

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

MAR. 15 and 22, 1935.*

I.—GENERAL; PLANT; MACHINERY.

Principles, development, and examples of technical firing calculations. I. Construction of formulæ from the material balance. H. SCHWIEDESEN (Arch. Eisenhüttenw., 1934—5, 8, 231—238).—Mathematical. A. R. P.

Temperature history and rate of heat loss of an electrically heated slab. A. B. NEWMAN and L. GREEN (Trans. Electrochem. Soc., 1934, 66, 279—292).—A mathematical investigation has been made of the variation of the temp. of, and the rate of loss of heat from, one face of a slab of material exposed to a fluid medium while heat is supplied at a const. rate to the other face until a steady state is attained, and then after the supply of heat is cut off. The results are shown in tables and graphs so as to facilitate their application to electric furnace problems. H. J. T. E.

Drying of solids. VI. Relations between the velocity of drying and the direction of the air stream. S. KAMEI, S. MIZUNO, and S. SHIOMI (J. Soc. Chem. Ind., Japan, 1934, 37, 626—630 B; cf. B., 1934, 758).—The drying of damp powders is most rapid when the air stream is directed along the surface of the material. Such direction not only dries the surface, but has the greatest effect in accelerating the diffusion of moisture from the interior of a damp layer of powder. J. W. S.

Volatile solid filters for dust-sampling. (Miss) J. W. MATTHEWS and H. V. A. BRISCOE (Bull. Inst. Min. Met., 1934, No. 363, 4—13; cf. B., 1935, 81).—Satisfactory dust filters may be made from anthracene (I) purified by distillation and recrystallised from CCl_4 with slow cooling to get crystals (II) of a suitable size. The (II) are compressed, while slightly moist with the saturated solution, into pads 4 mm. thick and 15 mm. in diam.; a pad weighing 0.4 g. passed 0.15—0.2 cu. ft. of air per min. at a pressure of 33 cm. of Hg and completely removed from it all traces of even very fine dust, e.g., NH_4Cl fume or cigarette smoke. The (I) can be volatilised at 170° in 1 hr., leaving the dust in a form in which it can be weighed, examined under the microscope, and analysed. A. R. P.

Erratum:—On p. 81, col. 2, line 24, for H. V. BRISCOE read H. V. A. BRISCOE.

Mountain waters impose unusual problems [in boiler-water treatment]. R. MCBRIAN (Railway Age, 1934, 96, 805—806).—Samples contain low total solids, but considerable SiO_2 causing hard destructive scale. Addition of Na aluminate pptd. SiO_2 in a form which could be blown out without damage to boilers. CH. ABS. (p)

Natural silicates: their deposition as objectionable formation in boilers. C. W. RICE (Combustion, 1934, 5, 16—21).— SiO_2 -scale (I) formation is best predicted by a comparison of the % of SiO_2 and of total pptg. solids. Reduction of (I) is best obtained by use of PO_4^{3-} , but hard deposits are not prevented if sol. SiO_2 accumulates and Al is present in the feed- H_2O . CH. ABS. (p)

Modern methods of boiler-water treatment and control. H. T. FISHER (Proc. Tech. Sect. Paper Makers' Assoc., 1934, 15, 77—97).—A survey, dealing especially with scale formation and caustic embrittlement. H. A. H.

Feed-water treatment for small boilers. C. H. FELLOWS (Power Plant Eng., 1934, 38, 407—408).—Treatment with HCl containing an inhibitor, with subsequent neutralisation by soda ash containing small amounts of tannic acid, is described. CH. ABS. (p)

Winkler test for determining oxygen in boiler feed-water. J. D. YODER and A. C. DRESHER (Combustion, 1934, 5, 18—22).—An accuracy of 0.01 ml. per litre is obtainable if the proper grade of starch is used, the test is made at 29.5° or less, and if a deduction is made for O_2 in reagents and interfering substances are removed. CH. ABS. (p)

Loeffler system of steam production. S. McEWEN (J. Inst. Fuel, 1934, 8, 87—107).—The system is described and its advantages and some details of plant design are discussed; it is claimed that it has a 10—12% higher efficiency than have existing low-pressure systems. Plants erected on the Continent, including one at Moscow and one at Trebovice, are briefly described. Boiler designs suitable for marine application are illustrated. A. B. M.

Comparative works trials of different types of sterilising filters. W. VINZ (Woch. Brau., 1935, 51, 385—387).—Consumption of steam, cooling- H_2O , and power in a recently built sterilising plant were determined and compared with those in an older washing filter supplied by the same makers, the latter using indirect steam. The % economies in all the above and also in time required for the heating and cooling operations are cal. C. I.

Porcelain sheaths for thermocouples. V. TARANENKO (Zavod. Lab., 1934, 3, 1038).—A porcelain plate is fused to one end of a porcelain tube by heating with borax and SiO_2 . R. T.

Effect of humidity on moisture determination. L. PAP (Z. ges. Getreide-, Mühlen-, u. Bäckereiwes., 1934, 21, 149—153; Chem. Zentr., 1934, ii, 1543).—Substances with a gel-like structure cannot be completely dried in a humid atm. A formula for the

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

correction of observed vals. of moisture content of wheat, rye, etc. for atm. humidity is given. H. N. R.

Temp.-viscosity relations of coal ashes.—See II. **Bagasse. Black-liquor evaporator design.**—See V. **Hardness-testing machine.**—See X. **Determining moisture in powders.**—See XXII.

See also A., Feb., 187, **Calorimetric apparatus.**

PATENTS.

Thermal treatment of materials easily oxidisable under heat. SOC. ANON. DES MANUF. DES GLACES ET PROD. CHIM. DE ST.-GOBAIN, CHAUNY & CREY (B.P. 421,945, 7.6.34. Fr., 8.6.33).—A melting furnace (for, e.g., Mg and its alloys), pouring spout (with plug), and a mould are surrounded by a single airtight casing, the heat being applied by electrical resistance. B. M. V.

Apparatus for heat interchange. H. HOLZWARTH, ASSR. to HOLZWARTH GAS TURBINE Co. (U.S.P. 1,959,362, 22.5.34. Appl., 20.4.31. Ger., 23.4.30).—Oil or other poor conductor is caused to flow in thin films at high velocity over heat-transmitting surfaces. B. M. V.

Drying plant [for road-making material etc.]. C. G. HODGSON, and MILLARS' MACHINERY Co., LTD. (B.P. 421,403, 15.5.33).—A rotary drum dryer is provided with burners and waste-gas oftakes at each end, the gases passing concurrent with the material for low-temp. and countercurrent for high-temp. drying. A wet dust catcher is described. B. M. V.

Grinding mills. C. WHITTAKER & Co., LTD., and N. WHITTAKER (B.P. 421,670, 11.9.33).—An edge-runner mill has a rotating table and stationary rim, and the gap between those two parts forms a screen for the ground material. B. M. V.

Machines for disintegrating or reducing in volume solid or semi-solid materials. R. A. GILBERT and (MRS.) B. A. McNAUGHT (PHENIX SUPPLY Co.), and W. P. TRELOAR (B.P. 421,294, 14.8. and 30.12.33).—A toothed and corrugated roll (*R*) is built up of a no. of discs, and precautions are taken that the teeth of *R* are always opposite grooves in the stationary member. B. M. V.

Classifier. C. HARRELL, ASSR. to J. B. BATES and H. E. DIXON (U.S.P. 1,959,917, 22.5.34. Appl., 28.6.33).—For a cone or other classifier a discharge device acting on the principle that accumulating solids will cause increased resistance to the rotation of a paddle is described. B. M. V.

Apparatus for dry separation of materials of different density. ATÉLIERS & CHANTIERS DE LA MANCHE (B.P. 421,764 and Addn. B.P. 422,514, [A] 19.1.34, [B] 2.2.34. Fr., [A] 21.1.33, [B] 14.6.33).—(A) A pneumatic shaking table is provided with a discharge weir for, but no other obstruction to, the heavy material which forms one continuous natural slope. (B) The table is divided into sections each having a regulable supply of air; the heavy material is drawn off from each section through transverse troughs while the upper stratum passes on to the next section. B. M. V.

Separation of dry materials. C. W. H. HOLMES, and BIRTLEY Co., LTD. (B.P. 421,967, 29.4.33).—

Products from a pneumatic shaking table, e.g., coal and dirt of smaller size, are subjected to screening as delivered in several different grades, the aperture of the screens being adjusted so that substantially no light material passes through and no heavy material remains on them. B. M. V.

[Dry] mineral separation and the like. W. H. BERRISFORD (B.P. 421,553, 22.6.33).—Dry material, e.g., coal and dirt, is fed to an intermediate point of an inclined table (*T*) which is reciprocated harmonically in the longitudinal direction but with sufficient differential of acceleration to cause the heavy material to travel uphill, the inclination being sufficient to cause the light material to slide downhill. Stratification is effected by pneumatic currents through the pervious bed, and also by applying to *T* a vertical jerk on the upstroke, caused by shoes attached to *T* passing over ratchet teeth. Preferably part of the air is caused to remove dust before feeding on to *T* and two or more *T* are operated by a common mechanism and fed with sized material, the different sizes of coal and dirt being reunited before final delivery. B. M. V.

High-pressure separator. W. G. McMURRAY, ASSR. to M. & V. TANK Co. (U.S.P. 1,959,440, 22.5.34. Appl., 28.7.32).—An apparatus comprising a no. of concentric partitions forming annular swirling zones in a pressure-resisting shell, and suitable for oil-well gas, is described. B. M. V.

Centrifugal machine. A. O. AUSTIN, ASSR. to OHIO BRASS Co. (U.S.P. 1,959,850, 22.5.34. Appl., 26.11.30).—Apertures in the outer wall of a centrifugal drum (*C*) are closed by smaller drums (*D*) rotatable about axes situated on a circle around the axis of *C*. *D* are provided with turbine blades arranged so that the centrifuged heavy material rotates them when leaving and cannot leave unless they do rotate, such rotation being hindered by brakes set to a predetermined torque. B. M. V.

Decolorising and clarifying mineral oils and other liquids. A. B. CUMMINS, ASSR. to CELITE CORP. (U.S.P. 1,959,346, 22.5.34. Appl., 18.12.31).—The liquid is treated with porous, aq. Mg silicate formed, preferably, from MgO and diatomaceous SiO₂ in specified wide proportions. B. M. V.

Cinder or dust collector. G. C. COOK (U.S.P. 1,959,345, 22.5.34. Appl., 27.11.31).—The solid matter is collected by impingement on the surface of a pool of liquid, the inlet and outlet currents of gas being subdivided so as to flow alternately in spaces between a no. of vertical plates extending nearly to the surface of the pool. B. M. V.

Purification of air or gases. H. A. BRASSERT & Co., LTD., and J. E. CALVERLEY (B.P. 421,811, 20.5.33).—The gas is passed through a perforated screen which is maintained at a high electrical potential with reference to the conduit (which is earthed), and immediately afterwards through a spray of H₂O which is charged to the same or opposite polarity. B. M. V.

Separation of fine particles from gases. R. G. BOWMAN (U.S.P. 1,959,945, 22.5.34. Appl., 19.5.32).—A froth is formed of H₂O and suitable oil and the gas

is passed through it, preferably with the aid of a perforated plate or other interstitial member. B. M. V.

Cleaning or removing moisture from gases and vapours. W. H. OWEN (B.P. 421,888, 29.5.33).—The gases are passed through an apparatus of sheet metal or the like which provides a no. of narrow sinuous passages (*P*) alternating with dead spaces for collecting heavy matter, perforations being provided in the walls at the concave parts of *P*. B. M. V.

Apparatus for treating gaseous fluids with liquids. DIAMOND POWER SPECIALTY CORP. (B.P. 422,032—3, 29.5.33. U.S., 30.3.33).—In apparatus for contact of liquid (*L*) flowing over baffles with gases (*G*): (A) the supply of *L* is regulated in accordance with the humidity of *G* before or after passing the baffles; (B) the baffles are in the form of rings having a section similar to screw threads, threaded on a pipe which supplies the irrigation *via* holes at the roots of the threads. B. M. V.

Manufacture of brake linings containing frictioning compounds. W. NANFELDT, ASSR. to WORLD BESTOS CORP. (U.S.P. 1,959,686, 22.5.34. Appl. 13,4.29).—An asbestos-type composition is impregnated with vulcanised linseed oil (5% S), tung oil (which may also be partly polymerised and vulcanised), and a solvent. The lining is dried in an oven and rolled. B. M. V.

Apparatus for separating gases from air.—See VII. Pptg. particles from gases.—See XI.

II.—FUEL; GAS; TAR; MINERAL OILS.

Temperature-viscosity relations of coal ashes.

(A) Experimental methods and results. K. ENDELL and C. WENS. (B) Significance for furnace technique. P. ROSIN and R. FEHLING (Angew. Chem., 1935, 48, 76—79).—Viscosity-temp. curves have been determined in the neighbourhood of 1400° for ashes of different compositions. The practical significance of the results is discussed. E. S. H.

Modern developments in coal cleaning. V. F. GLOAG (J. Inst. Fuel, 1934, 8, 108—109).—Developments in the automatic control of the Baum washer, the prevention of breakage, de-dusting, slurry cleaning, flocculation of colloidal matter in washery H₂O, etc. are briefly reviewed. A. B. M.

Nitrogen in the liquid low-temperature carbonisation products of Kashpira shale. Y. I. KHISIN and V. F. VASILCHAKOVA (Goryuch. Slantz., 1934, 4, No. 2, 52—55).—The N in the low-temp. coke decreases with rising carbonisation temp., that in the tar (I) and tar-H₂O increasing. A considerable amount of material in the shale tar is not basic and is not removed by H₂SO₄. During thermal treatment of (I) polymerisation of N compounds occurs. CH. ABS. (e)

Regeneration of bone black. N. KUDEL'YA (Nauk. Zapiski Tzuk. Prom., 1933, 10, No. 35, 91—95).—The filter [7 tons of bone black (I)] is filled with hot H₂O, which is drawn off in 10—15 min. and removes char dust. 0.45% of calcined Na₂CO₃ on the wt. of char in the first treatment and 0.2% in the second, dissolved in H₂O at 90—95°, is introduced into the char filter for

$\frac{1}{2}$ hr., and (I) then washed to neutrality. After steaming, the filter is returned to operation. 3 or 4 such regenerations may be made without discharging and thermal treatment. CH. ABS. (e)

Reactivity of anthracite with carbon dioxide. W. L. KEENE, H. G. TURNER, and G. S. SCOTT (Trans. Amer. Inst. Min. Met. Eng., 1934, 108, 303—323).—A formula for calculating the reducing power of anthracites is given. Data are recorded. The reactivity is increased by Na₂CO₃; Fe salts, Fe, Cr, and Mn oxides, alkali and alkaline-earth salts, and CaO were less active. The activity is mainly influenced by the ash composition, volatile matter, and *d*. CH. ABS. (e)

Refining of peat oil with alcohol. E. V. KONDRATIEV and S. K. KUTUIEV (Torf. Delo, 1932, No. 12, 28; 1933, No. 2—3, 38).—90% EtOH extracts 75% of the phenols (I) and acids (II) from the crude oil, unsaturated and aromatic hydrocarbons being unaffected. O and N compounds (III) are partly extracted. Extraction at 15° is as effective as that at high temp. Peat oil (including oils of b.p. < 225°) may be purified with liquid SO₂. The fraction of b.p. > 250° must first be separated from hard paraffins. The product does not resinify on exposure to light. (I), (II), and (III) are completely removed by SO₂. CH. ABS. (e)

Production of illuminating gas by cracking bituminous sandstones. J. J. PITTARD and A. SCHIESS (Arch. Sci. phys. nat., 1934, [v], 16, 131—138).—Bituminous sandstone from Dardagny gave uneconomic yields of gas and a sandy residue of little val. but served as a basis on which certain otherwise useless waste-tar emulsions could be gasified. G. H. C.

Ignition of firedamp by broken electric lamp bulbs. Appearance of the filaments. G. ALLSOP and R. V. WHEELER (Safety in Mines Res. Bd., 1935, Paper 89, 6 pp.).—Examination of the filament of a broken lamp may sometimes show whether the filament has burnt out in an explosive mixture and thus been a potential source of ignition. W. H. B.

Suitability of various technical oils as benzol wash oils. H. BRÜCKNER and H. GRUBER (Gas- u. Wasserfach, 1934, 77, 897—901).—The v.p. of C₆H₆ in equilibrium with 3, 6, and 9% solutions thereof in coal-tar fractions of b.p. 230—250°, 250—270°, etc. up to 330—350°, in gas oil, and in tetrahydronaphthalene (I) have been determined by a statical method over the temp. range 10—40°. For the same partial v.p. of C₆H₆ the solvent power of the tar fractions fell with rising b.p., and therefore with rising mol. wt.; the differences between the various fractions were, however, small so that the boiling range of a benzol wash oil is of little importance from the viewpoint of solvent power. The observed v.p. are > those calc. from Planck's equation, whence it is concluded that the wash oils are associated. Technical benzol possesses a v.p. about two thirds that of C₆H₆, and the v.p. over solutions of the former are correspondingly lower. The solvent power of (I) for C₆H₆ is considerably > that of the other wash oils. A stable motor benzol was obtained by refining a crude benzol by washing with 5% of 75% H₂SO₄ and adding 0.05% of *p*-cresol after rectification. A. B. M.

Liquid fuels from coal for naval purposes. S. H. DUNLOP (Trans. Inst. Eng. Shipbuilders, Scotland, 1933, 77, 54—84).—With $> 0.25\%$ of anthracene in creosote (I) it deposits as a paste and is injurious to the personnel. One pt. of (I) to 2 pts. of gasoline was satisfactory. CH. ABS. (e)

Propane and butane as industrial fuels. E. A. JAMISON and W. H. BATEMAN (Iron Steel Eng., 1934, 11, 344—345).— C_3H_8 can replace C_2H_2 in the steel industry. CH. ABS. (e)

Relative values of different fuels of the same octane number. G. G. BROWN and S. C. SINGER, JUN. (Nat. Petroleum News, 26, No. 23, 21—24; Oil and Gas J., 1934, 33, No. 10, 80, 96).—Cracked gasolines are superior to leaded gasolines of the same C_8H_{18} no. CH. ABS. (e)

Densities of petroleum products: (A) Between 0° and 50° . L. D. KHUDYAKOVA and P. S. CHISTOVICH. (B) Between -20° and 100° . L. D. KHUDYAKOVA (Trav. inst. mét. Stand. U.R.S.S., 1934, No. 6, 69—92, 93—102).—Data are recorded. CH. ABS. (e)

Comparison of the results of determinations of heat of combustion of individual liquids and mixtures in the Junkers and in the bomb calorimeter. J. KRZYŻKIEWICZ (Przemysł Chem., 1934, 18, 450—458).—The vals. obtained with the Junkers calorimeter are $2-3\% <$ the bomb vals. for benzine and gasoline, and for their mixtures with Et_2O , solvent naphtha, olein, C_6H_6 , and C_5H_5N , and the former should therefore be multiplied by the coeff. $\alpha = 1.02$, when the mean experimental error should be $\geq \pm 1\%$. For serial determinations α of unknown liquids should first be determined by comparison with the results given by a bomb calorimeter. R. T.

Deposits and corrosion in the cooling system of internal-combustion engines. E. A. SMITH (J. Inst. Automobile Eng., 1934, 2, 29—59).—Effects of various salts causing corrosion are examined and tests of scale preventatives are described. The most satisfactory colloid materials were starch and quebracho. CH. ABS. (p)

Boundary lubricating value of mineral oils of different origin. M. E. NOTTAGE (Dept. Sci. Ind. Res., Lubr. Res. Tech. Paper No. 2, 32 pp.).—Curves showing the effect of temp. on boundary friction (F) for steel and Ag-alloy surfaces of Burmese, Persian, Russian, asphaltic-base, and blended oils are given. The oil was heated on the lubricated surfaces in air and in N_2 . When a solution of the oil in a solvent (S), e.g., C_6H_6 , Et_2O , was placed on the surface and the S evaporated, the F -temp. curve was generally different from that for the oil itself. Two types of wax have been found in the oils, viz., (I) that which readily separated from the oil as a white, oil-free, cryst. solid, and (II) that not completely freed from oil even after prolonged fractional crystallisation. Two kinds of F -temp. curves have been obtained: (a) given by distillate oils in which (I) was found, with F remaining const., or decreasing when temp. is raised from 18° to 60° , above which point F increases in air and to a smaller extent or not at all in N_2 ; (b) given by residual oils in which (II) was found with F increasing as temp. is raised from 18°

to 60° and then remaining steady. An interpretation of the results is given. D. K. M.

Emulsions of paraffin oil stabilised by soap. R. SPYCHALSKI (Rocz. Chem., 1934, 14, 904—908).—Homogeneous emulsions are obtained by adding 1 vol. of H_2O to 2 vols. of 1% gel of soap in lamp oil. R. T.

Regeneration of used machine oil. F. EVERS (Chem.-Ztg., 1935, 59, 55—56).—A review of present practice. E. S. H.

Prep. of anhyd. NH_3 in gasworks etc.—See II. **Dissolution of CH_4 and C_3H_8 in liquid hydrocarbons.**—See III. **Corrosion of Fe.**—See XIII.

See also A., Feb., 157, Volatility of C_7H_{16} - $EtOH$ - C_6H_6 mixtures. 172, Spark ignition of CH_4 - O_2 mixtures. 184, Determining traces of As in soot. 188, Determining heats of combustion. 191, Combustible liquid from C_2H_4 .

PATENTS.

Apparatus for dry-cleaning of coal and like materials. PRÉP. INDUST. DES COMBUSTIBLES (B.P. 421,147, 6.3.34. Fr., 10.3.33).—An automatic control device for apparatus of the type comprising a vibrating table combined with a blower device is so designed that the blade which limits the zone of flow of the product (P) is displaced in accordance with fluctuations in the bulk density of P . A. B. M.

Washing of coal. MINERALS SEPARATION, LTD., and P. T. WILLIAMS (B.P. 421,890, 27.6.33).—Washery H_2O containing fine coal 1.0—0.1 mm. diam. (C), very fine coal (D), and clay or the like slime (S) is passed through a preliminary settler (P) from which C is withdrawn and freed from admixed S in a classifier operated with return H_2O , and is then dewatered for sale. The overflow from P is treated in a large, single-stage flotation machine with only 0.01 lb. of frothing reagent (per ton of H_2O) on the first round and still less on subsequent rounds. The coal froth is freed from S in a smaller flotation machine operated with fresh H_2O in quantity sufficient to make up the losses of the whole washery system. All waters are approx. freed from S by settlement and returned to the jigs. B. M. V.

Treatment of coal. N. R. LANDON and E. V. COLLINS, JUN., ASSIS. to DELAWARE, LACKAWANNA, & WESTERN COAL CO. (U.S.P. 1,945,371, 30.1.34. Appl., 14.2.30).—Coal discoloured by Fe_2O_3 is sprayed with a dil. alkaline tannin solution and exposed to the air to restore the natural coal colour. A. R. P.

Chamber ovens. GIBBONS BROS., LTD. From DIDIER-WERKE A.-G. (B.P. 420,790, 9.5.34).—The ovens are provided with means for steaming the charge, comprising horizontal steam-distributing channels (A) which are disposed directly below the flue walls (W) and have branch channels extending up the binders of W and communicating with passages opening into the chambers. To avoid leakage the steam is conveyed through A within tubes of high-heat-resisting steel. A. B. M.

Continuously-operated vertical chamber ovens or retorts. W. FITZ, ASSEE. of H. KOPPERS GES.M.B.H. (B.P. 421,144, 13.2.34. Ger., 13.2.33).—The walls of the retort or coking chamber, or the parts thereof

where the decomp. of the hydrocarbons occurs, are made of refractory material, resistant to temp. changes and having a porosity of < 15% (8–10%) by vol., with the closed-pore vol. predominating. Deposition of C in the pores and the consequent cracking away of the surface of the wall itself when the outer layer of C is removed are avoided. A. B. M.

Heating of carbonising chambers. WOODALL-DUCKHAM (1920), LTD., and F. B. RICHARDS (B.P. 420,456, 10.7.33).—Vertical retorts or other carbonising chambers are heated by producing two separate flames in the flue (*F*), one derived from a mixture of coal gas and air and the other from a mixture of lean gas and air. The flames are caused to commingle and traverse *F* throughout its length, the temp. of the mixed gases being controlled by adjusting the relative proportions of the two heating gases. A. B. M.

Preheating of carbonaceous materials. M. PIER, ASSR. to STANDARD-I. G. Co. (U.S.P. 1,955,014, 17.4.34. Appl., 21.8.30. Ger., 26.8.29).—Carbonaceous materials which are to be subjected to destructive hydrogenation are preheated while under pressure by burning a mixture of a combustible gas and air, containing one of these components in large excess, at one end of a chamber (*C*) containing the coil through which the material is passed, and introducing a further supply of the second component into *C* at suitably spaced points. In this manner it is possible to cause the initial material to flow in indirect heat exchange with gases of gradually rising temp. and finally with gases at a const. temp. until the desired preheat is attained. A. B. M.

Destructive hydrogenation of carbonaceous materials. M. PIER and K. WISSEL, ASSRS. to STANDARD-I. G. Co. (U.S.P. 1,954,096, 10.4.34. Appl., 25.4.29. Ger., 18.6.28).—The liquid and gaseous products obtained in the destructive hydrogenation of coal, tar, etc. are separated by releasing the pressure in stages. The gas separated on condensation at the pressure of operation, e.g., 200 atm., consists principally of H₂ and may be recirculated, preferably after removal of the small quantity of hydrocarbons therein by thermal decomp. or by washing with oil. The gas released in the next stage, e.g., at 25 atm., contains a higher proportion, e.g., 20–35%, of hydrocarbons; these may also be removed by washing, and the residual gas then recompressed and recirculated. The hydrocarbons, e.g., C₃H₈, C₄H₁₀, etc., in the gas released on reduction of the liquid to atm. pressure are recovered by compression or by strong cooling. A. B. M.

Production of gas, oil, and other products. L. C. KARRICK (U.S.P. 1,950,558, 13.3.34. Appl., 29.10.26).—Finely-divided coal is conveyed down through an externally-heated helical pipe (*P*) (1 in. diam. ; 100 ft. long) by a current of steam, the temp. within *P* being maintained at 370–650°. The volatile products are separated from the powdered coke in a heat-insulated, cyclone dust collector and are passed through a heat-exchange device, wherein steam is generated which may be utilised in a second unit, to a condensing system. The hot gases and vapours from one or more units may, if desired, be used to carbonise coarse coal in an internally-heated type of retort. Clogging of *P* by adhering

coal is prevented by periodically passing pieces of Fe down with the coal. A. B. M.

Gas generator for pulverised fuel. W. B. PLUMMER, ASSR. to COMBUSTION UTILITIES CORP. (U.S.P. 1,953,312, 3.4.34. Appl., 27.7.28).—A relatively long, narrow wedge-shaped gasification chamber (*C*), with the wider edge of the wedge uppermost, is provided with a no. of narrow burners which project a flame of hot combustible gases, air, and steam from below into *C*. Finely-divided solid fuel is injected, with air or producer gas, into one end of *C*, and the gases formed therein are withdrawn at a controlled slow rate from the other end. The temp. within *C* is sufficiently high to fuse the ash, which is deposited on the inclined walls and flows down to an ash pit below *C*. A. B. M.

Manufacture of carburetted water-gas. M. H. MERRITT and G. I. KOONS, ASSRS. to WESTERN GAS CONSTRUCTION Co. (U.S.P. 1,950,620, 13.3.34. Appl., 16.5.31).—A water-gas plant designed to use heavy oil for carburetting operates on the following cycle: (a) a forward air-blast, the blast gases being burned with secondary air in the carburettor (*C*) and superheater (*S*); (b) a steam up-run during which heavy oil is sprayed into the upper part of the generator, the resultant gases and vapours being passed through *C* and *S*; (c) a steam back-run or down-run; (d) a reverse air-blast, during which air is passed through *S* and *C* and then down through the top portion only of the fuel bed. A. B. M.

Manufacture of blue and carburetted water-gas. H. J. CARSON (U.S.P. 1,952,654, 27.3.34. Appl., 17.6.27).—The air-blasting of the fuel bed of a water-gas generator is effected by introducing air, preferably preheated, into the lower portion of the column of fuel at a no. of separate levels, either simultaneously or successively. Steam is then introduced at a level above that of the lowermost air-blast, so that the temp. in the lowermost zone of the fuel bed is maintained sufficiently high to permit the ash to be withdrawn in the form of liquid slag; if necessary, fluxing material may be introduced into this zone. The plant may be so operated as to produce blue or carburetted water-gas, and/or, by using bituminous coal as fuel, mixed water-gas and coal gas. A. B. M.

Carburetted water-gas process. H. J. CARSON (U.S.P. 1,953,848, 3.4.34. Appl., 8.4.29).—A water-gas plant of the type described in U.S.P. 1,952,654 (see above) has a carburettor (*A*) the upper part of which contains heat-storing material while the lower part forms a carburetting chamber (*B*). The blast gases are burned with secondary air and passed downwards through *A*. The water-gas produced during the following gas-making period is also passed downwards through *A*, the oil for carburetting being simultaneously sprayed into *B*. A. B. M.

Manufacture of gas from oil. CARBURETTED GAS, INC. (B.P. 420,713, 12.10.33. U.S., 22.10.32).—Oil, preheated in a pipe still to about 315° under a pressure sufficiently high to maintain the oil in the liquid state, e.g., 250 lb./sq. in., is introduced into an externally-heated chamber wherein the temp. and pressure conditions are so regulated that the oil is immediately vaporised

and converted into a fixed, non-condensable hydrocarbon gas, suitable for enriching water-gas. A. B. M.

Processing of hydrocarbon gas. J. B. GARNER, R. W. MILLER, and G. B. LEYDEN, Assrs. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,954,991, 17.4.34. Appl., 10.3.27).—Natural gas and air are supplied to a burner (B) in the proportions necessary for complete combustion. B is mounted in one end of a heat-insulated chamber containing some refractory material, the temp. of which is thereby raised to 700–1200°. Simultaneously, a further supply of the gas is passed through the hot reaction zone, whereby it is converted into a large vol. of gas of lower calorific val., better suited for commercial use. There is no substantial formation of C black.

A. B. M.

Removal of hydrogen sulphide and ammonia from gases. C. J. HANSEN, Assr. to KOPPERS Co. OF DELAWARE (U.S.P. 1,953,478, 3.4.34. Appl., 13.6.31. Ger., 14.6.30).—The greater part of the NH_3 in the gas is removed therefrom in the form of NH_3 liquor. The H_2S present in excess of the mol. ratio $\text{H}_2\text{S} : 2\text{NH}_3$ is then removed by scrubbing the gas with an aq. suspension of $\text{Fe}(\text{OH})_3$; the spent solution is revived by aëration, the S thereby formed being separated and burned to SO_2 , which is absorbed in NH_3 liquor. The residual H_2S and NH_3 in the gas are then removed together by absorption in the aq. NH_4HSO_3 so produced, the spent solution from this stage being finally heated to convert the thionates into $(\text{NH}_4)_2\text{SO}_4$ and S. A. B. M.

Purification of combustion gases. R. LESSING (B.P. 420,539, 14.6.33. Cf. B.P. 416,671; B., 1935, 10).—During treatment of the gases with aq. media, the formation of deposits of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (I) is inhibited by maintaining an excess of (I) in suspension in the aq. medium at points where CaSO_4 is being formed, in such manner as to prevent the formation of supersaturated solutions of the salt. A. B. M.

Manufacture of asphaltic products. J. C. BLACK and W. D. RIAL, Assrs. to E. W. GARD (U.S.P. 1,953,333, 3.4.34. Appl., 7.12.27).—Asphaltic oil is withdrawn continuously from a chamber (A) containing a bulk supply heated to a suitable oxidising temp., and is circulated in admixture with air and steam through a heating coil (C) and back to A, until the desired degree of oxidation is effected. A pressure > 1 atm. is maintained in C. The residual air and gases and vapours formed are removed from A, wherein preferably a reduced pressure is maintained. A. B. M.

Manufacture of asphaltic products. E. W. GARD and B. G. ALDRIDGE (U.S.P. 1,953,345—6, 3.4.34. Appl., [A] 7.12.27, [B] 22.7.29. Cf. U.S.P. 1,953,333; preceding abstract).—(A) Asphaltic oil is oxidised by being heated to a suitable temp. and circulated through a pipe coil (P) in admixture with air and, if desired, steam, being then returned to the bulk supply. The P and pump may be mounted inside the still (S) in which the bulk supply of the material is heated. The vapours and gases formed are withdrawn through oftakes in the top of S. (B) The oxidation temp. is controlled by providing P, which is mounted outside S, with a jacket through which a heating or cooling medium can be circulated. A. B. M.

Treatment [cracking] of bituminous materials and hydrocarbon oils. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,954,866, 17.4.34. Appl., 10.2.30).—Finely-divided, solid bituminous material is mixed with a solvent for bitumen, e.g., benzol or other tar oil, which undergoes no substantial conversion under the conditions employed, and, if desired, with a heavy hydrocarbon oil, and the mixture is passed through a heating coil and thence into a reaction chamber wherein the material is cracked to coke and hydrocarbon oil vapours. The latter pass to a dephlegmator, wherein they are fractionated, the lighter fraction being passed to a condenser while the heavier fraction is recirculated.

A. B. M.

Preparation of bituminous emulsions. D. N. MYERS (U.S.P. 1,957,031, 1.5.34. Appl., 6.7.32).—A mixture of molten asphalt and a little rosin is agitated with aq. caustic alkali.

D. K. M.

Removal of phenols from hydrocarbons containing the same. H. ROOS and E. SCHWAMBERGER, Assrs. to STANDARD-I. G. Co. (U.S.P. 1,955,023, 17.4.34. Appl., 11.2.33. Ger., 12.2.32).—Phenols are separated from coal-tar oils etc. by diluting the latter with a liquid paraffinic hydrocarbon and washing the mixture with an aq. solution of a salt of an org. base, e.g., $\text{C}_5\text{H}_5\text{N}$ sulphate, or of other salts which are readily sol. in phenols but insol. in hydrocarbons, e.g., Na stearate, alkali phenoxides, etc. The solution is washed with a light benzene to remove dissolved neutral oils and the phenols are then recovered by washing out the greater part of the base sulphate with H_2O and distilling, preferably under reduced pressure.

A. B. M.

Treatment of coal-tar acids. J. C. MORRELL, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,954,091, 10.4.34. Appl., 15.11.29).—High-boiling tar acids are converted into relatively low-boiling phenols by heating them at 400–600° under pressure in presence of H_2O or steam.

A. B. M.

Hydrocarbon oil conversion. J. D. SEGUY, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,957,810, 8.5.34. Appl., 15.6.29).—The flue gas at 482–594° from a pipe furnace used for cracking hydrocarbon oil is mixed with a fraction (I), b.p. range 204–373°, produced in that process, thereby causing vapour-phase cracking (II) of (I) at 482–566°/15—115 lb. per sq. in. The vapours are fractionated and the reflux is returned to operation (II).

D. K. M.

Treatment of (A) heavy oils and the like, (B) soda-treated tars and other residues of the petroleum industry, for the conversion thereof into lighter products. E. HOUDRY, Assr. to HOUDRY PROCESS CORP. (U.S.P. 1,957,648—9, 8.5.34. Appl., 16.2.31. Fr., [A] 16.6.30, [B] 14.11.30).—(A) Hydrocarbon oil is partly vaporised in contact with porous material (M) in the upper chamber of a vessel (V) and the mixture flows by gravity into a lower cracking chamber containing a catalyst (C) disposed around pipes through which air and/or steam may be introduced to regenerate C as required. (B) Provision is made for cleansing M and C by washing with a suitable solvent, e.g., H_2O , to remove Na_2SO_4 , and by burning away the C deposits.

D. K. M.

Catalytic purification or polymerisation of cracked hydrocarbon vapours.

HOUDRY PROCESS CORP. (B.P. 421,650, 28.6.33. U.S., 11. and 20.7.32).—Cracked hydrocarbon vapours are passed through a chamber containing a catalyst (I) to a dephlegmating column from which the reflux is withdrawn, the vapours are condensed (II), and the fixed gas (III) is separated. (II) is revaporised and passed through a chamber containing a catalyst (IV) consisting of activated clay (98%) and finely-divided metallic oxide, *e.g.*, NiO (2%), at 205—370°, and thence through a dephlegmating column, the vapours from which on condensation yield a low-boiling motor fuel. (I) and (IV) are regenerated by passing (III) through them at 427—565°. Alternatively, before using (III) as a regenerator it may be purified by scrubbing and passing through a chamber containing a finely-divided metal or oxide (*cf.* B.P. 304,654 and 309,585; B., 1930, 493, 406) at 177—370°.

D. K. M.

Purification of hydrocarbon oils. **D. M. EVANS** and **W. C. DORSETT**, ASSRS. to **PETROLEUM CONVERSION CORP.** (U.S.P. 1,957,449, 8.5.34. Appl., 19.3.30).—A mixture of hydrocarbon oil and a solid treating material (*C*), *e.g.*, fuller's earth, is heated and passed at 204—260°/200—300 lb. per sq. in. through a reaction chamber (*R*) into a flash chamber with reduction of pressure, the vapours from which pass through a fractionating tower (*F*) to yield a product (*P*) of improved stability, odour, and colour. The reflux from *F* is recirculated through *R*. If desired, a suspension of *C* in *P* may be passed down *F* to treat the vapours.

D. K. M.

Treatment [refining] of hydrocarbon oils. **J. C. MORRELL** and **G. EGLOFF**, ASSRS. to **UNIVERSAL OIL PRODUCTS Co.** (U.S.P. 1,957,794, 8.5.34. Appl., 19.6.31).—The S and gum-forming constituents of gasoline are reduced by passing the vapours mixed with O₃ through a bed of material, *e.g.*, fuller's earth, countercurrently against an alkaline solution.

D. K. M.

Refining [desulphurising] hydrocarbons. **R. I. LEWIS**, ASSR. to **SHELL DEVELOPMENT Co.** (U.S.P. 1,957,840, 8.5.34. Appl., 15.7.29).—Gasoline is treated successively with (1) 31% H₂SO₄ at room temp., (2) 97.4% H₂SO₄ at -9° to -7°, (3) 97.4% H₂SO₄ at room temp. The spent acid is drawn off after each step.

D. K. M.

Refining of petroleum crude oil. **M. C. McDONALD** (U.S.P. 1,958,310, 8.5.34. Appl., 27.6.31. *Cf.* U.S.P. 1,791,329; B., 1931, 916).—Petroleum oil is purified and dewaxed by passing down a reflux tower into a still (*S*) in which it is heated to 121°. From *S* the liquid is passed through a cooler into a vessel (*V*) fitted with a cone bottom and agitator and surrounded by a jacket through which flows brine to cool the apparatus. When the temp. of the oil has fallen to -34° to -4° it is agitated with H₂SO₄ to the exclusion of air. The sludge after settling is drawn off, heated to 53°, and agitated, after which the petrolatum in it separates on keeping. The oil is withdrawn from *V* and neutralised.

