine, Chlorazol, and other dyes in retouching continuous-tone negatives and positives was studied. CH. ABS. (e)

Effect of cathode rays on photographic paper. P. H. CARR (Proc. Iowa Acad. Sci., 1934, 41, 248–249).—Exposure of the paper to cathode rays renders it relatively insensitive to subsequent exposure to light. A similar effect is obtained by heating the paper. CH. ABS. (e)

Etching of half-tones for uncoated papers. C. D. HALLAM and R. S. COX (Penrose's Ann., 1935, 37, 119–122).—Methods of obtaining the necessary depth in the half-tone block are described. CH. ABS. (e)

Metallographic films.—See X.

PATENTS.

Production of photographic pictures. I. G. FARBENIND. A.-G. (B.P. 439,812, 14.6.34. Ger., 25.7.33).—Emulsions are prepared containing light-sensitive metallic salts or complex compounds, the metal of which can form a dark sulphide. Suitable salts are, *e.g.*, compounds of Bi or Pb with CS(NH₂)₂, CSMe·NH₂ (I), or other substance which can easily split off S; on exposure to light traces of metal sulphide are formed (latent image), and the image is then developable by alkalis with decomposable S compound, *e.g.*, NaOH + (I). Alternatively, complexes such as Erdmann's salt etc. may be used in the emulsion; these give metal ions by light action, and are developable by slow-acting S compounds, *e.g.*, polysulphides or the above developer.

Some of these emulsions, besides being highly light-sensitive, are also sensitive to heat, X-rays, or electric currents. J. L.

Development of silver halide emulsions and photographic developers therefor. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 439,967, 18.6.34).—Developers are claimed containing an alkoxy-2-methylaminophenol, *e.g.*, the 5-OMe-derivative 1 g., anhyd. Na_2SO_3 5 g., and KBr 0.2 g., in 200 c.c. of H_2O . J. L.

Photographic reproduction from lenticular colour-record films. I. G. FARBENIND. A.-G. (B.P. 440,187, 22.5.34. Addn. to B.P. 353,121).—A simplified source of illumination is claimed. J. L.

Colour photography. KODAK, LTD. From EASTMAN KODAK Co. (B.P. 440,032 and 440,089, [A, B] 15.6.34, [A] 10.11.34).—(A) Two or three emulsion layers sensitive to different colours are coated on the same side of a support, and gelatin layers containing suitable, removable, filter dyes may be coated between such layers. After exposure, the layers are developed and washed, and the Ag images removed. The reversed developable images are then processed, by suitable variation of controlled or selective colour development and bleaching processes, to give the full colour picture with the correct minus-colours. Finally, the Ag images are removed, leaving only the dye images. (B) The processes of (A) are applied to multilayer films for colour photography, in which one emulsion is coated on one side of the support and the others are coated on the reverse side. Suitable variations in the disposition of the filter-dye layers, and in the bleaching and/or colour-developing processes, are described. J. L.

Photographic method of colour separation for colour printing. J. R. ELSWORTH (B.P. 440,086, 24.5.35).—Defects, inherent in the colour separation obtainable on printing from the usual 3-colour negatives, are overcome by combination of these negatives with suitable positives prepared from these negatives. The final positives used for photogravure are photographed from combinations of the "red" negative with a "blue" transparency, green with red, and blue with green. J. L.

Application of light-sensitive layers to films in intermediate film television installations. FERNSEH A.-G. (B.P. 440,130, 20.9.34. Ger., 22.9.33).

Carbocyanine dyes.—See IV. **Photo-engraving plates.**—See XIII.

XXII.—EXPLOSIVES; MATCHES.

Influence of certain substances on the separation velocity of nitroglycerin from spent acid. I. E. MOISAK and N. V. GRIGOREV (Trans. Butlerov Inst. Chem. Tech. Kazan, 1934, No. 1, 187—191).— $\text{Fe}_2(\text{SO}_4)_3$ and $\text{Pb}(\text{NO}_3)_2$ ($\leq 0.5\%$) lower the rate of separation, but increase it if the proportion of HNO_3 in the mixture is high (optimum, HNO_3 17, H_2SO_4 70, H_2O 13%). Urea favours separation and at 0.5% concn. counteracts the harmful effects of Fe and Pb salts. CH. ABS. (p)

Products of nitration of centralite. I. E. MOISAK (Trans. Kirov Inst. Chem. Tech. Kazan, 1935, No. 3,

153—164).—Rates of nitration of centralite with HNO_3 , NO , and NO_2 increase with $[\text{HNO}_3]$. With diphenyl dimethylurea 10—20% HNO_3 gives mono-, 30—70% HNO_3 gives di-, and conc. HNO_3 tri-nitrocentralite. NO_2 nitrates centralite and also the products of its hydrolysis. Dinitrocentralite yields on hydrolysis nitrosoamine, and mono- and di-nitromethylaniline.

