

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

OCT. 27 and NOV. 3, 1933.*

I.—GENERAL; PLANT; MACHINERY.

Rotary furnace. PETERS (Chem.-Ztg., 1933, 57, 643—644).—The heating of materials which must not come in direct contact with fire gases is effected by the use of a cruciform gas flue dividing the furnace drum into segments, designed for pasty materials, or by the use of several inner tubes containing the material to be heated, if this is granular. High gas velocities and correspondingly small units are possible and dust losses are avoided. C. I.

Heat transmission in rotary kilns. III, IV. W. GILBERT (Cement, 1933, 6, 189—201, 262—269; cf. B., 1933, 367).—The rate of heat transfer to the material is calc. for 2 typical rings in a kiln, and is later worked out in detail for a 202-ft. kiln. C. A. K.

Economic regenerators for open-hearth furnaces. H. TRINIUS (J. Inst. Fuel, 1933, 6, 357—369; cf. Rummel, *ibid.*, 1931, 4, 160).—The design of regenerators is discussed, particularly in relation to cost. A. B. M.

Gas-air control in open-hearth furnaces. V. H. LEGG (J. Inst. Fuel, 1933, 6, 349—357).—A Pitot tube in conjunction with a micromanometer has been used to determine the flow of air, gas, and waste gases in an open-hearth furnace. The amount of air infiltration through the regenerator walls was directly measured and shown to be considerable. The resistances to gas flow of various types of chequer settings have been measured in an experimental regenerator. A. B. M.

Calculation of open-hearth furnace regenerators. H. SOUTHERN (J. Inst. Fuel, 1933, 6, 369—380; cf. preceding abstract).—The methods of calculating the structural characteristics of chequerwork, the thermal interchange between gases and chequerwork, and the "quality of regeneration" are outlined and applied to the computation of the air chequers for an open-hearth steel-melting furnace operating under specified conditions. A. B. M.

High-speed centrifuge. W. DEW. GARMAN (Rev. Sci. Instr., 1933, [ii], 4, 450—453).—The shape of air ports, the most effective angle of the jets, the design of rotor grooves, and the proper conditions of max. speed have been investigated. C. W. G.

Rectification. W. H. KEESOM (Chem. Weekblad, 1933, 30, 558—562, 566—569, 573—575).—Consideration is given to (a) the process of fractionation in the single- and double-column Linde apparatus and in the Claude apparatus; (b) the separation of the inert gases from air; (c) distillation and condensation of ternary mixtures, and, in particular, the separation of such mixtures when only a small quantity of the most or least

volatile component is present; (d) the rectification of A in the Filippo apparatus; and (e) the separation of coke-oven gas. H. F. G.

Modern water softening. A. J. MILLS (J. Soc. Dyers & Col., 1933, 49, 277—285).—A lecture.

See also A., Sept., 901, **Colloidal subdivision.** 920, **Sedimentation analysis.**

PATENTS.

Heat-treating oven. C. A. HERBST, Assr. to ECONOMY FUSE & MANUFG. Co. (U.S.P. 1,891,981, 27.12.32. Appl., 18.2.31).—A kiln suitable for cold-moulded articles is provided with forced horizontal circulation of air centrally through the goods and back through heaters (*H*) between false walls (*W*) near the goods and the walls of the casing. *W* also heat the goods by radiation, and part of the air from *H* is bypassed through a shorter circulation to render the temp. more uniform. B. M. V.

Heat-transfer device. H. G. CHATAIN, Assr. to NORTHERN LABS., INC. (U.S.P. 1,890,108, 6.12.32. Appl., 13.7.31).—A heat exchanger comprising a pile of plates separated by spacers is described. B. M. V.

Heat-transfer device. H. E. SMITH, Assr. to PFAUDLER Co. (U.S.P. 1,891,058, 13.12.32. Appl., 2.6.32).—Heating coils are paired, the steam flowing clockwise in one and counterclockwise in the other of a pair. All coils are attached to one header and are without return bends. B. M. V.

Cooling system. C. H. BILLS and G. G. GRISWOLD (U.S.P. 1,890,072, 6.12.32. Appl., 17.2.31).—A cooling tower having impervious side walls is described, the air being supplied through a tunnel having louvred walls and the tower above the sprays being provided with screens. B. M. V.