D. K. M.

Dewaxing mineral oils. **V. VOORHEES**, ASSR. to **STANDARD OIL Co.** (U.S.P. 1,956,780, 1.5.34. Appl., 11.12.31).—The oil mixed with diluent, *e.g.*, C₆H₆-

EtOAc, the composition of the mixture being adjusted to suit each stage, is chilled to a no. of falling temp. stages and the deposited wax is filtered off at each stage.

D. K. M.

Treatment of hydrocarbon oils. **G. EGLOFF**, ASSR. to **UNIVERSAL OIL PRODUCTS Co.** (U.S.P. 1,950,721, 13.3.34. Appl., 10.2.30).—In the prep. of motor fuels, hydrocarbon oils are subjected to cracking conditions and finely-divided alkali or alkaline-earth hydrides are introduced with steam into the reaction and fractionating zones, whereby undesirable highly unsaturated hydrocarbons are hydrogenated and partly saturated and the oil is desulphurised.

C. C.

Refining of hydrocarbon oils. **J. C. MORRELL**, ASSR. to **UNIVERSAL OIL PRODUCTS Co.** (U.S.P. 1,950,739, 13.3.34. Appl., 15.11.29).—Cracked petroleum distillates are refined by treatment with H₂SO₄ containing "spacing agents" (I) in solution, *e.g.*, sulphates of alkali, alkaline-earth, or heavy metals. Org. (I) such as glycerin or EtOH may also be added to the mixture.

C. C.

Desulphurisation of hydrocarbon oils. **I. LEVINE**, ASSR. to **UNIVERSAL OIL PRODUCTS Co.** (U.S.P. 1,950,735, 13.3.34. Appl., 5.3.31).—The S content of cracked petroleum distillate is reduced by treating the latter with a ketone, *e.g.*, COMe₂, in presence of a condensing agent, *e.g.*, AlCl₃, ZnCl₂.

C. C.

Treatment of hydrocarbons. **E. A. BOSING**, ASSR. to **BUFFALO ELECTRO CHEM. Co., INC.** (U.S.P. 1,951,324, 13.3.34. Appl., 28.8.30).—Sour distillates containing S are heated with aq. Na₂PbO₂ (I). The distillate is separated from the aq. alkali (II) and the sol. Pb mercaptides are decomposed by aq. H₂O₂, whereby PbO is pptd. Harmless alkyl disulphides remain in solution. The alkali separated in (II) is used to produce further (I) with the pptd. PbO.

C. C.

Refining liquid hydrocarbons [from the cracking of petroleum].

G. C. CONNOLLY and **A. F. WURZBACHER**, ASSRS. to **SILICA GEL CORP.** (U.S.P. 1,943,583, 16.1.34. Appl., 22.5.31).—The oil is heated with H₂SO₄ to remove unsaturated hydrocarbons, and steam is injected into the mixture so that it condenses therein and washes out the acid and sludge. The separated oil is then heated under pressure with SiO₂ gel impregnated with a Fe₂O₃ or CuO catalyst to remove S, and finally the purified oil is distilled to remove polymerised gums, resins, etc.

A. R. P.

Dissociation of hydrocarbon gases and vapours to obtain a mixture of hydrogen and nitrogen in determined proportions.

W. D. WILCOX (U.S.P. 1,951,044, 13.3.34. Appl., 7.7.30).—A wide conduit (I) is filled with permeable refractory material which is heated to > 1090° by the combustion of air and fuel gas. A mixture of hydrocarbon gases and steam is then passed through (I), preferably countercurrent to the direction of the combustion gases in the heating cycle. A controlled vol. of air, preheated to > 980°, is introduced at an intermediate point in (I). The temp. is raised by the partial combustion which ensues, and by adjusting the rate and vol. of air a H₂-N₂ mixture of predetermined composition can be obtained.

C. C.

Purification of sulphur-containing substances.

H. WHITAKER, ASSR. to PETROLEUM PROCESSES CORP. (U.S.P. 1,952,482, 27.3.34. Appl., 28.6.29).—Petroleum distillates are treated in the vapour phase at 415–440° with SiO₂ gel or other suitable contact material, whereby the S compounds, *e.g.*, mercaptans, are converted into H₂S, which is removed by washing the oil, after condensation, with H₂O and aq. alkali. A. B. M.

Revivification of mineral absorbents [from oil refining].

G. R. LEWERS (U.S.P. 1,943,976, 16.1.34. Appl., 28.10.31).—Oil-saturated spent absorbents are purified by passing them through a multiple-hearth furnace maintained at such temp. that the greater part of the oil is distilled off from the upper hearths (I) at the same time that the non-volatile org. constituents are charred, while the C is burned out in the lower hearths. By regulating the air input, combustion of the oil in (I) can be avoided. A. R. P.

Production of low-boiling hydrocarbons by action of water.

R. T. HASLAM, ASSR. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,956,573, 1.5.34. Appl., 26.5.30).—A mixture of hydrocarbon oil and H₂O is heated (I) to 483–704°/70–500 atm. and passed through a reaction chamber, heat exchanger, and cooler to a separator (II) from which the oil is withdrawn and rectified to yield a product of b.p. < 224°. The high-boiling reflux from rectification and H₂O separated in (II) are recycled. If desired, fixed gas formed in the process may be mixed with the oil and H₂O before process (I). D. K. M.

Aquolysation [of hydrocarbons].

C. ELLIS, ASSR. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,956,567, 1.5.34. Appl., 31.5.30).—Heavy hydrocarbon oil, *e.g.*, gas oil, is mixed with H₂O and heated at 482–580°/3000–3500 lb. per sq. in. The mixture is cooled without reduction of pressure to 204–260° and the H₂O separated and recycled with fresh oil. D. K. M.

Aquolysis of [mineral oil-water] emulsions.

A. WHITE, ASSR. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,956,603, 1.5.34. Appl., 2.7.30).—An emulsion of hydrocarbon oil and H₂O (< 50%) is passed through a reaction chamber at 492–705°/100–1000 atm. pressure, the time therein being < 2 min., and the resulting light oil is separated from the H₂O which contains oxygenated products, *e.g.*, alcohols, ketones, acids. D. K. M.

Treatment of water-in-oil emulsions.

A. M. HERBSMAN, ASSR. to INDUSTRIAL PATENTS, LTD. (U.S.P. 1,959,824, 22.5.34. Appl., 10.10.31).—Emulsions are cut by treatment with a sulphonated fat (50%), and an alkaline-earth salt, *e.g.*, MgCl₂ (0–20%) dissolved in a homologue of C₆H₆, an alcohol, a phenol, or a hydrocarbon solvent (30–50%). D. K. M.

Sulphonation of petroleum oils.

H. LIMBURG, ASSR. to PATENT & LICENSING CORP. (U.S.P. 1,958,630, 15.5.34. Appl., 19.5.28. Holl., 1.6.27).—Spindle oil which has been treated with H₂SO₄ (< 30%) and had the sludge removed is further treated with H₂SO₄ and the sludge removed and neutralised with alkali. The resulting salt of a sulphonic acid (mol. wt. > 250;

Ca salt sol. in H₂O and aq. CaCl₂) stabilises aq. emulsions of mineral and vegetable oils, asphalt, etc. D. K. M.

Hydrogenation system [for hydrocarbons].

R. E. WILSON, ASSR. to STANDARD OIL Co. (U.S.P. 1,958,528, 15.5.34. Appl., 28.11.30).—The vapours obtained by the liquid-phase hydrogenation of a petroleum oil at 454°/200–300 atm. are mixed with the vapours of a light hydrocarbon oil superheated to < 482° and passed through a tower containing a catalyst, *e.g.*, oxides of Cr or Mo; the products are condensed, yielding a motor spirit of high antiknock val. and low S content. D. K. M.

Removal of oil from air.

AKTIEB. SEPARATOR (B.P. 422,450, 22.6.34. Swed., 22.6.33).—The exhaust from an air pump is caused to pass through a flat, spring-loaded valve which is allowed to leave its seat only about 0.10 mm., the oil being separated by passing through the slit and collecting on the flat face, whence it falls from the edges in the form of large drops. B. M. V.

Motor fuel.

L. F. MAGNESS (U.S.P. 1,954,939, 17.4.34. Appl., 12.1.20).—The fuel is composed of approx. 50% of gasoline, consisting principally of paraffin hydrocarbons, and 50% of light oils from the carbonisation of coal, consisting principally of C₆H₆ and PhMe. A. B. M.

Non-detonating fuel.

P. S. DANNER, ASSR. to STANDARD OIL Co. OF CALIFORNIA (U.S.P. 1,954,865, 17.4.34. Appl., 17.6.31).—A small proportion of a metallic nitrosocarbonyl, *e.g.*, Co(CO)₃NO or Fe₄(CO)₁₅NO, is added to a hydrocarbon oil. A. B. M.

Preparation of antidetonation motor fuel.

E. J. GOHR, ASSR. to STANDARD-I. G. Co. (U.S.P. 1,954,993, 17.4.34. Appl., 22.12.30).—Heavy hydrocarbon oils are subjected to destructive hydrogenation under such conditions (*e.g.*, at 480–600°/20–150 atm. for 2–6 min.) as retard coke formation but produce an unsaturated antiknock motor fuel; the products are removed from the reaction zone and the light oil, after separation from the heavier fractions, is hydrogenated in the vapour phase under conditions (*e.g.*, at 400–480° and under increased H₂ partial pressure) which free the oil from gum-forming constituents but leave it in a substantially unsaturated condition. The heavier fractions can be recycled. A. B. M.

Production of an antidetonating fuel for internal-combustion engines by heat-treatment of mixtures of alcohols and oils.

SOC. ANON. CARBURANTI ITALIA (B.P. 420,600, 25.5.33. It., 9.6.32).—40–60 pts. by wt. of EtOH or synthetic MeOH are mixed with 60–40 pts. of light oil (obtained by distilling tar or asphalt) and 2 pts. of C₁₀H₈, the mixture is distilled, and the vapour heated at 350–500°. 95% EtOH may be used. A. B. M.

Liquid fuels for internal-combustion engines.

N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 421,928, 26.1.34. Holl., 11.2.33).—The addition of org. peroxides, *e.g.*, tetrahydronaphthalene peroxide, to fuels for compression-ignition engines is claimed; no other primers are present. C. G.

[Gum inhibitors for] stabilised motor fuel. F. B. DOWNING, R. G. CLARKSON, and C. G. WOLFF, ASSRS. to

E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,957,134, 1.5.34. Appl., 24.8.32).—The use of *p*-hydroxyanilino-acetonitrile and its alkyl or aralkyl derivatives (*e.g.*, the α -Me₂, α -Pr, α -hexyl, α -CHPr.CH', also *N*- and nuclear-alkylated derivatives) is claimed. H. A. P.

Treating [decolorising and stabilising] petrol-um distillate. J. B. RATHER, L. C. BEARD, JUN., and O. M. REIFF, Assrs. to SOCONY-VACUUM CORP. (U.S.P. 1,959,315—7, 15.5.34. Appl., [A] 7.6.33, [B] 25.9.29, [C] 25.6.30).—Gasoline is decolorised and/or stabilised by the addition (<0.01%) of (A) a Bu-substituted pyrogallol, (B) an alkyl-, amyl-, or diamyl-substituted quinol, (C) an alkyl-substituted polyhydroxybenzene, the substitution being nuclear. D. K. M.

Lubricating oils. (A—C) B. H. LINCOLN and (A, C) A. HENRIKSEN, Assrs. to CONTINENTAL OIL CO. (U.S.P. 1,944,941 and 1,945,614—5, [A] 30.1.34, [B, C] 6.2.34, Appl., [A] 11.6.32, [B] 21.3.32, [C] 14.7.32).—(A) A small quantity of a halogenated ester of a fatty acid with a OH- or (OH)₂-alcohol is added to the oil. Halogenated Et oleate or Me stearate are mentioned. (B) Lubricating oil is mixed with 35—100 g./gal. of a deflocculating agent obtained by oxidising with KMnO₄ the product obtained by treating oleic acid with HNO₂. (C) The oil is mixed with a small quantity (1%) of a product obtained by chlorinating paraffin wax, m.p. 55°, until the m.p. falls to 15°, and then condensing the chlorinated wax with NaOEt in EtOH and evaporating the EtOH. A. R. P.

Manufacture of lubricating oils. J. HANSEN, Assr. to SHELL PETROLEUM CORP. (U.S.P. 1,956,716, 1.5.34. Appl., 3.12.26).—Lubricating oil that has been heated with acid and freed from sludge is purified by mixing with adsorbent material (I), *e.g.*, fuller's earth, heating to 150°, and blowing in steam while under vac. for 1 hr. (I) is separated by filter-pressing. D. K. M.

Manufacture of high-quality lubricating oils. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 422,471, 6.7.33).—Lubricating oils (I) of high η are treated with liquid hydrocarbons which are gaseous at room temp., *e.g.*, C₃H₈, whereby constituents of high mol. wt. are removed. Synthetic hydrocarbon products (0.1—30%) of high mol. wt. and rich in H, *e.g.*, polymerisation products of paraffin wax or hydrogenation products of polymerised styrene or olefines are added. (I) of η index > 120 and able to withstand high bearing pressures are thus obtained. C. C.

Lubricant. B. GALLSWORTHY, Assr. to TEXAS CO. (U.S.P. 1,957,259, 1.5.34. Appl., 18.2.32).—A Pb soap is heated with S (0.25—50%) at 120—235°, whereby some of the Pb forms PbS, and the product (4—30%) is mixed with lubricating oil at 38—150°. D. K. M.

Graphite lubricant. W. C. THORPE (B.P. 420,682, 6.6.33).—Graphite (30 pts.) is suspended in an emulsion of degreas from which the fatty acids have been removed (20), kerosine (16), H₂O (75), turpentine (8.7), and aq. NH₃ (4.4 pts.). A. B. M.

Safety device for [gas] producers and the like. P. VAN ACKEREN, Assrs. to KOPPERS CO. OF DELAWARE (U.S.P. 1,964,546, 26.6.34. Appl., 17.8.31. Ger., 18.8.30).

Conversion of hydrocarbons. R. E. BURK, Assr. to STANDARD OIL CO. (U.S.P. 1,963,647, 19.6.34. Appl., 23.7.31).

Conversion of hydrocarbon oil. (A) G. EGLOFF and A. FISHER, (B) J. G. ALTHER, Assrs. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,963,264 and 1,963,605, [A, B] 19.6.34. Appl., [A] 11.12.31, [B] 11.12.30).

Vapour-phase cracking of oil. E. W. GARD and B. G. ALDRIDGE, Assrs. to UNION OIL CO. OF CALIFORNIA (U.S.P. 1,964,686, 26.6.34. Appl., 19.4.29).

Cracking of hydrocarbons. (A) E. W. ISOM and G. H. TABER, JUN., (B) E. C. HERTHEL, Assrs. to SINCLAIR REFINING CO. (U.S.P. 1,961,693 and 1,962,595, [A] 5.6.34, [B] 12.6.34. Appl., [A] 16.10.29, [B] 4.4.30).

Cracking [of hydrocarbons]. M. P. YOUKER, Assr. to PHILLIPS PETROLEUM CO. (U.S.P. 1,962,107, 5.6.34. Appl., 16.5.29).

Apparatus for cracking heavy hydrocarbons to produce lighter hydrocarbons. E. W. ISOM, Assr. to SINCLAIR REFINING CO. (U.S.P. 1,961,692, 5.6.34. Appl., 10.6.27).

Cracking of [hydrocarbon] oil. L. DE FLOREZ, Assr. to TEXAS CO. (U.S.P. 1,962,235, 12.6.34. Appl., 11.12.23).

Return bend for cracking coils in oil stills. F. C. FANTZ (U.S.P. 1,962,863, 12.6.34. Appl., 15.2.33).

Treatment of oils. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,962,488, 12.6.34. Appl., 17.3.22).

Treatment of high-boiling hydrocarbons. E. MOEHRLE (U.S.P. 1,963,757, 19.6.34. Appl., 3.4.31. Ger., 7.6.30).

Heat-treatment under pressure of high-boiling hydrocarbons. W. RITTMEISTER (U.S.P. 1,963,717, 19.6.34. Appl., 27.4.32. Ger., 6.5.31).

Apparatus for refining mineral oil by aluminium chloride. B. E. CARL, Assr. to C. G. CAMPBELL (U.S.P. 1,963,259, 19.6.34. Appl., 3.4.31).

Distillation of oil. H. M. GRAHAM, Assr. to ROSS HEATER & MANUFG. CO., INC. (U.S.P. 1,961,211, 5.6.34. Appl., 13.3.31).

Fractional distillation [of hydrocarbons]. A. G. PETERKIN, JUN., Assr. to ATLANTIC REFINING CO. (U.S.P. 1,962,153, 12.6.34. Appl., 18.6.31).

Distillation of heavy petroleum oils. G. B. COUBROUGH, Assr. to LUMMUS CO. (U.S.P. 1,963,888, 19.6.34. Appl., 5.10.32).

Dewaxing of hydrocarbon oils. G. R. LORD, Assr. to SINCLAIR REFINING CO. (U.S.P. 1,963,498, 19.6.34. Appl., 1.8.31).

[Dewaxing of oils by] chilling. I. C. CARPENTER, Assr. to M. B. MILLER & Co., INC. (U.S.P. 1,962,580, 12.6.34. Appl., 18.1.29).

Valuable hydrocarbons by destructive hydrogenation. M. PIER and K. WISSEL, Assrs. to STANDARD-

I. G. Co. (U.S.P. 1,963,759, 19.6.34. Appl., 21.1.31. Ger., 24.1.30).

Oil-filter medium and its manufacture. K. E. LYMAN and K. MILLER, Assrs. to BORG-WARNER CORP. (U.S.P. 1,963,945, 19.6.34. Appl., 2.1.31).

Apparatus for purifying insulating and lubricating oils. P. B. RENFREW, Assr. to S. F. BOWSER & Co., INC. (U.S.P. 1,962,463, 12.6.34. Appl., 11.1.30).

Separating dry materials. Mineral [coal] separation. High-pressure separator [for oil-well gas]. Decolorising etc. oils.—See I. Carbide cakes. H₂. Recovering S from gases.—See VII. Heat-treating metals. Hydrogenation plant. Al-Zn alloy.—See X. Fertilisers.—See XVI.

III.—ORGANIC INTERMEDIATES.

Rate of dissolution of methane in quiescent liquid hydrocarbons. II. E. S. HILL and W. N. LACEY (Ind. Eng. Chem., 1934, 26, 1324—1327).—Data are recorded for the rate of dissolution of CH₄ in 26 pure and crude oils and the composition of the equilibrium mixtures. Smooth curves are obtained for solubility-*d* of oil and for log solubility-log η , C₆H₆ and C₆H₁₂ being exceptions. The diffusion const. (*D*) is given by $D = 0.00011/[\eta/(t - 60)^{0.375}]^{0.52}$, in which *t* is the temp. in °F. A. G.

Rate of dissolution of propane in quiescent liquid hydrocarbons. E. S. HILL and W. N. LACEY (Ind. Eng. Chem., 1934, 26, 1327—1331).—C₃H₈ is much more sol. and dissolves much more rapidly in oils than CH₄, and it produces correspondingly greater changes in vol., *d*, and η . A. G.

C₃H₈ and C₄H₁₀ as fuels.—See II. NaOAc from timber waste.—See V. Alcohols from wood waste.—See XVIII.

See also A., Feb., 176. **Anodic oxidation of acetates. Electro-reduction of (CHPhMe)₂O.** 182, [Purification of technical] methylal. 192, Catalytic dehydration of Bu alcohols. 193, Prep. of higher aliphatic bromides, and of (-CH₂OH)₂ from C₂H₄Cl₂. 194, Prep. of (CH₂)₂O. 203, Synthesis of C₈H₆ hydrocarbons. Prep. of cymene. 206, Prep. of arylcarbimides. 208, Prep. of cyclohexanol. 209, Prep. of NH₂-alcohols. 210, Sulphonation of BzOH. 215, Prep. of ketones and keto-acids.

PATENTS.

Purification of organic fluorine compounds. H. W. DAUDT, Assr. to KINETIC CHEMICALS, INC. (U.S.P. 1,946,195, 6.2.34. Appl., 10.8.32).—Apparatus is claimed in which an org. F compound (CCl₂F₂, CCl₃F) containing acidic substances (including COCl₂) is mixed with an amine [NH₂Ph, N(C₂H₅·OH)₃] and distilled (at 18—20°/65 lb. per sq. in.). H. A. P.

Production of solid formaldehyde. DEUTS. GOLD- U. SILBER-SCHNEIDANSTALT VORM. ROESSLER (B.P. 421,691, 23.11.33. Ger., 29.11.32).—A hot solution (at 65°) containing CH₂O (55—65%), MeOH (10—15%), H₂O (20—35%), and traces of electrolytes (e.g., 0.04% NH₃) is cooled at the rate of 1—3°/hr. until approx. 90%

of the CH₂O has polymerised. A H₂O-sol. granular solid is thus obtained. H. A. P.

Manufacture of diacetyl. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 421,676, 5.10.33).—Divinyl or CH₂:CH·C:CH is passed into an acid solution of a Hg^{II} salt (HgSO₄·H₂SO₄), and the Hg compound formed is decomposed by heating with acids (HCl) at 90—100°. Halogen acids should be excluded during the absorption. H. A. P.

Manufacture of amines and amides. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 421,718, 26.4.33 and 7.3.34).—A carboxylic acid or a derivative is heated with H₂ and NH₃ and/or a primary or *sec.*-amine or a substance or substances giving these *in situ* (e.g., nitriles, C₂H₅N, CO compounds + NH₃) at 200—400°/≧ 1000 atm. (250—270°/200—300 atm. or 300—350° in vapour phase). Preferred catalysts are Co or Cu on Al₂O₃, SiO₂ gel, or bleaching earth (I). Examples are: Me stearate (II) + NH₃ over Co-Al₂O₃ at 270°/200 atm. → mono- (VI) and di-octadecylamine; Ac₂O + NH₃ over Co-Mn oxide-(I) (III) at 270°/250 mm. → NHAcEt; C₉H₁₉·CO₂H (IV) + NH₃Ph or + NH₂Bu or NHBu₂ over Co-BaO-Al₂O₃ (V) at 270°/200 atm. → cyclohexyldecylamine, b.p. 160—180°/13 mm., butyldecylamine, b.p. 144—160°/17 mm., and dibutyldecylamine, respectively; EtOAc + NH₃ over (V) at 270°/250 atm.; EtOBz + NH₃ over (III) at 270°/200 atm. → NH₂·CH₂Ph and NH(CH₂Ph)₂; lauric acid + C₂H₄(NH₂)₂ over (III) at 270°/300 atm.; coconut oil + NH₃ over Co at 250°/250 atm. → mono- (40%) and di-dodecylamine (50%); (II) + NH₃ (excess) over Cu-BaO-Al₂O₃ at 270°/200 atm. → (VI) (90% of theory); Me laurate (VII) + CH₂Ph·CN over Co at 270°/200 atm. → β-phenylethyldecylamine; (VII) + cyclohexanol + NH₃ over (III) at 270°/25 atm. → cyclohexyldecylamine, b.p. 180—181°/12 mm., or + C₂H₅N over Co → dodecylpiperidine, b.p. 190—195°/15 mm. Except where yields are quoted they are generally poor (< 25% of theory). (Cf. B.P. 421,196; B., 1935, 139.)

H. A. P.

[Di]sulphonation [of benzene]. N. B. GRILLET, Assr. to SOC. USINES CHIM. RHÔNE-POULENC (U.S.P. 1,956,571, 1.5.34. Appl., 15.8.31).—A cyclic process is claimed in which C₆H₆ is converted into PhSO₃H with excess of conc. H₂SO₄, sufficient oleum is added to give (at 100—120°) C₆H₄(SO₃H)₂, and a portion of the reaction product is then worked up, while the remainder is used to sulphonate fresh C₆H₆ to PhSO₃H. Economy of H₂SO₄ is claimed. H. A. P.

Manufacture of alkyl derivatives of ammonia [aryllalkylamines]. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 421,596, 24.6.33).—NH₃ or primary or *sec.*-arylamines are passed with ethers having < C₃ (I) (and olefines or other secondary reaction products) over a dehydrating catalyst [peptised Al₂O₃ (II), ThO₂] at 200—400°/≧ 10 atm. E.g., NH₂Ph (2.5 pts.), Et₂O (5.6 pts.), and C₂H₄ (0.85 pt) are passed over (I) at 320°/150 atm., giving NPhEt and NPhEt₂ in the ratio 1:2. Other examples of (I) are Bu₂O and EtBuO. H. A. P.

Catalytic manufacture of nuclear-substituted aromatic amines. I. G. FARBENIND. A.-G. (B.P.

421,791, 27.7.34. Ger., 29.7.33. Addn. to B.P. 414,574; B., 1934, 873).—*N*-Alkylated arylamines are heated (at 200–270°) with acid-activated natural Al silicates. *E.g.*, *NPhMe*₂ is heated at 200° with "Frankonite" + 10% phosphotungstic acid to give 1 : 3 : 6-*C*₆H₃Me₂:NH₂. H. A. P.

Recovery of resorcinol. C. H. GALLAY, Assr. to Soc. USINES CHIM. RHÔNE-POULENC (U.S.P. 1,956,570, 1.5.34. Appl., 15.8.31).—The mass obtained by fusing *m*-*C*₆H₄(SO₃H)₂ with alkali is neutralised to phenolphthalein, a Cu salt (CuSO₄) is added, and the *m*-*C*₆H₄(OH)₂ recovered in the usual way from the filtered solution. H. A. P.

Production of monocarboxylic acids and their derivatives. A. O. JAEGER, Assr. to SELDEN Co. (U.S.P. 1,956,718, 1.5.34. Appl., 13.5.29).—Crude polycarboxylic acids (I) and anhydrides (II) prepared by catalytic vapour-phase oxidation are fractionally condensed to give a pure (I) or (II) and the residual gases (+ steam or H₂) are heated with a decarboxylating catalyst (containing Zn, Cu, or Cd). The decarboxylation of (I) or (II) [*o*-*C*₆H₄(CO)₂O to BzOH] with BeO₂ at 350–450° is specifically claimed. H. A. P.

Purification of organic bodies. A. ZIMMERLI and R. C. LYON, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,957,484, 8.5.34. Appl., 27.5.31).—The org. compound, m.p. > 100° (benzoquinone, camphor, BzOH), is distilled with steam while a H₂O-immiscible, steam-volatile, org. solvent (PhCl) is added at such a rate that it cannot form a saturated vapour. H. A. P.

Manufacture of 4 : 8-dihydroxy-1 : 2 : 5 : 6-dibenzophenazines [6 : 13-dihydroxy- $\alpha\beta'\beta\alpha'$ -dinaphthazines] and azo dyes therefrom. I. G. FARBENIND. A.-G. (B.P. 421,611, 26.6.33. Ger., 25.6. and 1.7.32).—2 : 3-Aminonaphthols are oxidised to corresponding dihydroxydinaphthazines (the OH being first protected by alkylation or acylation), which may be coupled in substance or on the fibre with diazo compounds. 2 : 3-Aminonaphthol *O*-*m*-carboxybenzenesulphonate oxidised with CuO in *C*₆H₃Cl₃ and hydrolysed with NaOH gives 6 : 13-dihydroxy- $\alpha\beta'\beta\alpha'$ -dinaphthazine (I), m.p. 375–380° (decomp.) (diacetate, m.p. 322°; Me₂ ether, m.p. 324–326°). (I) is coupled with diazotised *m*-NH₂-*C*₆H₄Cl (brown), 5-nitro-*o*-anisidine (black-brown), 4-benzamido-2 : 5-diethoxyaniline (dark green), or 4-amino-4'-methoxydiphenylamine (olive-black). C. H.

Manufacture of (A) 1-amino-4-hydroxyanthraquinone, (B) aminodihydroxyanthraquinones. (A) M. S. WHELEN, (B) E. C. BUXBAUM and H. R. LEE, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,957,920 and 1,957,936, 8.5.34. Appl., [A, B] 14.9.32).—(A) α -Methoxyanthraquinone is nitrated (HNO₃-H₂SO₄ + H₃BO₃ at < 15°), the NO₂-derivative reduced (NaHS), and the 4-NH₂-compound produced is hydrolysed with conc. (or 75–93%) H₂SO₄ at 100–150°; on dilution to 70–80% H₂SO₄ content the sulphate of 1-amino-4-hydroxyanthraquinone separates. (B) A similar process is applied to 1 : 5- and 1 : 8-dimethoxyanthraquinones. The prep. of 4-nitro-, 4-amino-, 4 : 8-dinitro-, and 4 : 8-diamino-1 : 5-dimethoxy-, 4-nitro-, 4-amino-, 4 : 5-dinitro-, and 4 : 5-

diamino-1 : 8-dimethoxy-, and 4 : 8-diamino-1 : 5- and 4 : 5-diamino-1 : 8-dihydroxyanthraquinone is described. H. A. P.

Preparation of [condensed] anthraquinone bodies. E. T. HOWELL, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,957,459, 8.5.34. Appl., 19.10.29).—*Bz*-1 : *Bz*-1'-Dibenzanthronyl (I) (cf. U.S.P. 1,607,491; B., 1927, 102) is nitrated (HNO₃ in H₂SO₄ or PhNO₂) and the product reduced to the NH₂-compound, and/or converted into the dibenzanthrone derivative by fusion with alkali (KOH-EtOH at 100–130°). NO₂- and (NO₂)₂-derivatives of (I) and its 1 : 1'-(or 7 : 7')Cl₂-derivative, and corresponding NH₂-compounds, are described. The final products are grey to black vat dyes. H. A. P.

Manufacture of nitrogenous condensation products. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 421,264, 13.3. and 25.11.33. Cf. B.P. 412,586; B., 1934, 876).—Orange to green and grey vat dyes are obtained from *Bz*-3-, 5-, and 8-azabenzanthrone unsubstituted in the *peri*-(*Bz*-1 : 1-)positions, or substituted therein (a) by groups etc. that are readily split off, (b) by an arylamine residue with < 2 condensed rings, or (c) by a *C*-aryl residue, by heating with (d) an alkaline or (e) an acid condensing agent. (d) is the normal dibenzanthrone condensation in the *peri*-positions, and (e) yields carbazoles [from (b)]. The products may be chlorinated and (if desired) further condensed with alcohols, phenols, or amines, or nitrated. Examples of typical starting materials are : *Bz*-1- α -[KOH-EtOH at 140–145° (olive green; Cl_n-derivative, dark green); conc. H₂SO₄ at 130–140° (orange-yellow)] and *Bz*1 : 6(?)-bis- α -anthraquinonylamino-, *Bz*-1-pyrazoleanthronyl-, *Bz*-1-5'-benzamido-, -methylamino-, and -dimethylamino-anthraquinonylamino-, amino-, and 2-benzoyl-8-azabenzanthrone [AlCl₃-NaCl + O₂ at 180–190° (orange)], 8-azabenzanthrone and its sulphonic acid, *Bz*-1- α -anthraquinonylamino- *Bz*-3-azabenzanthrone and its 5'-NMe₂ and 5'-NH₂ derivatives; *Bz*-1-methoxy- and *Bz*-1-5'-anthrapyrimidylamino-5-azabenzanthrone. H. A. P.

Phenols from hydrocarbons. [Phenols from] tar acids.—See II. **Disazo-dye intermediates. Benzanthrones.**—See IV. **Substitutes for common salt. Sols.**—See VII. **Pigments.**—See XIII. **Coloured smokes.**—See XXII.

IV.—DYESTUFFS.

See A., Feb., 207, The azo chromophore. 223, Cyanine dyes.

PATENTS.

Manufacture of dyes of the triarylmethane series. I. G. FARBENIND. A.-G. (B.P. 421,592, 23.6.33. Ger., 25.6.32. Addn. to B.P. 387,956; B., 1933, 298).—The invention of the earlier patent is extended to dyes containing < 1 group RSO₃H, where R is alkylene > C₂; *e.g.*, *N*- β -sulpho-*n*-propyl-*N*-*n*-butylaniline is condensed with *o*-*C*₆H₄Cl-CHO and oxidised to a green dye. C. H.

Manufacture of rhodamine dyes and their application. IMPERIAL CHEM. INDUSTRIES, LTD., and M. WYLER (B.P. 421,737, 30.6.33).—2 : 3-*C*₁₀H₆(CO₂H)₂ or its anhydride is condensed with an *N*-mono- or -di-alkylated *m*-aminophenol, and, if desired, sulphonated.

Examples are: $m\text{-C}_6\text{H}_4(\text{OH})\cdot\text{NEt}_3$, sulphonated (blue-red on wool); $m\text{-C}_6\text{H}_4(\text{OH})\cdot\text{NHEt}$, sulphonated (red-orange); 2-ethylamino-*p*-cresol, sulphonated (red).

C. H.

[Manufacture of] monoazo dyes [for acetate silk etc.]. IMPERIAL CHEM. INDUSTRIES, LTD., and A. H. KNIGHT (B.P. 421,975, 26.6. and 25.7.33).—6-Bromo- or 6-chloro-2:4-dinitroaniline is diazotised in H_2SO_4 and the diazo solution is added directly to an acid solution of a *para*-coupling amine of C_6H_6 series carrying 1 or 2 *N*-alkyl groups, at least 1 alkyl being hydroxylated. Suitable amines are: di-(β -hydroxyethyl)-*m*-toluidine (violet); *N*- β -hydroxyethyl-*N*-*n*-butylcresidine, b.p. 177—178°/12—13 mm. (navy-blue); *N*-ethyl-*N*- β - γ -dihydroxypropylaniline (red-violet); *N*- β -hydroxyethyl-*N*-*n*-butyl-*m*-toluidine, b.p. 175—179°/112 mm. (picrate, m.p. 99—101°; blue-violet). The dyeings on acetate silk are light-fast and readily discharged.

C. H.

Manufacture of [mono]azo dyes containing a heavy metal in complex form. I. G. FARBENIND. A.-G. (B.P. 421,421, 20.6.33. Ger., 21.6.32).—Monoazo dyes having 2:8-dihydroxynaphthalene-6-sulphonic acid (I) as coupling component are converted into their Cu or Cr compounds. Examples are: *o*-aminophenol-4-sulphonic acid \rightarrow (I), + Cr (red-grey on wool); 6-nitro-*o*-aminophenol-4-sulphonic acid \rightarrow (I), + Cu (blue-violet on leather).

C. H.

Manufacture of chromiferous azo dyes. SOC. CHEM. IND. IN BASLE (B.P. 421,935, 29.3.34. Switz., 31.3.33).—Azo dyes of the Eriochrome-black type containing ≤ 1 atom of Cr per chelate group are boiled with aq. alkaline agents (NaOH, KOH) for ≤ 6 hr. to remove part of the Cr. The products give navy-blue shades faster to rubbing.

C. H.

Manufacture of azo dyes insoluble in water [pigments and ice colours]. I. G. FARBENIND. A.-G. (B.P. 421,610, 26.6.33. Ger., 25.6.32).—A 3:5-diarlyldiaminophenol, made from phloroglucinol (I) and 2 mols. of an arylamine, is coupled in substance or on the fibre with diazo components free from solubilising groups. Examples are compounds from (I) and NH_2Ph ($\leftarrow 2$:5-dichloroaniline for yellow-brown), or *p*-anisidine ($\leftarrow 4$:4'-dichloro-2-aminodiphenyl ether for orange-brown).

C. H.

Manufacture and application of secondary disazo dyes [for acetate silk etc.]. IMPERIAL CHEM. INDUSTRIES, LTD., and A. H. KNIGHT (B.P. 422,422, 18.7.33).—A diazotised $\text{C}_6\text{H}_4\text{Me}\cdot\text{NH}_2$ or $\text{C}_6\text{H}_4\text{Cl}\cdot\text{NH}_2$ is coupled through 2:5-di-(β -hydroxyethoxy)aniline with 1- β -hydroxyethylamino-5-naphthol, m.p. 144°, in acid medium. The dye from $o\text{-C}_6\text{H}_4\text{Cl}\cdot\text{NH}_2$ gives fast green-blue shades readily dischargeable.

C. H.

Manufacture of disazo [chrome] dyes and intermediates. I. G. FARBENIND. A.-G. (B.P. 421,739, 30.6.33. Ger., 30.6.32).—2:2'-Dihydroxy-1:1'-dinaphthyl (I) diacetate, hydrogenated at 110—120°/30—50 atm. with H_2 and Ni in EtOH, gives the octahydro-compound, m.p. 112—113°, which is hydrolysed with alkali to form 2:2'-dihydroxyoctahydro-1:1'-dinaphthyl (II), m.p. 139—140°, also obtainable from (I). (II) is coupled with a diazo-phenol- or -naphthol-sulphonic

acid (2 mols.), e.g., diazotised 6-nitro-2-aminophenol-4-sulphonic acid (after-chromed, brown on wool). C. H.

Manufacture of water-soluble anthraquinone dyes. CHEM. WORKS FORMERLY SANDOZ (B.P. 421,632, 5.2.34. Switz., 8.2.33).—4-Halogeno-1-aminoanthraquinone-2-sulphonic acid is condensed with a dialkylamide of *p*-toluidine-2-sulphonic acid, e.g., the dimethylamide (pure blue on wool or silk).

C. H.

Manufacture of compounds of the benzanthrone series [2-methylbenzanthrone]. E. I. DU PONT DE NEMOURS & Co. (B.P. 421,732, 29.6.33. U.S., 2.7.32).—The crude product of condensation of 2-methylanthraquinone with glycerol (+ Fe and H_2SO_4 at 110—120°) is heated with an org. solvent (naphtha), an alkali (Na_2CO_3), and decolorising C and the solution is filtered and allowed to crystallise. The cryst. product has m.p. 198—200°.

H. A. P.

Manufacture of improved [salts of dihydroxy-] dibenzanthrone. R. N. LULEK, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,957,547, 8.5.34. Appl., 10.3.32).—Dihydroxydibenzanthrone is fused with an alkali sulphide or polysulphide (Na_2S at 130—160°), or boiled with its aq. solution. The salt thus produced is used as such as a yellow-green vat dye or converted (direct) into acyl or alkyl derivatives.