CH. ABS. (p)

Preventing gas explosives.—See II. **Nitrating cellulose.**—See V.

XXIII.—SANITATION; WATER PURIFICATION.

Micro-colorimetric method for determination of benzene [vapour in air]. H. H. SCHRENK, S. J. PEARCE, and W. P. YANT (U.S. Bur. Mines Rept. Invest. 3287, 1935, 11 pp.).— C_6H_6 is determined in air by passing a measured vol. through 2 c.c. of a nitrating mixture (equal vols. of fuming HNO_3 and conc. H_2SO_4), neutralising the acid mixture, extracting it with 10 c.c. of COMeEt , and adding 1.5 c.c. of 40% aq. NaOH to the extract. A reddish-purple colour develops, the intensity of which \propto the amount of $m\text{-C}_6\text{H}_4(\text{NO}_2)_2$ present. This is determined therefore by comparison with a series of standards. As little as 0.001 mg. of C_6H_6 can be determined. The precision is 5% within the range 0.01—0.06 mg. of C_6H_6 . PhMe produces a similar colour, but on a wt. basis 1 pt. of C_6H_6 is as effective as are 15 pts. of PhMe. A. B. M.

Vacuum filtration of [sewage] sludge from secondary settling tanks. C. E. KEEFER and H. KRATZ, JUN. (Sewage Works J., 1935, 7, 963—978).—The best results are obtained when the semi-digested secondary sludge is mixed with digested primary settlement tank sludge and the mixture elutriated before conditioning with FeCl_3 . C. J.

Disposal of sewage solids. F. W. MOHLMAN (Sewage Works J., 1935, 7, 979—990).—Incineration of sludge was adopted at Chicago because it is a complete and economical method of disposal which requires a relatively small area; it eliminates digestion and in conjunction with some additional fuel it provides a source of power. Recent developments elsewhere in this field are reviewed. C. J.

[Committee report on] chemical treatment of sewage. ANON. (Sewage Works J., 1935, 7, 1000—1108).—A comprehensive summary is given of the development of chemical treatment and of present-day methods. Chemical treatment usually accomplishes a degree of treatment between plain sedimentation and biological processes and is suitable for seasonal or occasional use in cases where sedimentation is normally sufficient. C. J.

Chemical treatment of sewage at Dallas (Texas). E. W. STEEL and P. J. A. ZELLER (Public Works, 1935, 66, No. 4, 23).—Freshly-prepared FeCl_3 is a more effective coagulant than the commercial salt. Fe turnings are treated with aq. Cl_2 , the resulting FeCl_2 being oxidised by controlled excess of Cl_2 .

CH. ABS. (p)

Evaluation of chemical and other methods of sewage treatment. A. POTTER and E. T. KILLAM (Water Works and Sewerage, 1935, 82, 129—132).—

Chemical and biological methods are compared. Conditions affecting relative economy are noted.

CH. ABS. (p)

Effect of chlorination on activated sludge. I. Complete chlorination. W. RUDOLFS and N. S. CHAMBERLIN (Water Works and Sewerage, 1935, 82, 109—111).—Activated sludge requires a balanced flora and fauna for max. purification and stabilisation. Complete chlorination may disturb this balance. The biochemical O_2 demand of sludge alone may be reduced by chlorination, but turbidity and the O_2 demand of the supernatant liquid may increase.

CH. ABS. (p)

Multiplication of total bacteria and *B. coli* after sewage chlorination. W. RUDOLFS and H. W. GEHM (Sewage Works J., 1935, 7, 991—996).—Bacteria removal from sewage varies with the quantity of Cl_2 added, the time of contact, and the types of substances present. The reduction in nos. of both *B. coli* and total bacteria was followed by great increases after incubation. In all cases, except where the full Cl_2 demand was satisfied, growth occurred within 6 hr. after chlorination, but no counts reached the original nos. until after 24 hr. of incubation. The after-growth was not \propto the Cl_2 added, and the greater was the initial reduction of *B. coli* and total bacteria the longer was the lag period and the more rapid the subsequent increase. When $> 50\%$ of the Cl_2 demand was satisfied no protozoa were present after 72 hrs. incubation.

C. J.

Providence water treatment. E. L. BEAN (J. New England Water Works Assoc., 1935, 49, 406—418).—Alum, $FeSO_4$, and chlorinated $FeSO_4$, successively used as the coagulant, have been supplanted by $Fe_2(SO_4)_3$. It is dissolved before addition (0.5—0.75 grain per gal.) and thoroughly mixed by aeration before addition of sufficient $Ca(OH)_2$ (0.8—1.05 grains per gal.) to raise the p_H of the plant effluent to 9.6 in order to reduce corrosion. The change in treatment has increased the length of filter runs with the production of improved effluents.