Disintegrating or grinding apparatus. G. PORTEUS (B.P. 396,400, 2.2.32).—In a system comprising a pulveriser, fan, and cyclone dust collector, the pulveriser group draws its air from an adjustable hood over the outlet of the cyclone. B. M. V.

Pulverising mills. BABCOCK & WILCOX, LTD., Assees. of E. G. BAILEY, P. R. CASSIDY, and R. M. HARDGROVE (B.P. 396,614, 31.12.32. U.S., 21.5.32).—A pulveriser of the type having balls running in races is provided with > 1 ring of balls, those of the inner ring(s) being of larger diam. than those of the outer. Means for retarding the centrifugal progress of the material from ring to ring are provided. B. M. V.

Heat- and sound-insulating material. E. R. DARLING, Assr. to PACIFIC LUMBER Co. (U.S.P. 1,892,138,

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

27.12.32. Appl., 25.7.29).—A mixture is made of "tree sand" (waste material from redwood bark) 3 pts. and exfoliated zonolite (to prevent excessive packing) 1 pt. B. M. V.

Fire-extinguishing compound. A. J. GILLES, ASSR. to OUTRITE FIRE EXTINGUISHER CORP. (U.S.P. 1,891,673, 20.12.32. Appl., 25.4.31).— NaHCO_3 is coated, to render it moisture-repellent, with an acid (I), e.g., stearic, which melts at approx. the same temp. as the NaHCO_3 decomposes. A powdered silicate may be added to (I) and a solvent (instead of heat) used in the coating process. B. M. V.

Treating dry fire-extinguishing powder to prevent caking. KOMET KOMPAGNIE F. OPTIK, MECHANIK, U. ELEKTRO-TECHNIK G.M.B.H. (B.P. 396,779, 10.2.33. Ger., 13.2.32).— NaHCO_3 alone or admixed with powdered cryst. borax or soda is moistened with soap solution and dried so that the particles are coated with a thin soap film. A. R. P.

Rotary container for centrifugal machines. H. JANSSEN, ASSR. to TEXTILE MACHINE WORKS (U.S.P. 1,892,057, 27.12.32. Appl., 2.9.30).—A basket comprising a comparatively thin part of wrought metal joined to a casting embodying the attachment to the driving shaft is constructed so that the plane of the joint includes the centre of gravity of the whole; balancing is effected by removing metal from the comparatively thick flanges of the joint. B. M. V.

Sedimentation device. S. I. BOUSMAN, ASSR. to DORR Co., INC. (U.S.P. 1,892,648, 27.12.32. Appl., 23.7.32).—A travelling bridge carrying rakes which scrape grit and settled sludge into a longitudinal channel carries also a pump for elevating the grit + sludge, and a small washer for delivering clean grit and returning sludge to the settling tank. B. M. V.

Filter press. P. W. PRUTZMAN (U.S.P. 1,891,396, 20.12.32. Appl., 3.3.30).—A plate-and-frame press is arranged with a vertical axis and is provided with a rotatable shaft in the axial-feed passage and a scraper in each cake space; only the lower sides of the plates are channelled and provided with filter medium. B. M. V.

Filter. J. A. GORDON (U.S.P. 1,892,210, 27.12.32. Appl., 20.5.30).—A filter for an air intake comprises hair felt reinforced with wire mesh. B. M. V.

Filter. G. O. HILLIER, ASSR. to OLIVER UNITED FILTERS, INC. (U.S.P. 1,892,306, 27.12.32. Appl., 13.10.30).—In a rotary drum filter the division strips are in the form of collapsible tubes which are pneumatically distended at any desired moment. B. M. V.

Laboratory distillation apparatus. S. I. CHARLES-WORTH and A. W. HARRIS (U.S.P. 1,892,609, 27.12.32. Appl., 16.6.31).—Inflammable liquids are distilled in flasks held over cup-shaped bodies heated to a const. temp. by steam; the cups may be screwed nearer to or farther from the flasks to regulate the heat. B. M. V.

Condensing apparatus. C. A. RAINEY (U.S.P. 1,891,607, 20.12.32. Appl., 13.8.29).—A surface condenser is described. B. M. V.

(A, B) **Atomisation of liquids and (A) absorbing the same by gases, or (B) impregnating gases therewith.** P. D. VAN VLIET, ASSR. to AIR CONTROL SYSTEMS, INC. (U.S.P. 1,892,293—4, 27.12.32. Appl., 18.4.32).—The liquid is centrifugally sprayed in the form of a thin flat film and the flow of gas is parallel to the plane of the film on both sides of it. B. M. V.