H. A. P.

Manufacture of anthraquinoneacridone derivatives. I. G. FARBENIND. A.-G. (B.P. 421,591, 23.6.33. Ger., 25.6.32).—A 5-amino- or 5-halogeno-1:4-diaroyl-aminoanthraquinone is condensed with an *o*-halogeno- or *o*-amino-benzoic acid (or ester), respectively, and the product cyclised, e.g., by H_2SO_4 , ClSO_3H , elimination of HCl from the chloride, or, preferably, by vatting. Thus 5-amino-1:4-dibenzamidoanthraquinone is heated at the b.p. with $o\text{-C}_6\text{H}_4\text{Br}\cdot\text{CO}_2\text{Me}$, KOAc, and Cu in PhNO_2 , and the product reduced with $\text{Na}_2\text{S}_2\text{O}_4$ and NaOH in aq. $\text{C}_5\text{H}_5\text{N}$ at 30—40°. A blue vat dye fast to Cl_2 is obtained. The same product is obtained by condensing 5-chloro-1:4-dibenzamidoanthraquinone (from the 5- NO_2 -compound and BzCl at 160—200°) with $o\text{-NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{CO}_2\text{H}$, vatting, and benzoylating the diaminoanthraquinoneacridone produced.

H. A. P.

Azo dyes from dihydroxydinaphthazines. Condensed anthraquinone bodies. Nitrogenous condensation products.—See III.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Determination of sulphur and sulphate in wool.

R. T. MEASE (J. Res. Nat. Bur. Stand., 1934, 13, 617—623).—Total S is determined by completely oxidising a specimen in an O_2 bomb, absorbing the oxidised S in aq. $(\text{NH}_4)_2\text{CO}_3$, and pptg. and weighing as BaSO_4 . The SO_4^{2-} present is determined by dissolving a wool specimen in 30% HCl, and pptg. as before as BaSO_4 (the cystine-S is not pptd. in the latter case). Accuracy in each case was 2% of the S present.

H. J. E.

X-Ray analysis of textile fibres. I. Literature survey. II. Experimental methods; single-fibre studies; adsorption effects; fibre decomposition; oxidised cellulose and fibre structure. W. A. SISSON (Textile Res., 1933, 3, 242—260, 295—307; 1934, 4, 286—302, 429—435).—II. X-Ray photographs

are recorded for cellulose after treatment with paraffin and soap, after decomp. by heating in air and in oil, and after oxidation by KMnO_4 . CH. ABS. (e)

Crêpes. III. Degree of crêping. Y. KONISI (J. Soc. Chem. Ind., Japan, 1934, 37, 593—595 B).—Mathematical. A. G.

Micellar arrangement in various cellulose fibres. D. R. MOREY (Textile Res., 1934, 4, 491—512).—The fibre is dyed with a fluorescent direct dye and viewed with ultra-violet light from a Hg arc. Measurements on the polarisation of the fluorescent light are interpreted in terms of the micellar orientation and spiral structure of the fibres. CH. ABS. (e)

[Properties of] viscose rayon made from cotton linters. F. OHL (Silk and Rayon, 1935, 9, 18, 50).—Rayon (I) made from linters (*L*) has higher dry and wet tensile strengths (*T*), elasticity, extensibility (*E*), and resistance to creasing than rayon (II) made from wood pulp (*P*). *E.g.*, the *T* and *E* of (I) and (II) of 112 denier were (dry) 1.56, 1.36 and (wet) 0.58, 0.45 g./denier, and (dry) 22.0, 19.3 and (wet) 31.1, 26.9%, respectively. "Angles of crease" in Hall's test (B., 1930, 1023) were 80—90° and 55—68° for (I) and (II), respectively. Limits of variation in the properties of rayon caused by spinning irregularities are smaller for (I) than (II). Less NaOH is used in the steeping process (for formation of alkali-cellulose) with (I) because *L* contains 10% more α -cellulose than *P*. Cl_2 -bleaching of freshly spun (I) is unnecessary since it is greyish-white, whereas (II) at the same stage is yellow. Viscose solutions prepared from *L* require longer ripening than those made from *P*. The conditions of coagulation in the spinning bath must be modified for viscose solutions made from *L* since they contain no hemicelluloses to act as protective colloids as in spinning (II). In the desulphurising bath (I) remains white, whilst (II) becomes dirty brown to green. A. J. H.

Drying of solids. VII. Cellulose. S. KAMEI and T. SEDOHARA (J. Soc. Chem. Ind., Japan, 1934, 37, 657—668 B; cf. B., 1935, 209).—In its behaviour during drying, sheet cellulose differs from clay in its more powerful capillary action, which promotes surface evaporation. The crit. H_2O content, corresponding with the beginning of interior evaporation, is 80—130%. The vol. contraction is small, and ceases during the latter part of the surface drying. The rate of drying is greatly affected by air speed above a certain val. The thickness of the sheet has little effect during the period of const. drying speed (I) (surface drying), but (I) falls with increasing thickness during the period of interior evaporation. A. G.

Taking up of water by cellulose. W. D. BANCROFT and J. B. CALKIN (Textile Res., 1934, 4, 371—398).—Data are recorded for the adsorption of H_2O vapour by cotton at 25°. The part of cellulose peptised by NaOH adsorbs more H_2O than an unpeptised part. Capillary condensation cannot account for the H_2O taken up. CH. ABS. (e)

Cellulose and its derivatives. VI, VII. T. NAKAJIMA (Mon. J. Art. Silk and Staple Fibre, Japan, 1934, 2,

128—132, 172—175).—Viscosity (I) measurements for cellulose (II) in cuprammonium solution show that [Cu] influences the velocity coeff. (*k*) of decrease in (I), but has no effect on the abs. val. of relative (I) at the moment of dissolution of (II). The concn. of NH_3 or cellulose has no relation to *k*, but has a great influence on the abs. val. of relative (I). CH. ABS. (e)

Utilisation of bagasse. III. Physical properties of Cellotex. I. Thermal conductivity. H. KATO (J. Cellulose Inst., Tokyo, 1934, 10, 312—315).—The thermal conductivity of Cellotex compared with that of wood shows it to be suitable for use in buildings as a heat-insulation medium. T. W. P.

Shortening the time of digestion in the sulphite process by pretreatment of the wood. E. BORCHERS and O. BRYDE (Papier-Fabr., 1934, 32, 500—504).—The effects of pretreatment of the wood before digestion with SO_2 gas (*G*) and evacuation (*E*) on cooking time, penetration, yield, strength, and colour of the pulp are compared with those of a normal cook (*N*). Both *G* and *E* in every case give better results than *N*, although in the production of hard pulps the greatest improvements are shown in the yield, but in strength and colour with soft pulps. *E* always gives slightly better results than *G* treatment; > 2% of SO_2 (on the wt. of wood) has to be absorbed to give any material improvement. D. A. C.

(A) **Utilisation of limestones in sulphite pulping.** I. L. KÁGAN and E. V. LIPSHITZ. (B) **Determination of usefulness of limestones for producing calcium bisulphite solutions by the tower method.** O. K. GILLER (Centr. Sci. Res. Inst. Paper Ind. Trans., 1934, No. 1, 11—26, 27—34).—(B) A limestone sample (I) was soaked for 24 hr. at 16° with 3% aq. SO_2 . The difference in wt. of (I) before and after SO_2 treatment and the % of $\text{Ca}(\text{HSO}_3)_2$ in solution and of CaSO_3 and CaSO_4 in the sludge indicate the quality of (I). CH. ABS. (e)

Pulping of straw at temperatures up to 100°. A. M. RUBEKINA-GOER (Centr. Sci. Res. Inst. Paper Ind. Trans., 1933, No. 3, 139—161).—Details of the single- and 2-stage pulping process are recorded, data for the lignin content, bleaching qualities, and mechanical properties given by varying times and temp. of pulping and changes in alkali concn. being quoted. CH. ABS. (e)

Two-stage pulping of straw. A. P. PETROV (Centr. Sci. Res. Inst. Paper Ind. Trans., 1934, No. 1, 111—147).—Tests are described on the 2-stage pulping of rye straw by preliminary maceration and subsequent steaming of the mass which has been freed from excess of alkali liquor. Pulping with $\text{NaOH} + \text{Na}_2\text{S}$ is more active than that with NaOH, and gives a smaller yield of purer pulp (lower lignin content). CH. ABS. (e)

Production of sodium acetate and kraft pulp from timber-fell waste. L. P. ZHEREBOV and M. N. PLUNGYANSKAJA (Trans. Centr. Inst. Sci. Res. Forest Chem., 1934, 3, 71—91).—Wood chips were impregnated with dil. NaOH at 50° for 30 min. and then steamed at 140—160° for 1 hr. with a little H_2O . With 4.5% NaOH, pine produced 6% and leafy trees 6—8% of AcOH (as

NaOAc), *i.e.*, twice the amount by dry distillation. The wood residue is suitable for pulp production.

CH. ABS. (e)

(A) Use of seed-flax pulp in production of fine rag papers. L. A. KANTOR and M. P. RESH. (B) Supplies and economy of seed-flax straw in Ukraine as a raw material for the paper industry. V. CHUÏSTOV. (C) Mechanico-chemical methods of production of rag halfstuff from seed-flax straw and from common flax refuse straw. L. A. KANTOR and S. M. IKHELIZON (Centr. Sci. Res. Inst. Paper Ind. Trans., 1933, No. 4, 169—191, 191—219; 1934, No. 1, 147—171).—(A) Results of tests with 25, 40, and 50% of seed-flax pulp substituted for rag stuff are described.

(B) A discussion.

(C) The straw was treated mechanically to reduce the chaff content. The product was subjected to a 2-stage pulping with 10% of CaO and 1—3% NaOH (1—2 hr. at 0.8—0.9 atm.; 6 hr. at 3.5—4 atm.), followed by beating at 35—40° and bleaching with 3—4% of active Cl.

CH. ABS. (e)

Determination of furfuraldehyde number of pulp. H. ASPELUND and F. W. KLINGSTEDT (Finn. Pap. Timber J., 1933, 682—684; Chim. et Ind., 1934, 32, 161).—The colorimetric xylydine method is described. Results agree with those obtained by the gravimetric method when pptn. is carried out after distillation.

CH. ABS. (e)

Pulp bleaching. M. F. MARTUINOV (Centr. Sci. Res. Inst. Paper Ind. Trans., 1934, No. 1, 77—111).—In single-stage bleaching (I) at 35° the improvement in colour and reduction of lignin content, η , and hardness occur during the first hr. The decrease in α -cellulose (II) content, the higher Cu no. and the lower strength arise chiefly in the last third of the bleaching reaction. At 20° there is an 8.5% reduction in the Ca(OCl)₂ consumption. Two-stage bleaching gives a product of better mechanical properties and higher const. The swelling capacity is $>$ in (I). Treating pulp between the two stages of bleaching with dil. aq. NaOH instead of washing with H₂O increases (II) by 2% and reduces the Cu no. and lignin content.

CH. ABS. (e)

Recent trends in [soda-pulp] black-liquor evaporator design. W. T. HINCKLEY (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 16—20).—A review of evaporation practice in American woodpulp mills employing the alkaline cooking process. A description of the various types of evaporators, their merits and defects, is given, and particular attention drawn to the need for cheap corrosion-resisting construction materials. H. A. H.

Formation of paper on the Fourdrinier wire. II. D. McNEILL (Proc. Tech. Sect. Paper Makers' Assoc., 1934, 15, 201—213; cf. *ibid.*, 1933, 13, 335—346).—Consideration is given to a no. of practical factors affecting drainage rate of paper stock and formation of paper on the machine wire.

H. A. H.

Factors governing heat transfer through [paper-machine] dryer shells. F. C. STAMM (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 20—22).—The most important variables affecting heat transfer are the accumulation of air within the drying cylinders, and

the % of H₂O in the sheet as it leaves the wet end of the paper machine. H. A. H.

Lateral porosity of paper. J. BEKK (Papier-Fabr., 1935, 33, 30—32).—Attempts are made to show that, on the assumption that the sp. air-porosity of paper is the same both laterally and at right angles to its surface, the lateral porosity will not appreciably affect smoothness determination by the Bekk method. D. A. C.

Breaking length and stretch [of paper]. H. KIENZL (Papier-Fabr., 1934, 32, 482—485).—The product of breaking length and stretch of paper as a measure of its capacity to absorb work is discussed. D. A. C.

Cause of fibre orientation in paper. J. A. ROBERTSON and F. W. BAILEY (Proc. Tech. Sect. Paper Makers' Assoc., 1934, 15, 155—159).—Experiments made on a miniature paper machine (with and without shake motion), in which samples of paper were taken from the couch roll, the two presses, and the reel end, and tested for tensile strength (*T*) and elongation (*E*), show that, if it be assumed that the ratio of test results in the machine direction to those in cross-direction can be taken as a measure of fibre orientation in the paper, then such orientation is affected most during the passage of the paper over the drying cylinders, and to a smaller extent by the rolling action of the presses. In general, the employment of shake gives higher *T* and *E*, in both directions. H. A. H.

Delthirna sizing process [for paper and boards]. A. E. MONTGOMERY and T. G. BATCHELOR (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 1).—A brief description, including advantages claimed. H. A. H.

Fastness to light of synthetic dyestuffs on paper. J. G. GRUNDY (Proc. Tech. Sect. Paper Makers' Assoc., 1934, 15, 245—260).—An attempt is made to list a wide range of dyes according to their light-fastness (*F*). By using Brilliant Paper Yellow (fast) and Clayton Yellow G (fugitive) in varying proportions, it is possible to produce a series of yellow dyeings of graded *F*. The effect of sizing, and of the order of addition of sizing ingredients, on *F* has also been investigated, and it is concluded that such variations are not likely to influence *F* appreciably. *F* of a no. of dyes on several paper-making fibres (bleached sulphite, esparto, rag, etc.), as well as on cotton and wool, is discussed. *F* of basic dyes can be much increased by the use of Fixing Agent P. H. A. H.

Surface application of titanium pigments [to paper]. W. R. WILLETS (Paper Trade J., 1935, 100; T.A.P.P.I. Sect., 2—3).—In order to avoid loss of pigment through the paper-machine wire, as always occurs when loading materials are added to the beater, the application of Ti pigments in conjunction with starch sizing products to the paper web is described. Methods of making and applying such pigment-size suspensions are given, and the results of applying TiO₂, TiO₂ + BaSO₄, and TiO₂ + CaSO₄ to rag-bond papers are discussed. In general, it is shown that the addition of a Ti pigment to the size does not adversely affect the beneficial characteristics bestowed by the starch on the paper, and that it greatly enhances the opacity, colour,

and brightness. The treatment is claimed to be especially advantageous for the manufacture of offset papers.

H. A. H.

Relation of paper properties to register in offset lithography. C. G. WEBER (J. Res. Nat. Bur. Stand., 1934, 13, 609—616).—Data on the closeness of register in printing are correlated with the properties of the papers and history of manufacture.

H. J. E.

Sulphite-cellulose tannides.—See XV.

See also A., Feb., 163, **Viscosity of conc. cellulose nitrate solutions.** 201, **Acetylation of cellulose.** 214, **Lignins and derivatives.** 236, **Fur dermatitis.** 268, **Spruce holocellulose.**

PATENTS.

Manufacture of mixed fabrics. SOC. CHEM. IND. IN BASLE (B.P. 421,920, 23.11.33. Switz., 30.11.32).—A mixed fabric composed of different cellulosic components (*C*), e.g., cotton with viscose, Chardonnet, or cuprammonium artificial silk, which are capable of acylation to different high degrees under the same conditions, is treated with the acylating agent until *C* yield very different effects with the desired dye.

F. R. E.

Treatment of material containing cellulose. N. C. WARD, ASSR. to ANDERSON-TULLY CO. (U.S.P. 1,958,376, 8.5.34. Appl., 1.7.33).—Finely-divided wood is subjected to pressure (e.g., 1500 lb./sq. in.) and heat (50°) in presence of H₂O (60—85%) until the cellulose passes into solution, the treatment being continued until it is converted into sugars if desired.

F. R. E.

Spinning of artificial filaments. C. DREYFUS and W. WHITEHEAD, ASSRS. to CELANESE CORP. OF AMERICA (U.S.P. 1,958,238, 8.5.34. Appl., 10.11.28).—Cellulose acetate dissolved in COMe₂ is treated with 2.5—10% of a non-solvent (kerosene, petroleum jelly, wax, etc.) and spun into an evaporative medium; the products possess enhanced toughness and pliability and are readily delustrated.

F. R. E.

Paper manufacture. (A, B) J. H. SWAN, 3RD, (C) C. A. THOMAS and J. H. SWAN, 3RD, ASSRS. to GARDNER-RICHARDSON CO. (U.S.P. 1,957,368—70, 1.5.34. Appl., 30.8.29).—(A) Paper, boards, or multi-ply boards having a central layer of asphalt, intermediate layers of board, and high-grade liner coverings are coated (several times, if desired) with a flexible base coating (I), which is smoothed, and dried by blasts of hot air. A secondary H₂O- and grease-proof coating (II) is then applied and similarly dried, and finally receives a top thin covering of wax to render it tasteless and odourless. (I) consists of 60% of a mixture of 38% of rubber latex (*R*), 38% of rubber hydrocarbons, and the balance of an aq. alkali (*A*) (e.g., aq. NH₃ or NaOH) and 40% of Na₂SiO₃ (or other oil-insol. adhesives). (II) has 35% of 38% aq. Na₂SiO₃, 20% of glycerin (*G*) (or other polyhydric alcohol), and 1% of aq. starch acetate (or oxidised starch, ground tale, etc.). (B) (I) consists of 60% of a mixture of 38% aq. *R* emulsion, 2% of an alkali polysulphide, and 2% of *A*, and 40% of a mixture (*M*) of 10% aq. casein (*C*) and 10% (on the wt. of *C*) of CH₂O. (II) consists of *M* to which have been added *G* (= wt. of *C*) and 2% of an alkaline compound (e.g.,

CaCO₃). (c) The coating is applied by allowing it to overflow from troughs (*T*) on to the surface of the paper or board as it passes through the calender stack (*S*). There may be three *S*, and to each *S* may be attached several *T* applying a no. of base coats (*B*) (e.g., 3) and a final wax coating. All *B* contain 10% of *G*, but progressively decrease in their content of *R* from 75% to 10%, and increase in their Na₂SiO₃ content from 25% to 80%.

D. A. C.

Paper manufacture. H. R. RAFTON, ASSR. to RAFFOLD PROCESS CORP. (U.S.P. 1,957,474, 8.5.34. Appl., 8.7.32).—A non-waxy and substantially H₂O-insol. hydrocarbon (*H*) is added to stock containing alkaline filler (*F*) (e.g., Ca and Mg carbonates). The stock may also contain alum and resin size or starch, which together with *H* are preferably added to it in the mixing box to allow min. time of contact with *F*. *H* may be a liquid or semi-solid and may either be added in the form of an emulsion or dissolved and sprayed on to the web on the paper machine. The paper is claimed to acquire special receptivity for printing ink.

D. A. C.

Paper making. C. W. SMITH (U.S.P. 1,957,913, 8.5.34. Appl., 18.11.32).—The paper-machine slice has a concave shape just above the lip so as to impart a rotary motion to the fibres before they are fed on to the wire. The sheet after pressing is pressed on to a very hot cylinder and partly créped by scraping off with a doctor. The créping may afterwards be pulled out in the dryers. Paper of high porosity is claimed.

D. A. C.

Manufacture of [paper-]sizing material. I. J. NOVAK, ASSR. to RAYBESTOS-MANHATTAN, INC. (U.S.P. 1,958,202, 8.5.34. Appl., 19.12.31).—To 1% aq. NaOH at 57° is added 10% of oleic acid, and the mixture raised to 80° with agitation with live steam. Alum is subsequently added as usual to ppt. the size.

D. A. C.

[Manufacture of] moisture-resistant fibrous material. P. C. SEEL, ASSR. to EASTMAN KODAK CO. (U.S.P. 1,957,912, 8.5.34. Appl., 24.12.29).—Thin paper is impregnated with a mixture of COMe₂-sol. cellulose acetate having a pptn. val. (determined as described) of < 90% and *o*-tolyl *p*-toluenesulphonate.

F. R. E.

Manufacture of waterproof compound paper, cardboard, and the like. H. HESTNES (B.P. 422,148, 13.12.33. Norw., 16.12.32 and 26.10.33).—Layers of board or paper are cemented together with a thick (75 g./sq. m.) adhesive layer of rubber latex (*L*), the adhesive powers of which may be increased by small additions of wood tar, resin, mineral oils, etc., or partly decomposed *L*. *L* is applied as a conc. solution (about 55%), and is finally air-dried.

D. A. C.

Seasoning of sheets containing a solvent. G. J. ESSELEN, ASSR. to FIBERLOID CORP. (U.S.P. 1,958,136, 8.5.34. Appl., 24.10.31).—Pyroxylin sheet is treated with PhMe, CCl₄, petrol, or naphtha to replace the solvent (EtOH) therein, and is afterwards dried.

F. R. E.

Seasoning of pyroxylin plastic, particularly sheets. G. C. GRESS, ASSR. to FIBERLOID CORP. (U.S.P. 1,958,140, 8.5.34. Appl., 29.7.31).—Pyroxylin plastic

material is formed into a sheet (*S*) while still containing the original solvent, a portion of which is removed first by exposure to air until the surface of *S* is set in its normal unclouded condition, and then more by immersion of *S* in hot H_2O .
F. R. E.

[Paper] shot shells. C. E. BURKE, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,957,935, 8.5.34. Appl., 30.8.30).—The paper is coated with a cellulose ether composition, formed into a tube, and the interior impregnated with a waterproofing material (paraffin).
F. R. E.

Dryers [for cloth, paper, etc.]. J. Y. JOHNSON. From PROCTOR & SCHWARTZ, INC. (B.P. 422,332, 24.7.34).

Bleaching. Filaments etc.—See VI.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Cleaning and bleaching of crude cotton with hydrogen peroxide for production of hydrophilic cotton wool without heating under pressure. W. FEHRE and M. AUDOYNAUD (Arh. Hemiju, 1934, 8, 179—184).—The cotton is freed of impurities and bleached by treatment at 90° with solutions containing Na silicate, NaOH, Igepon, and H_2O_2 .
R. T.

Properties and uses [in dyeing] of Calgon [sodium hexametaphosphate]. ANON. (Silk & Rayon, 1935, 9, 40—41).— H_2O -sol. $Na_6P_6O_{18}$ (I) (Calgon) has base-exchange properties and softens hard H_2O without rendering it alkaline by reacting with Ca salts thus: $(I) + 2Ca^{++} = Na_2Ca_2P_6O_{18} + 4Na^+$. It is recommended as an addition to H_2O used in the treatment of textiles to prevent formation of CaO-soap scum.
A. J. H.

Acid-milling of mordant-dyed woollens. W. JOCKERS (Textile Mfr., 1934, 60, 287, 290).—Mordant-dyed woollen cloths shrank $<$ the same undyed fabric in acid-milling. The effect of sulphonated castor oil is described.
CH. ABS. (e)

Effect on the X-ray pattern of drying caustic-pretreated cotton. W. D. BANCROFT, J. B. CALKIN, and C. W. STILLWELL (Textile Res., 1934, 4, 411—412).—No change in the X-ray pattern was observed commensurate with the change in adsorption, indicating that the sintering during drying is an intermicellar, and not an intramicellar, shrinkage.
CH. ABS. (e)

Use of magnesium chloride in the sizing process of handloom weavers. P. N. JOSHI and J. F. VALLADARES (Dept. Ind. Bombay Pres., Bull. 9, 1934, 13 pp.).— $MgCl_2$ can be used as a softening and weighting agent in size mixings for sizing warp of coarse and medium counts (8's to 20's) used in the hand-loom weaving industry.
CH. ABS. (e)

Rosins, viscose, etc. in finishing cotton cloths. J. A. CLARK (Textile Mfr., 1934, 60, 293—294).—A review of applications of these materials.
CH. ABS. (e)

Hydrogenated naphthalene [for use] against clothes moth. W. COLMAN (J. Econ. Entom., 1934, 27, 860).— $C_{10}H_{12}$ is more effective than $C_{10}H_8$.
A. G. P.

Pulp bleaching. Light-fastness of dyes on paper. See V.

See also A., Feb., 170, Oxidising agents and vat-dyed cotton. 236, Fur dermatitis.

PATENTS.

(A) Bleaching of fibrous cellulose. (B) Bleaching [of fibrous cellulose]. J. CAMPBELL and L. O. ROLLESTON, Assrs. to INTERNAT. PAPER Co. (U.S.P. 1,957,937—8, 8.5.34. Appl., [A] 10.10.30, [B] 9.12.31).—(A) The process of bleaching with Cl_2 gas claimed in B.P. 419,453 (B., 1935, 59) is described, with the exception that pretreatment of the pulp with alkaline-earth salts or NH_3 gas is excluded. (B) Slush pulp (*P*) of wood, straw, bagasse, etc. is treated with an alkaline substance (e.g., 2—5% of NaOH), and H_2O then removed to give 25—50% consistency. *P* is transferred to a vessel where it is subjected to a vac. (25 in. Hg) to remove the air from between and within the fibres, and Cl_2 gas introduced until the pressure reaches about 1 atm. The Cl_2 is removed by blowing a current of air through *P*, which is then washed. The process may be repeated several times. After the final bleach *P* is treated with NaOH to remove all chlorinated impurities.
D. A. C.

Manufacture and treatment of artificial filaments, yarns, and the like containing, organic derivatives of cellulose. H. DREYFUS (B.P. 421,613, 27.6.33).—Filaments, threads, yarns, ribbons, etc. composed of an org. ester (acetate) of a hydroxyalkyl (β -hydroxyethyl) ether of cellulose of high η having $>$ 1 hydroxyalkyl group per $C_6H_{10}O_5$ are hydrolysed (NaOH in H_2O , MeOH, or EtOH) while highly stretched (to $<$ 3 times the original length). Very fine threads of a high tenacity and having affinity for substantive dyes are produced.
H. A. P.

Textile dyeing and printing [with leuco-esters of vat dyes]. IMPERIAL CHEM. INDUSTRIES, LTD., and A. WORMALD (B.P. 421,606, 26.6. and 6.12.33).—Dibenzylsulphanilic acid or a sol. salt thereof, or a solution of either in a polyhydric alcohol (diethylene glycol), is added to the dyeing or padding medium or to the printing paste in place of Solution Salt-B.
C. H.

Stripping of [(A) vat and (B) basic and alizarin dyes from] dyed textiles. IMPERIAL CHEM. INDUSTRIES, LTD., J. G. EVANS, and L. G. LAWRIE (B.P. 422,466 and 422,556, [A] 7.4.33, [B] 7.4. and 23.5.33).—(A) The dyed material (I) is heated with an alkaline reducing liquor ($Na_2S_2O_4$ -NaOH at 90 — 95°) containing an amine or quaternary NH_4 salt (II) having an alkyl radical of $<$ C_{10} ($C_{16}H_{33}Br-NMe_3$) and a sol. soap or detergent of sulphonic acid or sulphuric ester type. (B) (I) is heated with an amine free from OH, esterified or etherified OH, or nuclear O, or (II) free from OH having a hydrocarbon chain of $<$ C_{10} in alkaline, neutral, or acid aq. solution in presence or absence of a reducing agent. (II) may be derived from a fatty acid monoamide of an alkylene- or arylene-diamine.
H. A. P.

Manufacture of insoluble azo dyes on the fibre. I. G. FARBENIND. A.-G. (B.P. 421,971, 22.6.33. Ger., 22.6.32. Addn. to B.P. 377,207; B., 1932, 1026).—Alkali salts of diazosulphonates of *p*-amino-*sec*-arylamines (other than diarylamines) and an *o*- (or α -) coupling component (2:3-hydroxynaphthoic arylamides),

both being free from H_2O -solubilising groups, are printed together on the fibre and developed by steaming.

H. A. P.

Application of dyes of the anthraquinone series. IMPERIAL CHEM. INDUSTRIES, LTD., N. CHAPPELL, N. H. HADDOCK, and F. LODGE (B.P. 421,969, 18.5.33).—Anthraquinone (I) dyes having a pendant *o*-aminophenylthioglycollic acid residue [linked to the (I) nucleus by $\cdot NH\cdot$, $\cdot S\cdot$, $\cdot NH\cdot CO\cdot$, $\cdot CO\cdot NH\cdot$, or $\cdot NH\cdot SO_2\cdot$] are lactamised on the fibre by gradual addition of a dil. inorg. acid to the hot dyebath, or, preferably, by dyeing in presence of NH_4OAc , *o*- $NH_2\cdot C_6H_4\cdot CO_2H$ or its NH_4 salt, $(NH_4)_2HPO_4$, or $(NH_4)_2SO_4 + NH_3$ at elevated temp. Treatment with a mild detergent (Na cetyl sulphate, sulphonated $CH_2O-C_{10}H_8$ products) is advantageous. (Cf. B.P. 377,740; B., 1932, 1026.) [Stat. refs.]

H. A. P.

[Resist-]printing of textile materials. I. G. FARBENIND. A.-G. (B.P. 422,488, 14.7.33. Ger., 14.7.32).—The material is printed with a SO_3H - and CO_2H -free substantive coupling component (a 2:3-hydroxynaphthoic arylamide), a H_2O -sol. diazoamino-compound, a resist for (I) (below), and, if desired, a mild reducing agent ($Na_2S_2O_3$), and over-printed with a leuco-vat dye ester (I), an oxidising agent ($NaClO_4$), an agent (II) yielding a non-volatile acid (III), e.g., an NH_4 salt, and an oxidation accelerator (NH_4VO_3), and is then steamed, washed, and soaped. (I) may be replaced by NH_2Ph -black, using a suitable resist, and (II) by (III) (org. or weak inorg.).

H. A. P.

Application of rhodamine dyes. Disazo dyes for acetate silk.—See IV. **Mixed fabrics. Dryers for cloth etc.**—See V. **Preserving cellulosic material.**—See IX. **Fatty substances sol. in alkaline baths.**—See XII. **Coloured lacquers.**—See XIII.

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

Preparation of pure anhydrous liquid ammonia in gasworks and coke-oven plants. R. ZANIBONI (Acqua e Gas, 1934, 23, 47—57; Chem. Zentr., 1934, ii, 1550).—The NH_4 salt is decomposed by heat, CO_2 , H_2S , etc. are removed, and the NH_3-H_2O mixture is passed through a dephlegmator, the aq. condensate being treated with $Ca(OH)_2$. This treatment is repeated, the NH_3 being then liquefied and treated finally with aq. NH_4CNS or NH_4NO_3 .

H. J. E.

Control of ammonia oxidation. S. JUSCHTSCHENKO (Zavod. Lab., 1934, 3, 989—994).—Nomographs are given for use in the analysis of NH_3 -air and NH_3 - NO -air mixtures.

R. T.

Determination of potassium in catalysts for ammonia synthesis. G. V. ZAVAROV (Zavod. Lab., 1934, 3, 995—997).—2 g. of catalyst and 2 g. of $NaCl$ are dissolved in 15 c.c. of conc. HCl , the solution is conc. to a syrup, 35 c.c. of conc. HNO_3 are added, the solution is evaporated to dryness, the residue ignited, boiled for 20 min. with 150 c.c. of H_2O , and filtered, the filtrate + washings are boiled with $FeCl_3$ and excess of Na_2CO_3 , cooled, diluted to 200 c.c., and filtered, and K determined in 100 c.c. by the $Na_3Co(NO_2)_6$ method.

R. T.

Determination of relative velocity of slaking of lime. M. E. POZIN (Zavod. Lab., 1934, 3, 1041—1042).—The velocity of hydration of $CaO \propto$ the time elapsing before the temp. of a sample attains a max. val. under standard conditions.

R. T.

The alkali and associated industries—a retrospect. J. T. CONROY (Chem. & Ind., 1935, 121—127).—Hurter Memorial Lecture.

Stability of sodium metasilicate solutions. P. FLETCHER (Tiba, 1934, 12, 585, 587).—Solutions containing 20 g. per litre of a detergent prep. [$Na_2SiO_3 \cdot 5H_2O$ (I) 40, $NaHCO_3$ (II) 30, soap powder 20, $NaBO_3 \cdot 4H_2O$ 10 pts.] became turbid and pptd. in a few hr. after prep. A solution with 5—10 g. per litre of (I) pptd. with > 40 g. of (II) per litre. Substitution of Na_3PO_4 for (II) eliminates pptn.

CH. ABS. (e)

Reaction of magnesium chloride in solution on pyrite. B. SEGAL (J. Chem. Met. Soc. S. Afr., 1934, 35, 111—115).—Aq. $MgCl_2$ becomes more acid when pyrrhotite (I), marcasite (II), or pyrite (III) is suspended in it; at 22° the p_H falls from 6.67 to 3.38 with (I), 1.80 with (II), and 1.02 with (III), and at 32° to 3.32, 1.91, and 0.83, respectively. It is suggested that these facts will serve for the differentiation of (II) and (III).

A. R. P.

Detection of nitrites [and nitrates]. A. C. BITTENCOURT and A. BARRETO (Bol. Min. Agric., Rio de Janeiro, 1935, 23, 7—9).—A drop of a solution of benzidine in dil. HCl is held over the solution, suspected to contain NO_2' , contained in a test-tube and acidified with $2N-H_2SO_4$ for some min. The drop is then transferred to a filter paper and a drop of an aq. $NaOH$ solution of $\beta-C_{10}H_7-OH$ is superposed. An intense red coloration indicates NO_2' . To test for NO_3' , NO_2' is first removed, if present, by means of urea, the NO_3' is reduced to NO_2' by means of Cu in presence of acid, and the NO_2' detected as above.

D. R. D.

Determination of available chlorine in hypochlorite solutions by direct titration with sodium thiosulphate. V. A. WILLSON (Ind. Eng. Chem. [Anal.], 1935, 7, 44—45).—The procedure is based on the observations that when $Na_2S_2O_3$ (I) is added to a dil. $AcOH$ solution of $NaOCl$ it is oxidised completely to Na_2SO_4 , and 8 equivs. of Cl are used per mol. of (I). The titration is carried out in the usual way, using starch-KI paper as an external indicator. The results compare favourably with those obtained by use of Na_3AsO_3 .

E. S. H.

Origin of varying specific weights and changes of lead oxides by grinding and compression. J. HOFFMANN (Z. anorg. Chem., 1935, 221, 363—366).—The variations in sp. wt. and colour of Pb oxides are due to the simultaneous formation, in varying proportions, of different Pb oxides. Mechanical action, such as pressure or grinding, results in a change in polymerisation or decomp. into mixtures of higher and lower oxides with consequent changes in properties.

M. S. B.

Analysis of natural gases and their helium content. B. M. NAKASHIDZE (Azerb. Neft. Khoz., 1934, No. 6, 30—35).—An apparatus for determining He is described.

CH. ABS. (e)

Limestones for sulphite pulping.—See V. **Uses of Calgon.**—See VI. **Li [compounds].**—See X.

See also A., Feb., 179, **Prep. of pure NaF. Synthesis of Na₂CN₂.** 180, **Prep. of pure Eu, Gd, and Tb compounds.** 183, **Determination of perchlorates.**

PATENTS.

[Catalyst for] contact sulphuric acid process. F. P. FIEDLER and A. O. JAEGER, Assrs. to SELDEN Co. (U.S.P. 1,945,267, 30.1.34. Appl., 1.6.31).—The catalyst is made by spraying Sil-O-Cel successively with solutions containing Tl₂O, Ag₂O, and V₂O₅ and calcining at 300–400° after each spray to give a product containing these oxides in the ratio of 1 : 4 : 4. A. R. P.

Production of carbamates of the alkali and alkaline-earth metals. MATHIESON ALKALI WORKS, Asses. of R. B. MACMULLIN and W. K. MCCREADY (B.P. 420,748, 1.6.33. U.S., 4.6.32).—NaCl (10) is stirred into a mixture of H₂O (40) and EtOH (50 pts.) containing NH₃ (24) and CO₂ (11 pts.) at 30°, whereby crystals of NH₂·CO₂Na (> 10 pts.) separate. A. R. P.

Production of substitutes for common salt. S. MICHAEL (B.P. 421,554, 22.6.33).—Intimate mixtures, produced by evaporation or pptn. of mixed solutions of NH₄ or hydroxylamine (< 2 OH- and > 2NH₂-groups) salts of OH-acids are used. Examples are: NH₄ tartrate + malate, NH₄ gluconate + citrate, diethanolamine gluconate + malate, and NH₄ gluconate + lactose. H. A. P.

Production of a solid product containing available chlorine and highly insensitive to the influence of temperature. I. G. FARBENIND. A.-G. (B.P. 422,540, 30.8.34. Ger., 21.10.33).—The assumption that in treating finely-divided alkali hydroxide with Cl₂ the temp. must be prevented from rising above 30° is erroneous. The Cl₂ may be supplied intensively, and products of higher concn. and stability are obtained, if the reaction temp. is about 60°. W. J. W.

Preparation of alkali nitrates from alkali chlorides. A. GUYER and A. BIELER (B.P. 422,165, 26.5.34. Switz., 12.6.33).—An alkaline-earth nitrate [Ca(NO₃)₂] is dissolved in liquid NH₃, an alkali chloride added, the pptd. alkaline-earth chloride ammoniate filtered off, and the residual solution evaporated. The reactions may be carried out under pressure. W. J. W.

Manufacture of [zeolite] gels. W. VAUGHAN, Assr. to PERMUTT Co. (U.S.P. 1,945,838, 6.2.34. Appl., 7.8.31).—Aq. Na silicate with a SiO₂:Na₂O ratio of 100 : 31 is spray-dried and the powder mixed with dry Al₂(SO₄)₃ and dry Na₂CO₃ or NaAlO₂ to give a product (P) containing a 1 : 1 : 2–3 mol. ratio of Na₂O, Al₂O₃, and SiO₂. P is thoroughly mixed and pressed into briquettes (B) which are steamed at 80–100° until thoroughly moist; after 3–4 hr. B are dried at 80° in warm air and the sol. salts leached out, leaving a porous zeolite residue. A. R. P.

Production of salts by means of base-exchanging substances. NORSK HYDRO-ELEKTRISK KVAELSTOF A./S. (B.P. 421,154, 15.5.34. Norw., 22.6.33).—Ca(NO₃)₂ is converted into NaNO₃ by passing the

solution through a tower containing Na zeolite, which is later regenerated by treatment with aq. NaCl. A. R. P.

Manufacture of carbide cakes. CARBIC, LTD., Asses. of H. THEM (B.P. 422,397, 8.6.34. Ger., 30.12.33).—The cakes are formed by compressing a mixture of carbide, sugar, and S, with or without NaCl. They are treated with a light oil (paraffin, benzene) and, while still wet, with a heavy oil (b.p. > 355°). The latter will not soak into the cakes, but will form a crust $\frac{1}{2}$ – $\frac{3}{4}$ in. thick, which is a protection against moisture. W. J. W.

Manufacture of basic copper sulphate. B. H. MARSH (B.P. 421,498, 24.11.33).—Scrap Cu is heated with aq. CuSO₄ and a current of air and steam is passed through to oxidise the Cu. A. R. P.

Manufacture of zinc chloride. GRASELLI CHEM. Co. (B.P. 420,828, 8.6.33. U.S., 9.6.32).—Molten ZnCl₂ is allowed to solidify until a mushy crystal mass is obtained; this is then stirred or agitated at 230–250° and passed to the granulator, which converts it into small granules free from powder. A. R. P.