C. J.

Anthracite and sand as a [water-]filter medium. O. J. RIPLE (Water Works Eng., 1935, 88, 277—279).—The mixture gives a lower rate of washing, longer running, and quicker filtration than sand alone. It is as effective in removing turbidity.

CH. ABS. (p)

Effect of chlorination on water organisms. A. O. TAUSON (Bull. inst. recherches biol. Univ. Perm, 1934, 9, 251—263).—A dosage of 1.25 mg. of Cl_2 per litre is sufficient to remove all plankton organisms except *Cyclops*. Treatment 2 hr. before drinking is necessary.

CH. ABS. (p)

Removal of fluorine from drinking water in Iowa. C. A. KEMPF, D. A. GREENWOOD, and V. E. NELSON (Proc. Iowa Acad. Sci., 1934, 41, 153—156).—Boruff's method (B., 1934, 478) markedly lowers the $[F]$ of waters. $[H^+]$ is a factor in the pptn. of F^- by alum.

CH. ABS. (p)

Colorimetric determination of aluminium in waters. M. SCHPAK and SCHUBAEV (Iskusst. Volok., 1935, 6, No. 1, 51—52).—The Hatfield method may yield low results since some Al in industrial effluents is in a pptd. form, probably as $Al(OH)_3$. The sample

(25 c.c.) is shaken with 10 c.c. of 0.1N- H_2SO_4 and subsequently treated with 10 c.c. of N-NaOH and 50 c.c. of H_2O , and diluted to known vol. 1 c.c. of saturated aq. $(NH_4)_2CO_3$ and 1 c.c. of 1% hæmatoxylin solution are added, and, after 15 min., 1 c.c. of 30% AcOH. The colour is compared with standards prepared with K alum.

CH. ABS. (p)

Recent progress in supplying less-corrosive soft water. M. PIRNIE (J. New England Water Works Assoc., 1935, 49, 419—427).—Soft H_2O delivered to existing cast-Fe or Pb distribution systems should have p_H 9.6—9.8, be free from Mn, and contain > 0.05 p.p.m. of Fe or 0.03 p.p.m. of Al in order to minimise corrosion and prevent deposits in pipes. Bacterial activity in low-velocity sections should be inhibited by maintaining the temp. as low as possible and the presence of a residual of 0.02 p.p.m. of Cl_2 .

C. J.

Treatment of "beer slop" and similar wastes. A. M. BUSWELL (Water Works and Sewerage, 1935, 82, 135—138).—Difficulties in treatment of wastes from breweries, starch factories, creameries, and meat canneries are discussed. Mechanical means of purifying effluents having high sol. org. matter contents are described.

CH. ABS. (p)

Adsorption of PhOH by active charcoal.—See III. Soap and water.—See XII.

PATENTS.

Insecticides. E. HOPE (B.P. 440,097, 19.4.34, N. Zealand, 15.3.34).—Solutions of SO_2 ($> 2\frac{1}{2}\%$) in H_2O and/or an animal oil, and a hygroscopic substance to maintain a moist surface after application (e.g., glycerin: $H_2O = 1:40$), are used as insecticidal sprays. Emulsifiers may be incorporated.

E. J. B.

Sewage[sludge] disposal. W. K. PORTEOUS (B.P. 440,073, 28.2.35).—After sewage sludge has been heated at a pressure of 100 lb./sq. in. and subsequently cooled and freed from supernatant H_2O the mass is mixed and further dewatered by a filtering device in which fibrous matter present in the sludge is used as a superstructure to prevent clogging. The dried cake may be burned to provide heat for use in the early stages of the process, or ground for use as fertiliser (cf. B., 1935, 176).

C. J.

Water-treatment plant. J. R. WADE (B.P. 439,951, 12.6.34).—A floating forebay which collects and screens river or pond H_2O and returns the sludge etc. into the main body of H_2O is described.

B. M. V.

Apparatus for recovery of phenols from [waste] aqueous solutions. J. Y. JOHNSON. From I. G. FARBERIND. A.-G. (B.P. 438,124, 7.5. and 15.10.34).—Waste liquors containing PhOH are distilled in a still provided with a fractionating column and reflux condenser so that a distillate relatively rich in PhOH is obtained, leaving a residue free therefrom to any desired extent. The PhOH is recovered from the distillate by known solvent methods, no trouble due to emulsification being then experienced. The distillation may be effected in presence of CO_2 .

A. B. M.

Colorimetric determination [of sugar-factory waste- H_2O].—See XI.