Fluid composition [for fluid-pressure apparatus]. A. T. K. TSENG, ASSR. to HYDRAULIC BRAKE CO. (U.S.P. 1,891,962, 27.12.32. Appl., 24.10.27).—A fluid suitable for use in contact with rubber comprises, in equal vols., a dil. solution of KOH in diacetone alcohol (free from COMe_2) and an oil of low f.p. and stable at high temp., e.g., castor. A proportion of BuOH may be present. B. M. V.

Apparatus for examination of substances by ultra-violet light. GRIFFIN & TATLOCK, LTD., and J. C. O. TURFERY (B.P. 397,059, 27.3.33).—A device whereby the inclination of the platform, on which the substance to be examined is mounted, to a filter through which the substance is viewed can be varied is claimed. J. S. G. T.

Apparatus for fractionating liquids. P. E. KUHLE, ASSR. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,904,144, 18.4.33. Appl., 25.1.30).

Salt dissolver.—See VII. Alloys for turbines.—See X.

II.—FUEL; GAS; TAR; MINERAL OILS.

Some characteristic features of the coking coals of Limburg (Holland). H. A. J. PIETERS and H. KOOPMANS (Fuel, 1933, 12, 280—281; cf. B., 1931, 827; 1932, 823).—For a series of coals of the same origin, characterised by a high vitrain content and low ash content, and having volatile matter contents ranging from 18 to 32%, the softening point increased regularly with decrease in volatile matter content. The velocity of evolution of volatile matter from the coals at a const. rate of heating reached a characteristic max., which occurred at a temp. which rose with degree of coalification. A. B. M.

Combustion. XIV. "A" and "C" layers of the Tandjoeng-Enim coalfield. D. J. W. KREULEN [with A. KLOOTWIJK] (Chem. Weekblad, 1933, 30, 582—586; cf. B., 1933, 737).—Measurements of the softening temp. have been made by a modified penetrometer method in which the sample is placed in an Al block to ensure uniformity of temp., and temp.—% volatile matter curves have been determined for a no. of samples. The quantity of gas evolved per 10° interval passes through a well-defined max. at 380—540°; if the temp. of the max. is plotted against % volatile matter in the specimen, a smooth curve is obtained, and results with a no. of coals from different sources lie approx. on the same curve. H. F. G.

Froth flotation with bituminous coal. J. W. STEWART (Min. Ind., Penn. State Coll., 1932, 2, No. 3, 1, 4).—Reduction in ash and S contents was possible by flotation at all p_{H} vals., but the % yield and % recovery varied widely. In general, these are higher in acid medium, but higher ash and S also result.

In a basic medium ash increases. CaO is a depressant for pyrite, marcasite, and coal. H_2SO_4 promotes the flotation of these. CH. ABS.

Adsorption of pyridine vapour by coal. K. BUNTE, H. BRÜCKNER, and H. G. SIMPSON (Fuel, 1933, 12, 268—270; cf. B., 1933, 771).—Study of a series of German coals has shown that there is a close curvilinear relationship between their adsorptive power (I) for C_5H_5N vapour and their content of C_5H_5N -sol. material (cf. Chorazy, B., 1931, 955). With one exception (Heinitz coal) there was also a smooth curvilinear relationship between the (I) for C_5H_5N and the C:H ratio (degree of polymerisation), (I) diminishing as the latter increased. A. B. M.

Determination of total sulphur in fuels by igniting in a calorimetric bomb. E. GAVRILENKO (Z. anal. Chem., 1933, 94, 24—28).— SO_2 formed during the combustion is absorbed by aq. NaOH in the bomb, and the Na_2SO_3 is oxidised by adding H_2O_2 . After boiling off SO_2 , SO_4^{2-} is determined by adding $BaCrO_4$, filtering, adding KI, and titrating the liberated I with aq. $Na_2S_2O_3$. Any Fe^{3+} , Al^{3+} , or PO_4^{3-} should be removed by aq. NH_3 before the titration. E. S. H.

Quantitative analysis of coal ash. J. G. KING and H. E. CROSSLEY (Dept. Sci. Ind. Res., Fuel Res., Survey Paper No. 28, 1933, 20 pp.).—Suitable methods for the determination of SiO_2 , Fe, Ti, Al, Ca, Mg, Mn, SO_3 , alkalis, and P are described. In addition to the "Fuel Research" method of determining P (cf. Survey Paper No. 7; B., 1927, 321) a second method is tentatively suggested; this depends on bringing the ash completely into solution, removing the Ca as oxalate in the presence of citric acid, and subsequently pptg. the phosphate as Mg phosphate. A. B. M.