Preparation of ferric oxide catalysts [for production of hydrogen from steam and carbon monoxide]. RÜTGERSWERKE A.-G. (B.P. 421,963, 17.9.34. Ger., 12.10.33).—Burnt pyrites is extracted with hot H₂O, or slightly alkaline or acidified H₂O, and then treated with alkali. W. J. W.

Electrolytic production of metallic compounds. M. MONSERAT (B.P. 420,757, 7.6.33).—The cathode is separated from the anode by an ebonite frame carrying a porous fabric diaphragm and the electrolyte (I) is fed continuously into the cathode compartment through an insulated tube. *E.g.*, for making white lead, (I) consists of a solution of NaClO₃, NaOH, and Na₂CO₃ and the electrodes are of sheet Pb. A. R. P.

Production of titanium compounds or pigments. TITAN Co., INC. (B.P. 421,308, 27.3.34. Norw., 30.3.33).—Finely-ground ilmenite is digested in a closed vessel with hot HCl to dissolve the Fe compounds, and the residual crude TiO₂ is elutriated from heavy sand, mixed with soft coal, and heated in Cl₂ at 600–700° to obtain TiCl₄; this is purified by fractional condensation and hydrolysed to yield HCl for the first stage and pure TiO₂. A. R. P.

Production of reactions with silica and products thereof [basic magnesium silicate]. E. W. REMBERT, Assr. to JOHNS-MANVILLE CORP. (U.S.P. 1,945,534, 6.2.34. Appl., 10.4.31).—Magnesite is calcined in a rotary furnace and the resulting MgO is ground finely and digested with finely-divided SiO₂ in an aq. alkali solution, *e.g.*, Na₂CO₃ or NaOH. When reaction is complete the basic Mg silicate is separated and the alkaline filtrate returned to the circuit. A. R. P.

Manufacture of sols and highly disperse suspensions containing oxidic metal compounds. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 417,340, 18.4.33).—A solution of the metal chloride (*e.g.*, AlCl₃, FeCl₃, CrCl₃, or CuCl₂) or other salt is treated with, preferably a little < the theoretical quantity of, an alkylene oxide (I), *e.g.*, C₂H₄O, at 15–30°, whereby the

corresponding chlorohydrin (II) and a colloidal solution of the metal hydroxide are formed; (II) and any excess of (I) are then removed by distillation under reduced pressure or by extraction with org. solvents immiscible with H_2O . Evaporation of the aq. layer affords a dry product readily sol. in H_2O . A. R. P.

Manufacture of colloidal aluminium hydroxide. P. S. MOYER (U.S.P. 1,958,710, 15.5.34. Appl., 23.3.33).—Solutions of Na aluminate and a sol. Al salt are mixed, and the pptd. $Al(OH)_3$ is mixed with an alkaline-earth hydroxide [$Ca(OH)_2$]. A colloidal gel containing 4–10% of total solids and having high absorptive properties is obtained. W. J. W.

Removal of iron from acid solutions of aluminium sulphate. J. R. GEIGY A.-G. (B.P. 422,318, 22.5.34. Ger., 19.5.33. Addn. to B.P. 399,772; B., 1933, 1009).—The Fe is pptd. by means of a (Ca) salt of $2-C_{10}H_7SO_3H$ with a metal of which the sulphate is sparingly sol. or insol. at room temp. W. J. W.

Decomposition of siliceous aluminiferous minerals. T. GOLDSCHMIDT A.-G. (B.P. 422,463, 20.9.34. Ger., 14.10.33. Addn. to B.P. 409,710; B., 1934, 833).—Instead of using a stirrer to bring the aq. SO_2 in contact with the clay, the aq. SO_2 is caused to flow on to stagnant material on the counter-flow principle through a series of vessels. The temp. gradually falls from the first vessel to the last. No opportunity is afforded for the initial formation of liquors that deposit basic Al sulphites. W. J. W.

Preparation of solid carbon dioxide. A. H. STEVENS. From CARBONIC DEVELOPMENT CORP. (B.P. 421,754, 6.10.33).—In the prep. of solid CO_2 by adiabatic expansion of the gas, the preliminary heat exchanger (which is cooled by the unsolidified gas) is of the surface type, the expansion engine is of the uniflow type, and the solid CO_2 is separated by a bag filter. B. M. V.

Manufacture of hydrogen. G. NATTA (B.P. 420,652, 5.6.34).—A mixture of steam and water-gas is passed at 450–480° under pressure over smithsonite (native $ZnCO_3$) impregnated with NaOH or Na_2CO_3 . A. R. P.

Stabilisation of peroxide solutions. H. T. BÖHME A.-G. (B.P. 421,843, 18.9.33. Ger., 27.9.32).—Sol. salts of the acid pyrophosphoric esters of aliphatic alcohols $\leq C_8$ (lauryl alcohol) are added. W. J. W.

Recovering the sulphur content of gases. L. ROSENSTEIN and G. A. KRAMER, Assrs. to SHELL DEVELOPMENT CO. (U.S.P. 1,945,163, 30.1.34. Appl., 9.5.32).— H_2S is removed from gas mixtures by washing them with cold aq. K_3PO_4 (2.5 g.-mol./litre); on boiling the solution most of the H_2S is evolved in a pure state. A. R. P.

Recovery of selenium from copper matte. O. C. RALSTON and L. KLEIN, Assrs. to UNITED VERDE COPPER CO. (U.S.P. 1,945,074, 30.1.34. Appl., 11.11.30).—The matte is blown to "white metal" with 2% S and this is agitated with fused Na_2CO_3 and reducing gas, whereby the Se is converted into Na_2Se and can be recovered by leaching the slag with H_2O , acidifying the solution, and passing SO_2 . A. R. P.

(A) **Separation of krypton and xenon from air and (B) apparatus therefor.** W. DENNIS, Assr. to AIR REDUCTION CO., Inc. (U.S.P. 1,945,365—6, 30.1.34. Appl., [A] 5.5.32, [B] 23.3.33).—(A) The air is liquefied and the O_2 containing the Kr and Xe separated from the N_2 by rectification. The O_2 is then subjected to a second rectification to remove most of the O_2 and the residual liquid is fractionally evaporated to effect further concn. of the rare gases, the O_2 removed in this step being returned to the liquefier. (B) An arrangement of heat exchangers, rectifying columns, and storage vessels is claimed. A. R. P.

Removing H_2S and NH_3 from gases.—See II. **Hydrogenation plant.** PbO. [S from] sulphide ore.—See X. **Electrolytic cells.**—See XI. **Lithopone.**—See XIII. **Fertilisers.**—See XVI.

VIII.—GLASS; CERAMICS.

Free alkali in glass. L. F. GABEL (J. Amer. Pharm. Assoc., 1934, 23, 1174–1177).—Ampoules or bottles to be tested are filled with freshly-boiled distilled H_2O (at p_H approx. 5.6 by Me-red) and kept at 80–90° for 16 hr. The resulting liquid is cooled and tested with bromothymol-blue or cresol-red, the increase in p_H being a criterion of the relative suitability of the glass. F. O. H.

Drying of solids. VIII. Relation between rate of drying and nature of liquid in kaolin. S. KAMEI, S. MIZUNO, and S. SHIOMI (J. Soc. Chem. Ind., Japan, 1934, 37, 756–764 B; cf. B., 1935, 221).—The rate of drying of kaolin containing an org. liquid is const. at high liquid content, and afterwards decreases. The coeff. of surface evaporation $\propto M^{1.28}$, where M is the mol. wt. of the liquid. Fourteen liquids have been studied. F. L. U.

Ceramics and the chemical industry. G. N. HODSON (Chem. & Ind., 1935, 75–77).—Building brick, fireclay refractories, and the manufacture, physical properties, and some uses of chemical stoneware are described. D. K. M.

Porcelain and glass in place of gold. Manufacture of artificial teeth. A. BERGE (Chem.-Ztg., 1935, 59, 93–95).—A review.

Effect of preliminary grinding of quartz sand on the quality of Dinas brick. P. P. BUDNIKOV and N. S. KASSIYAN (Keram. i Steklo, 1934, 10, No. 7, 29–31).—The properties and constitution are described. CH. ABS. (e)

Rapid determination of density of Dinas articles. A. N. SCHTSCHUKAREV and V. D. TSIGLER (Zavod. Lab., 1934, 3, 1006–1007).—The d is calc. from the difference in wt. of 5 g. of powdered product in air and in xylene. R. T.

Boron carbide. A new crystalline abrasive and wear-resisting product. R. R. RIDGWAY (Trans. Electrochem. Soc., 1934, 66, 293–308).—By heating B_2O_3 with coke in a resistance furnace to 2500°, crystals of B_4C (I) are formed around a zone of molten (I) which solidifies to an ingot (cf. U.S.P. 1,897,214; B., 1934, 62). Study of the chemical composition of the product and physico-chemical investigations (including X-ray exam-

ination) show that (I) is a definite compound, probably of the annexed constitution. It is unattacked by aq. alkalis or acids (including oxidising acid mixtures) below 200°; it is definitely harder than SiC, and is mechanically stronger than other abrasives of this type, except that it is weaker in compression or cross-bending than cemented WC. Data for physical properties and resistance to oxidation at high temp. are tabulated, and some commercial applications described.



H. J. T. E.

See also A., Feb., 157, Systems CaO-SiO₂ and CaO-SiO₂-CaF₂.

PATENTS.

Lehrs for annealing glassware. W. W. TRIGGS. FROM EUROPÄISCHER VERBAND DER FLASCHENFABR. G.M.B.H. (B.P. 422,283, 14.8.33).—The outlet end of the lehr is formed with walls of conducting plates and the roof is of transverse troughs in which H₂O flows from the centre to the sides of the kiln. If desired, felt or wick-like material may be placed in the troughs.

B. M. V.

Continuous kilns for burning bricks, terra cotta, and the like. J. SHERLOCK (B.P. 422,424, 27.7.33).—In a kiln comprising two rows of chambers, in addition to the ordinary flow of air and combustion gases an entirely separate flow of air is drawn from a nearly cool chamber through a flue in the central dividing wall to a chamber containing green ware, this moist air being exhausted by a fan through one of a pair of underground flues.

B. M. V.

[Interlayers for] laminated glass. RÖHM & HAAS Co. (B.P. 421,541, 22.5.33. U.S., 25.5.32).—< 2 films are used, one of which remains tough at < temp. (I), while another remains tough at low temp. (II). (II) is an interpolymeride of esters of CH₂:CH-CO₂H and/or CH₂:CMe-CO₂H; (I) may be a similar interpolymeride of different composition or another plastic, e.g., celluloid. The preferred example uses CH₂:CMe-CO₂Me (III) (4 pts.) + CH₂:CH-CO₂Et (1 pt.) and CH₂:CH-CO₂Me (3 pts.) + (III) (2 pts.). The use of rubber-like polymerides of, or interpolymerides from, isoprene is excluded.

H. A. P.

Enamelling composition. C. J. KINZIE, Assr. to TITANIUM ALLOY MANUF. Co. (U.S.P. 1,944,938, 30.1.34. Appl., 10.4.30).—The enamel is made by fritting a mixture of Na Zr silicate 10—43 (26.43), Al(OH)₃ 0—3 (1.64), K felspar 0—48 (30.05), quartz 0—24, Na₂CO₃ 0—11, NaNO₃ 3—5 (3.5), CaCO₃ 0—8, cryolite 0—7 (3.96), ZnO 4—14 (13.87), CaF₂ 0—11 (6.22), and borax 23—47 (23.46) pts. to give a product containing, e.g., SiO₂ 27, Al₂O₃ 7, Na₂O 9, K₂O 4, CaF₂ 6, Na₃AlF₆ 4, B₂O₃ 14, ZnO 14, and ZrO₂ 15%.

A. R. P.

Manufacture of bonded abrasive articles. CARBORUNDUM Co., LTD. FROM CARBORUNDUM Co. (B.P. 421,651, 28.6.33).—The abrasive particles of Al₂O₃ (pure, or from which surface impurities have been removed) are bonded with a borosilicate glass having a coeff. of expansion 20% < that of the abrasive (e.g., < 5 × 10⁻⁶) and a toughness sufficient to withstand thermal shock. Such a bond may be composed of SiO₂ 80, B₂O₃ 12, and K₂O-Na₂O 4%. The abrasive article has an improved cutting action.

J. A. S.

[Bristle] treatment of green clay, shale, or like goods, such as bricks, before burning. H. H. BAILEY and J. F. GILL (B.P. 422,269, 9.6.33).

Enamelled sheet Fe.—See X. Abrasives.—See XV.

IX.—BUILDING MATERIALS.

Comparison of the Portland cement specifications of the world. W. WATSON and Q. L. CRADDOCK (Cement, 1935, 8, 16—21).—Tables are given for the requirements of 28 countries for fineness, chemical composition, setting time, and soundness tests (Vicat method), and tensile and compression tests.

T. W. P.

Hydration, setting, and hardening of Portland cement. W. WATSON and Q. L. CRADDOCK (Cement, 1935, 8, 1—15).—A review of the literature.

T. W. P.

Heat of hydration of cements for Boulder Dam. T. J. NOLAND (Civil Eng., 1934, 4, 365—367).—The determination of heats of hydration is described. Results are discussed.

CH. ABS. (e)

Estimation of free calcium hydroxide in set cement. V. RODT (Mitt. Materialprüf., 1934, 287).—Set cement (I)-trass mixes contain about the same amount of free Ca(OH)₂ (II) as does (I) alone, whereas little free (II) is produced by blast-furnace slag cements. In trass-(II) mixes, combination occurs rapidly up to 1 month and then continues at a reduced rate. Different types of trasses harden to varying degrees in the mixes, but all take up about the same amount of (II).

T. W. P.

Application of setting inhibitors for cement in the cementing of bore holes. R. I. GRODZOVSKAJA and N. A. LUTZENKO (Azerb. Neft. Khoz., 1934, No. 2, 23—27).—The following had little effect on the retardation of the setting: Na₂B₄O₇·10H₂O, NaCl, Na₂SO₄, Na₂HPO₄, FeCl₂, soap, CaSO₄·2H₂O, BaCl₂, Na₂CO₃, Na₂SiO₃, CaCl₂, and K₂SO₄. Analyses of the cement used are given.

CH. ABS. (e).

Glycerol-litharge cements. I. Setting and hardening. II. Stability of volume. E. CREPAZ and R. SALMONI (Annali Chim. Appl., 1934, 24, 549—571, 572—587).—I. Commercial PbO (I) of oil no. 7.1 and pure glycerol (II) of *d*₂₀ 1.260 were used. The setting of these lutes develops heat, apparently from a single reaction, the temp. passing through a max. and then falling continuously. For mixtures of 200 g. of (I) with 40 c.c. of (II) solutions of different concn., the max. temp. is highest and is reached most quickly at 80% concn. The lutes show thixotropic properties and colloidal swelling. For pastes with (II) solutions of medium concn. [30 c.c. to 100 g. of (I)], the hardness (by steel-ball method) increases as heat is developed, then falls, and again increases. With > 80% (II) solutions the intermediate fall is lacking. PbCl₂ slightly delays the start of the setting process, without affecting its velocity appreciably; Pb(NO₃)₂ (III) lowers this velocity also. The mechanism of the changes is discussed.

II. The changes in vol. of these lutes occur only within a short period subsequent to setting. The mechanical strength of a lute depends mainly on the proportion of liquid used, its change in vol. during setting on the

concn. of (II) used, and its setting time on the concn. and proportion of (II). Min. expansion is obtained by using either about 70 or 95% (II), far greater vals. being shown with either 80 or 100%. \times about 20 c.c. of liquid should be used per 100 g. of (I), the inconvenience of rapid setting being obviated by addition of (III) or HNO_3 solution. Max. strength is given by 95% (II), and this is not lowered materially by (III). The mechanism of the expansion of the lutes and the influence on their properties of the surface gel formed are discussed.

T. H. P.

Influence of various cements on resistance of concrete in corrosive water. O. GRAF and K. WALZ (Zement, 1934, 23, 376—388, 401—410; Chem. Zentr., 1934, ii, 1511—1512).—Tests are recorded using a variety of cements in H_2O , in aq. NaCl (5%), Na_2SO_4 (0.9—2.1%), and MgSO_4 (2.4%), and in sea- H_2O .

H. J. E.

Elasticity, plasticity, and shrinkage of concrete. FREYSSINET (Mitt. Materialprüf., 1934, 285—287).—Data on shrinkage (I) and plastic deformation (II) of concrete under continuous loading, up to 3 months' duration, are given. The magnitude of (II) is $>$ that of (I) under the conditions of the experiment.

T. W. P.

Determination of the working properties of mortar and concrete. W. HUMM (Beton u. Eisen, 1934, 33, 184—188; Chem. Zentr., 1934, ii, 1512).—Tests are described depending on the compression of the sample in a steel cylinder. Data are recorded.

H. J. E.

Wood decomposition. S. A. WAKSMAN (Chem. & Ind., 1935, 132—133).—A crit. review of evidence against the infiltration theory of wood decomp.

P. G. M.

Wood decomposition. E. A. RUDGE (Chem. & Ind., 1935, 149—150).—A reply to the above.

Bagasse. NaOAc and pulp from timber waste.—See V. Ceramics and industry.—See VIII. Alcohols from wood waste.—See XVIII.

See also A., Feb., 165, Swelling of pine wood and lignin.

PATENTS.

Manufacture of cement. H. E. POTTS. From SOC. DES CIMENTS DU CONGO (B.P. 422,359, 9.10.33).—Chlorides (I) (e.g., CaCl_2 ; \times 0.5%) are added to the Portland cement raw materials, and the gases liberated in the hot zone of the kiln are passed over fresh raw material, to re-form (I). Cements may be prepared free of sesquioxides by use of (I) as a flux. T. W. P.

Manufacture of cementitious materials. CEMENT PROCESS CORP., Assees. of A. J. BLANK (B.P. 421,819 and Addn. B.P. 422,238, [A] 22.6.33, [B] 15.11.33. U.S., [A] 20.7. and [A, B] 23.11.32).—(A) Hydraulic cements are prepared by grinding together quicklime, hydrated CaO , or slaked CaO and SiO_2 , siliceous earths, or argillaceous materials (I) (e.g., diatomaceous earth, tripoli), in presence of H_2O at 100—400°. Portland cement may be ground in varying proportions with the other materials and waterproofers (II) or accelerators (III) may be added. By adjusting the ratios, types of

cement ranging from high early strength to plastering and masonry cements may be produced. (B) Limestone and (I) are pre-calcined at temp. $<$ that of ordinary Portland cement clinkering but $>$ 800°, before the wet grinding operations. Part only of the (I) may be used in calcining, the remainder being added at the grinding stage. (II), (III), or Portland cement may be added.

T. W. P.

Manufacture of Keene's cement. H. G. C. FAIRWEATHER. From AMER. CYANAMID CO. (B.P. 422,684, 23.6.34).—By-product $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (I), containing Fe compounds as impurities, is treated with 1—3% of a volatile, decomposable reagent [$(\text{NH}_4)_2\text{SO}_4$, H_2SO_4 , etc.], and calcined at 600—750° to form a Keene's-type cement. The reagent reacts with the Fe compounds and prevents formation of a pink coloration in the cement. Alternatively, the (I) may be heated at $>$ 750° and the reagent added later. The process is particularly suitable for gypsum obtained from phosphate rock treated with H_2SO_4 .

T. W. P.

Manufacture of bricks, blocks, slabs, tiles, and like articles suitable for building etc. purposes. A. F. BERRY (B.P. 421,973, 23.6.33).—Graded hard-burnt clay and fillers are bonded with a hydraulic cement slurry (up to 5% of the total). The bricks (etc.) may be treated with hot aq. CaCl_2 to fix sol. silicates. Different surface treatments may be applied, depending on the later use of the product, e.g., carborundum slurry in hot aq. CaCl_2 for paving slabs, or aq. MgSiF_6 . Colouring agents may be added. The bonded materials may be subsequently fired.

T. W. P.

Manufacture of light porous solid bodies. T. YASUI and H. NOTOKI (B.P. 421,940, 17.4.34. Jap., 19.5.33).—Cement pastes are maintained under reduced pressure during setting, whereby the air bubbles trapped in the cement expand.

T. W. P.

Preservation of wood and like [cellulosic] material. E. I. DU PONT DE NEMOURS & Co. (B.P. 421,589, 23.6.33. U.S., 23.6.32).— $1\text{-C}_{10}\text{H}_7\text{-NO}_2$ either alone or as a 5% solution in a volatile solvent (kerosene, C_6H_6 , *o*- $\text{C}_6\text{H}_4\text{Cl}_2$, naphtha) is used as a preservative.

T. W. P.

Drying plant.—See I. Adhesive [for tiles].—See XV.

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

Equilibrium $\text{FeS} + \text{Mn} \rightleftharpoons \text{MnS} + \text{Fe}$ at high temperatures. O. MEYER and F. SCHULTE (Arch. Eisenhüttenw., 1934—5, 8, 187—195).—The equilibrium can be expressed over a wide range by $(\text{Fe})[\text{Mn}] = K_1 x (\text{Mn})[\text{Fe}]$ and $(\text{S})[\text{Mn}] = K_2 (\text{S})[\text{Fe}]$, where () represent concns. in the slag. At 1600° $K_1 = 0.00425 \pm 0.00125$ and $K_2 = 0.000725 \pm 0.000175$; addition of C or Si to the metal phase changes only K_2 , K_1 remaining practically unaltered. The heat effect of the reaction $(\text{FeS}) + [\text{Mn}] = (\text{MnS}) + \text{Fe}$ calc. from the change in K_1 produced by rise in temp. is about 18—19 kg.-cal./g.-mol. The separation of a second phase from the homogeneous metal bath is determined by $(\text{Mn})[\text{S}]$; in the ternary Fe—Mn—S system at 1600° separation occurs

when this product (P) is 2.6, but in the quaternary system Fe-Mn-C-S it occurs when $P = 1.2$ at 1600° and when $P = 0.75$ at 1250 – 1350° . Desulphurisation of the metal by segregation is therefore impossible under practical conditions. A. R. P.

Effect of manganese on the equilibrium between the iron oxides and carbon monoxide and dioxide in the thermal decomposition of siderite. L. KRAEBER (Mitt. Kaiser-Wilh.-Inst. Eisenforsch., 1933, 15, 161–166; Chem. Zentr., 1934, i, 924–925).—The FeO content increases with temp. if the reaction gases remain in contact with the solid phase (I), and the CO_2 content of the gas also increases simultaneously. At 95% CO_2 (I) is an isomorphous mixture of $\text{FeO}, \text{Fe}_2\text{O}_3$ (I) and $\text{MnO}, \text{Fe}_2\text{O}_3$ (II). At higher % of CO_2 , (I) is oxidised to Fe_2O_3 whilst (II) remains stable. The cubic Fe_2O_3 again forms isomorphous mixtures with the $(\text{Fe}, \text{Mn})\text{O}, \text{Fe}_2\text{O}_3$ solid solution. Below 95% CO_2 the free lower oxide is formed as well as the "ousic" oxide. The Mn is found in both phases. L. S. T.

Influence of common impurities on the notched impact strength of technical iron. G. SCHMIDT (Arch. Eisenhüttenw., 1934–5, 8, 263–267).—The effects of small quantities of C, P, S, O, and N on the temp.-impact val. (T - V) curve of purified Armco Fe at -80° to 300° have been determined. For the pure metal the curve rises sharply with rise in T from -80° to -50° , then more slowly to a max. at 0° , after which an almost linear slow fall in V occurs up to 300° . The initial steep rise in the curve is displaced to higher temp. and the max. is reduced the greater the amount of impurity (I) present; for a given % I the effect of the elements decreases in the order N, P, O, C, S in annealed alloys. Deformation and ageing has the most deleterious effects on V when the Fe contains both O and S; these elements, therefore, appear to be the cause of "blue-brittleness" phenomena, C, N, and P being relatively inert in this respect. A. R. P.

Scaling and surface decarburisation of steels under the influence of various gases. W. EILENDER (Gas- u. Wasserfach, 1934, 77, 757–762, 779–784).—A crit. summary of recent work. A. R. P.

Carbides in steels of low vanadium content. W. BISCHOF (Arch. Eisenhüttenw., 1934–5, 8, 255–258).—Electrical resistance measurements on steels with V 1–9 and C 0.16–1.07% and chemical analysis of carbides isolated from them indicate that in these steels only V_4C_3 and VC exist together with Fe_3C . No evidence for the formation of other V carbides could be obtained. A. R. P.

Development of heat-resistant alloys. E. PIVOVARSKY (Rev. Mét., 1934, 31, 452–459).—A review of recent work on the effects of Al, Cr, and Si on the heat-resisting properties of cast Fe, steels, and Ni-Cr alloys. A. R. P.

Apparatus for [creep] tests at high temperatures and the resistance of some steels to creep. I. MUSATTI and A. REGGIORI (Rev. Mét., 1934, 31, 421–438).—An automatically controlled apparatus for measuring the creep of metals at high temp. is described and results obtained with it on various steels are shown in tables and graphs. Movements of 0.0002 mm. in a specimen

100 mm. long can be measured with accuracy and the temp. of the metal can be kept const. within 0.1° . A. R. P.

Characteristics of the resistance of metals to high temperatures. M. ROS and A. EICHINGER (Rev. Mét., 1934, 460–470).—A discussion of the mechanism of fatigue and creep of metals at high temp. A. R. P.

Compression tests of structural steel at elevated temperatures. P. D. SALE (J. Res. Nat. Bur. Stand., 1934, 13, 713–743).—Data are recorded up to 945° . H. J. E.

Practical distinction between hardening [of steel] due to martensite and [that due to] separation [of other constituents]. F. SAUERWALD and H. GROSS (Z. anorg. Chem., 1934, 221, 159–160).—If the hardness of a specimen of steel is measured at suitable temp. intervals during slow (about $\frac{3}{4}$ hr.) cooling, it is found to increase at 200 – 300° if due to the formation of martensite. F. L. U.

Comparison of the Brinell and scratch hardnesses [of steels]. E. SCHEIL and W. TONN (Arch. Eisenhüttenw., 1934–5, 8, 259–262).—A simple relationship between these two hardness vals. is shown to exist for homogeneous plain and alloy steels. Deformation, pptn.-hardening, and the production of a martensitic structure affect only the Brinell no. (H_B), the scratch hardness (H_S) remaining substantially unchanged. In plain steels quenched from 1100° H_B rises sharply to a max. at 0.8% C, then falls more slowly, whereas H_S rises rapidly with increase in C to a const. val. at $> 0.6\%$ C. A. R. P.

[Micro-]hardness-testing machine. EUGÈNE (Rev. Mét., 1934, 31, 507–513).—The apparatus comprises a diamond point (I) which is impressed into the specimen by a lever system whereby the load can be varied from 10 to 50 kg. The depth of penetration of (I) is read directly by means of an optical system. Examples of the use of the instrument in determining the variation of hardness with depth in case-hardened steels are given. A. R. P.

Relation between the X-ray photograph and tensile properties of welds [in steels]. K. WALLMANN (Arch. Eisenhüttenw., 1934–5, 8, 243–247).—Examples are cited to show that an X-ray photograph (P) does not always indicate whether a weld is sound; thus internal cracks may not be revealed when the metal is examined at right angles to the plane of the crack, and holes in the weld produce variations in the density of the P which give no real indication of the val. of the weld from a strength point of view. Again, the vals. obtained in bending and impact tests do not always correspond with the no. and distribution of the imperfections revealed by X-rays; more satisfactory agreement with the X-ray results is, however, obtained by tensile tests in which the load is applied slowly and steadily, or is alternately applied and released. A. R. P.

Bending-tensile test. E. BUSCHMANN (Z. Metallk., 1934, 26, 274–279).—By measuring the elongation (E) of a metal strip under gradually increasing load (L) while the upper part is bent backwards and forwards over small rollers, and plotting E against L , a curve is

obtained which shows a well-defined point of inflexion corresponding with the endurance limit in fatigue tests. The results obtained with Cu, Al, Ag, Zn, Fe, brass, tombak, and Cu-Ag alloys are shown graphically.

A. R. P.

Voltaic couples and corrosion. O. P. WATTS (Trans. Electrochem. Soc., 1935, 67, 1—17).—If O_2 be effectively excluded, various metals and metallic couples show no visible signs of corrosion on keeping for several months in solutions which otherwise readily attack them. This has been shown particularly for Fe, alone or coupled with nobler metals, in NaCl, NH_4Cl , NaCN, and $NH_4Cl + NEt_3$ solutions, and sea- H_2O , and for Cu, alone or coupled with nobler metals, in 0.5N- H_2SO_4 . Cold-working, subjection to special strains, or roughening the surface did not lead to corrosion in absence of O_2 , nor did the maintenance of a considerable temp. difference between the two ends of a metal strip while immersed in the solution. Moreover, in presence of O_2 , amalgamation of Cu does not prevent its corrosion. These observations are discussed in relation to theories of the mechanism of corrosion.

H. J. T. E.

Motor-electrolytic current as a factor in corrosion. E. NEWBERY (Trans. Electrochem. Soc., 1935, 67, 25—33).—By rotating one of two brass rods of identical composition, each dipping into one of the limbs of an H-tube containing diluted sea- H_2O , an appreciable p.d. is established between them. Observed characteristics of the corrosion of the brass pipe and driving rod of a deep well pulsometer pump (*P*) were such as to indicate the action of such motor-electrolytic p.d. produced by rapid relative motion of the metal and the salt solution dealt with by *P*.

H. J. T. E.

Indices of corrosion. PROT and (MLLE.) GOLDOVSKY (Rev. Mét., 1934, 31, 490—494).—Consistent results for the corrosion of Al, Mg, and their alloys can be obtained by immersion in 3% NaCl containing 0.3% H_2O_2 , the solution passing through the vessel at the rate of 100 c.c. per hr. The loss in wt. of the metal (after washing first with H_2O and then in hot HNO_3) after 20 hr. gives an "index of corrosion" (*I*) which serves as a measure of relative corrodibility. (*I*) \propto temp. along a parabolic curve, with a max. at about 40°, linearly with [NaCl] from 3 to 10%, and along a hyperbolic curve with increase in active O in the solution. The val. of (*I*) for Al at 35° is 6.9, for duralumin (*D*) without Cu 59, for annealed *D* 400, for ordinary *D* 512, and for Mg 5000.

A. R. P.

Appreciation and measurement of corrosion [of metals]. J. COURNOT and M. CHAUSSAIN (Rev. Mét., 1934, 31, 487—490).—Methods of evaluating the degree of corrosion suffered by a metal are briefly described.

A. R. P.

Standardisation of methods of testing the corrosion of metals in sea-water. LEGENDRE (Rev. Mét., 1934, 31, 442—449).—Since the composition and p_H of natural sea- H_2O varies with its origin it is recommended that for standard corrosion tests an artificial sea- H_2O be used, consisting of a 3% NaCl solution buffered to p_H 8 by addition (to 10 litres) of Na_2HPO_4 1.876 and H_3BO_3 12.404 g. so that it gives a pale pink

colour with phenolphthalein. Standard alternating immersion and salt-spray tests are described and the necessary apparatus is illustrated.

A. R. P.

Composition of standard sea-water and the influence of the composition and replenishment of the corrosive medium in corrosion tests. QUILLARD (Rev. Mét., 1934, 31, 449—451).—The addition of $MgCl_2$ or $MgSO_4$ to the standard sea- H_2O (cf. preceding abstract) has little effect on its corrosive properties, but when $NaHCO_3$ as well as $MgSO_4$ is added corrosion of Al is appreciably reduced, probably owing to the formation of a protective film. Replenishment of the corrosive medium results in a loss in wt. of soft Fe in tap- H_2O of 1.5 times, and in sea- H_2O of 2.5 times, as much as in an agitated or circulated supply of H_2O .

A. R. P.

Corrosion of steels containing copper. G. TAMMANN and K. L. DREYER (Z. anorg. Chem., 1934, 221, 124—128).—Electrolytic Fe containing 0.25—1% Cu is only slightly attacked by 4N- H_2SO_4 . No Cu can be detected in the solution. The protective action is due to the formation of a coherent surface layer of Cu.

F. L. U.

Primitive smelting of copper and bronze. T. A. RICKARD (Bull. Inst. Min. Met., 1934, No. 363, 26 pp.).—An account is given of the methods adopted by primitive negroes for making charcoal, smelting malachite ore, and refining the Cu produced; the manufacture and working of bronze by the early Peruvians and Egyptians are discussed.

A. R. P.

Effect of cold-rolling on the indentation hardness of copper. J. G. THOMPSON (J. Res. Nat. Bur. Stand., 1934, 13, 745—756).—For tough-pitch electrolytic Cu, commercial O-free Cu, and for two single-crystal rods of different orientation, hardness increased to a max., which was retained on further cold-working (*I*) until the specimen became too thin for measurement. The effect of (*I*) on the indentation hardness was practically uninfluenced by the orientation of the rolling plane with respect to the lattice in single-crystal specimens, by the change from single-crystal to polycryst. Cu, by < 0.4% O, or by the initial thickness of the specimen (0.2—3 in.).

H. J. E.

Bismuth in copper: its effects, determination, and gaseous elimination. C. O. BANNISTER and W. M. DOYLE (Bull. Inst. Min. Met., 1934, No. 363, 34 pp., and Analyst, 1935, 60, 33—34).—Bi in Cu is determined by addition of Fe^{+++} to the HNO_3 solution, pptn. with Na_2CO_3 , dissolution of the $(Fe, Bi)(OH)_3$ ppt. in H_2SO_4 and repptn. with aq. NH_3 and $(NH_4)_2CO_3$, and treatment of the H_2SO_4 solution of the ppt. with KI and SO_2 followed by colorimetric comparison in the usual way after filtration of any CuI ppt. Bi may be completely eliminated from finely-divided Cu by heating it in a stream of H_2 , N_2 , or other neutral or reducing gas. In H_2 no Bi is removed at < 500° from blister Cu, but Bi is completely removed at 950—1050° in 2 hr. In N_2 removal of Bi starts at 450° and is practically complete at 850° in 2 hr. At > 1000—1050°, when sintering of the Cu occurs, the rate of removal of Bi drops sharply and becomes very small when the metal melts. In wire-bar, fire-refined Cu, N_2 is the best eliminator for

Bi, coal gas and H_2 are little inferior, and CO is relatively feeble. Bubbling of H_2 , N_2 , or NH_3 through molten Cu effects no reduction in the Bi content even after 30 hr. The lower temp. at which Bi is removed from Cu containing O when a N_2 stream is used compared with that required when a H_2 stream is used is attributed to the greater volatility of Bi_2O_3 compared with that of Bi. A. R. P.

Mechanical properties of copper-zinc alloys. W. BRONIEWSKI and S. TRZEBSKI (Rev. Fond. mod., 1934, 28, 173—178; Chem. Zentr., 1934, ii, 1522).—Results of mechanical tests are recorded with alloys with < 44% of Zn. The hardness-, tensile strength-, and elasticity-composition curves show a break between 20 and 36% Zn. The expansion curve has a min. at 13% and a max. at 32% Zn. H. J. E.

Alloys of nickel and barium. D. W. RANDOLPH (Trans. Electrochem. Soc., 1934, 66, 375—379).—The production, properties, and applications of Ba-Ni alloys containing $\geq 0.2\%$ of Ba are reviewed. Ba-Cu-Ni and Ba-Cu-Ni-Cr alloys containing $\geq 10\%$ of Ba, which are stable in air, have now been produced. The tensile strength and hardness increase with the Ba content. The electron-emitting properties (E) of Ba-Cu-Ni alloys containing about 1% of Ba are particularly good, and Duffendack and Wolfe's method (B., 1934, 242) of surface oxidation practically eliminates evaporation below 850° and greatly increases E . The m.p. of Ba is $708^\circ \pm 5^\circ$ (corr.) (cf. Rinck, A., 1932, 115). H. J. T. E.

Flotation of Witwatersrand ore products (laboratory results). A. KING (J. Chem. Met. Soc. S. Afr., 1934, 35, 136—144).—By direct flotation of the de-slimed ore (I) crushed through 60-mesh a recovery of > 90% of the FeS_2 content with > 80% of the Au can be made in a 5% concentrate using < 0.2 lb. of K Et xanthate and < 0.15 lb. of pine oil per ton of (I) in a neutral (p_H 7) circuit. Subsequent cyanidation of the tailing (0.5—0.6 dwt. of Au per ton) yields a residue containing about 0.2 dwt. of Au per ton. The flotation concentrate after grinding to < 325-mesh yields about 98% of its Au content to aq. KCN, leaving a residue containing 2.5 dwt. of Au per ton; hence, combined flotation and cyanide treatment gives a tailing containing 0.3 dwt. of Au compared with one containing 0.5 dwt. per ton obtained by present cyanide treatment, and the cost of grinding is reduced and the capacity of the mill increased. Flotation of the cyanide tailings now produced (0.5 dwt. of Au per ton), using $CuSO_4$ or SO_2 in a slightly acid solution as activator, yields a concentrate containing > 95% of the FeS_2 and 70% of the Au with a tailing containing only 0.13 dwt. of Au per ton. A. R. P.

Gold-chromium resistance alloys. J. L. THOMAS (J. Res. Nat. Bur. Stand., 1934, 13, 681—688).—Alloys of Au with 1.6—2.5% Cr, after baking at 150 — 200° , had a very small temp. coeff. from 20° to 30° . The alloys are very stable in resistance and might replace manganin (I). The thermo-e.m.f. against Cu was 7—8 microvolts per 1° at 25° as compared with 2 or 3 microvolts per 1° for (I). H. J. E.

Ductile tungsten. S. L. HOYT (Met. & Alloys, 1935, 6, 11—18).—Historical review.

Use of radioactive alloys in the study of metals. O. WERNER (Z. Metallk., 1934, 26, 265—268).—The measurement of the radioactivity (R) of alloys of Tl, Zn, or Al containing Th-X affords a means of studying the effects of cold-work and heat-treatment on the metals. Thus Tl containing Th-X shows a point of inflexion at 235° in the R -temp. (T) curve corresponding to the allotropic transformation, whereas Zn and Al show no such points. The R of Zn increases with the degree of deformation (D) to a max. at 20% reduction then falls to the original val. at $D = 30$ —50%, after which R decreases linearly with D . With $D = 11\%$ the R - T curve shows a sharp max. (M) at 232° for Zn, whereas for Al the max. occurs at 33° with $D = 50\%$, 150° with $D = 12.7\%$, and 173° with $D = 62\%$; the M in the curve for Zn decreases linearly with D to a min. of about 165° with $D = 35\%$ and then increases linearly to $> 250^\circ$ with $D = 55\%$, whereas the M - T graph for Al has 4 linear branches, maxima occurring at 200° , $D = 18\%$, and at 162° , $D = 61\%$, and a min. at -50° , $D = 42\%$. These M vals. are attributed to the recovery of the metal from the effects of cold-work. A. R. P.