Tube method for determination of the fusion temperature of coal ash. A. DAWE (Fuel, 1933, 12, 271—275).—The tube method (J.S.C.I., 1923, 42, 266 T; 1925, 44, 197 T), which is convenient for the rapid routine testing of coal ashes, has been modified by the provision of improved means for producing and controlling the reducing atm. (A) (H_2 -steam mixture). The technique is described in detail. An average deviation from the mean of 10° in A and 20° in an oxidising atm. (B) (air) was obtained by different observers using this method. The Fuel Research method (Dept. Sci. Ind. Res., Fuel Res., Tech. Paper No. 23, 1929) gives slightly higher results in A, and lower results in B. A. B. M.

Dry distillation of sunflower-seed hulls. K. NOGIN (Masloboino-Zhir. Delo, 1932, No. 7, 34—38; No. 9, 35—38).—Only 43—45% of distillate is obtained from hulls with 17% H_2O . Dry hulls afford: residual tar 6.9, sol. tar 2.64, gases 34.9, MeOH 1.17, $COMe_2$ 0.15, acids 4.38 (HCO_2H 0.39), C 34.2%. The liquid products contained 0.24—0.76% of methylfurfuraldehyde. CH. ABS.

Coke formation. VII. Influence of oil. J. P. ALLINSON and R. A. MOTT (Fuel, 1933, 12, 258—268; cf. B., 1933, 771).—Determinations have been made of the rate of oil evolution from pulverised coals (C 89—77%) on carbonisation in the Gray-King apparatus.

Oil evolution from columns of particles of coals began at the same temp. as from single particles of the same coal; this coincided with the temp. of initial continuous gas evolution which occurs at about the softening temp. Oil was not distilled from columns of particles as rapidly as from single particles, due to adsorption of the oil evolved from one particle on the surface of adjacent particles. The adsorptive power for oil, and therefore the rate of oil evolution, was related to the C contents of the coals, being lower for coals of high C content. The rate of oil evolution was also dependent on the rate of gas evolution, which was not directly related to the C content of the coal. Strongly swelling and good coking coals (C > 84%) had a higher adsorptive power for oils than feebly swelling coals (C < 83%). The quantity of oil necessary to give a good coke varied from about 4% for coals of 89—95% C up to 8% for coals of 82—83% C and up to 12% for coals of 80% C. A. B. M.

Impregnated carbon of the Carboraffin type. J. MILBAUER (Chem. Obzor, 1932, 7, 189—190; Chem. Zentr., 1933, i, 1334—1335).—The $CaCl_2$ in "Radit" does not activate the $ZnCl_2$ present. A. A. E.

Evaluation of activated carbons. E. A. SIGWORTH (Oil & Soap, 1933, 10, 47—49).—Curves should be plotted showing the decolorising effect of various concns. of each competing sample of C, so as to compare both decolorising efficiency at low concns. and the max. decolorisation obtainable; possible improvement of taste and odour by decolorising C should not be neglected. E. I.

Separation of the constituents of natural gas. W. SHELLSHEAR (Chem. Eng. Min. Rev., 1933, 25, 323—326).—A general review of the methods of production and stabilisation of gasoline from natural gas. H. S. G.

Reciprocal influence of carbon monoxide and carbon dioxide in their hydrogenation, especially in relation to the synthesis of benzene. F. FISCHER and H. PICHLER (Brennstoff-Chem., 1933, 14, 306—310).—The presence of CO inhibited the reduction of CO_2 by H_2 (to CH_4) in the presence of a Ni catalyst. The yield of benzene obtained by the hydrogenation of CO in the presence of a Ni-Mg-Al-kieselguhr catalyst, or other benzene catalyst, was not affected by the presence of CO_2 ; reduction of the latter began only when all the CO had disappeared. Reduction of CO_2 by H_2 under these experimental conditions led to the formation of CH_4 only (cf. B., 1933, 50); reduction of CO below 200° led to the formation of higher hydrocarbons, whereas at higher temp. the following reactions occur: $2CO + 2H_2 = CO_2 + CH_4$, and $2CO = C + CO_2$. The mechanism of the reactions is briefly discussed. A. B. M.

Motor fuel from coal and oil shales. A. FISHER and J. C. MORRELL (J.S.C.I., 1933, 52, 228—230 T).—Both a brown coal low-temp. tar and a shale oil produced good yields of motor fuel of high anti-knock val. on cracking in a continuous plant at 482—495°/200 lb. per sq. in. High-temp. tars, e.g., coke-oven tar, water-gas tar, or creosote oil, were very refractory to cracking, and gave low yields of motor fuel. The tar acids from

a lignite tar were readily cracked to lower-boiling tar acids and neutral oils; under suitable conditions of temp. and pressure a high yield of neutral oils was obtained. No appreciable quantity of neutral oil (motor fuel) was obtained on cracking the tar acids from a high-temp. tar. A. B. M.

Antioxidants and antioxygens of cracked [motor] spirit. E. VELLINGER and C. RADULESCO (Compt. rend., 1933, 197, 417—418).—The lower rate of spontaneous oxidation shown by unrefined cracked motor spirit as compared with that of the same spirit refined is traced to the fraction of b.p. 170—180°, which is antioxygenic. It is thus advisable to refine the fraction distilling up to 170°, and then add the crude 170—180° fraction. The temp. applicable will vary with different oils. C. A. S.

Corrosion of petroleum pipe-lines and its prevention. V. NEGREEV (Azerbaid. Neft. Choz., 1933, No. 1, 48—54).—Coating with a mixture of clay and asphalt, m.p. 80° (1:1), is recommended. CH. ABS.

Physical interpretation of the knock problem. J. J. ZEEHUISEN (Petroleum, 1933, 29, No. 31; Motoren-etr., 6, 2—5).—An attempt is made to analyse the chemical and physical processes occurring in the cylinder of an engine which lead to "knocking," on the basis of Schmidt's vals. for the H.U.C.R. of a no. of fuels (cf. B., 1932, 376, 585). A. B. M.

Influence of temperature on detonation in internal-combustion motors. P. DUMANOIS (Compt. rend., 1933, 197, 393—394).—As at ordinary pressure certain mixtures of saturated hydrocarbons and air inflame at 250—300°, and then not till > 550° (cf. A., 1930, 1255), if the mixture can be brought to a sufficiently high temp. before entering the cylinder it should not detonate. This has been effected by using as "cooling" agent aq. "ethyl" glycol at 150°. The temp. in the cylinder rises, and detonation ceases as soon as it reaches 340°, a figure that varies somewhat with conditions. C. A. S.

Knock-rating of heptene-1 [Δ^4 -heptinene]. A. R. BOWEN, A. W. NASH, and F. H. GARNER (Nature, 1933, 132, 410—411).—Data for Δ^4 -heptinene are compared with those for other hydrocarbons. The introduction of a double linking, and, to a lesser extent, a triple linking, into the C_7H_{16} mol. in the α -position, considerably increases the blending C_8H_{18} no. L. S. T.

Slope of the viscosity-temperature function as an important criterion of the value of a lubricant. H. UMSTÄTTER (Petroleum, 1933, 29, No. 31, 1—3).—The applicability of the formula $\log \log \eta = A - B \log T$, where η = kinematic viscosity in centistokes, T = abs. temp., and A and B are consts., to lubricating oils has been confirmed by experiments on about 100 oils. The vals. of B , which varied from 2.6 to 8.8 and can be determined with a probable error of 0.02, form a suitable measure of the lubricating vals. of the oils. The relation of B to the friction losses in a bearing and the effect of a temp. gradient within the oil layer on the friction losses are discussed (cf. A., 1933, 775). A. B. M.

Colloidal graphite [lubricating] oils and greases. E. BELANI (Petroleum, 1933, 29, No. 31; Motoren-etr.,

6, 5—8).—The production and utilisation of colloidal graphite lubricants are briefly discussed. A. B. M.

Preparation of stable graphite suspensions. L. V. LYUTIN and G. V. ZAKHAROVA (Min. Suir., 1933, 8, No. 1, 58—70).—Causes of the coagulation of highly disperse graphite suspensions stabilised with alkaline tanning extracts were studied. A graphite suspension stabilised with sulphite cellulose waste liquor gave reversible dried suspensions. Tannins are irreversibly adsorbed by graphite, the adsorption increasing with increase in concn. of tannins, period of storage, and rise of temp. Stable suspensions can be formed only in a medium containing a sufficient excess of NaOH. The alkaline tanning medium is oxidised and hydrolysed with destruction of tanning materials and formation of gallic acid and glucose, and resistance to coagulation by acids is diminished. The prep. of stable suspensions is described, and the mechanism of stabilisation with sulphite liquor is discussed. CH. ABS.