Metals as constructional materials. A. FRY (Naturwiss., 1935, 23, 78—82).—A lecture.

Electrical melting of aluminium. E. F. RUSS (Z. Metallk., 1934, 26, 285—287).—A brief description is given of induction furnaces for melting up to 200 kg. of Al and of a 250-kw. hearth furnace for melting up to 2500 kg. A. R. P.

Determination of the castability of aluminium alloys. A. VON ZEERLEDER and R. IRMANN (Z. Metallk., 1934, 26, 271—274).—A modified apparatus for determining the castability (C) of Al alloys by the spiral method is described and an account is given of the use of the method for determining the best casting conditions for anticorrosion. Max. C is obtained with 0—5% Sb in the alloy with 2% Si, and the best casting conditions are: casting temp. 700° , mould temp. 300 — 350° ; under these conditions the castings have a tensile strength of 27—28 kg./sq. mm. with an elongation of 4—5%. High casting temp. improves C , but reduces the mechanical properties (M); high mould temp. has a similar effect on M , but only slightly improves C . A. R. P.

Study of the homogeneity of light alloys by means of coloured indicators. PROT and (MLLE.) GOLDOVSKY (Rev. Mét., 1934, 31, 439).—The specimen is cleaned free from oxide films and grease and sprayed with 3 coats of a warm 10% solution of gelatin in sea- H_2O , each coat being allowed to set and dry before the next is applied. After several hr. the surface is sprayed with a universal p_H indicator; the colours produced reveal spots of varying anodic or cathodic intensity. A. R. P.

Producing metallic deposits on aluminium and its alloys. C. BOULANGER (Rev. Mét., 1934, 31, 440—441).—Thin, adherent deposits (I) of Fe, Ni, Co, Cu, or Cd can be produced on Al and its alloys (II) by simple immersion of (II) in solutions of the corresponding cyanides in an excess of NaCN. The (I) serve as a basis for electroplating (II) with Ag, Ni, Cr, etc. A. R. P.

(A) **Surface treatment and surface protection of aluminium and its alloys.** H. RÖHRIG. (B) **Coating of aluminium and its alloys.** H. RÖHRIG and W. NICOLINI (Korros. u. Metallschutz, 1934, 10, 135—142; Maschinenbau, 1934, 13, 293—294; Chem. Zentr., 1934, ii, 1523).—(A) A discussion.

(B) The prep. of surfaces is discussed. Coating materials for Al and Al alloy surfaces under various conditions are described. H. J. E.

Mechanism of the protection [of aluminium and its alloys] by oxide films. C. BOULANGER (Rev. Mét., 1934, 31, 441—442).—Artificial oxide films (I) on Al consist of two layers, the inner being extremely fine and in the nature of a dielectric film the thickness of which is independent of the current in electrolytic oxidation processes. The outer layer is much thicker, behaves as a conductor, and varies with the nature of the electrolyte and its concn. and with the current. When (I) are produced by immersion in alkaline chromate solutions the Al first becomes coated with Al_2O_3 by reaction with the alkali and the H_2 evolved reduces the Na_2CrO_4 to Cr_2O_3 , which is deposited in the film.

A. R. P.

Electrolytic treatment of zinc. J. SCHULEIN (Trans. Electrochem. Soc., 1934, 66, 357—360).—By treatment with low-voltage a.c. for a short time in a bath of the same composition as is used for Cr-plating, Zn acquires a superficial coating of deep black colour which greatly increases its resistance to corrosion (cf. B., 1933, 196).

H. J. T. E.

Lithium. H. OSBORG (Trans. Electrochem. Soc., 1934, 66, 361—374).—The production, properties, and uses of Li, its alloys, and principal compounds are reviewed. 99.5% Li is produced commercially by electrolysis of a fused salt bath with a current efficiency > 90% and a material yield > 95%. Electrolysis of fused salt baths containing LiCl with cathodes of molten Pb, Sn, or Zn yields alloys of these metals with small proportions of Li. Cu-Li alloys, especially those with 30% and 50% of Li, are produced by electrolysis of a fused bath containing Cu and Li salts. Properties of Li-Si alloys containing 25—60% of Li, produced by heating the elements above 600°, are tabulated. The use of Li alloys of the Li-Ca type in refining and improving the properties of Cu, Cu alloys, cast Fe, and various steels is described. Small proportions of Li increase the resistance of commercial Mg to corrosion, and confer on Al-Zn alloys strength and elastic properties similar to those of mild steel.

H. J. T. E.

Chromium-plating in automobile construction. O. BAUER, H. ARNDT, and W. KRAUSE (Mitt. Materialprüf., 1934, 281—284).—Cr- and Ni-plating of automobile parts are compared and tests developed to meet special requirements. Visual inspection is usually sufficient to detect spots, fissures, etc. For depth and uniformity of coating, a metallographic microscope with high magnification is used. The average thickness of Cr coatings is 0.5 μ , that of Ni 2—8 μ . Variation in thickness was found in all cases. Normally an intermediate coat of Ni is applied before application of Cr; resistance to corrosion and permanence are improved thereby. In rare cases Cr may be used direct on the

ground-metal. Completely non-porous coatings are difficult to prepare. The stability to temp. of Cr is > that of Ni. T. W. P.

Black chromium-plating. A. POLLACK (Chem.-Ztg., 1935, 59, 56).—Black electrodeposits of Cr, having improved hardness and wear-resistance, are obtained by replacing H_2SO_4 in the usual bath by AcOH, and using a higher c.d. E. S. H.

Adhesion of electrolytic copper deposits. P. A. JACQUET (Trans. Electrochem. Soc., 1934, 66, 309—334).—By a modification of a previously developed method (cf. A., 1933, 458) direct measurements have been made of the load required to strip electrodeposited Cu coatings (< 0.3 mm. thick) from electrolytic Ni surfaces. During successive electrolyses of moderately acid CuSO_4 bath the adhesion of the Cu deposits improves, while the stress which develops in the deposit during formation (measured at intervals by the "contractometer" method) decreases in a parallel fashion with ageing of the bath. Except where adhesion is poor, chemical tests show that a thin film of Cu remains on the Ni surface after stripping the Cu deposit; with strongly adherent deposits visible patches of Cu remain. Thus, the force required to detach the deposit is not a true measure of adhesion unless the latter is very low. With a CuSO_4 bath of very low H_2SO_4 content the deposits tend to expand instead of contract during formation and the stress changes very little with successive electrolyses. Moreover, with such baths the adhesion is good from the outset and does not vary much with ageing, but the deposits have a low shearing stress, probably due to the presence of Cu_2O formed by hydrolysis of Cu. The ageing effects observed with more acid baths are attributed to progressive enrichment in Cu. The adhesion of Cu on polished Ni surfaces is usually better than on roughened surfaces.

H. J. T. E.

Electrodeposition of ternary alloys of cadmium, zinc, and tin. L. E. STOUT and B. AGRUSS (Trans. Electrochem. Soc., 1934, 66, 345—356).—Cd-Zn-Sn alloys have been electrodeposited on Fe cathodes from baths containing Na stannate and the double cyanides of Cd and Zn, the [Cd] and [Zn] being equal, and the total concn. of heavy metals 0.5N, of which < 60% had to be Sn in order to obtain appreciable proportions of Sn in the deposits. Increase of [Sn] or [Cd] in the bath increases their proportion in the deposit, but increasing [Zn] in the bath lowers the Zn content of the deposit at low c.d., whilst at higher c.d. the Zn content of the deposit falls to a min. and then increases again. At 20° increase of c.d. decreases the proportions of Sn and Zn in the deposit, but increases that of Cd; at > 40° the effects are reversed. Raising the temp. increases the proportion of Sn in the deposit, but decreases that of Cd; the effect on the proportion of Zn depends on its concn. in the bath and the c.d. Deposits rich in Sn are much more resistant to corrosion by the salt-spray than pure Cd or Cd-Zn alloy deposits.

H. J. T. E.

Rhenium plating. C. G. FINK and P. DEREN (Trans. Electrochem. Soc., 1934, 66, 381—384).—Bright, hard, compact deposits of Re, which are very resistant to the action of dil. or conc. HCl, can be

obtained by electrolysis of baths of various types containing $KReO_4$ or $HReO_4$ and H_2SO_4 or H_3PO_4 in aq. solution. The compositions of typical baths and their operating conditions are specified. H. J. T. E.

C_3H_8 and C_4H_{10} as fuels.—See II. Protecting Fe.—See XIII. Action of sider on metals.—See XVIII. Cd for foodstuffs.—See XIX.

See also A., Feb., 158, Systems Fe-Al, Al-Mg, Al-Ni, Al-Cu, Cu-Zn, Au-Ag, Cu-Ag-Cd, Al-Ag-Mn. 159, New magnetic alloy. 161, Electron microscope for study of thin films on metals. 166, Cyanide solutions. 167, Complex [Cu and Zn]-thiocarbamide salts. 171, Overvoltage and strength of steel. 172, Passivity of Fe and steel in HNO_3 solutions. 175, Electroplated Cu-Ni-Fe alloys. 176, Electrolytic Li. 180, Prep. of Ba and its amalgams and of Ga. 181, Prep. of pure, finely-divided V, and of Fe-Sn alloys. 184, Determining traces of As in Fe ore, and of Ag, Bi, Pd, Cu, and Cd. 186, Determining Cd. 187, Determining Cr^{+++} in Cr-plating baths. Autographic thermal expansion apparatus. 189, Soldering Mo to Cu.

PATENTS.

Roasting of ores. METALLGES. A.-G. (B.P. 422,163, 22.5.34. Ger., 10.3.34).—A rotary tubular furnace is supplied with air by means of nozzles (*N*) inserted through the shell to such a distance that the ore can never overflow through them. *N* are constructed with treble walls to afford passages for cooling air which is supplied to them from a fan at one end of the kiln through a rotating joint and pipes along the outside of the shell. The air for combustion may also be blown through *N* if desired. B. M. V.

Reduction of iron ores. F. L. DUFFIELD (B.P. 422,058, 4.7.33).—After calcination if necessary, the ore is mixed with C and passed through a muffled reducing chamber (*R*) and the reduced product dropped into a non-muffled melting furnace (*M*). The bottom wall of *R* is formed of SiC and is heated from below by the combustion of waste gases from *R* and *M*, enriched if necessary. The ore is spread and conveyed in a thin layer in *R* by means of shoes (*S*) on a conveyor, *S* being in the form of boxes filled with insulating material, so that when they abut in the straight working run they form a heat-insulating roof to the layer of ore and C. B. M. V.

(A, B) Reduction, (B) and smelting, of [iron] ores. (c) Apparatus for producing low-carbon metals. H. A. BRASSERT, Assr. to H. A. BRASSERT & Co. (U.S.P. 1,944,874 and 1,945,341—2, 30.1.34. Appl., [A] 8.7.31, [B] 27.8.31, [C] 13.9.32).—(A) A mixture of finely-divided Fe ore and coal dust is allowed to fall down a shaft furnace (*I*) into the hearth (*II*) of which impinge a series of oil or coal-dust burners fed with preheated air to provide complete combustion of the fuel. The ore is almost completely reduced to sponge Fe in its passage down (*I*) and the Fe is melted and refined by the hot oxidising gases in (*II*). (B) The ore is separated into fine and coarse portions, the former, mixed with appropriate fluxes, being fed round the walls, and the latter into the centre of (*I*). (c) (*I*) is supported above (*II*) by a H_2O -

cooled ring below which is an adjustable device for regulating the area of the passage between (*I*) and (*II*).

Rotary furnaces [for distilling metals]. F. KRUPP GRUSONWERK A.-G. (B.P. 422,151, 11.1.34. Ger., 14.2.33).—A no. of satellite muffles for the distillation of Zn, Hg, etc. are supported in holes in discs which are in turn threaded on the ends, or ends and middle for longer furnaces, of a shaft covered with heat-insulating material. The discs form closure members for the ends of a stationary, surrounding heating furnace. A single large condenser or individual smaller condensers are rotated with the retorts. B. M. V.

Heat-treatment of metals. BIRMINGHAM ELECTRIC FURNACES, LTD., and A. G. LOBLEY (B.P. 421,540, 19.5.33 and 3.5.34).—An auxiliary furnace for the prep. of a protective work-enveloping atm. by the combustion of air and (*e.g.*) C_4H_{10} , town's gas, or vaporised liquid fuel is constructed with a circular combustion chamber provided with a tangential inlet (*I*) for the mixture, the flame circulating several times past *I* before leaving through an axial outlet to another chamber containing a catalyst mass which ensures complete elimination of free O_2 . B. M. V.

Production of iron sponge. C. J. HEAD (B.P. 421,566, 4.9.33).—Fe ore is mixed with $Ca(OH)_2$, coal dust, and H_2O , the mixture is briquetted, and the briquettes are stored for < 5 days, then heated at a temp. sufficient to reduce the Fe_2O_3 to sponge Fe, and finally melted. In this way all the S passes into the slag as CaS. A. R. P.

Manufacture of metal articles from iron-carbon alloys. STELLUM, INC., Assees. of N. H. SCHERMER (B.P. 421,794, 31.3.33. U.S., 28.6.32 and 17.2.33).—Malleable castings of Fe with 1.5–4% C are rolled into sheet or strip at 540–1100°; the strip may then be formed into tubes the seams of which are welded. A. R. P.

Manufacture of enamelled sheet iron or articles thereof. I. KREIDL (B.P. 421,171, 24.9.34. Austr., 10.10.33. Addn. to B.P. 401,650; B., 1934, 102).—Prior to enamelling, the surface layer of the metal is converted into an alloy containing a metal the oxide of which causes adherence of the enamel, *e.g.*, Ni (1.5%). The alloying may be produced by cementation, sherardising, or like process. A. R. P.

Manufacture of ductile electrolytic iron. J. R. CAIN, Assr. to F. A. EUSTIS (U.S.P. 1,945,107, 30.1.34. Appl., 27.5.31).—Aq. $FeCl_2$ (*I*) containing $MgCl_2$ and $CaCl_2$ is electrolysed in a divided cell using scrap Fe, Fe matte, or insol. graphite electrodes, and the anolyte is constantly circulated through a reducing column containing scrap Fe, FeS, or the like to reduce the $FeCl_3$ to $FeCl_2$, before being passed to the cathode compartment. The pH of (*I*) is kept const. at 1–3 (2). A. R. P.

Heat-treatment of steel. C. J. COBERLY, Assr. to KOBE, INC. (U.S.P. 1,959,344, 22.5.34. Appl., 10.7.29).—A relatively long ferrous body (*B*) is passed through heating (*H*) and quenching zones, the temp. in *H* being controlled by the magnetic flux produced in *B* by suitably excited coils. *B* is quenched when it becomes substantially non-magnetic. B. M. V.

Composition of matter and treatment [therewith] of molten metals [steel]. A. H. DAVIES (U.S.P. 1,945,260, 30.1.34. Appl., 7.3.32).—Gases and sulphides are removed from steel by treating the molten metal with a 3 : 2 : 2 : 1 mixture of KClO_3 , borax, NaF or Na_2CO_3 , and MnO_2 . A. R. P.

Cementation of iron, steel, and alloys thereof. DEUTS. GOLD- u. SILBER-SCHNEIDANSTALT VORM. ROESSLER (B.P. 421,014, 23.11.33. Ger., 26.11.32).—Steel articles are case-hardened by heating at 700–1050° (930°) in salt baths containing an alkali chloride, an alkali hydroxide and/or carbonate, and an alkaline-earth carbide, e.g., KCl (10), Na_2CO_3 (10), and CaC_2 (1.1 kg.). A. R. P.

(A) Prolonging the life of pressing, drawing, stamping, and similar tools. (B) Treating steel, alloy steel, copper, or brass before cold-working. A. A. THORNTON. From VEREIN. STAHLWERKE A.-G. (B.P. 420,513–4, 23.2.33).—The metal is annealed and quenched (A) after finishing, (B) before cold-rolling, to produce stress in the marginal parts; steel is annealed at 300°—Arl, and Cu or brass at 400–700°. [Stat. ref.] A. R. P.

Manufacture of articles [hydrogenation plant] from steel alloys. F. KRUPP A.-G. (B.P. 420,567, 19.3.34. Ger., 20.3.33).—Steel which is not subject to decarburisation by H_2 at high temp. contains 1–5% V and $\geq 0.4\%$ C; the % V = (4–5.6) × % C. When V is < 2% the steel may contain $\geq 3\%$ Mo and $> 10\%$ Cr. A. R. P.

Prevention of rusting of ferrous metals. J. H. TUCKER & Co., LTD., and J. N. R. HANNAN (B.P. 420,461, 5.9.33).—The articles are immersed in 0.5–1% H_3PO_4 to produce a $\text{Fe}_3(\text{PO}_4)_2$ film (I), washed free from acid, and immersed in a colloidal suspension of graphite (G) in linseed oil (1 oz./gal.), whereby the pores in (I) are filled with G. A. R. P.

Manufacture of nickel-iron alloys. TELEGRAPH CONSTRUCTION & MAINTENANCE Co., LTD., H. J. GARNETT, and F. H. SMITH (B.P. 419,953, 22.5.33).—The metals are pptd. together as oxalates and the washed ppt. is heated first at 300° in N_2 until evolution of gas ceases and then in H_2 at 600–700° until a partly sintered coherent mass of alloy is produced. A. R. P.

Manufacture of [nickel-iron] magnetic alloys. TELEGRAPH CONSTRUCTION & MAINTENANCE Co., LTD., ASSEES. of HERAEUS-VACUUMSCHMELZE A.-G. (B.P. 420,406, 7.11.33. Ger., 21.11.32).—Alloys of Fe with 30–90% Ni and a small quantity of another constituent (I) having a variable solid solubility are heated at a temp. at which (I) is completely dissolved, and are then allowed to cool slowly to cause pptn. of (I) in a disperse form. A. R. P.

Metallic [cobalt-nickel-iron] alloys. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 420,580, 27.6.34. U.S., 1.7.33).—Alloys resistant to oxidation consist of Fe with Ni 47, Co 5–25 (7), and Ti 1–3 (2.5)%, age-hardened by quenching from 900–1100° (950°) and reheating at 700° for 1–24 hr. A. R. P.

Manufacture of magnetic [phosphorus-iron] alloys. H. KAMURA (B.P. 420,543, 21.7.33. Jap., 5.9.32).—A mixture of pure Fe (electrolytic or H_2 -reduced) and high-P reduced Fe is melted at 1600–1700° in a high-

frequency induction furnace to give an alloy with C ≥ 0.03 , P 0.5–2, Si ≥ 0.01 , and Mn $\geq 0.04\%$. A. R. P.

Smelting sulphide ore. R. F. BACON (U.S.P. 1,944,873, 30.1.34. Appl., 31.12.30).—A mixture of the ore with SiO_2 , CaSO_3 , and coke is smelted in a blast furnace under conditions such that a reducing atm. is maintained above the charge and the issuing gases, containing S, SO_2 , CO, and N_2 , are passed over a catalyst to reduce part of the SO_2 , then through a condenser for the S, and finally through milk-of-CaO to absorb SO_2 and make CaSO_3 for use as a flux. A. R. P.

Working up auriferous and cupriforous arsenical pyrites. A. R. LINDBLAD (B.P. 420,577, 13.6.34. Swed., 19.2.34).—The ore is treated by gravity or flotation to obtain a large product (I) low in Au and a small product (II) rich in Au. (I) is roasted in the ordinary way and smelted to give a Cu-Fe matte, which is blown in a converter (C) to blister Cu (B). (II) is roasted at a low temp. to expel the As without oxidising the Fe or removing $> 50\%$ of the S, and the product is added to C so that its Au content passes into B without serious slag loss. A. R. P.

Refining of copper. H. W. BROWNSDON, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 420,671, 29.5.33).—Bi is removed from fire-refined Cu by heating it at 1100–1200° in vac. in an induction furnace. A. R. P.

Refining of zinc. D. R. TULLIS, P. OAKLEY, and G. P. FENNER (B.P. 420,672, 30.5. and 18.8.33).—The grain-size of Zn is reduced by addition of 0.3–5% of an alloy of Al and Mn, with or without a small quantity of Ti. A. R. P.

Zinc-base alloy. P. J. MORELL, Assr. to AMER. BRASS Co. (U.S.P. 1,945,288, 30.1.34. Appl., 9.7.31).—The alloy contains Al 15–35 (20) and Mg 0.01–0.2 (0.1)%. A. R. P.

Refining and casting of non-ferrous metals and alloys. D. R. TULLIS and P. OAKLEY (B.P. 420,694, 11.7.33).—Molten Al, Zn, or Cu and their alloys are treated by bubbling or blowing Cl_2 or a volatile halide through them under > 1 atm. in a non-oxidising atm. A. R. P.

Roasting and sintering of galena. F. KRUPP GRUSONWERK A.-G. (B.P. 420,776, 30.1.34. Ger., 17.2.33).—The ore is roasted at 550–600° in a thick layer in a rotary furnace from which it is discharged through a shorter and narrower section in which it is sintered at 650° by direct impingement of a small flame. A. R. P.

Production of finely-divided lead or lead oxide. P. KEMP and E. FEUER (B.P. 421,297, 7.9.33. Austr., 7.9.32).—Pb melted by direct contact with hot, non-oxidising flue gases in a rotary furnace is sprayed into a chamber (C) filled with neutral gas and provided with agitating devices. For the manufacture of PbO the finely-divided Pb is roasted in suspension in air in such a way that the heat of oxidation serves to preheat the metal entering C. A. R. P.

Production of hard metal [carbide] alloys. G. DILLON (B.P. 420,544, 1.8.33).—In the manufacture of sintered alloys of carbides of W, Ti, etc., with a

bonding metal (*B*), e.g., Co, Ni, or Co-Cr, \leq 35 wt.-% of *B* is added in a colloidal form. A. R. P.

Treatment of vanadium ores [carnotite]. C. KNIGHT and A. M. WILSON (U.S.P. 1,945,611, 6.2.34. Appl., 21.11.30).—Carnotite is roasted at 750–800° for 1½–2 hr. to remove org. matter, cooled, and boiled with aq. Na₂CO₃, the solution (*A*) containing all the U and 40–60% of the V is separated and the residue digested with HCl \equiv twice the Na₂CO₃ to extract the remainder of the V and all the Ra. The acid solution is filtered, treated with BaCl₂ and H₂SO₄ to ppt. the Ra, and again filtered (solution *B*). *A* is boiled and treated first with HCl until a slight ppt. forms, then with NaOH to ppt. the U as Na₂U₂O₇, and the filtrate is mixed with *B*, whereby all the V is pptd. as Fe vanadate. The ppt. is washed, digested with aq. Na₂CO₃ and H₂O₂, and the Fe(OH)₃ discarded; V₂O₅ is obtained by treating the filtrate with the calc. quantity of HCl. A. R. P.

Manufacture of [barium-nickel] alloys. A. C. SPARK PLUG CO. (B.P. 418,298, 14.3.33. U.S., 14.3.32).—The composition of such alloys is controlled spectrographically, the arc spectrum of the alloy being photographed on a plate on which are the spectra of standard alloys and the intensity of suitable lines being compared photometrically. A. R. P.

Recovery of alkaline-earth and other metals from drosses and other metal-bearing substances, and preparation of alkaline-earth metal alloys [with lead or cadmium]. G. N. KIRSEBOM, and CALLOY, LTD. (B.P. 419,665, 10.5.33).—Drosses formed in the manufacture of Al-alkaline-earth metal (*I*) alloys by the process of B.P. 397,844 (B., 1934, 105) are reduced with Al at 800–1000° in presence of Pb or Cd, whereby the (*I*) alloys with the Pb or Cd. A. R. P.

Electrodeposition of alkaline-earth compounds on metal [for making electron-emission devices]. E. THEISZ, ASSR. to EGYESÜLT IZZÓLÁMPA ÉS VILLAMOSÁGI RÉSZVÉNYTÁRSASÁG (U.S.P. 1,945,623, 6.2.34. Appl., 18.4.32. Hung., Ger., and Austr., 22.4.31).—The metal (*M*) is made the anode in 30% aq. (HCO₂)₂Ba containing 2% of Ba(OH)₂; electrolysis at 60–70° coats *M* with BaCO₃. A. R. P.

Production of oxide coatings. BRIT. THOMSON-HOUSTON CO., LTD., Assees. of ALLGEM. ELEKTRICITÄTSGES. (B.P. 421,003, 24.8.33. Ger., 24.8.32).—The article to be coated is heated with the flame of a blow-lamp into which are introduced volatilisable org. or inorg. compounds of the metal the oxide of which is to be applied as a coating. E.g., for Al₂O₃ coatings, aq. Al(NO₃)₃ or Al(OEt)₃ is sprayed into the flame. A. R. P.

Obtaining composite coatings of two or more metals. W. S. THORPE (B.P. 419,960, 23.5.33).—A stranded wire of one or more metals, some or all of the strands of which are coated with another metal, is passed through a spraying pistol. A. R. P.

[Aluminium-zinc] alloy and its applications. H. PETOT, Assee. of COMP. FRANÇ. DES CONDUITES D'EAU (B.P. 421,439, 27.4.34. Fr., 28.4.33).—The alloy, of special use for gas-meters, H₂O-pipes, etc., consists of

Zn with Al 5–25, Bi 0.1–3, Sb 0.1–3, and Ti 0.05–0.1%, Bi + Sb + Ti being \leq 3.9%. A. R. P.

Preparation of aluminium and zinc lithographic plates for planographic and off-set printing. O. WOLF (B.P. 421,217, 11.10.33).—The plates are anodically oxidised to produce a coating having the properties of natural lithographic stone. E.g., Al plates are made the anode in 0.3–5% HNO₃ for 10–30 min. at a c.d. of 1–2 amp./sq. dm., and Zn plates the anode in saturated aq. K₂CO₃ for 10–30 min. at a c.d. of 2–3 amp./sq. dm. A. R. P.

Aluminium-base alloys. ALUMINIUM, LTD., Assees. of F. KELLER and C. M. CRAIGHEAD (B.P. 420,707, 7.9.33. U.S., 21.9. and 30.11.32).—Claim is made for alloys of Al containing Mg₂Si 0.5–3 (1.5–2)% and 0.1–1% (in all) of \leq 1 of the following: Cr, Mn, Mo, W, V, Zr, Ti, U, the Al used containing \geq 0.3% of impurity. [Stat. ref.] A. R. P.

Heat-treatment of aluminium-magnesium alloys. E. H. DIX, JUN., and L. W. KEMPF, ASSRS. to ALUMINIUM CO. OF AMERICA (U.S.P. 1,945,737, 6.2.34. Appl., 23.12.30).—Al alloys with 5–20% of Mg are heated for 5–20 hr. at 250–450°, slowly cooled to 300°, then air-cooled to improve the physical properties. A. R. P.

Anodic coating of zinc-base metals. H. G. C. FAIRWEATHER. From NEW JERSEY ZINC CO. (B.P. 421,696, 13.1.34).—The electrolyte comprises a solution of R₄Fe(CN)₆, K₃Fe(CN)₆, R₂Cr₂O₇, R₂C₂O₄, or R₂MoO₄ where R = K, Na, or NH₄. A. R. P.

Electrolytic production of embossing foils of gold or other metal or of different metals. J. FICHTMUELLER (U.S.P. 1,945,142, 30.1.34. Appl., 13.5.32. Ger., 15.1.31).—The Au or other metal is deposited on a highly polished Cu or Ni band (*B*), and then coated with gelatin or shellac (*I*). After the latter has dried, the film is removed from *B* and the Au is coated on the side which was in contact with *B* with a film of a cellulose ester and the (*I*) is then removed by suitable solvents. A. R. P.

[Heat-]treating oxidisable [metallic] materials.—See I. Se from Cu matte.—See VII. Enamel. See VIII. Alkali-metal amalgam.—See XI.

XI.—ELECTROTECHNICS.

Heat loss in heated slabs.—See I. Ignition of firedamp.—See II. Corrosion. Ni-Ba alloys. Au-Cr resistance alloys. Melting Al. Deposits on Al and its alloys. Treating Zn. Li. Cr-plate. Cu electro-deposits. Cd-Zn-Sn electro-deposits. Re-plating.—See X. Determining moisture in grain.—See XIX.

See also A., Feb., 159, New magnetic alloy. 161, Electron microscope for study of thin films on metals. 166, Cyanide solutions. 167, Complex [Cu and Zn]-thiocarbamide salts. 171, Over-voltage and strength of steel. 175, Electroplated Cu-Ni-Fe alloys. 176, Electrolytic Li. Anodic oxidation of acetates. Electro-reduction of (CHPhMe)₂O. 178, Photochemical measurement of ultra-violet radiation. Action of light on Se

electrolytic photo-cells. 180, Prep. of pure Eu, Gd, and Tb compounds. 185, Determining Ag, Bi, Pb, Cu, and Cd. 186, Determining Cd. 187, Determining Cr⁺⁺⁺ in Cr-plating baths.

PATENTS.

Coreless induction furnace. SIEMENS & HALSKE A.-G. (B.P. 422,726, 16.10.33. Ger., 30.6.33).—The magnetic field is screened from the trestle of magnetic material by interposed parallel layers of different non-magnetic metals, *e.g.*, of Cu and Al or Zn. J. S. G. T.

Electrode furnaces for use as salt-bath furnaces. O. EVANS. From ALLGEM. ELEKTRICITÄTS-GES. (B.P. 422,868, 22.7.33).—The crucible or container is divided into a heat-treatment chamber (*H*) and an electrode chamber or chambers (*E*) by respective partition walls which obstruct, in part, the passage between *H* and *E* so that there is circulation of the liquid between them. J. S. G. T.

Electric accumulators. CHLORIDE ELECTRICAL STORAGE Co., LTD. (B.P. 422,887, 11.7.34).—Active material for the plates, composed of finely-divided Pb (30%) and red tetragonal litharge (70%) of *d* 9·3, is claimed. J. S. G. T.

Electrolytic cells [for preparing alkali-metal amalgam from alkali chlorides]. I. G. FARBENIND. A.-G. (B.P. 422,790, 18.7.33. Ger., 19.7.32).—The bottom and longer side walls of the cell are made in one piece and of a metal, *e.g.*, Fe, unattacked by Hg, the bottom being of bright metal; the surface of the cell in contact with electrolyte (*E*) and its decomp. products (*D*) are coated with insulating material, *e.g.*, rubber or bakelite, which is unattacked by *E* and *D*. J. S. G. T.

Electrical precipitation [of particles from gases]. M. A. LISSMAN, ASSR. to INTERNAT. PRECIPITATION Co. (U.S.P. 1,959,374, 22.5.34. Appl., 1.10.32).—Upon the ordinary unidirectional voltage (*V*), which is < the arcing potential, is superposed, at intervals, a very "peaky" wave < 50% of *V*, each impulse lasting > 10⁻⁵ sec. and being produced by spark-discharge devices. B. M. V.

Purifying air etc.—See I. Metallic compounds.—See VII. Ductile electrolytic Fe. Heat-treating steel. Magnetic alloys. Electron-emission devices. Oxide coatings. Lithographic plates. Coating Zn-base metals. Embossing foils.—See X. Treating tobacco.—See XX.

XII.—FATS; OILS; WAXES.

Determination of free alkali in soaps. VIZERN and GUILLOT (Ann. Chim. Analyt., 1934, [iii], 16, 446—449).—Total free alkali (including CaCO₃, Na₂S₂O₃) can be determined (*a*) by decomp. 10 g. of soap on the H₂O-bath with a measured excess (*e.g.*, 30 c.c.) of N-H₂SO₄, dissolving the product in 150 c.c. of neutral 95° EtOH, and back-titrating with standard NaOH (difference = free alkali). Alternatively, (*b*) 10 g. of soap may be dissolved by boiling in 100 c.c. of 80° EtOH, containing a small weighed excess of fatty acids of known mol. wt., the excess being back-titrated as before. If anhydrides were present in the fat stock used for

the soap, these would be re-formed on acidification by method (*a*), so that the free alkali found would be too high. After titrating the free caustic alkali in an abs.-EtOH solution of the soap, the solution may be diluted with H₂O, in order to dissolve carbonates, which are measured by continuing the titration to the phenolphthalein end-point ($\equiv \frac{1}{2}$ carbonate). Preliminary experiments indicate that *p*_H determinations are not as useful from a practical point of view as was expected. E. L.

The stand oil problem. E. KARSTEN (Farben-Ztg., 1935, 40, 77—79, and Paint Var. Prod. Man., 1935, 12, 5—8, 34).—Although Hanus I vals. of blown and stand oils vary widely with heat-treatment when determined in the usual way, they rise to a steady val. (156—162), nearly independent of heat-treatment, when the halogen solution is permitted to act for 33 days. G. H. C.

Mechanism of polymerisation. J. O. CUTTER and L. A. JORDAN (J. Oil Col. Chem. Assoc., 1935, 18, 5—11).—The polymerisation of drying oils may occur in the manner found by Diels and Alder for other unsaturated substances (A., 1928, 1018). G. H. C.

Sulphurised oils and their preparation. R. HEUBLUM (Peint. Pig. Ver., 1935, 12, 1—3).—Linseed oil blown in presence of 14—16% of S₂Cl₂ (I) with subsequent addition of Co and/or Mn driers gives firm-drying, H₂O- and acid-resisting paints. Oils may also be prepared by heating and blowing in presence of driers, then cooling and blowing in presence of 1—3% of (I). G. H. C.

Alcohol and sugar content of olive press-water. IV. A. MANGINI (Annali Chim. Appl., 1934, 24, 587—594; cf. A., 1933, 104; B., 1933, 927).—19 samples of this H₂O collected during the 1933—4 campaign contained 0·2—0·64% of EtOH and 1·56—3·12% of total sugars; mean vals. corr. for added H₂O were 0·48 and 2·67%, respectively. T. H. P.

Oxidation of cod-liver oil and a rapid method of determining the action of antioxidants. M. MOTTIER (Arch. Sci. phys. nat., 1934, [y], 16, 139—143).—In a stream of O₂, the acid val. (*A*) rises rapidly after an induction period. Guaiacol and maleic acid lengthen the induction period and decrease the rate of rise of *A*. G. H. C.

Used machine oil.—See II.

See also A., Feb., 163, Colloid chemistry of metal soaps. Soap curd. 233, Pig-liver oil. Body-fats of pigs. Abdominal fat of the horse. Fish-liver oils. 241, Season variation of butter fat. 242, Salmon dépôt-fat. 260—3, Vitamins. 267, Indian acorn oils. Constituents of plant and insect waxes. Raw tea oil. 269, Oil in linseed and hemp seed during maturation etc., and in birch and lime trees.

PATENTS.

Manufacture of materials containing fatty substances soluble in strong alkaline baths. DEUTS. HYDRIERWERKE A.-G. (B.P. 421,625, 27.9.33. Ger., 27.9.32).—Mixtures of unsaturated glycols having < C₈ (dihydroxyoctadecene from reduction of castor oil or ricinoleic acid, 1 pt.) with phenols (mixed cresols, 3—4

pts.) are sol. in conc. alkali lyes, *e.g.*, mercerising baths, and impart wetting properties thereto. (H. A. P.)

Distillation of fatty acids and products resulting therefrom. NEW PROCESS FAT REFINING CORP. (B.P. 421,733, 29.6.34. U.S., 1.4.33. Addn. to B.P. 408,117; B., 1934, 509).—A column with bubbling caps for the distillation described in the prior patent is provided with filling rings (*R*) in and above the liquid on the trays. Preferably *R* comprise short cylinders with an internal spiral vane. (B. M. V.)

Separation of oil from oil-containing substances. K. SOHLER (B.P. 422,530, 24.5.34. Ger., 26.5.33).—Extraction is effected in several stages by a solvent moving generally countercurrent to the material, which is moved by worm or other conveyors. The feeder comprises the last stage of enrichment of the solution and in this device the motion is concurrent. (B. M. V.)

Extraction of oleaginous materials that are rich in oil or otherwise unsuitable for treatment by ordinary methods of extraction. Z. METZL (B.P. 422,732, 17.11.33. Ger., 18.11.32).—The excessive oil content of highly oleaginous materials is reduced by a pretreatment (which may be repeated if necessary) wherein the crushed seed etc. is saturated with solvent for a short period (5–30 min.) and the oil miscella rapidly withdrawn; after this the residual oil may be completely extracted by solvent by the usual methods. (E. L.)

Distillation of polymerised drying oils. IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 422,941, 20.12.33. Holl., 20.12.32).—Low-mol. non-polymerised glycerides and free fatty acids are removed from stand oils by evaporative (mol.) distillation in a high (cathode) vac., conducted so that the condensing surface (*C*) is in close proximity to the evaporating surface (*E*). An apparatus comprising two vertical concentric tubes, of which the outer surface of the closed and internally-heated inner tube is utilised as *E* (temp. 200–300°) while the opposing inner surface of the cooled outer tube serves as *C*, is described. (E. L.)

Manufacture of [odourless] sulphur soap. T. TANAKA (U.S.P. 1,957,918, 8.5.34. Appl., 9.9.32. Jap., 18.9.31).—I-starch (about 1:1) (1 pt.) mixed with vaseline or wax ($\frac{1}{2}$ pt.) is incorporated with S (1 pt.), resin soap (1 pt.), and (potash) soap (10 pts.). (E. L.)

Manufacture of polishing substances [wax powders]. S. DUNLOP. From "SEGECI" (SOC. GÉN. D'EXPLOIT. COMMERCIALE ET INDUSTRI.) (B.P. 422,568, 15.7.33).—A dry, powdery wax product is obtained by dispersing the melted wax as a fine emulsion in a liquid of approx. the same *d* and having a b.p. ≤ 6 –11° above the m.p. of the wax (*e.g.*, aq. EtOH or aq. PrOH), and separating and drying (in vac.) the fine wax particles after cooling the suspension. (E. L.)

Lubricating oil. Sulphonated oils.—See II. **Size for paper.**—See V. **Synthetic resinous compositions.**—See XIII. **Margarine.**—See XIX. **Cosmetics etc.**—See XXIII.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Chalking of white paints. L. E. KING (Oil and Col. Trades J., 1935, 87, 24–29).—The chalking tendencies

of paints containing various white pigments and pigment mixtures have been compared. Factors tending to prevent chalking are enumerated, the most important being efficient wetting by the medium, soap formation being helpful in this respect, and rapid settling of the pigment, as a result of which the surface of the paint film consists entirely of medium, which dries hard and prevents chalking. (D. R. D.)

Determining the inorganic constituents of driers, varnishes, and paint media. C. P. A. KAPPELMEIER (Verfkroneik, 1935, 8, 22–23).—The ashing method gives low results, since inorg. matter is lost. Shaking the material with dil. HNO₃ containing H₂O₂ frequently extracts metals completely, but the following procedure is more reliable. A 2–3-g. sample is refluxed with 25 c.c. of *N*-KOH in EtOH for 30 min., the mixture is diluted to 100 c.c. with H₂O, and 10 c.c. of 4*N*-HNO₃, 50 c.c. of C₆H₆, and a little 3% H₂O₂ are added. The C₆H₆ layer is separated and washed with dil. HNO₃ containing H₂O₂. The aq. layer and the washings are combined, evaporated to dryness, dissolved in dil. HNO₃, and decolorised by means of C. The metals present in the solution are determined by standard methods. A method particularly suitable for determining Pb, Mn, and Ca in such solutions is described. (D. R. D.)

Relationship between pigment-vehicle ratio and durability of exterior house paints. A. C. ELM (Official Digest, 1934, No. 141, 346–349).—Exposure tests on a series of paints indicate that the most durable coats are obtained when the pigment-vehicle ratio is adjusted to give the best consistency for brushing. (D. R. D.)

Primers for exterior house paints. F. C. SCHMUTZ (Official Digest, 1934, No. 141, 355–357).—Primers for wood should contain the same pigment as the top coats in a bodied linseed oil-tung oil medium. (D. R. D.)

Exterior paints. H. H. MORRIS (Official Digest, 1934, No. 141, 359–367).—Detailed results of a series of exposure tests on paints of stated composition are given. (D. R. D.)

Determining exterior house paint durability. G. W. ASHMAN (Official Digest, 1934, No. 141, 351–354).—A review of experimental methods. (D. R. D.)

Corrosion protection [of iron] by paints. P. STRUCK (Gas- u. Wasserfach, 1934, 77, 765–769).—The characteristics of paints which withstand the conditions in a gasworks are described and the behaviour of 64 commercial paints in various corrosive media is summarised. (A. R. P.)

Paint and varnish problems in aeronautics. E. W. J. MARDLES (J. Oil Col. Chem. Assoc., 1935, 18, 12–43).—Adhesion is better on plain than on plated metals, especially if the deposit be not well cleaned before painting. Oil undercoats are essential for adhesion of nitrocellulose. Accelerated abrasion tests are made by spraying revolving painted propellers with H₂O containing sand. ZnO or Al in nitrocellulose is as effective an antifouling paint as is any proprietary brand containing poisons, because the smooth surface gives no hold for fouling. Cu arsenite is effective for a short period, but needs frequent renewal. Capillary

viscosimeters give lower vals. of η than falling balls or rotary viscosimeters on paints, but the shear stress so imposed resembles more nearly that of actual painting conditions. G. H. C.

Trade names and chemical composition of the more important solvents and softeners. H. ULRICH (Farben-Chem., 1935, 6, 53—56).

Limitations of chemical analysis. C. A. KLEIN, J. J. FOX, *et al.* (Oil and Col. Trades J., 1935, 87, 251—254).—A symposium, dealing particularly with the problems of the paint chemist. D. R. D.

Chrome yellow on a strontium basis. H. HAASE (Farbe u. Lack, 1935, 6).— SrCrO_4 , with or without substrates of SrSO_4 or BaSO_4 , does not possess greater staining and covering power than PbCrO_4 and imparts delayed drying to linseed oil. The effect of BaCrO_4 in Pb-Ba chromates (pptd. by adding Na_2CrO_4 to the reaction product of PbO and BaCl_2) is to reduce the covering power of the PbCrO_4 and the drying time in oil. S. M.

Earth colours and zinc oxide. J. S. REMINGTON (Paint Manuf., 1934, 4, 267—269).—Good rust-preventive paints are made from Fe oxide and ZnO pigments. Leaded ZnO is superior to mechanical mixtures of ZnO and basic PbSO_4 . CH. ABS. (e)

Behaviour of pigments in cellulose ester lacquers. A. KRAUS (Farbe u. Lack, 1935, 3—4, 14—15, 26).—Living with basic pigments (I), *e.g.*, ZnO, is usually due to the resin component of the lacquer, particularly if natural; it is not, however, \propto the acidity thereof. The remedy for "bleeding" appears to lie in the choice of suitable (I) or dyes; the solvent action of 9 common solvents on 25 dyes is tabulated. The gelation of lacquers containing Cu- or Al-bronze, Pb_3O_4 , Pb chromes, or Cr greens is sufficiently retarded by addition of 0.2—4% of boric, oxalic, or citric acid to meet practical requirements. The effects of (I) on the durability and after-yellowing of films and on the formation of gas bubbles in presence of some black (I) are also discussed. S. M.

Prevention of tung oil defects. F. RENNER (Farbe u. Lack, 1935, 5).—The development of the characteristic puckering or crystal effect in tung oil films when air-dried or stoved can be prevented by addition of 3—4% (calc. on wt. of oil) of Albertol 109 J to the properly prepared varnish before or after dilution. S. M.

Enamels—old and new. J. C. GEHANT (Paint, Oil, and Chem. Rev., 1935, 97, No. 1, 16—19).—The compositions of pre-war and modern paint enamels are compared and correlated with the observed differences in properties (hiding power, gloss, durability, etc.). D. R. D.

Fire prevention and control [in the varnish factory]. D. R. LONEY (Official Digest, 1934, No. 141, 367—371). D. R. D.

Natural resinous products. V. E. ASTER (Verf-kroniek, 1935, 8, 17—21; cf. B., 1935, 160).—The published methods for the analysis of shellac are reviewed. The chemistry and properties of esterified and other modified shellac resins, shellac wax, acaroid

resin, sandarac, mastic, dragon's blood, and elemi are dealt with briefly. D. R. D.

Phthalic acid resins in the American varnish industry. W. KRUMBHAAR (Verf-kroniek, 1935, 8, 13—17).—A review of recent work on the modified glyceryl phthalate resins. D. R. D.

Ti pigments for paper.—See V. **Finishing cotton cloths.**—See VI.

See also A., Feb., 218, **Pyro- and hydro-abietic acids.** 219, **Ammoniacum resin.**

PATENTS.

Manufacture of pigments [lithopone] by wet precipitation. W. C. HOOEY and E. J. FLYNN, Assrs. to NEW JERSEY ZINC CO. (U.S.P. 1,945,551, 6.2.34. Appl., 12.12.28).— ZnSO_4 solutions containing MgSO_4 are treated with a slight deficiency of aq. $\text{Ba}(\text{SH})_2$ to ppt. lithopone (L) free from $\text{Mg}(\text{OH})_2$, the ppt. is collected, washed, made into a slurry with H_2O , and treated with a small quantity of $\text{Ba}(\text{SH})_2$ to stabilise the L, and the product is dried and calcined as usual. A. R. P.

Manufacture of pigments [from 1-nitroso- β -naphthol]. KREBS PIGMENT & COLOR CORP. (B.P. 421,535, 24.3.33. U.S., 24.3.32).—To an aq. solution of the NaHSO_3 compound of 2:1-OH· $\text{C}_{10}\text{H}_6\text{NO}$ (I) containing a wetting agent (Turkey-red oil) (and an org. acid, *e.g.*, oxalic, tartaric, or citric acid) are added salts of (a) a pigment-forming metal, *e.g.*, Fe, Co, Ni, Cr, or Cu, and (b) Zn, Be, Mg, Ca, Sr, Ba, Cd, or Al. If (a) is added first, the at. ratio (a)/(I) is $\geq 1/3$; if (b) is added first or simultaneously with (a), then (a) + (b) is $\geq 1/3$. The pigments are of the same shade as in absence of (b), but are brighter and softer. H. A. P.

(A, B) **Cellulose acetate compositions containing (A) ethylene chloride and an amino-plasticiser, (B) a mixture of isomeric cresyltoluenesulphonates.** (A) C. J. STAUD and L. M. MINSK, (B) E. R. TAYLOR, Assrs. to EASTMAN KODAK CO. (U.S.P. 1,957,857 and 1,957,861, 8.5.34. Appl., [A] 4.5.32, [B] 20.10.32).—(A) Cellulose acetate can be dissolved at room temp. in $\text{C}_2\text{H}_4\text{Cl}_2$ containing small proportions of one of the following plasticisers: *m*- or *p*-toluenesulphonethylamide, acetethylanilide, isoamyl carbamate. (B) The use of a mixture of *o*-, *m*-, and *p*-tolyl *o*- and *p*-toluenesulphonates, prepared from crude cresol, is claimed as a plasticiser. (Cf. U.S.P. 1,560,542, B., 1926, 48.) S. M.

Cellulose acetate composition. C. S. WEBBER and C. J. STAUD, Assrs. to EASTMAN KODAK CO. (U.S.P. 1,957,868, 8.5.34. Appl., 14.12.29).—Cellulose acetate (Ac content $> 30\%$) which is insol. in COME_2 can be dispersed in mixtures of 1:4-dioxan and EtOH or other aliphatic monohydric alcohol. S. M.

Cellulose organic ester composition containing a benzyl ether of diethylene glycol. S. J. CARROLL, Assr. to EASTMAN KODAK CO. (U.S.P. 1,957,878, 8.5.34. Appl., 19.6.31).—The use of di- $\beta\beta'$ -benzyloxyethyl ether as a plasticiser is claimed. S. M.

Production of coating compositions. BAKELITE, LTD. From BAKELITE CORP. (B.P. 422,416, 6.7.33).—

Coatings for absorbent surfaces, *e.g.*, paper, plaster, leather, comprise an emulsion of varnish in H_2O or of H_2O in varnish, in presence of an emulsifying agent, *e.g.*, $N(C_2H_4-OH)_3$, NH_4 caseinate, the varnish containing drying oil, *e.g.*, boiled linseed or tung oil, and an oil-sol phenolic synthetic resin, *e.g.*, the reaction product of a phenylphenol with a CH_2 -containing agent. S. S. W.

Manufacture of [coloured] lacquers from cellulose esters. I. G. FARBENIND. A.-G. (B.P. 422,302, 20.12.33. U.S., 21.12.22).—Cellulose ester lacquers are coloured with black pigments that have been pretreated with sol. black dyes in such a manner (*e.g.*, mechanical mixing, heating under pressure) that the dye is adsorbed on the pigment and can no longer be dissolved out from it. Pretreatment of the dye itself with oleic acid or Bu phthalate at raised temp. is recommended. The final admixture can be carried out in presence of nitrocellulose, softeners, and solvents if desired. S. S. W.

Manufacture of condensation products from urea and formaldehyde. C. ARNOLD. From I. F. LAUCKS, INC. (B.P. 421,942, 2.5.34).— $ZnCl_2$ (57) is stirred into 37% aq. CH_2O (approx. 275) and urea (100 pts.) is added immediately. $PhOH$ and sucrose may also be incorporated. A stable liquid is formed which can be used as an adhesive for varnishes, waterproofing agents, etc. The solid obtained by evaporation without excessive heating can be used as a glue or moulding powder. S. M.

Manufacture of [phenol-formaldehyde] resinous compositions. BRIT. THOMSON-HOUSTON Co., LTD., Assees. of R. H. KIENLE and P. F. SCHLINGMAN (B.P. 421,866, 23.1.34. U.S., 26.1.33).—Heat-convertible resins are produced by condensing $PhOH$ (1 mol.) with CH_2O (> 1 mol.) at 130° in presence of an *A*-stage alkyd resin having acid val. 200—210 (0.01—0.15 mol.). The products can be cast and, after curing at 75 — 80° , drilled and machined. S. M.

(A, B) **Manufacture of [alkyd] synthetic resins and compositions containing the same.** E. I. DU PONT DE NEMOURS & Co. (B.P. 422,130—1, 5.7.33. U.S., 5.7.32).—(A) A partly formed alkyd resin (I) containing excess of a polybasic acid is dissolved in an aq. solution of a base, *e.g.*, NH_3 , NH_2Me , and then caused to react with more glycerol or other polyhydric alcohol. (I) may be modified with drying oils or drying-oil acids. The product can be used for making stoving varnishes. (B) The (I) is modified with sunflower oil (from which "foots" have preferably been removed) or its fatty acids. Enamel films prepared therewith are substantially free from after-yellowing. S. M.

Manufacture of synthetic resinous compositions. E. I. DU PONT DE NEMOURS & Co. (B.P. 421,542, 21.3.33. U.S., 21.3.32).—A natural resin or its ester or a natural unsaturated fatty acid is condensed with an aromatic hydrocarbon or Ph ether in presence of $AlCl_3$, $FeCl_3$, etc. The products are used as components of glyptal resins. *E.g.*, abietic acid is condensed with C_6H_6 or naphtha (crude xylene) and $AlCl_3$ at 45° , or its glyceryl ester (ester gum) with PhMe under similar conditions. Products from linseed

oil and C_6H_6 , cottonseed oil and PhMe, and Et oleate and xylene are described. H. A. P.

Moulding of thermoplastic materials. CELLULOSE CORP. (B.P. 422,232, 26.9.33. U.S., 26.9.32).

Azo pigments.—See IV. **Seasoning pyroxylin plastic.**—See V. **Metallic compounds [white-Pb]. Ti pigments.**—See VII. **Interlayers for laminated glass.**—See VIII. **Treating rubber etc. [for paint]. Coating rubber.**—See XIV. **Waterproof abrasives.**—See XV.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Special properties of [rubber] latex. F. H. COTTON (India-Rubber J., 1935, 89, 109—113).—A semi-popular account of the characteristics of latex as a colloidal system. D. F. T.

Constitution of rubber and the nature of its viscous solutions. H. STAUDINGER (Trans. Inst. Rubber Ind., 1935, 10, 263—279).—A discussion of the subject and a re-statement of the author's methods of investigation and his views. D. F. T.

The rubber pendulum, Joule effect, and dynamic stress-strain curve. W. B. WIEGAND and J. W. SNYDER (Trans. Inst. Rubber Ind., 1934, 10, 234—262).—Details are given of 2 forms of "rubber pendulum" which, by making use of the Joule effect, can continuously convert heat energy into work. A thermodynamic study is made of the energy transformation effected by this method. The stress-strain curve comprises three regions (*A*—*C*): in *A* the rubber behaves thermodynamically like a steel spring with negligible hysteresis and thermal effects; in *B*, which is responsible for the Joule effect, it behaves like a gas with strongly exothermal structural changes involving a sharp increase in hysteresis; in *C* it behaves like a friction member and causes disappearance of reversible heat transfers. Raised temp. raises the dynamic stress-strain curve (Joule effect) and also straightens it. Solvents narrow the hysteresis loop and also depress tensile vals. near rupture. A structural hypothesis is suggested to explain the behaviour. D. F. T.

Heats of combustion of rubber and of rubber-sulphur compounds. R. S. JESSUP and A. D. CUMMINGS (J. Res. Nat. Bur. Stand., 1934, 13, 357—369).—The heat of combustion of Et_2O -sol. rubber in O_2 , giving CO_2 and liquid H_2O at 30° and 1 atm., is 45,207 international joules per g. (in vac.). The average vals. obtained for Et_2O -insol. and total rubber are lower by 0.9 and 0.4%, respectively. The results for compounds of rubber and S are given by $Q_c = 45,200 - 37,823m$, wherem is the mass of S per g. of compound. From these and published data the calc. heat of combination of rubber with rhombic S at 30° and 1 atm. is 1881 international joules per g. of S (estimated error 15%). E. S. H.

Microchemical analysis of rubber. I. K. SHIMADA (J. Soc. Rubber Ind. Japan, 1934, 7, 347—350).—The Cu content of raw rubber, determined colorimetrically with piperidine pentamethylenedithiocarbamate, was 2.32—5.50 mg. per kg. Its relation to tackiness is discussed. CH. ABS. (e)

Tests on crêpe rubber for shoe soles. T. H. MESSENGER and B. D. PORRITT (J. Res. Assoc. Brit. Rubber Manufrs., 1934, 3, 127—145).—Examination of a no. of samples of crêpe soling, some prepared in the East and others from ordinary crêpe rubber in this country, as to chemical composition, d_{16}^{16} , tensile qualities, hardness, solution- η , permanent set, resistance to deformation and to tearing, and adhesion between plies reveals no important difference between the estate- and factory-prepared crêpe-sole rubber; the general variation, however, in tensile strength, plasticity, and ply-adhesion was considerable.

D. F. T.

Chlorinated rubber. T. YAMATO (Repts. Imp. Ind. Res. Inst. Osaka, 1934, 15, No. 5, 14 pp.).—Chlorination of rubber (I) in CCl_4 or C_6H_6 with Cl_2 gave a final product $\text{C}_{10}\text{H}_{13}\text{Cl}_7$ (64.7% Cl). The η of (I) decreased with progressive chlorination. Material with > 60% Cl was heat-, acid-, and alkali-resistant and incombustible.

CH. ABS. (e)

PATENTS.

Treatment of rubber, gutta-percha, and balata. A. DAVIES (B.P. 421,820, 23.6.33).—The rubber (etc.) is subjected to mechanical working in a mixing machine and then in a colloid mill to such an extent that it becomes disaggregated to a liquid which does not subsequently recover its original state. The product may be mixed with a solvent, drying oil, or bitumen, and the mixtures used in this form or in an emulsified condition in H_2O , e.g., for paint and varnish purposes.

D. F. T.

Drying of rubber. E. B. NEWTON, Assr. to B. F. GOODRICH Co. (U.S.P. 1,958,110, 8.5.34. Appl., 23.4.30).—Rubber articles derived directly from an aq. dispersion of rubber are dried by placing them in a pressure vessel at > 100°, admitting sufficient steam to produce R.H. 50—100%, raising the total pressure to \leq twice the v.p. of H_2O at the temp. of the vessel, circulating the gases within the vessel, and relieving the pressure after the rubber is dry. Vulcanisation may be effected by further raising the temp. before releasing the pressure.

D. F. T.

Vulcanisation of rubber. IMPERIAL CHEM. INDUSTRIES, LTD., and W. BAIRD (B.P. 421,533, 15.3.33).—Vulcanisation accelerators are prepared by interaction of a metallic derivative (e.g., Na salt) of 2-mercaptobenzthiazole with a quaternary NH_4 halide, such as benzylpyridinium chloride, benzyltrimethylammonium chloride, or hexadecyltrimethylammonium bromide, in a medium in which ≤ 1 of the reactants is sol. and ≤ 1 of the reaction products is insol. By using mono- or di-hydroxypropylpyridinium chloride as the reactant, H_2O -sol. products are obtained which can be used with latex without previous dispersion.

D. F. T.

Vulcanisation of rubber. GOODYEAR TIRE & RUBBER Co. (B.P. 421,810, 21.4.33. U.S., 2.7.32).—Prevulcanisation is prevented in rubber mixtures, particularly those containing mercaptobenzthiazole, $(\text{NMe}_2\text{-CS}_2)_2\text{Zn}$, or a $\text{PrCHO-NH}_2\text{Ph}$ condensation product as accelerator, by the incorporation of α -polyoxymethylene.

D. F. T.

Vulcanisation of rubber. M. W. HARMAN, Assr. to RUBBER SERVICE LABS. Co. (U.S.P. 1,941,146, 26.12.33.

Appl., 9.3.32).—Vulcanisation is accelerated by the reaction product of a ketone-amine, e.g., diacetone-amine, and a mercaptoarylenethiazole (mercaptobenzthiazole), possibly together with an activating nitrogenous accelerator such as diphenylguanidine.

D. F. T.

Treatment of scorched rubber compounds. M. G. SHEPARD and E. R. BURNS, Assrs. to DISPERSIONS PROCESS, INC. (U.S.P. 1,957,298, 1.5.34. Appl., 27.6.31).—Prematurely vulcanised stock is masticated between tightly closed mill rolls, small proportions of H_2O being added at intervals to effect cooling and increase the friction. After the material has been rendered plastic it is dispersed by known means in an aq. medium for use as artificial latex.

D. F. T.

Composition for coating rubber. S. I. STRICKHOUSER, Assr. to NAUGATUCK CHEM. Co. (U.S.P. 1,956,965, 1.5.34. Appl., 28.7.27).—Rubber-like articles containing vulcanising ingredients including S, e.g., golf balls, are painted with an acyl peroxide, e.g., Bz_2O_2 , and a varnish containing a drying oil and a heavy-metal drier compound, either together or successively.

D. F. T.

Rubber composition and its manufacture. W. N. JONES, Assr. to B. F. GOODRICH Co. (U.S.P. 1,941,012, 26.12.33. Appl., 15.8.27).—A condensation product of aldol and a diarylethylenediamine with monocyclic aryl groups, e.g., di-*p*-tolylethylenediamine, is used as an antioxidant.

D. F. T.

Waterproof paper etc.—See V. Adhesive.—See XV.

XV.—LEATHER; GLUE.

Prolonged storage of sheep skins. M. S. LYUKSEMBURG and I. I. KNYAZEV (Ztent. Nauch. Issl. Inst. Koz. Prom. Sborn. Rabot, 1934, No. 3, 77—86).—Hides salted with NaCl show great deterioration, which is entirely eliminated by addition of PhCl (2%, calc. on the amount of NaCl).

CH. ABS. (e)

Determination of fat, ash, and water in raw hides. K. L. DVORKINA (Ztent. Nauch. Issl. Inst. Koz. Prom. Sborn. Rabot, 1934, No. 3, 87—94).—The saponification method is suitable for determining fat in raw hides, but the type of fat, solvent, and extraction apparatus must be specified. The ash determined by carbonisation is > that determined in a muffle furnace at $\geq 600^\circ$. In determining NaCl the raw material should be broken up with NaOH.

CH. ABS. (e)

Determination of sulphite-cellulose tannides in presence of vegetable (oak) tanning substances. L. Y. GINZBURG (Ztent. Nauch. Issl. Inst. Koz. Prom. Sborn. Rabot, 1933, No. 1, 30—35).—The determination of the KMnO_4 factors of the tanning solutions by means of an indigo solution is described. A formula is given for calculating the sulphite-cellulose tannides in a solution containing oak tannides.

CH. ABS. (e)

Tanning of upper leather and cowhide with sulphite-cellulose extract ZNIKP No. 1. L. I. RESNIK (Ovlad. Tekh. [Ser. Koz. Proiz], 1932, 48—50).—A boiled solution of willow bark or oak wood and sulphite-cellulose (I) extract (1:1) is used to prepare an 11 or 13 coloration. It gives a well-tanned leather.

A pure (I) treatment gives at low p_H an elastic, light upper leather. By after-tanning in a dil. willow- or oak-wood bath a drying of the grain which accompanies pure (I) tanning is avoided. CH. ABS. (e)

Fat-liquoring of leather. A. A. PHELIN and G. S. RABKINA (Zent. Nauch. Issl. Inst. Koz. Prom. Sborn. Rabot, 1934, No. 4, 23—52).—The max. elongation of wet samples of leather is reached at 5.7% of fatty substances. The permanent elongation (load 0.5 kg. per sq. mm.) increases to a max. at 10—11% of fat. The fat content does not affect the strength of leather in storage. Treatment with mixtures of train oil (I) and sulphated (I) with spindle oil, Al naphthenate as emulsifier, paraffin and ceresin, petroleum sulphonic acids, and alkali petroleum sludge does not affect physical and mechanical properties of the hides. CH. ABS. (e)

Grease stains on [vegetable-tanned sole] leather.
IV. Effect of various materials on removal of fat from steer hide. E. K. MOORE and J. H. HIGHBERGER (J. Amer. Leather Chem. Assoc., 1935, 30, 2—26; cf. B., 1934, 975).—More fat was removed in laboratory tests by soaking raw hides in aq. Na_2S , NH_2Me , $(\text{NH}_3\text{Me})_2\text{S}$, and $\text{Na}_2\text{S} + \text{NH}_2\text{Me}$, respectively, by liming with $\text{CaO} + \text{Na}_2\text{S}$; and by soaking in 1:4-dioxan, and in a partly H_2O -miscible mixture of solvents. No improvement was obtained by soaking greasy hides in 0.1% Na_2SiO_3 solution even after green-fleshing, but the no. of stains in slightly greasy hides was reduced thereby. The intensity of the grease stains was reduced in tannery tests with soaks containing 1% of NH_2Me and 0.12% of Na_2S , respectively. D. W.

Deterioration of vegetable-tanned leather by oxalic acid. R. C. BOWKER and J. R. KANAGY (J. Amer. Leather Chem. Assoc., 1935, 30, 26—30).—Quebracho and chestnut-tanned leathers were treated with $\text{H}_2\text{C}_2\text{O}_4$ (I), aged for 2 years, and their p_H vals. and tensile strengths determined. The deterioration, which was approx. the same for both leathers at 65% and 85% R.H., was appreciable at $p_H < 3.0$ [produced by 1% of (I) in chestnut- and 1.5% of (I) in quebracho-tanned leather]. D. W.

See also A., Feb., 269, **Tannin in oak gall-nuts.**

PATENTS.

Treatment of hides [and skins]. H. C. REED, Assr. to NIACET CHEMICALS CORP. (U.S.P. 1,957,020, 1.5.34. Appl., 5.8.31).—Raw hides and skins to be preserved are treated with paraldehyde (I) and subsequently dried. Skins to be tanned may be pretreated with 0.1—10 wt.-% of paraldol or (I). D. W.

Manufacture of artificial or reconstructed leather. INTERNAT. LATEX PROCESSES, LTD., Assees. of Soc. ANON. PRODOTTE SALPA & AFFINI (S.A.P.S.A.) (B.P. 422,027—8, 1.5.34. It., 18.5.33).—Leather or raw-hide waste is disintegrated, mixed with rubber latex, finely-divided C, and/or a heavy-metal oxide or hydroxide, and applied in the processes of B.P. 315,413 and 365,564 (B., 1931, 79; 1932, 338). The oxides or hydroxides may be pptd. *in situ*. D. W.

Adhesives. J. GRAHAM and E. B. CATLOW (B.P. 421,456, 7.8.34).—A mixture of whiting, BaSO_4 , pow

dered starch and alum, boiled linseed oil, and gold size is claimed for cementing tiles. D. W.

Adhesive. E. HAZELL and H. F. STOWE, Assrs. to NAUGATUCK CHEM. CO. (U.S.P. 1,958,479, 15.5.34. Appl., 15.2.30).—A solution of rubber in an org. solvent is mixed with finely-divided chrome-tanned leather and vulcanising materials. D. W.

Adhesive for coating, penetrating, sizing, priming, or waterproofing a base or backing, and/or for bonding grit to a base or backing to form with it an article in the nature of a flexible waterproof abrasive. A. H. STEVENS. FROM MINNESOTA MINING & MANUFG. CO. (B.P. 421,394, 9.3.33).—Claim is made for the use of synthetic resins made by condensation, reaction, or polymerisation of an aldehyde, an aromatic amine, and urea, plasticised with an oil, alcohol, glycol, aryl phosphate or phthalate, or $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$, and containing K_2SO_4 as a gelatinising agent and $(\text{CH}_2)_6\text{N}_4$ as a hardening agent. [Stat. ref.]. A. R. P.

Monoazo dyes [for leather].—See IV. **Urea- CH_2O condensation products [as glue etc.].**—See XIII.

XVI.—AGRICULTURE.

Soil survey of north Shropshire. II. Classification of series and types. W. M. DAVIES and G. OWEN (Empire J. Exp. Agric., 1934, 2, 359—379; cf. A., 1934, 863).—Analyses and profile characteristics are recorded. A. G. P.

Weathered Devonian and Carboniferous soils in North-East Sauerland. W. PAECKELMANN, P. PFEFFER, and A. UDLUFT (Mitt. Lab. Preuss. Geol. Landesanst., 1933, 18, 1—8; Proc. Internat. Soc. Soil Sci., 1934, 9, 183—184).—Harmful factors in forest soils probably result from the management of previous afforestation and are not due to the state of weathering of the soil, its soil acid constituents, or clay content. A. G. P.

Soil survey of the area at "Dismal Swamp." T. J. MARSHALL and J. S. HOSKING (Counc. Sci. Ind. Res. Australia, Bull., 1934, No. 85, 18—22).—Depressions in these soils have higher proportions of dissolved salts and more clay than normal soils. Analytical data are given. A. G. P.

"Terra rossa" of Emilie. N. GAUDENZI (Ann. Staz. Sperim. Agric. Modena, 1934, 3; Proc. Internat. Soc. Soil Sci., 1934, 9, 208—210).—The formation and chemical characteristics of these soils are examined. A. G. P.

Appalachian upland podsol soils. II. Organic matter-acidity relations. H. J. ATKINSON and R. R. MCKIBBIN (Canad. J. Res., 1934, 11, 759—769; cf. B., 1934, 161).—The p_H of raw humus from the A_1 horizon of virgin podsoils increased with leaching. The leachate contained considerable amounts of free H_2SO_4 . The presence of H_3PO_4 is less common. A. G. P.

Influence of maturity and rainfall on the properties of lateritic soils in Mauritius. N. CRAIG and P. HALAIS (Empire J. Exp. Agric., 1934, 2, 349—358).—The colour, mechanical composition, org. matter content, and clay composition of mature and immature soils are closely related to the average rainfall to which they are subjected. A. G. P.

Changes in salt content of irrigation water as it passes through the irrigation system. K. LAZAREV (Hydrochem. Materialien, U.S.S.R., 1930, 5, 58—82).—Seasonal changes in salt contents of irrigation H₂O are recorded, and salts dissolved from soils during flow are examined. CH. ABS. (p)

Role of micro-organisms in humus formation. A. V. SOROKINA and M. G. TYAGNO-RYADNO (Microbiologiya, 1933, 2, 285—291).—No humus was obtained from dead mycelium of *A. niger* by inoculation of artificial media with soil suspensions, but inoculation of a natural soil medium resulted in the formation of α -humus (but not β -humus) from the mycelium. Addition of superphosphate or CaCN₂ did not affect humus formation, but accelerated the mineralisation of the α -fraction. The latter process is favoured by an alkaline medium. CH. ABS. (p)

Estimated number of nemas in soils of Manitoba. E. H. J. MARCHANT (Canad. J. Res., 1934, 11, 594—601).—The no. of nematodes is independent of [H⁺] and % H₂O, but \propto the org. matter content of the soil. E. C. S.

Field examination and sampling of soils. W. G. OGG and A. B. STEWART (Scot. J. Agric., 1934, 17, 410—418).—Profile examination and field observations bearing on the physical and nutrient conditions of soils are outlined. A. G. P.

Mechanical analysis of soil. E. M. CHOFRÉ (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 79—81).—The sample is washed through a 0.5-mm. sieve, heated with H₂O at 70°, and dispersed with NaOH. Special forms of sedimentation apparatus are described. A. G. P.

Mechanical analysis of soils. D. J. HISSINK (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 19—27).—The use of 0.004N-NaOH is preferable to that of aq. NH₃ for soil dispersion. The further subdivision of the sand fraction is advocated. A. G. P.

Mechanical analyses of some Natal soils. J. R. H. COURTS (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 41—46).—After preliminary decomp. with H₂O₂, the efficiency of dispersing agents for these soils was in the order NaOH > aq. NH₃ > Na₂C₂O₄. A. G. P.

Mechanical analysis of soils of Indochina. R. CERIGHELLI (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 57—64).—In red-earth soils examined, dispersion by NaOH greatly exceeded that by aq. NH₃ or Na₂C₂O₄. Little change was effected by increasing the [NH₃] used. The difficulty of dispersion may be related to the cementing together of finer particles by colloidal Fe(OH)₃ and Al(OH)₃. A. G. P.

Mechanical analysis of soils with special reference to the coarser fractions. V. NOVÁK (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 65—78).—Various methods now in use are discussed. A. G. P.

Use of sodium oxalate and carbonate in dispersing soils for mechanical analysis. F. G. LOUGARY and G. W. CONREY (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 29—40).—The completeness of dispersion of soil samples may be judged by the constancy of the ratio clay < 0.005 mm. : clay < 0.002 mm. in duplicate samples. Following pretreatment with HCl, Ca may be

removed by shaking with two successive portions of H₂O, centrifuging, and decanting the clear liquid. Na₂C₂O₄ (I) and Na₂CO₃ (II) are equally effective dispersing agents when samples receive thorough mechanical stirring, and soil is washed initially with HCl. In untreated samples (I) gives complete dispersion in lower concns. than does (II). Normal soils are dispersed by amounts of (I) or (II) \equiv 150% of the total base capacity (III) of the sample. With acid-washed or naturally acid soils the equiv. of (III) suffices. Large excesses of dispersive agent must be avoided. A. G. P.

Dispersion of clay colloids. Application to their extraction [in mechanical analyses of soils]. A. DEMOLON and E. BASTISSE (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 47—56).—The resistance of clay to flocculation by NaCl is increased by the presence of K and of certain anions, notably citrate. A modified process of mechanical analysis includes pretreatment with H₂O, washing with 0.1N-KCl, and dispersion by Na citrate followed by the customary sedimentation procedure. A. G. P.

Physical measurements in soils. S. B. HOOGHOUTD (Vers. Landbouwk. Onderz., 1934, No. 40, 215; Proc. Internat. Soc. Soil Sci., 1934, 9, 154—155).—Relationships between mechanical composition and structure of soils and their permeability, capillarity, and sp. surface area are examined. A. G. P.

Relationship between the mechanical composition of soil and the estimate of texture in the field. J. A. PRESCOTT, J. K. TAYLOR, and T. J. MARSHALL (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 143—153).—A system of correlation is examined. A. G. P.

Structure of soils. N. A. SOKOLOVSKI (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 89—95).—Aggregate analysis of soils and of factors concerning structural characteristics are discussed. A. G. P.

Influence of moisture content of soils on their structure. D. VILENSKI (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 97—108).—The stability (*S*) of soil structure towards mechanical forces is largely influenced by the base-adsorption capacity and the proportion of Ca in the adsorbed bases. The *S* towards H₂O is markedly affected also by the nature of the absorbed bases, and is increased, e.g., by replacement of absorbed Ca by Na. There is no parallelism between mechanical and aq. *S*. Definite structural formation occurs in soils only between certain limits of H₂O content, which are characteristic for each soil. A. G. P.

Stability of soil structure. M. A. ACHROMEIKO (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 109—113).—Apparatus for determining stability (*S*) is described. In moist soils *S* of the macrostructure (> 1 mm.) is >, and that of the microstructure (< 0.5 mm.) <, that of moist soils. A. G. P.

Rapid mineralogical examination of soil. O. TAMM (Svenska Skogsvårdsför. Tidsk., 1934, No. 1—2, 231; Proc. Internat. Soc. Soil Sci., 1934, 9, 204—205).—Colloids are removed from the sample by sedimentation and the residue is treated with H₂O followed by (NH₄)₂C₂O₄ as for mechanical analysis. From the dry residue granular particles (I) are separated from mica platelets by gentle

tapping on a metal sheet. Further separation of (I) is carried out by means of Thoulet's solution (d 2.680).

A. G. P.

Oxalate method in chemical examination of soils. O. TAMM (Medd. Stat. Skogsförsöksanst., 1934, 27, No. 1; Proc. Internat. Soc. Soil Sci., 1934, 9, 199).—The method is suitable for the examination of pptd. mineral colloids and for small quantities of Ti and Mn compounds.

A. G. P.

Shortening the time without affecting the accuracy of Dyer's modified method for determining in soils the phosphoric acid, lime, and potash soluble in 1% citric acid solution. J. A. BONNET and F. A. VILLAMIL (J. Puerto Rico Dept. Agric., 1933, 17, 287—300).—A portion of the citric acid extract is evaporated to dryness with HCl-HNO₃ (I) and ignited at relatively low temp. The residue is dissolved in (I) and PO₄^{'''} determined by the volumetric molybdate method. Brown colour due to Mn appearing after neutralisation with aq. NH₃ and re-acidification with HNO₃ is removed by heating to coagulate the colloid and filtering.

CH. ABS. (p)

Magnesium content of Palatinat soils and the importance of this element in plant nutrition. M. KLING and O. ENGELS (Ernähr. Pflanze, 1934, 30, 353—357).—Analytical data indicate that Mg deficiency is more general than is usually supposed. MgSO₄ is most suitable for manurial purposes.

A. G. P.

Limiting p_H for plant growth in steppe areas. E. CHABANIER (Compt. rend., 1934, 199, 1332—1334).—The process of alkalisiation of soils in areas of restricted rainfall is discussed in relation to crop growth.

A. G. P.

Change in manurial value of superphosphate after application to soil. S. AXI (J. Sci. Soil Manure, Japan, 1934, 8, 195; Proc. Internat. Soc. Soil Sci., 1934, 9, 178).—Loss of manurial val. (M) of superphosphate (I) after admixture with soil is associated with the drying-out of the mixture beyond certain limits. Remoistening does not restore M . Drying soil does not affect the M of (I) applied later.

A. G. P.

Electrodialysable potassium and phosphorus [in soils] and Neubauer's method. L. SMOLIK (Bull. Czechoslov. Acad. Agric., 1934, 10, No. 4/5; Proc. Internat. Soc. Soil Sci., 1934, 9, 165).—In the cathode dialysates Ca, K, Na, Mg, Al, Fe, and Mn appear in the order named. Degradation of soils by electro dialysis affords a means of studying podsolisation.

A. G. P.

Effect of boron in fertilisers. K. SCHARRER and W. SCHROPP (Phytopath. Z., 1934, 7, 245—254).—With cereal crops addition of H₃BO₃ to synthetic NaNO₃ (I) fertiliser had no effect on crop yields. Sugar beet and turnips grown with (I) showed much root rot, but use of Chili NaNO₃ or addition of H₃BO₃ to (I) prevented this.

A. G. P.

Action of fertilisers on the physical properties of silts. H. BURGHEVIN (Trans. 1st Comm. Internat. Soc. Soil Sci., 1934, 243—246).—Seasonal variations in H₂O content in differently manured soils are recorded. The general level of vals. was highest for animal manure (I); those for NaNO₃ (II) were >, and for Ca(NO₃)₂ slightly <, those for untreated soil. Differences in H₂O

retaining capacity were similarly related. (I) and (II) increased the hygroscopicity of soils.

A. G. P.

Summary of investigations at the agricultural research station, Sakrand. V. A. TAMHANE (Ann. Rept. Dept. Agric. Sind, 1930—1, 65—71; 1931—32, 66—74).—Crops are usually successful on soils containing > 0.5% of total sol. salts (I), but wheat, jambo, and castor tolerate higher proportions. Rate of movement of NaCl in soil is > that of Na₂SO₄. Movement of salts in soil follows that of H₂O. (NH₄)₂SO₄ is only partly nitrified in soils containing 2—3% of (I), and decomp. of green manures is restricted. Cotton and other crops remove considerable amounts of Na and K from "kalar" soils. MgCl₂ is probably more toxic to plants than are Na salts, excepting Na₂CO₃.

CH. ABS. (p)

Annual report of the agricultural chemist, Bengal, 1933. M. CARBERY (Ann. Rept. Dept. Agric. Bengal, 1932—1933, II, 71—98).—Omission of N, K, P, Mg, or Ca from fertilisers did not significantly alter the N, P, or K contents of the paddy crop. Omission of N caused accumulation of SiO₂ in roots, stems, leaves, and grain. Nutrient vals. of the water-hyacinth are recorded.