Water-soluble preparations of colloidal graphite. L. V. LYUTIN, G. V. ZAKHAROVA, and V. A. KIRYUSHKIN (Min. Suir., 1933, 8, No. 1, 75—78).

Dispersion analysis of graphite-oil suspensions. L. V. LYUTIN and V. A. KIRYUSHKIN (Min. Suir., 1933, 8, No. 1, 71—74).—Graphite concn. is determined by filtration through a porous crucible, and decomposing the tarry matter at 350°, allowance being made if necessary for the amount of coke formed. Alternatively, the suspension in C_6H_6 is coagulated with $COMe_2$ and filtered through paper in a Gooch crucible. Determination of the distribution is discussed. CH. ABS.

Rectification.—See I. Asphalt in high-voltage work.—See XI. Wool-scouring wastes.—See XXIII.

See also A., Sept., 897, n - C_6H_{14} - C_6H_6 mixtures. 910, **Combustion of light hydrocarbons. Measurement of viscosities of liquids saturated with gases.** 928, **Balkashite.** 929, **Origin of petroleum.** 930, **Synthesis of C_2H_2 .** 952, "Dihydropyrocatechol" [from pine tar].

PATENTS.

Manufacture of smokeless fuels. T. M. DAVIDSON (B.P. 396,087, 31.12.31).—Coking coal in the form of lumps free from fines is fed into a retort together with finely-pulverised, non-coking coal or coke breeze, so that the latter coats the lumps of coking coal and prevents them from adhering to the surfaces with which they come in contact. A. B. M.

Manufacture of briquettes. G. KOMAREK, G. MACPHAIL, and C. CORYELL (U.S.P. 1,893,555, 10.1.33, Appl., 16.7.26).—Pulverised coking coal is mixed with a non-coking fuel, e.g., anthracite, and, if desired, a binder, e.g., sulphite liquor, and the mixture is briquetted, dried, and predistilled, e.g., at 425°, for only sufficient time to carbonise the exterior of the briquette; afterwards the product is cooled, and finally carbonised at 550—750° in a rotary kiln. A. B. M.

Production of lampblack. J. C. MORRELL and V. A. MEKLER, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,890,188, 6.12.32, Appl., 2.4.28).—Liquid hydrocarbon is burned while flowing in a thin film over an inclined surface the temp. of which is carefully

adjusted by a cooling fluid. A drainage channel is provided for unburnt oil. B. M. V.

Preparation of gas black. W. K. LEWIS, Assr. to GOODYEAR TIRE & RUBBER Co. (U.S.P. 1,891,202, 13.12.32. Appl., 15.12.28).—A hydrocarbon gas is burned in an insufficient supply of air by means of a burner designed to project alternate layers of gas and air, the spacing and rate of flow of which are so adjusted as to reduce turbulence to a min. A. B. M.

Coke ovens. SOC. GÉN. DE FOURS À COKE, SYSTÈMES LECOCQ (B.P. 395,914, 26.10.32. Belg., 27.10.31).—Each heating wall consists of alternately arranged up-flow and down-flow vertical flues into which the air for combustion is introduced in two or more stages at different heights. Under each carbonisation chamber is a row of regenerator chambers separated by walls which are parallel to the axis of the battery and which are quincuncially arranged with respect to the walls separating regenerator chambers of the neighbouring row. Each regenerator chamber communicates at its upper end with a single flue of each of both heating walls of the carbonisation chamber under which it is arranged by a pipe opening at the base of the heating wall and by a second pipe opening at half the height of the wall. A. B. M.

Coking [of] pitch. A. H. RADASCH, Assr. to BARRETT Co. (U.S.P. 1,891,606, 20.12.32. Appl., 28.12.29).—Pitch is progressively added to a retort the walls of which are heated to a max. at the rising level of the fresh pitch. Zigzag heating flues may be provided, fuel burners being situated at several return bends and one or more used according to the desired level of the max. heat. B. M. V.