CH. ABS. (p)

Effect of potassium supply on composition and quality of wheat. A. G. MCCALLA (Canad. J. Res., 1934, 11, 687—700; cf. B., 1934, 345).—Higher grain quality was obtained from plants receiving a continuous supply of K, from germination to maturity, than from those which had absorbed an equal proportion of K during a restricted period of growth. Deficiency of K may be partly, but not entirely, counteracted by a supply of Na. The N content of grain is an approx. const. proportion of the total intake, but that of mineral matter \propto the dry wt. of the grain.

A. G. P.

Significance of soil moisture in the behaviour of *Puccinia graminis* and *P. tritricina* towards different wheat varieties. K. HASSEBRAUK (Phytopath. Z., 1934, 7, 259—269).—With increasing soil moisture up to 75% saturation, chlorosis increased and pustule formation declined.

A. G. P.

Increase in the protein content of oats obtained by delaying the application of nitrogen. A. M. SMITH (Scot. J. Agric., 1934, 17, 404—410).—Increased yields and N content of grain may be associated with smaller yields of straw.

A. G. P.

Effect of nitrogenous fertilisation on protein content of maize when harvested for silage. C. B. BENDER and A. L. PRINCE (New Jersey Agric. Exp. Sta. Bull., 1934, No. 563, 4 pp.).—Application of nitrophoska or Leuna saltpetre (up to 4 cwt. per acre) increased the total yield but not the protein content of maize.

A. G. P.

Micro-determination of ammonia and the formation of ammonia in paddy fields. S. OSUGI and N. NISIGAKI (J. Sci. Soil Manure, Japan, 1934, 8, 167; Proc. Internat. Soc. Soil Sci., 1934, 9, 204).—Toerell's method for blood is adapted to the examination of soil extracts. The rates of ammonification of various org. forms of N (I) are examined. Presence of (I) did

not influence rate of transformation of $(\text{NH}_4)_2\text{SO}_4$.
Decomp. of soya-bean cake and fish meal was slow.

A. G. P.

Forest manuring. II. R. LANG (Forstwiss. Centr., 1933, No. 16/17, 541; Proc. Internat. Soc. Soil Sci., 1934, 9, 185).—Manuring with K or N is unlikely to be profitable under conditions examined (Germany). Forest growth is more dependent on the physical conditions of soil affecting H_2O supply than on chemical constituents.

A. G. P.

***Apocynum sibiricum* culture.** N. S. VAL'KO (Trud. Inst. Norvogo Lubyano Suir'ya, 1933, 4, 3—30).—*Apocynum* responds to N fertilisers and tolerates sulphates more readily than chlorides in saline soils.

CH. ABS. (p)

Response of grasses and clover to treatment on acidic upland soils: effect of herbage plants on the reaction of acidic soils. R. O. DAVIES and H. G. CHIPPENDALE (Empire J. Exp. Agric., 1934, 2, 324—336).—Manuring, cultivation, and re-sowing with grass-clover mixtures increased the dry-matter yields and N, Ca, and PO_4''' contents of herbage. The high val. of basic slag is demonstrated.

A. G. P.

Improving pastures in New Jersey. H. B. SPRAGUE, N. F. FARRIS, and C. S. CATHCART (New Jersey Agric. Exp. Sta. Bull., 1934, No. 565, 47 pp.).—Effects are recorded of manurial treatment on the botanical composition, yield, and nutrient val. of the herbage.

A. G. P.

Five-years' results on pasture fertilisation and rotation management. C. B. BENDER (New Jersey Agric. Exp. Sta. Bull., 1934, No. 564, 8 pp.).—Effects of varying levels of application of $(\text{NH}_4)_2\text{SO}_4$ on the grazing val. of herbage under intensive conditions are examined.

A. G. P.

Pasture studies. IV. Nutrient value of pasture herbage: quality of protein. E. W. CRAMPTON (Empire J. Exp. Agric., 1934, 2, 337—348).—The nutrient val. of herbage is influenced by the nature of the proteins present.

A. G. P.

Use of hydrogen peroxide as a seed dip. J. KISSER and L. PORTHEIM (Phytopath. Z., 1934, 7, 409—426).—The action of H_2O_2 solutions of varying concn. on fungus spores is examined. Successful disinfection of many species of seeds is recorded.

A. G. P.

Relationship between transpiration and diffusion in the potassium intake by seedlings from nutrient solutions. F. ALTEN and R. GOTTWICK (Ernähr. Pflanze, 1934, 30, 415—420).—Adsorption of various ions by seedlings in sand cultures did not coincide with the amounts calc. from the amount of H_2O absorbed, those for K being higher and for PO_4''' , SO_4''' , Cl', Na', Ca', and Mg' lower than calc. vals. Absorption of SO_4''' was $>$ that of Cl'. Absorption of K from SO_4''' media was $>$ that from Cl' media. The bearing of these results on certain irregularities in the Neubauer method observed in acid soils is discussed.

A. G. P.

Nutrient requirement and symptoms of potassium deficiency of leguminous crops. G. ROHDE (Ernähr. Pflanze, 1934, 30, 357—361).—Leguminous

crops are very susceptible to deficiencies of K, and observations of symptoms of injury serve to indicate the K-fertiliser requirement of soils.

A. G. P.

Importance of potassium for soya beans. A. KORNFELD (Ernähr. Pflanze, 1934, 30, 335—343).—K manuring increases the protein and oil content of soya beans. Large applications tend to retard maturity and increase the resistance of the plants to frost. Deficiency of K causes leaf spotting, increases transpiration, and restricts soil- H_2O absorption.

A. G. P.

Injury to potatoes from improper placement of fertiliser. J. BUSHNELL (Proc. 18th Ann. Meet. Ohio Veg. Growers' Assoc., 1933, 105—110).— $(\text{NH}_4)_2\text{SO}_4$ and KCl are more liable to cause injury than is superphosphate. Injury is more severe during drought, and cut seed are more susceptible than small whole seed.

CH. ABS. (p)

Effect of certain ammonium compounds on soil and crop. A. L. PRINCE and A. W. BLAIR (New Jersey Agric. Exp. Sta. Bull., 1934, No. 571, 20 pp.).—Injury to cabbage plants due to heavy application of $(\text{NH}_4)_2\text{SO}_4$ (I) was less persistent on limed soils and less marked when the fertiliser was distributed 10 days before sowing or in successive smaller amounts during growth. Recovery of N in pot-cultured crops varied from 55 to 85%. Continued use of (I) increased the acidity of light soils, but the action of added N counteracted acid injury to crops up to a limiting p_{H} characteristic of the crop. Luxury consumption of N follows heavy application of (I). Variations in N content of cabbage seedlings grown with various fertilisers are examined.

A. G. P.

Mineral-deficiency symptoms in tomato and cucumber plants. I. C. HOFFMAN (Proc. 18th Ann. Meet. Ohio Veg. Growers' Assoc., 1933, 58—59).—Externally apparent effects of deficiencies of N, K, and Mn are recorded.

CH. ABS. (p)

Clover chaff as [soil] mulch. A. W. MARION (Proc. 18th Ann. Meet. Ohio Veg. Growers' Assoc., 1933, 62—65).—Clover chaff contains sufficient N to supply bacterial requirements during its decomp. when used as a mulch for tomatoes.

CH. ABS. (p)

Acidity, anti-acid buffering, and nutrient content of forest litter in relation to humus and soil. M. J. PLICE (Cornell Univ. Agric. Exp. Sta. Mem., 1934, No. 166, 32 pp.).—Vals. obtained for litter of different species were seldom characteristic for the species.

A. G. P.

First pruning cycle of the Tea Research Institute [Ceylon]: fertiliser trials. T. EDEN (Tea Quart., 1934, 7, 83—92).—Yields were increased by N fertilisers in the order: $(\text{NH}_4)_2\text{SO}_4 >$ blood meal $>$ CaCN_2 . The composition and quality were not appreciably influenced. K manuring had little effect on yields.

CH. ABS. (p)

Report on tobacco. G. CORBETT (Mauritius Dept. Agric. Ann. Rept., 1932, 55—62).— $(\text{NH}_4)_2\text{SO}_4$ was superior to NaNO_3 in increasing yields and quality of tobacco and in hastening maturity. Superphosphate was more effective than the P of guano.

CH. ABS. (p)

Fertiliser responses of Baldwin apple trees on an acid soil. R. C. COLLISON and J. D. HARLAN (New

York State Agric. Exp. Sta. Bull., 1934, No. 646, 24 pp.).—Application of NH_4 salts was less effective than NO_3^- or org. N; the tendency towards acidity was counteracted by dressings of CaO much < the normal CaO requirement. KNO_3 produced exceptionally good results. A. G. P.

Winter injury of Baldwin apple trees and its relation to previous tree performance and nutritional treatment. R. C. COLLISON and J. D. HARLAN (New York State Agric. Exp. Sta. Bull., 1934, No. 647, 13 pp.).—Winter injury on acid soil was best corr. by fertilisers containing available Ca and N principally as NO_3^- . Fertilisers having N as NH_4^+ and without CaO, or those applied in autumn or only in alternate years, were less effective in this respect. A. G. P.

Fundamental effects of dates of picking [apples]. C. C. EIDT (Nova Scotia Fruit Growers' Assoc. 68th and 69th Ann. Rept., 1931—2, 222—223).—The first appearance of rot in stored apples was related to the disappearance of starch from the fruit. CH. ABS. (p)

Apple storage. F. KIDD and C. WEST (Hort. Educ. Assoc. Yearbook, 1933, 2, 59—62).—Data are given showing the optimum temp. and O_2 and CO_2 contents of the atm. during storage. CH. ABS. (p)

Apple storage at Kentville experimental station. C. C. EIDT (Nova Scotia Fruit Growers' Assoc. Ann. Rept., 1933, 44—47).—Excessive manuring caused premature rotting and/or shrivelling in storage. Normal applications of balanced manures delayed spoilage. CH. ABS. (p)

Balanced fertiliser practice as an aid to better keeping quality of fruit. M. B. DAVIS (Nova Scotia Fruit Growers' Assoc. Ann. Rept., 1933, 31—35).—On soils heavily dressed with NO_3^- apples were subject to premature spoilage. Corky fruit resulted from treatment with Ca or N only. Roots of trees giving pitted fruit contained excessive amounts of Fe, high starch, and low K contents. High applications of N accentuated die-back and spray injury. Effects of deficiencies of K, P, Ca, and Mg are described. Excessive K treatments induce symptoms of Mg or Ca deficiency. CH. ABS. (p)

Control of smut in wheat by dipping. II. G. GASSNER and H. KIRCHHOFF (Phytopath. Z., 1934, 7, 271—284; cf. B., 1933, 518).—Prolonged soaking (I) of seed before treatment reduced seedling injury. Addition of EtOH reduces the effective period of (I). During (I) the H_2O intake of endosperm increases and the H_2O content of the embryo declines. The latter is paralleled by the extent of injury to germination. A. G. P.

Control of barley smut. G. GASSNER and H. KIRCHHOFF (Phytopath. Z., 1934, 7, 303—314).—The warm-soaking process (50—53°) and use of 2% EtOH or Pr^nOH improved the efficiency of the seed dip. A. G. P.

Potato spraying. P. E. TILFORD (Proc. 18th Ann. Meet. Ohio Veg. Growers' Assoc., 1933, 80—83).—In preparing Bordeaux mixture high-Mg lime is as suitable as high-Ca lime and may be superior. CH. ABS. (p)

Use of formaldehyde on outdoor vegetables. J. D. WILSON (Proc. 18th Ann. Meet. Ohio Veg. Growers'

Assoc., 1933, 120—125).— CH_2O (I) dusts containing 4.5—6% (I), in C or infusorial earth, applied in the row at 1 lb. per 500 ft., controlled damping-off as effectively as corresponding (I) solutions, and in some cases were less injurious to seeds. CH. ABS. (p)

[Report on] vegetable diseases. V. L. OGLIVIE and B. O. MULLIGAN (Ann. Rept. Agric. Hort. Res. Sta. Long Ashton, 1933, 98—120).—The violet root rot of asparagus and also finger-and-toe in Brussels sprouts were markedly reduced by treating soil with HgCl_2 solution (1 in 1000). Mint rust was controlled by late autumn or early winter spraying with tar-oil emulsion. Org. Hg and also Cu preps. increased germination in pea seeds. CH. ABS. (p)

Bean insect control. N. F. HOWARD (Proc. 18th Ann. Meet. Ohio Veg. Growers' Assoc., 1933, 139—142).— K_3AlF_6 , synthetic Na_3AlF_6 , and BaSiF_6 were satisfactory if applied as wet sprays, but ineffective in the form of dusts. CH. ABS. (p)

[Report of] entomological division. A. MOUTIA (Mauritius Dept. Agric. Ann. Rept., 1932, 43—51).—Insect pests of pigeon peas are best controlled by spraying with Bordeaux mixture with Pb arsenate (I) or Paris Green (II), or by dusting with (II) and $\text{Ca}(\text{OH})_2$. Combinations of (I) with linseed oil and soap or flour injured foliage. CH. ABS. (p)

Sulphur dust for citrus thrips and certain scales. E. A. MCGREGOR (Calif. Citrograph, 1934, 19, 232, 254—256).—The efficiency of S dusts is related to the % of S passing 325-mesh. Adherence is poor with coarser particles. CH. ABS. (p)

Effect of certain zinc sulphate sprays for mottle leaf of citrus. E. R. PARKER (Calif. Citrograph, 1934, 19, 204).—Use of blood-albumin as spreader for ZnSO_4 sprays (5 lb. per 100 gals.) caused severe injury. Foliage and fruit were unaffected by $\text{ZnSO}_4\text{-Ca}(\text{OH})_2$ (10:5) preps. CH. ABS. (p)

Effect of temperature and humidity on fumigation for red scale. H. J. QUAYLE (Calif. Citrograph, 1934, 19, 264).—Under laboratory conditions fumigation of lemons was not influenced by temp. in the range 10—32°. Preconditioning fruit at 2° for 4—48 hr. at R.H. 70% gave better results than at 24—32°. Fumigation at R.H. 20—50% was more effective than at 90—100%. Rooted cuttings were more injured by treatment at 10° than at 32° (R.H. 70%) and more in dry than in wet soil. CH. ABS. (p)

Pest and disease control. A. KELSALL and J. F. HOCKEY (Nova Scotia Fruit Growers' Assoc. Ann. Rept., 1931—2, Nos. 68/69, 25—33).—Used in conjunction with Pb arsenate (I), Ca monosulphide (II) sprays were less effective in apple-scab foliage than was standard CaO-S (III). (II) did not cause foliage injury or fruit russetting when used with Ca arsenate. Flotation S (IV) and wettable S were inferior to (III) or bentonite-S (V) when combined with (I). (IV) and (V) were harmless to foliage. FeSO_4 eliminated As injury by (I) or (I)-(III) sprays. CH. ABS. (p)

Control of apple scab. Allington pippin and Newton Wonder, 1933. W. GOODWIN, H. MARTIN, E. S. SALMON, and W. M. WARE (J. South East Agric.

Coll. Wye, 1934, 34, 136—144).—Incorporation of 0.75% of cottonseed oil with Bordeaux mixture (4 : 6 : 100) (I) did not reduce efficiency of, and caused less russetting than, (I) alone. Leaves retained more Cu and for a longer period. CH. ABS. (p)

Joint control of apple sawfly (*Hoplocampa testudinea*, Klug) and apple scab. H. G. H. KEARNS, R. W. MARSH, and T. SWARBRICK (Ann. Rept. Agric. Hort. Sta. Long Ashton, 1933, 60—65).—The most satisfactory combination spray was Pb arsenate (I)—nicotine—CaO—S. To minimise interaction between constituents (I) should be not finer than 300-mesh. CH. ABS. (p)

Spraying against pear scab. H. MARTIN, E. S. SALMON, and W. M. WARE (J. South East. Agric. Coll. Wye, 1934, 34, 145—154).—Bordeaux mixture (4 : 6 : 100) with or without addition of cottonseed oil is effective, but caused some damage to certain varieties. CH. ABS. (p)

Feeding habits of the sinuate pear borer in relation to control practices. H. GLASGOW (New York State Agric. Exp. Sta. Bull., 1934, No. 648, 31 pp.).—Residues from As sprays were not greatly repellent to the insect. After feeding, the female ceases egg-laying and dies within a few days. The bearing of this on the timing of As sprays is discussed. A. G. P.

Control of the peach borer on nursery stock and orchard trees. O. I. SNAPP and J. R. THOMSON (J. Econ. Entom., 1934, 27, 771—779).—Successful results were obtained by spraying tree bark and surrounding soil with emulsions of $p\text{-C}_6\text{H}_4\text{Cl}_2$ (I) dissolved in cottonseed or mineral oil (II). Liberation of (I) from (II) preps. was the more rapid and the tendency to injury more accentuated, particularly if kerosene or petrol was used. Soil treatment with $\text{C}_2\text{H}_4\text{Cl}_2$ was also effective and caused no injury to trees. CCl_4 gave inferior results. A. G. P.

Control of grey-banded leaf roller. A. KELSALL, A. D. PICKETT, and N. A. PATTERSON (Nova Scotia Fruit Growers' Assoc. Ann. Rept., 1933, No. 70, 55—61).—Nicotine and Pb arsenate were equally effective and both were improved when combined with Bordeaux mixture. CH. ABS. (p)

Solvents for the removal of lead arsenate residues from fruits. R. H. CARTER (J. Econ. Entom., 1934, 27, 848—853).—HCl is the most satisfactory acid solvent. Org. acids decompose Pb arsenate with deposition of insol. salts. Solutions of neutral salts alone or in conjunction with acids have little solvent action unless they react to form other insol. salts. Alkaline solutions, e.g., NaOH or Na silicate, have appreciable solvent power for Pb and As, which may be augmented by addition of salts. Wetting and degumming agents may facilitate removal of spray residues, but, in themselves, have no solvent action. A. G. P.

Control of dewberry anthracnose by spraying. C. M. HAENSELER (New Jersey Agric. Exp. Sta. Bull., 1934, No. 574, 12 pp.).—The spraying schedule consists of delayed-dormant application of CaO—S (1 in 20) and a pre-blossom spray of Bordeaux mixture (5 : 10 : 100). A. G. P.

Control of orchid weevil (*Diorymerellus laevimargo*, Champ.). C. C. HAMILTON and K. HENDERSON (Amer. Orchid Soc. Bull., 1933, 2, 43—50).—Treatment of surface soil with $p\text{-C}_6\text{H}_4\text{Cl}_2$ proved satisfactory. CH. ABS. (p)

[Destruction of water-hyacinth.] F. SMITH (Ann. Rept. Dept. Agric. Bengal, 1932—3, II, 43—54).—Rotting of water-hyacinth by partial submergence in H_2O results in production of much CH_4 . Analyses of rotted residue are given. Rotting of sunn hemp produces H_2 . CH. ABS. (p)

Root rot of *Primula obconica* caused by *Thielaviopsis basicola*, Ferraris. B. A. TIDDENS (Phytopath. Z., 1934, 7, 223—229).—The incidence of the disease was unrelated to soil reaction. Soil may be disinfected by CH_2O or uspulun applied 10 days before use. A. G. P.

Derris insecticides. I. Toxicity of various extracts of derris root to sucking and chewing insects. J. M. GINSBURG, J. B. SCHMITT, and P. GRANETT. **II. Insecticidal properties of extracted root residue.** J. M. GINSBURG and P. GRANETT (New Jersey Agric. Exp. Sta. Bull., 1934, No. 576, 23 pp.).—I. COMe_2 and EtOH, but not H_2O , remove all active contact poisons from derris (D). Toxicity of H_2O extracts (I) compares well with that of COMe_2 (II) and EtOH extracts (III) at high, but not at low, concns. Activity of (I) decreases rapidly and that of (III) more slowly on storage. (II) show little change. D extracts are more toxic than solutions containing the same amount of pure rotenone.

II. Powdered D was more effective against aphid when dusted on wet than on dry foliage. D residues from (II) were non-toxic to aphid, but were toxic and repellent to caterpillars (IV). Residues from (II) after further extraction with H_2O were deterrent but not toxic to (IV). A. G. P.

Solvents for cryolite [insecticides]. R. H. CARTER (J. Econ. Entom., 1934, 27, 863).—Removal from apples of cryolite (I) residues from sprays containing fish or mineral oils is unsatisfactory. Solubility of (I) in 1.5% HCl is increased by addition of H_3BO_3 or of Al and Fe salts. A. G. P.

Method for comparison of oil deposits of proprietary [insecticidal] oil emulsions. A. D. BORDEN and G. S. HENSILL (J. Econ. Entom., 1934, 27, 834—841).—Appropriate apparatus is described. Results show wide variations in the deposited oil resulting from different methods of emulsification. A. G. P.

Determining surface area of trees covered by spray fluid and obtaining a permanent record of the degree of fineness of the deposit. C. DAVIES (J. South East. Agric. Coll. Wye, 1934, 34, 252—253).—Celluloid discs are suitably placed on trees and subsequently removed and tested chemically; e.g., CaO—S spray is shown by dipping dried discs in AgNO_3 . Disc surfaces are treated to resemble those of leaves. CH. ABS. (p)

Popular weed killers. M. A. H. TINCKER (J. Roy. Hort. Soc., 1935, 60, 68—79).—A lecture.

Phanerogamic parasiticism, with particular reference to *Striga lutea*, Lour. A. R. SAUNDERS (Union S. Africa Dept. Agric. Sci. Bull., 1933, No. 128, 56 pp.).—Host plants (*Gramineæ*) exude from their roots a substance (I) essential to the germination of seeds of the parasite. (I) is non-volatile, inactivated by heat or exposure to air, and acts on the cell contents and not on the coat of the seed. The weed is not injured by fertilisers or by addition of NaCl or CaO to soil, but is destroyed by spraying with chlorate (Mg, Ca, Na) solutions. CH. ABS. (p)

Bordeaux-oil sprays as repellents to the lesser bulb fly. F. S. BLANTON and F. J. SPRUIT (J. Econ. Entom., 1934, 27, 845—848).—Bordeaux mixture (4—4.50) (I) lessens injury by bulb flies and stimulates growth of the plants. (I)-oil preps. have no repellent action and may injure the bulbs. A. G. P.

Control of destructive prune worm. R. W. HAEGELE (38th Ann. Conv. Idaho State Hort. Assoc., 1933, 83—86, 88—89).—The efficiency of the spray depends on its ability to penetrate the webbing on infected buds. Best results were obtained with a soap emulsion of paraffin-pyrethrum extract. CH. ABS. (p)

Control of chrysanthemum eelworm (*Aphelenchoides ritzema-bosi*, Schwartz), 1931—1933. H. G. H. KEARNS and C. L. WALTON (Ann. Rept. Agric. Hort. Res. Sta. Long Ashton, 1933, 66—73).—Satisfactory control is obtained by immersing stools in H₂O at 43° for 20 min. CH. ABS. (p)

Wireworm control. M. C. LANE (Idaho State Hort. Assoc. 38th Ann. Conv., 1933, 66—73).—Application of CS₂ at the rate of 1 fl. oz. per injection at 4 in. depth and 2 ft. apart gave complete control. 800 lb. of C₁₀H₈ per acre incorporated with surface soil gave 90% control. Ca(CN)₂ was relatively ineffective. CH. ABS. (p)

Rodent control. T. B. MURRAY (Idaho State Hort. Soc. Ann. Conv., 1933, 59—66).—Raw linseed oil is heated at 243° and S powder added slowly with stirring (12 oz. per gal.). The product is brushed on to tree trunks. CH. ABS. (p)

Pasture fertilisation results. R. H. LUSH and J. L. FLETCHER (J. Dairy Sci., 1934, 17, 733—735).—Changes in yield, mineral composition, and milk-producing quality of pastures following fertiliser treatment are recorded. A. G. P.

Effect of feeding-stuffs on quality of butter. J. MÄGI (Rep. Zootech. Res. Stat., Univ. Tartu, Estonia, 1934, No. 12, 1—8).—For winter butter large daily rations of beet (I) or raw potatoes (II) give a hard and crumbly product with low I val. (III), (II) having a slightly greater effect than (I). Addition of 0.5—1.0 kg. of linseed cake (IV) to a ration containing 45 kg. of (I) or 18 kg. of (II) per head gives fairly satisfactory, only slightly crumbly butter. Bean meal also makes the butter hard and crumbly, with low (III), and (IV) counteracts the effect. Oatmeal gives a soft butter of high (III). Fish meal (V) from smelts (*Osmerus eperlanus*, var. *spirinchnus*) in quantities > 0.8—1.0 kg. per head (H₂O content about 24%: fat about 60 g.) with a ration of 9 kg. of medium-quality meadow hay,

1.7—4.2 kg. of cereals, 8—10 kg. of (II), or 25 kg. of (I) gives a butter of fairly good quality. Higher quantities of (V) make the butter increasingly soft [(III) rising to 35—36], very white, and of an unpleasant sweetish taste. NUTR. ABS. (m)

Phosphorus requirements of sheep. II. Effect of supplying phosphatic supplements to growing lambs depastured on phosphorus-deficient country. (1) Effects of allowing growing merino sheep free access to phosphatic licks while depastured on a phosphorus-deficient area at "Dismal Swamp," South Australia. H. R. MARSTON. (2) Field management. E. W. LINES (Counc. Sci. Ind. Res. Australia, Bull., 1934, No. 85, 5—17).—The growth and wool production of sheep on P-deficient soils was not increased by PO₄''' supplements beyond that of controls having access to NaCl licks. Application of superphosphate to the pasture produced beneficial results. A. G. P.

Rôle of fertilisers in pond-fish culture. O. L. MEEHEAN (Trans. Amer. Fisheries Soc., 1933, 63, 103—110).—Soya-bean meal produced 10—30 times the no. of organisms obtained with usual fertilisers, e.g., sheep manure. Cottonseed meal was still more effective, but caused disappearance of phytoplankton and increased nos. of crustaceæ and chironomids. CH. ABS. (p)

See also A., Feb., 186, Determining Al in plants. 191, Italian volcanic soils. Soil formation on coloured clays. 257, Tropical soil microbiology. 264 and 266, Sugar beet and cane. 266, Soils and Mn deficiency. 269, Rust-resistance of wheat. Potato-leaf hopper injury to forage legumes. 270, Action of sound waves on tobacco mosaic virus.

PATENTS.

Manufacture of fertilisers from carbonaceous material. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 422,061, 15.7.33).—Vegetable carbonaceous material is moistened and treated with Cl₂, which may be diluted with another gas, the product being neutralised with NH₃ or (NH₄)₂CO₃. Fertilising salts may be added before or after the neutralisation. W. J. W.

Fertilisers. J. RADCLIFFE (B.P. 422,126, 3.7. and 6.10.33).—Pieces of coke, varying in size from ¼ to ½ in., are treated with steam or other vapour capable of condensation to expel the air, and are then caused to absorb a solution or melt of a fertiliser such as NH₄NO₃. W. J. W.

[Mixed] fertilisers. ATMOSPHERIC NITROGEN CORP., Assees. of W. H. KNISKERN, C. K. LAWRENCE, and L. V. ROHNER (B.P. 420,598, 5.5.33. U.S., 13.5.32 and 21.1.33).—Claim is made for a product obtained by treating superphosphate, alone or mixed with K salts, with a solution of an NH₄ salt and urea in conc. aq. or liquid NH₃; 26 examples are given. A. R. P.

Disinfectants and immunising media for seed-grain and the like. SCHERING-KAHLBAUM A.-G., Assees. of L. MEYER and F. MEYER (CHEM. FABR. L. MEYER) (B.P. 421,704, 22.3.34. Ger., 22.3.33).—A non-dusting product is obtained by incorporating a H₂O-sol. Hg salt (HgCl₂), optionally in aq. solution, with a fatty substance capable of absorbing H₂O

(lanoline or constituents thereof) and an inert diluent (talc). H. A. P.

XVII.—SUGARS; STARCHES; GUMS.

Gum-producing organisms in sugar cane. M. T. COOK and P. B. OTERO (J. Puerto Rico Dept. Agric., 1933, 17, 271—286).—Gummosis, caused principally by *Phytophthora vasculorum*, is more active in rapidly-growing canes. Sugar yields are reduced. CH. ABS. (p)

Sugar kept from caking by addition of calcium phosphate. H. V. MOSS (Canner, 1934, 79, No. 6, 18).—1% of $\text{Ca}_3(\text{PO}_4)_2$ improves the free-running properties of sugar and prevents lumping. The nutritive val. is increased and baking tests are unaffected. CH. ABS. (e)

Diluting cylinder for sugar analysis. R. F. GIBB (Laboratory, 6, 58).—The apparatus and its use are described. CH. ABS. (e)

(A) **Action of solvents on Steffen's waste water from the manufacture of beet sugar.** E. BARTOW and E. C. LITTLE. (B) **Disposal of wastes from the beet-sugar industry.** E. BARTOW (Proc. Iowa Acad. Sci., 1932, 39, 139—148, 160).—(A) Steffen's waste (d 1.012) was conc. in a vac. pan to d 1.4, the product being added to 60, 70, 80, and 90% EtOH. The amount dissolved, the KCl obtained by pptn. with HCl from the EtOH extract, and the betaine hydrochloride obtained by concn. after filtering off KCl varied inversely as the % EtOH used. The glutamic acid (I) in the insol. portion (II) \propto the % EtOH used (optimum 90% EtOH). (I) was isolated by heating (II) with conc. HCl [1 c.c. per g. of (II)], filtering, decolorising, concentrating, and crystallising.

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

Regenerating bone black.—See II. Bagasse.—See V. Sugar in olive press- H_2O .—See XII. Determining starch in wheat products.—See XIX. Tragacanth mucilage.—See XX.

See also A., Feb., 165, Physical chemistry of starch and bread-making. 199, Purification of α -*D*-xylose. 240, Determining available carbohydrates of fruits. 250, Enzymic hydrolysis of inulin. 264 and 266, Sugar beet and cane.

PATENTS.

Packing of invert sugar and the like substance for transport purposes, and the subsequent unpacking thereof. ALBION SUGAR CO., LTD., A. H. GILLMAN, and T. S. DICK (B.P. 421,968, 3.5.33).

Treating cellulosic material.—See V.

XVIII.—FERMENTATION INDUSTRIES.

Calculating the tables for gauging the volume of beer wort by the Erhard-Schau measuring instrument. T. RUMBOLDT (Riv. Catasto Serv. Tecn. Erariali, 1935, 2, 60—74).—The simplified method described gives results in good agreement with those obtained by the customary method. T. H. P.

Fermentation control of ciders by the centrifuge method. V. L. S. CHARLEY (Ann. Rept. Agric. Hort. Res. Sta. Long Ashton, 1933, 145—151).—Removal of yeast by centrifuging (I) permits suitable control of

fermentation, which may be checked entirely when the liquor attains d 1.007—1.017. Fermentation cannot be controlled by the (I) of fresh juice, since an important N fraction is not thus removed. During fermentation yeast removes this N, which can thus be separated by (I) at a later stage. CH. ABS. (p)

Action of cider on metals. V. L. S. CHARLEY (Ann. Rept. Long Ashton Agric. Hort. Res. Stat., 1933, 152—174).—Al, Ag, and Ni were not dissolved and did not affect flavour (I) of cider (II). Cu, Pb, Fe, and Zn were dissolved to varying extents and imparted strong metallic flavours. Sn did not affect (I), but traces dissolved in bitter-sweet (II). Fe and Zn caused darkening of (II). Effects on various Cr-Ni steels and on bronzes are described. Tinned-Cu filters are not appreciably affected unless the liquid remains in contact for several hr. CH. ABS. (p)

Production of alcohols from wood waste. L. P. ZHEREBOV, S. R. SUBKOVA-GITLER, R. S. ZALMONZON, and L. N. YUKINA (Trans. Centr. Inst. Sci. Res. Forest Chem. Russia, 1934, 3, 5—23).—Spruce shavings are hydrolysed first with H_2O at 200°, followed by 70% H_2SO_4 at 20°, and finally with 0.25% H_2SO_4 at 175°. The aq. fraction is utilised for COMe_2 -BuOH fermentation. The final fraction gives high yields of EtOH. CH. ABS. (p)

Sterilising filters.—See I. EtOH in olive press- H_2O .—See XII.

See also A., Feb., 248, Determining peroxidase. 249, Amylase development during barley germination. Trypsin preps. 250, Enzymic hydrolysis of polysaccharides. 251, Liver-esterase. 253, Influence of p_{H} on rate of yeast growth. Assimilation of N by brewers' yeast. 255, Activator of lactic acid fermentation. 268, Protein content of barleys.

PATENT.

Maturation of spirituous liquors. H. F. WILLKIE (B.P. 422,678, 4.6.34. U.S., 28.11.33).—The vapours of the liquor are brought into intimate contact with O_2 or air in presence of a distributing agent (*D*) (porous or activated C) capable of presenting to them a large surface; thus, undesirable compounds present after distillation are oxidised to desirable or harmless constituents. A few sec. suffice for the conversion, as compared with the natural maturation period of 5—6 years. *D* may be contained, e.g., in a special chamber interposed between the still and the condenser. The temp. and pressure employed may vary between wide limits, whilst the EtOH content of the treated material may be 40—95%. Woody flavours may be imparted to the liquor by contact with, e.g., charred or uncharred finely-divided hard white oak. I. A. P.

XIX.—FOODS.

Rapid determination of moisture in grain. III. **Calibration and comparison of electrical moisture meters with vacuum oven for amber durum wheat, barley, and oats.** W. H. COOK, J. W. HOPKINS, and W. F. GEDDES (Canad. J. Res., 1934, 11, 547—563; cf. B., 1935, 121).—The hand-operated Tag-Heppenstall (*T*) and the Burton-Pitt meters are unsatisfactory with these grains. With the Limbrick (*L*) and motor-*T*

similar results are obtained to those for hard red spring wheat (I) (*loc. cit.*), but the actual resistance and slope of the curve vary. The motor-*T* is the more accurate for durum wheat and barley, and the *L* for oats. The temp.-correction factors were almost = that for (I). The Brown-Duvel (*B*) method is more accurate than the 130° air-oven (*A*) method with all four grains. With (I) in the range of 11—17% of H₂O the motor-*T* = the *B* method, and is > the *A* method, in accuracy. For each grain the various methods are placed in order of decreasing accuracy. E. C. S.

Modified micro-determination of nitrogen in cereals. E. M. HESS and J. MÄRZINGER (Brauer-u. Hopfen-Ztg., 1934, 61, 75—76; Chem. Zentr., 1934, ii, 1543—1544).—A modified container for weighing the material is described. The decomp. is effected with conc. H₂SO₄ saturated with P₂O₅, using H₂O₂ as catalyst, and is complete in 10 min. H. N. R.

Determination of protein in wheat flour and the assessment of the baking value of wheat. M. JAVILLIER and D. DJELATIDÈS (Bull. Soc. Chim. biol., 1934, 16, 1542—1552).—Several wheat flours are each divided into protein fractions by successive extraction with 10% aq. NaCl, 70% aq. EtOH, and alkaline 70% aq. EtOH, and the N content of these, N₁, N₂, and N₃, respectively, are determined. It is found that flours of good baking val. have N₂/N₃ between 1 and 2, and in those of bad baking val. the ratio is between 3 and 4. A. L.

Polarimetric determination of starch [in wheat products]. C. Y. HOPKINS (Canad. J. Res., 1934, 11, 751—758).—Starch is dispersed by heating in CaCl₂ solution and determined directly by the polarimeter. Sol. proteins, sugars, etc. are removed by preliminary washing with EtOH. A. G. P.

Colorimetric determination of lectithinphosphoric acid in cakes [etc.] containing eggs. G. BUOGO (L'Ind. Chimica, 1934, 9, 1634—1636).—The dried material is refluxed with EtOH—Et₂O mixture, the extract evaporated, the residue dissolved in aq. KOH, evaporated to dryness, dissolved in dil. HNO₃, and the H₃PO₄ determined as already described (B., 1935, 176); 0.13 g. of H₃PO₄ ≡ 1 egg. A correction must be applied for the 0.2—0.3% of H₃PO₄ present in egg-free cakes and derived from the flour. D. R. D.

Insects of stored rice in Louisiana and their control. C. H. STRACENER (J. Econ. Entom., 1934, 27, 767—771).—Fumigation with CS₂—CO₂ is recommended for warehouse treatment. A. G. P.

Relative efficiency of some fumigants against the rice weevil and the confused flour beetle. H. H. SHEPARD and D. L. LINGREN (J. Econ. Entom., 1934, 27, 842—845).—Data for C₂H₄Cl₂, C₃H₆Cl₂, CS₂, and CCl₄ are given. A. G. P.

Seasonal variation of non-fatty solids of milk. G. C. JONES (Dairyman, Jan., 1935).—The solids-not-fat of milk are always less during July, Aug., and Sept., and frequently fall below the normal min. val. of 8.5%. The possible relationship of this to drought periods is discussed. P. G. M.

Foam-producing substances in milk. S. ANSBACHER, G. E. FLANIGAN, and G. C. SUPPLEE (J. Dairy

Sci., 1934, 17, 723—731).—Foaming in milk is associated with constituents of the "nitrogenous extractives," probably colloidal protein-like material. The possible nature of the active substance is discussed. A. G. P.

Detecting "non-acid" milk. G. A. COX (New Zealand J. Agric., 1934, 49, 231—234).—Pasteurised samples are mixed with a starter and methylene-blue (I), and incubated at 37°. The time required to decolorise (I) is noted. A. G. P.

Testing frozen cream. H. C. TRELOGAN and W. B. COMBS (J. Dairy Sci., 1934, 17, 717—722).—Sampling by weighing frozen chips of cream for fat determination gives results within 0.5% of those of the original cream. If frozen cream is remelted before sampling vals. are within 1.0% of the original. A. G. P.

Plastic cream; a new dairy product. M. J. MACK and C. R. FOSKETT (Food Ind., 1934, 6, 156—157).—In special separators at 63° cream containing 80% of butter fat is prepared from milk or cream. The product is plastic at 10°. The presence of Fe or Cu catalyses deteriorative changes even at low temp. CH. ABS. (p)

Changes in fat of home-canned meats. R. C. NEWTON (Canner, 1934, 78, 62).—Oxidation of canned beef and pork fat occurs only at the surface. The presence of an antioxidant, possibly vitamin-E, is indicated in the lower layers. CH. ABS. (p)

Are soluble constituents extracted from vegetables in the blanching process? E. F. KOHMAN and N. H. SANBORN (Canner, 1934, 78, 78).—NaCl solutions extracted more Ca from peas than did H₂O, the amounts removed decreasing in successive extracts. The N loss during blanching was the same whether NaCl or H₂O was used. CH. ABS. (p)

Determination of maturity of canned peas. Z. I. KERESZ (Food Ind., 1934, 6, 168—170).—Hot 80% EtOH extracts sugars etc. from peas, but hemicellulose, fibre, and protein are insol., and the proportion of these present is an indication of the stage of maturity. CH. ABS. (p)

Effect of heat on red and yellow tomato pigments. J. H. MACGILLIVRAY (Canner, 1934, 78, 10—12).—Loss of colour in tomato products (I) increases with the temp. of sterilisation. Effects of temp. changes on the cryst. lycopene in (I) are described. CH. ABS. (p)

Handling of some Philippine fruits with special reference to the ethylene, borax, and paraffin treatment. F. T. ADRIANO, A. VALENZUELA, E. C. YONZON, and C. G. RAMOS (Philippine Agric. J., 1934, 5, 87—104).—Colouring of various fruits by means of C₂H₄ was complete in 3—6 days. Flavour was unaffected. Mould wastage in oranges was prevented by soaking in 4% borax solution, drying, and coating with paraffin. CH. ABS. (p)

Improvement of juice from culinary and dessert apples by maceration with pressed bittersweet pomace. P. T. H. PICKFORD (Agric. Hort. Res. Sta. Long Ashton Ann. Rept., 1933, 141—144).—Maceration with pomace for 12 hr. decreased the malic acid and tannin contents of juice, but improved flavour of juice and cider made therefrom. The rate of fermentation was unaffected. CH. ABS. (p)

Determination of jelling power of fruit-juice extractions. G. L. BAKER (Food Ind., 1934, 6, 305—315).—A viscosity pipette is used to determine the quantity of sugar or pectin required for preparing fruit jellies. CH. ABS. (p)

Problems in the bottling of carbonated fruit-juice beverages. J. H. TOULOUSE (Food Ind., 1934, 6, 249—251).—Certain fruit juices absorb the O_2 present in solution and in the free space of the bottle. Unsaturated substances (terpenes), aldehydes, and ketones are probably concerned. CH. ABS. (p)

Pickle and chutney manufacture. F. S. NEWMAN (Canning & Food Trade J., 1935, 5, 16, 25).—A general description of the processes is given, with the approx. composition of brine and sweet liquors for some varieties of chutney. E. B. H.

Testing mustard for mayonnaise. L. B. KILGORE (Glass Packer, 1934, 13, 114—116).—If mustard (I) is used in a dry condition, acidity of mayonnaise increases steadily. No change results if (I) is aged in a wet condition. Tests for H_2O -holding capacity, flavouring, and storage quality are described. CH. ABS. (p)

Definitions and standards for flavouring extracts. J. GLASSFORD (Canning Age, 1934, 15, 334—336).—New specifications for vanilla extracts (I) are suggested. Approx. $\frac{2}{3}$ of the flavour of (I) is due to vanillin. CH. ABS. (p)

Where does the gas in roasted coffee come from? C. BREDT (Food Ind., 1934, 6, 348—349).—Formation of CO_2 after roasting is due to reaction between reducing sugars and NH_2 -acids, which is rendered possible by the presence of H_2O condensed as the beans cool. Further reaction is retarded by the restricted amount of H_2O present. By addition of H_2O to freshly roasted beans, evolution of CO_2 and CO is completed in 12 hr. Rapid oxidation of fat and oil after gassing ceases is due to loss of antioxidant activity of sterol in the oil. CH. ABS. (p)

p_H of cocoa. H. GARCIA (Anal. Asoc. Quím. Argentina, 1934, 22, 100—103).—The sample (2 g.) is shaken with 20 c.c. of H_2O , and the p_H of the filtrate determined colorimetrically with Me-red or bromocresol-purple. The results with 14 samples range from 5.4 to 6.2; the corresponding H_2O , ash, fat, and free acid contents of the samples are given. H. F. G.

Cadmium is poisonous [for foodstuffs]. C. R. HAZEN (Food Ind., 1934, 6, 268).—Gelatin dessert allowed to solidify on a dish coated with metal containing 56% of Cd absorbed sufficient Cd to cause illness. CH. ABS. (p)

Crested wheat grass. L. E. KIRK, T. M. STEVENSON, and S. E. CLARKE (Dominion of Canada, Dept. Agric. Pamphlet No. 157, 1934, 22 pp.).—*Agropyron christolum* contains (as % dry matter): crude protein 18.2, carbohydrates 48.2, fibre 23.0, total ash 10.6, P_2O_5 0.701, CaO 0.600%. It compares favourably in nutritive val. with slender wheat grass and brome grass. NUTR. ABS. (m)

Determination of starch equivalent of meadow hays. M. A. KNOX and I. B. PROWSE (J. South East.

Agric. Coll. Wye, 1934, 34, 227—231).—In poor- and moderate-quality hay the starch equiv. (I) based on protein (P) content is $<$ that based on fibre content. The "presumptive (I)," more reliable than either of these vals., is calc. by doubling the val. from P, adding the val. from fibre, and dividing by 3. CH. ABS. (p)

Making silage with addition of acid. E. PIRAUX (Bull. Inst. agron. Gembloux, 1934, 3, 239—248).—With lucerne the p_H of the silage exerts an important influence on the results. The smallest loss of protein by conversion into H_2O -sol. nitrogenous substances occurs at $p_H < 4$. Drainage causes no marked alteration in the val. of the silage, and inoculation with lactic acid bacteria does not give satisfactory results. NUTR. ABS. (m)

[Nutrient] losses during the making of silage. R. VON KUBINZKY (Bied. Zentr. [Tierernähr.], 1934, B, 6, 233—280).—Analyses and feeding-trials with silage from lucerne, from red clover, and from oats-pea-vetch mixtures are recorded. Conversion of digestible protein into amides during ensilage was considerable. Digestible fibre vals. slightly increased. A. G. P.

Feeding value of canning-factory silage. F. B. MORRISON (Canner, 1934, 79, 14—16).—Data for sweet maize and pea silage are given. CH. ABS. (p)

Mineral assimilation from two typical fodders. A. V. IYER and N. K. AYYAR (Indian J. Vet. Sci., 1934, 4, 108—113).—In spite of a low Ca content, jouar hay induced assimilation of Ca and P by bullocks. Rice straw produced negative Ca balances, uncorrected by supplementary feeding of Ca phosphates. Ca rations cannot induce Ca assimilation unless sufficient P is present. CH. ABS. (p)

Effect of the curing process on the carotene and vitamin-A content of lucerne. W. C. RUSSELL, M. W. TAYLOR, and D. F. CHICHESTER (New Jersey Agric. Exp. Sta. Bull., 1934, No. 560, 8 pp.).—The carotene (I) content of machine-dried is $>$ that of field-dried lucerne, differences being controlled by the length and conditions of exposure in the field. Loss of (I) occurs mainly in daylight and may amount to 80% in the first 24 hr. Machine-drying involves no loss of (I). A. G. P.

Digestion coefficients of green fodders (oats, lucerne-clover mixtures) for working horses. F. TAUBERT (Bied. Zentr. [Tierernähr.], 1934, B, 6, 173—202).—The rate of digestion of green fodder was \gg that of dry feeds or concentrates. The superior digestibility of lucerne as compared with oats is attributable to its high protein and Ca content. Digestion coeffs. of green foods averaged 60—70% of that of the dried materials. Storage of dried fodder for 3—4 months results in a decrease of 25—30% in Et_2O -extractable matter. A. G. P.

Food value of stems and leaves of artichokes. B. LUSKE (Bied. Zentr. [Tierernähr.], 1934, B, 6, 227—234).—Data for tops cut in summer and in winter are recorded. A. G. P.

Treatment of incoming supplies is a safeguard against insect pests. H. STINER (Food Ind., 1934, 6,

160—162).—Uses of and dosages for various fumigants are described. CH. ABS. (p)

Moisture determination [of wheat etc.].—See I. **Apple storage.**—See XVI.

See also A., Feb., 165, **Peptisation of wheat-flour proteins. Physical chemistry of starch and bread-making.** 228, **Egg-yolk lecithins, and kephalin.** 240, **Nutritive val. of lactose. Determining available carbohydrates of fruits.** 241, **Seasonal variation in butter fat.** 247, **Heavy metals occurring in foods.** 260—3, **Vitamins.**

PATENTS.

Treatment of grain products. M. J. BLISH, Assr. to GEN. MILLS, INC. (U.S.P. 1,957,688, 8.5.34. Appl., 22.6.29).—Overbleached flours are improved by treatment with reducing agents such as sulphides, sulphites, thiosulphates, SO_2 , etc. Flours may be treated with reducing agents (e.g., 0.0005—0.005 lb. of Na_2SO_3 per 100 lb. of flour) during or after milling and before or after bleaching with oxidising agents. The max. amount of bleaching may then be applied without fear of damaging the flour. E. B. H.

(A) **Production of flour.** (B) **Prepared cake flour.** J. FINKEL (U.S.P. 1,944,880—1, 30.1.34. Appl., 20.3.30).—(A) Wheat flour alone or in admixture with maize, rice, or tapioca flour is agitated in a rotary vac. dryer at 60° to remove excess of moisture, and shortening, sweetening, or colouring materials are added with continuation of the agitation under reduced pressure to effect thorough softening of the gluten and the incorporation therein of the additions. (B) The process described in (A) is utilised in making a blended flour for preparing a chocolate cake; coconut oil, cocoa powder, and flavouring materials are incorporated into the vac.-dried flour. A. R. P.

Manufacture of margarine. (A) A. K. EPSTEIN, M. C. REYNOLDS, and B. R. HARRIS, (B) M. C. REYNOLDS and A. K. EPSTEIN (U.S.P. 1,958,697 and 1,958,975, 15.5.34. Appl., [A] 27.7.33, [B] 12.4.29).—(A) A vegetable oil, e.g., cottonseed oil, is hydrogenated so that the "clearing point" is ≥ 36 — 38° . The product is allowed to crystallise at 15 — 21° , and the liquid fraction removed. The solid fraction is employed in the manufacture of margarine. (B) The liquid emulsion is forced through a flat spray in finely-divided condition on to a rotating refrigerated drum, and solidified material is removed by a scraper. Spraying may be carried out in a vac. or in an atm. deficient in O_2 . E. B. H.

Manufacture of margarine. K. GROFENGIESSER (U.S.P. 1,958,820, 15.5.34. Appl., 25.4.33. Ger., 15.7.31).—An emulsion of the oil-in- H_2O type is produced by introducing atomised liquid fats of particle size 0.0001—0.001 mm. under the surface of a turbulently agitated aq. phase such as skim milk to which a few % of egg-yolk may be added, the resulting emulsion being worked to a solid by a buttering process. Flavouring cultures may be added, and the spreading capability of the margarine may be improved by emulsifying a fat of low m.p. in the emulsion, obtained as above, prior to working to a solid as above. E. B. H.

Preservation of citrus fruit juices. F. BURKART (U.S.P. 1,958,232, 8.5.34. Appl., 23.6.31).—The juices are rendered sterile and yet palatable by heating for a short time, at low temp., in presence of $\text{Ca}(\text{OH})_2$ in insufficient quantity to effect appreciable neutralisation. The juice is immediately canned or bottled, the cans being filled to the brim. The vessels are cooled at once. E. B. H.

Fruit-flavoured food. G. L. TELLER (U.S.P. 1,957,053, 1.5.34. Appl., 7.7.30).—A dry, powdered fruit juice (I) or (II) and cereal is prepared by fermenting away the natural sugars and evaporating to dryness with glucose, lactose, or other suitable sugar (not fructose or sucrose), and/or a cereal bran or meal. E. B. H.

Food product. [Animal feed.] C. W. CHRISTENSEN and V. CONQUEST, Assrs. to ARMOUR & Co. (U.S.P. 1,958,295, 8.5.34. Appl., 6.9.32).—A livestock feed may be made by mixing skimmed milk with fatty acid (stearic, palmitic, oleic) esters of glycerol (di-ester) or of glycol (mono-ester). Emulsification is not necessary. E. B. H.

Manufacture of [mixed] fruit-juice[carbonated water] beverages. CONSERVENFABR. LENZBURG VORM. HENCKELL & ROTH, and J. SCHLÖR (B.P. 421,631, 2.2.34).

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Preparation and preservation of hypochlorite solutions for medicinal use. J. E. MACHADO and J. SONOL (Rev. Sudamer. endocrinol. immunol. quimiotherap., 1934, 17, 566—587).—The preservative vals. of KMnO_4 and Na silicate vary with the nature of the prep. and are influenced by light. Breteau's solution is the most satisfactory. CH. ABS. (p)

Determination of phosphorus in phosphate, hypophosphite, and glycerophosphate syrups. G. J. W. FERREY (Quart. J. Pharm., 1934, 7, 346—353).—Pemberton's volumetric molybdate method is slightly modified. Hypophosphite syrup is treated with HNO_3 and KMnO_4 and glycerophosphate syrup ignited before determination. C. G. A.

Preparation of sterile solutions. H. DAVIS (Quart. J. Pharm., 1934, 7, 379—388).—Exposure to streaming steam for 1 hr. sterilises solutions used for hypodermic injections, but heating at 80 — 85° for 1 hr. on 3 consecutive days is not effective. C. G. A.

Loss of phenol from phenol lozenges. C. A. HILL and A. D. POWELL (Quart. J. Pharm., 1934, 7, 535—540).—Phenol lozenges (B.P.) under normal conditions of storage lose approx. 1 mg. of phenol per month. C. G. A.

Assay of phenazone. H. BRINDLE (Quart. J. Pharm., 1934, 7, 453—458).—Bougoult's and Kolthoff's methods (A., 1917, ii, 344; 1923, ii, 270) are modified slightly and a blank is introduced. C. G. A.

Extraction of drugs. I. Swelling effect, penetration, and extraction by various menstrua. W. J. HUSA and L. MAGID (J. Amer. Pharm. Assoc., 1934, 23, 891—901, 980—984, 1097—1103, 1187—1196).—The swelling (I) of chestnut wood (II) strips immersed

in H_2O , EtOH, glycerol, and their binary and ternary mixtures, and in glycols etc., was determined. With successive additions, each fluid exerts its characteristic effect despite a prior (I) or shrinking. $C_2H_4(OH)_2$ and H_2O have approx. equal (I) powers, whilst those of $C_3H_6(OH)_2$ and dioxan are $<$ those of EtOH. Variations in p_H of aq. media have practically no influence on (I), whilst with EtOH alkali increases and acid decreases the normal (I). Histological changes due to (I) are described. The (I) of powdered belladonna root (III) varies considerably with the medium and probably, to some extent, with the size of the particles. Parallel data of the penetration (IV) of the media into blocks of oak, peach, sassafras, and (II), and into (III) are also given. Drying at room temp. or, to a greater extent, at 90° diminishes (IV) of H_2O , EtOH, and, more especially, glycerol. With (III), imbibition decreases with fineness of division down to no. 80 sieving, after which it increases. Single extraction of (III) with EtOH- H_2O (5:1 by vol.) is max. with no. 60 powder; data are given for repeated extractions. The use of various EtOH- H_2O mixtures indicates that 5:1 are the best proportions, whilst the addition of acid is not recommended. F. O. H.

Preparation of a dry extract of ipecacuanha. Notes on ipecacuanha root of commerce. A. W. LUPTRON (Quart. J. Pharm., 1934, 7, 483—488).—A dried prep. suitable for conversion into other pharmaceutical preps. is obtained by extraction with 0.5% HCl in 90% EtOH and evaporation to dryness under reduced pressure. C. G. A.

Seasonal variation of santonin in Scottish Artemisias. J. COURTS (Quart. J. Pharm., 1934, 7, 392—405).—*A. gallica*, Willd., yields up to 2% of santonin (I). *A. maritima*, Linn., also gives good yields. There is regular seasonal variation of (I) content, two max. occurring in the leaves (a) just before the flower-heads become conspicuous, and (b) just before these begin to expand. C. G. A.

Colorimetric test for quillaia saponin. J. RAE (Pharm. J., 1935, 134, 59).—1 ml. of $NaNO_2$ solution (10%) is added to 10 ml. of the saponin (I) solution (1%) followed by 2 drops of H_2SO_4 and, after 30 sec., 20 ml. of $N-Na_2CO_3$. H_2O is added to 50 ml. and the full yellow colour is developed after 5 min. All quillaia saponins give colours of the same intensity and these \propto the amount present, but it is not known whether the test is sp. for this type of (I). E. H. S.

Preparation, viscosity, and suspending power of tragacanth mucilage. H. BRINDLE and H. BURLINSON (Quart. J. Pharm., 1934, 7, 492—504).—The η of mucilage (I) made from the whole gum is $>$ that from powdered gum, and, if not heated, increases on keeping. (I) containing 7.5% of glycerol retains its suspending power on dilution better than other preps. C. G. A.

Viscosity of tragacanth mucilages. L. A. HADDOCK (Quart. J. Pharm., 1934, 7, 505—508).—It is suggested that the comparison between samples of the gum should be made by comparing the η of 0.4% aq. solutions in poises at 20° . C. G. A.

Preservation of tragacanth mucilage. H. BURLINSON (Quart. J. Pharm., 1934, 7, 489—491).—0.05% of Pr or Et *p*-hydroxybenzoate is a very satisfactory preservative for the gum, being non-volatile. C. G. A.

Determination of nicotine in the smoke of Norwegian and foreign tobaccos. K. WÜLFERT (Tids. Kjemi, 1934, 14, 128—131, 140—143).—Analyses were carried out by the Pfyl-Schmitt method (cf. B., 1927, 955) with special reference to "nicotine-free" products; these contained as much nicotine as ordinary tobaccos. R. P. B.

Adulteration of cocaine. E. COLLARD (J. Pharm. Chim., 1935, [viii], 21, 57—60).—A sample of cocaine hydrochloride contained about $\frac{1}{3}$ of its wt. of anæsthesine. W. O. K.

Preparation of pure acriflavine. J. MARSHALL (Quart. J. Pharm., 1934, 7, 514—521; cf. B., 1934, 555).—The 30—40% of diaminoacridine in commercial acriflavine can be reduced to 12% by treatment with NaOH, recrystallisation of the product so obtained from H_2O eliminating the remainder. Alkali quickly converts acriflavine into diaminomethylacridone. C. G. A.

Analysis of acriflavine B.P. and neutral acriflavine. G. F. HALL and A. D. POWELL (Quart. J. Pharm., 1934, 7, 522—530).—Diaminoacridone in acriflavine (I) and euflavine is determined by pptn. with standard alkali and titration of the excess. (I) may be detected by the production of a red colour on treatment with CH_2O and aq. $NaNO_2$. C. G. A.

Use of diphenylamine in the assay of saccharated iron compounds. F. HARTLEY and W. H. LINNELL (Quart. J. Pharm., 1934, 7, 549—557).—Determination of Fe^{++} by titration with $K_2Cr_2O_7$, using $NHPh_2$ as internal indicator, gives high results in presence of sugars, due to oxidation of the latter. Use of $K_3Fe(CN)_6$ as external indicator is preferable. C. G. A.

Determination of camphor in galenicals by means of 2:4-dinitrophenylhydrazine. C. H. HAMPSHIRE and G. R. PAGE (Quart. J. Pharm., 1934, 7, 558—564).—Camphor may be determined gravimetrically as the 2:4-dinitrophenylhydrazone. C. G. A.

Assay of strong ointment of mercuric nitrate. W. R. HEADING (Quart. J. Pharm., 1934, 7, 413—417).—The ointment is saponified by 50% KOH in presence of Zn dust. The amalgam is washed, dissolved in HNO_3 , and titrated with NH_4CNS . C. G. A.

Analysis of some mercurial ointments. W. R. HEADING (Quart. J. Pharm., 1934, 7, 406—412).—In ointments where the Hg is not combined with the basis, the latter is removed by dissolution in xylol, centrifuging, and determining the Hg in the deposit by dissolution in HNO_3 and titration with NH_4CNS . C. G. A.

Determination of mercury in mercury-chalk preparations. W. J. BEARDSLEY and B. J. STYLES (Quart. J. Pharm., 1934, 7, 541—542).—The B.P. method is modified by using double the amount of HNO_3 and ensuring complete conversion into the Hg^{++} condition by addition of $KMnO_4$. C. G. A.

Mercurochrome. F. E. RYMILL and R. F. CORRAN (Quart. J. Pharm., 1934, 7, 543—548; cf. A., 1932, 630).—Mercurochrome, prepared by the action of $\text{Hg}(\text{OAc})_2$ on dibromofluorescein (I) in aq. EtOH solution, is shown to consist of a mercurated (I) containing 36% Hg and unchanged (I). C. G. A.

Florida tangerine oil. E. K. NELSON (Amer. Perfumer, 1934, 29, 347—348).—Oil expressed from peel of *Citrus nobilis deliciosa* has d_{20}^{20} 0.8493, $[\alpha]_D^{20}$ +92.5°, n_D^{20} 1.4762, and contains > 95% of limonene, small amounts of octyl and decyl aldehydes, linalool, citronellol, citral, and sesquiterpenes. The ester content is low and no Me anthranilate was detected.

CH. ABS. (p)

See also A., Feb., 223, New *N*-substituted *C*-derivatives of barbituric acid. 226, Synthesis of drugs: Ca theobromide- $\text{Ca}(\text{NO}_2)_2$; benzthiazolecarbarnides. 226—7, Alkaloids. 228, Furan arsenicals. Egg-yolk lecithins, and kephalin. 229, Detecting scopolamine and atropine in presence of PhOH. 246, Anthelmintics. 256, Prep. of endotoxin of typhus bacilli, and of diphtheria antitoxin. 257, Bactericidal action of colloidal solutions. 259, Isolation of melanophore hormones. 260, Prep. of corpus luteum hormone. 260—3, Vitamins. 267, Constituents of *Bixa orellana*, *Entanophragma palustris*, and *Ceanothus velutinus*. Essential oils from Fu Chü and Chao Kan. 268, Cryst. principles from Indian *Artemisia*. Marrubiin in *Labiata*.

PATENTS.

Manufacture of pharmaceutically valuable substances [diaminocarboxylic acids]. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 421,569, 20.5.33).—Albumin-rich cellular tissues (seeds) of curcubitaceous or leguminous plants are hydrolysed with dil. inorg. acids, and the $(\text{NH}_2)_2$ -acids (I) produced isolated with avoidance of strongly alkaline conditions. *E.g.*, dried and ground pumpkin seeds (200 pts.) are heated with 10% aq. H_2SO_4 at 200°, the H_2SO_4 is removed with $\text{Ba}(\text{OH})_2$, the solution clarified with $\text{Pb}(\text{OAc})_2$, and (I) pptd. as Hg^{II} salts, converted into Cu salts, and finally into free acids. (Yield 0.6 pt.) H. A. P.

Treatment of tobacco. M. WIX and S. W. BUNKER (B.P. 422,210, 12.7.33).—An apparatus is specified whereby the cut, moistened tobacco (I) is agitated and then submitted to the action of ultra-violet rays. Alternate agitation and treatment with rays may be performed several times, and the (I) may be heated before or during agitation and/or subjected to air or gas currents during the whole treatment.

E. H. S.

(A) Isolation of follicle hormone. (B) Manufacture of germinal-gland hormone derivatives. SCHERING-KAHLBAUM A.-G. (B.P. 421,630 and 421,681, [A] 29.1.34, [B] 26.10.33. Ger., [A] 31.1.33, [B] 27.10.32).—(A) The urine of pregnant individuals or a derived extract is treated with carbonyl reagents (NH_2OH , semicarbazide), and the pptd. condensation products are separated and hydrolysed. (B) Derivatives of germinal-gland hormones of the formula $\text{C}_{18}\text{H}_{28}\text{O}_2$

(having the physiological action of male hormones) are prepared from reduction products of follicle hormones and follicle hormone hydrates or their acyl derivatives. *E.g.*, hexahydrohormone hydrate, $\text{C}_{18}\text{H}_{30}\text{O}_3$, is heated at the b.p. with 5% aq. H_2SO_4 , or at 130—140° with *o*- $\text{C}_6\text{H}_4(\text{CO})_2\text{O}$ (and the product hydrolysed), or dissolved in 90% H_2SO_4 , or the H_8 -derivative of follicle hormone or its benzoate (or other acyl derivative) is oxidised (CrO_3 - H_2SO_4 , aq. KMnO_4). H. A. P.

Production of germicidal preparations. LEHN & FINK, INC. (B.P. 422,219, 3.8.33. U.S., 10.8.32).—See U.S.P. 1,953,413; B., 1935, 174.

[Tubular] apparatus for extracting drugs and the like. H. BREDDIN (B.P. 421,944, 16.5.34).

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Problems and progress in photography. O. BLOCH (Nature, 1935, 135, 89—92).—A summary.

L. S. T.

Influence of the nature and proportion of the alkali on the reducing power of photographic developers. A. SEYEWETZ and S. SZYMSON (Bull. Soc. Franç. Phot., 1934, 21, 236—238, 250—255).—The amount of AgBr reduced has been determined with varying mol. proportions of LiOH, NaOH, Na_3PO_4 , KOH, aq. NH_3 , K_2CO_3 , and Na_2CO_3 in quinol developer (I); similar determinations have also been made with NaOH or Na_2CO_3 in *p*- $\text{C}_6\text{H}_4(\text{NH}_2)_2$ (II), and *p*-methylaminophenol (III). LiOH and NaOH give the most reduction in (I); these alkalis and Na_3PO_4 show max. effects with 8, 10, and 9 mols. per mol. of quinol, respectively. With NaOH, (I) is the best developer; with Na_2CO_3 , (III) is the better. Any definition of the reducing power of a developer must therefore specify the nature and amount of alkali used. J. L.

X-Ray photographs of welds.—See X.

See also A., Feb., 177, Photochemistry. Influence of salts on intermittent exposures. Desensitisation of plates. Blackening on exposure to X-rays. 178, Photochemical measurement of ultra-violet radiation. 188, Monochromatic filter. 223, Cyanine dyes.

PATENTS.

Manufacture of photographic plates. E. BASSIST, Assr. to LANSTON MONOTYPE MACHINE Co. (U.S.P. 1,957,433, 8.5.34. Appl., 26.5.30).—A Ag and Cu chlorobromide emulsion (I) on a glass support is exposed under a half-tone negative, developed, and fixed. The image is intensified and then etched (with NaCN and I). The plate may then be coated with an acid-resisting ink, and the image dots reduced at their sides, by re-etching. Alternatively, a dichromated gelatin layer may be coated on top of an entirely exposed and developed (I), exposed under the required negative, and then inked; the dichromate is washed out of the unexposed portions, and the Ag in the lower layer correspondingly removed by bleaching and fixing; the sides of the dots of the image may then be reduced by etching, as before. J. L.

Photographic material. I. G. FARBENIND. A.-G. (B.P. 423,209, 13.12.33. Ger., 14.12.32).—A "universal" Ag halide emulsion, suitable for both normal and infra-red photography, and developable by a yellow light, results by adding a pair of dyes, one sensitising to yellow-green, the other to deep red and infra-red light, leaving a sensitivity gap from 500 to 700 or, preferably, from 580 to 620 m μ . This one emulsion is suitable, e.g., with a yellow filter, for landscape work, or with a red filter for distance photography or obtaining "night effects." Examples of pairs of sensitising dyes are (1) erythrosin and 4 : 4'-carbocyanine, (2) thia- ψ -cyanine and thiadicarbocyanine, (3) seleno- ψ -cyanine and thiatricarbocyanine. F. M. H.

Photomechanical resist. A. MURRAY, Assr. to EASTMAN KODAK CO. (U.S.P. 1,957,900, 8.5.34. Appl., 21.1.31).—A metal plate is coated with the composition: furfuraldehyde-COMe₂ resin 20 g., COMe₂ 100 c.c. The resin is not light-sensitive in absence of O₂. The dry coating is treated with a solution of H₂O₂ (25 c.c.) in glycerin (75 c.c.), and printed while wet, in contact with a waterproof negative. J. L.

Production of photographic pictures of high brilliancy. I. G. FARBENIND. A.-G. (B.P. 421,636, 15.5.34. Ger., 24.5.33).—A non-toning substance which forms a Ag salt having a solubility of \gt 0.05% in 10% aq. Na₂S₂O₃ at 20° [e.g., lysalbinic acid, cystine, 4 : x : 1-SEt-C₆H₃Cl-CO₂H, thioaniline, 2 : 2'-(NH₂-C₆H₄S)₂, mercaptobenzthiazole, HCS·S·NHPh, dithioaldehyde thiocyanate, or dicyanodiamide] is added to the fixing or developing bath or to an intermediate bath. H. A. P.

Colour photography. DUFAYCOLOR, LTD., T. T. BAKER, P. LAMBOIT, and W. CHAPMAN (B.P. 422,355, 10.7.33 and 16.2.34).—A method of printing (by projection) for the purpose of copying multicolour screen photographs on to similar material is claimed. J. L.

Kinematography. C. B. DREYER, Assr. to H. F. BOEGER (U.S.P. 1,960,373, 29.5.34. Appl., 5.7.33).—Celluloid film is coated with an orthochromatic emulsion on the front (lens) side and a panchromatic emulsion on the back. The image is focussed on the front, so that the rear image is diffuse; both images are printed together on to positive film. Effects of relief are obtained on projection; the effects can be enhanced by lighting the subject with red light, affecting the diffuse image only. J. L.

[Incised] photographic and kinematographic films. J. H. HALLO, and GEVAERT PHOTO-PRODUCTEN, N.V. (B.P. 421,877, 3.4.34).

XXII.—EXPLOSIVES; MATCHES.

Testing the stability of smokeless powders by measurements of p_H . L. METZ (Z. ges. Schiess- u. Sprengstoffw., 1934, 29, 361—365).—The stabilities of various German and Danish powders were determined by the Hansen (A), modified Lécorché (B), and the hydrolytic methods (C), as well as by a storage test (D) at 100°. In most cases test A gave results in agreement with those obtained in D, but B gave still closer agreement, provided that the stability was referred to the

time interval which elapsed before the break in the p_H curves was reached. Tests by method C are not directly comparable with those given by D, but C usefully supplements D. Nitroglycerin powders are apparently more readily hydrolysed than nitrocellulose powders.

W. J. W.

Determination of moisture in powders. F. BECKER and P. DITTMAR (Z. ges. Schiess- u. Sprengstoffw., 1934, 29, 327—331, 371—375).—Various methods are critically reviewed. Results are shown graphically of tests of various powders by drying in a desiccator and determining the moisture by its action on CaC₂, the C₂H₂ being determined by absorption in a solution of Cu^{II} salt. Results obtained by the desiccator method, the distillation process, and CaC₂ method are shown for various nitrocellulose and nitroglycerin powders.

W. J. W.

See also A., Feb., 181. NO₃F and (NSe)_x as explosives.

PATENTS.

Production of coloured smokes. J. F. S. STONE and N. K. JOHNSON (B.P. 421,655, 30.6.33).—A triphenylcarbinol, e.g., Michler's hydrol, and a phenol, e.g., Me salicylate, separately or in admixture, with or without oil, are sprayed or atomised, e.g., into the exhaust of an aeroplane engine. C. H.

Paper shot cells.—See V.

XXIII.—SANITATION; WATER PURIFICATION.

Evaluation of the germicidal potency of chlorine compounds. II. Chloramine-T products. C. K. JOHNS (Sci. Agric., 1934, 15, 218—227; cf. B., 1934, 1038).—Commercial products on dilution (I) with H₂O show increased alkalinity, probably as a result of the NaHCO₃ content. In the range 25—2000 p.p.m., germicidal action (II) declines with (I). With chloramine-T (U.S.P.) (I) increases acidity, and p_H -concn. curves resemble those for hypochlorites. In concns. < 1000 p.p.m. (II) increases with (I) to a max. at approx. 200 p.p.m. and subsequently declines with greater (I). A. G. P.

Ferric chloride in sewage treatment. O. M. SMITH (Southwest Water Works J., 1934, 16, 9—12).—Use of FeCl₃ (6 p.p.m.) is effective in reducing suspended solids, in lowering the O₂ consumption, reducing odour, and producing a rapidly drying sludge. CH. ABS. (p)

Excess lime [water-]purification process. O. VOLLMAR (Gas- u. Wasserfach, 1934, 77, 773—779).—The H₂O supplied to the Talkewitz waterworks has p_H 7.0, total hardness (I) 10°, carbonate hardness 5—6°, free CO₂ 30, and Mn⁺⁺ 0.8 mg./litre. The treatment consists in adding 20 kg. of CaO per cu. m. to bring the p_H to 10.5, and 2 g. of charcoal powder per cu. m. to remove odour and taste, spraying over a filter bed in which the MnO₂ and CaCO₃ are removed, treating with CO₂ to bring the p_H to 7.8 and then with Cl₂ (0.06—0.12 mg./litre). The purified H₂O has (I) 7.2° and (II) 2.8°, and is free from Mn. The procedure has the advantages that complete removal of Mn is effected, partial softening is obtained, colouring material and

colloids are adsorbed by the ppt., and partial sterilisation occurs by the excess CaO. A. R. P.

Sodium aluminate in [water-works] filter-plant practice. Double-coagulation process. ANON. (Chem. and Ind., 1935, 78—80).—The advantages of the treatment of H₂O with Na₂Al₂O₄ (I) followed by Al₂(SO₄)₃ (II), compared with treatment with (II) with or without Na₂CO₃, are: (1) speeding up of a time reaction; (2) elimination of risk of residual Al in H₂O; (3) a wider *p*_H range for optimum coagulation; (4) no dangerous depression of *p*_H can be experienced since [CO₂] in the H₂O remains substantially unchanged; (5) Al(OH)₃ freshly pptd. from (II) is positively, whereas from (I) it is negatively, charged so that mutual pptn. removes both positive and negative particles that may exist as coloured impurities in the raw H₂O; (6) it is cheaper. The results obtained at three public water-works are discussed. D. K. M.

Mechanical agitation and alum-floc formation [in water]. C. LEIPOLD (J. Amer. Water Works Assoc., 1934, 26, 1070—1084).—Investigations of paddle speeds and period of treatment in relation to floc formation are described. CH. ABS. (p)

Oligodynamic treatment of drinking water by various "katadyn" processes. H. GUTSCHMIDT (Z. Hyg., 1934, 116, 421—432).—Applications of oligodynamic Ag activity are described. Different strains of *B. coli* are not equally sensitive to the action of Ag. Suitable conditions for treatment of drinking-H₂O are examined. A. G. P.

Determination of the chlorine value of water. H. IVEKOVIĆ (Arh. Hemiju, 1934, 8, 185—192).—Kaess' method (Arch. Hyg., 1931, 107, 42) gives the most consistent results. R. T.

Chlorination of water supplies. P. S. LELEAN (Water and Water Eng., 1934, 36, 432—434).—NH₂Cl is superior to Cl₂ in that it prevents aftergrowths and algal formation, leaves no taste or odour, and is thermostable. CH. ABS. (p)

Chloroamine treatment of water. S. ELLIOTT (J. Roy. Army Med. Corps, 1933, 61, 161—179).—Appropriate dosage and treatment are described. CH. ABS. (p)

Simple apparatus for controlling the addition of hypochlorite for the sterilisation of water. H. BRUNS and PABST (Gas- u. Wasserfach, 1935, 78, 37—39).—To effect an eventual addition of 1 pt. of Cl to 5 × 10⁶ pts. of H₂O a NaOCl solution (15% Cl) is diluted 50 or 100 times in a tank and the flow of dil. NaOCl regulated by a const.-level device worked by a float. It passes to the bottom of a reservoir by a hard rubber pipe. C. I.

Effectiveness of filtration in removing from water, and of chlorine in killing, the causative organism of amoebic dysentery. B. K. SPECTOR, J. R. BAYLISS, and O. GULLANS (U.S. Pub. Health Repts., 1934, 49, 786—800).—Coagulation and filtration through rapid sand filters removes all cysts of *Endamoeba histolytica* (I). Dosage of Cl₂ or NH₂Cl necessary to kill cysts of (I) or *E. coli* (II) is > could be used for public

H₂O supplies. Cl₂ is more effective than NH₂Cl. Cysts of (II) are no more resistant to Cl₂ than those of (I).

CH. ABS. (p)

Factors influencing the distribution of certain protozoa in biological filters. D. W. CUTLER, L. M. CRUMP, and A. J. DIXON (Animal Ecol., 1932, 1, 143).—The amount of reducing substances (sugar) and the food supply in the medium to be filtered were the principal factors controlling the distribution of species of protozoa on the filter. Optimum *p*_H range for most species was 4.9—7.6. The effect of variations of nutrients is examined in relation to simultaneous changes in bacterial population. CH. ABS. (p)

Removal of fluorides from water by sand filtration. S. P. KRAMER (Science, 1934, 80, 593).—A contact filter, 15 cm. high, made of river sand (60 to the in.) containing 2 wt.-% of powdered Al removes F from a solution containing 30 p.p.m. of NaF. L. S. T.

Modern methods of analysis: application to water. J. GRANT (Water and Water Eng., 1934, 36, 470—471).—Methods for Cl', SO₄'', CO₃'', PO₄'', Al, hardness, and residual Cl₂ are described. CH. ABS. (p)

Recent developments in lead pipe for water services. W. SINGLETON (Surveyor, 1934, 85, 364).—Te (0.05%) in Pb pipes increases tensile strength and improves fineness of grain. CH. ABS. (p)

Standard sea-H₂O.—See X. **Disposal of beet-sugar wastes.**—See XVII.

See also A., Feb., 184, Analysis of S acids [in mineral waters]. Determining NH₃ in H₂O and air.

PATENTS.

Mouth-wash powders. DEUTS. GOLD- u. SILBER-SCHNEIDANST. VORM. ROESSLER (B.P. 421,692, 1.12.33. Ger., 1.12.32).—Mixtures of compounds which yield active O (I) with Ag salts (1%) of inorg. or org. acids (II) are claimed. (I) may consist of urea-H₂O₂, Na₂O₂-Na₄P₂O₇, NaBO₃, Na₂CO₄, etc., and (II) of AcOH, BzOH, salicylic acid, or *p*-C₆H₄(OH)-CO₂H. A. R. P.

[Manufacture of] cosmetic or other toilet preparations. W. J. TENNANT. FROM HENKEL & Co., G.M.B.H. (B.P. 421,532, 14.3.33).—The addition to cosmetics, dentifrices, etc. of compounds of the type R·X·R', where R is an alkyl radical having < C₈, X is CO₂, S, or NH, and R' is any aliphatic or carbocyclic residue carrying < 1 solubilising group of which < 1 is of strongly acid character, is claimed. Examples are: Na dodecyl sulphoacetate and dodecylthiolacetate, (n-) C₁₂H₂₃·CO₂·CH₂·S·SO₃Na, and octadecyl glycollate + sulphonated dodecyl glycollate (from crude alcohols from reduction of coconut oil). H. A. P.

[Agent for] combating of insect pests and the like. H. W. HARING and R. CREYDT (B.P. 421,885, 25.4.33. Ger., 23.8.32).—The use in insect-repellant salves, sprays, etc. of (4)-fluorocoumarin (1%) is claimed. H. A. P.

Al-Zn alloy.—See X.