Generators for producing a mixture of water-gas and coal gas. VERGASUNGS-IND. A.-G. (B.P. 395,991, 27.2.33. It., 25.2.32).—A gas generator (*A*) is combined with an inclined retort (*B*) the inclination of which is < that which permits the fuel to slide down naturally, the coal being fed through *B* at the desired rate by means of a feed screw. Means are provided for withdrawing part of the coke at the level of the discharge of *B*, the remainder of the coke passing into *A*. A. B. M.

Settings for vertical retorts used in the production of gas and for like purposes. DRAKES, LTD., and M. THOMPSON (B.P. 396,122, 8.2.32).—The arrangement of the flues is such that the producer gas enters a section of the combustion chamber (*C*) near the lower end of the retort (*R*) and passes thence through each of the upper sections to the top of *C*. Secondary air traverses a chamber surrounding the lower end of *R* and is then admitted, under the controlling dampers, to any of the sections of *C* wherein it is desired to consume the producer gas. The waste-gas flue extends from the second section from the top of *C* vertically downwards to the outlet to the chimney. This arrangement gives a distribution of gas pressure in the flues which counteracts that within *R* and permits convenient control of the secondary air supply. A. B. M.

Manufacture of gas by complete gasification. HUMPHREYS & GLASGOW, LTD., and A. R. GRIGGS (B.P. 395,473, 16.4.32).—The apparatus comprises a

complete-gasification generator (*A*), two recuperators, and an additional coal-carbonising chamber (*B*). Part of the water-gas produced in the lower zone of *A* is burned in one recuperator and the heat so stored is utilised for carbonising the coal in *B* by passing the mixed gas from *A* through the recuperator and thence through *B*. The recuperator may be arranged as a jacket around *B*, which is thereby heated externally as well as internally. A. B. M.

Fuel-gas generator. F. C. GREENE (U.S.P. 1,890,606, 13.12.32. Appl., 9.12.27).—A generator comprising a rotating firepot and hopper is described. B. M. V.

Simultaneous production, from methane, of hydrogen, lampblack, and light, liquid hydrocarbons. C. PADOVANI (B.P. 395,893, 12.9.32. Belg., 19.9.31).—CH₄ is preheated to about 800° and then passed through a chamber, e.g., a vertical tube of graphite or carborundum etc. at 1000—1300°, so dimensioned that the ratio of area of contact (sq. cm.) to vol. (c.c.) is 0.25—1, and the heating period of the gas is 0.5—6 sec. The pressure is approx. 1 atm. The conditions are such that for each 100 vols. of CH₄ dissociated into C and H₂ 5—100 vols. are converted into higher hydrocarbons. The relative yield of the latter can be increased by diluting the CH₄ with an inert gas or, preferably, H₂, the concn. of CH₄, however, being < 20%; coke-oven gas forms a suitable initial gas. The absorptive power of the C may be increased by subsequently heating it at 550—1000° in the presence of air, steam, or other oxidising gas. A. B. M.

Dissociation of natural gas. C. B. HILLHOUSE (U.S.P. 1,892,559, 27.12.32. Appl., 4.3.30).—C is showered through natural gas whirling around an axial flame of C and air. The process is applicable to the prep. of pure H₂. B. M. V.

Production of oil gases and aromatic hydrocarbons by destructive hydrogenation. TIDE WATER OIL Co. (B.P. 395,345, 11.1.32. U.S., 10.1.31).—Gas oil or other petroleum fraction is heated with gases containing H₂, e.g., coke-oven gas, under conditions of temp., pressure, and time, e.g., ½ hr. at 530°/50 atm., giving high yields both of gaseous products (*A*) and aromatic liquid hydrocarbons (*B*). *A* are suitable for enriching water-gas to give town's gas, whilst *B* after fractionation give a motor spirit of high anti-knock val. A. B. M.

Distillation of tar and simultaneous production of high- and low-m.p. pitches. S. P. MILLER, Assr. to BARRETT Co. (U.S.P. 1,892,469, 27.12.32. Appl., 29.8.29).—A modification of the process described in B.P. 347,107 (B., 1931, 663) is claimed. B. M. V.

Manufacture of asphalt. A. LOEBEL, Assr. to N. V. DE BATAAFSCHE PETROLEUM MAATS. (U.S.P. 1,889,365, 29.11.32. Appl., 19.4.30. Holl., 9.12.27).—In the process described in U.S.P. 1,881,753 (B., 1933, 754), after addition of the sulphonifiable oil residuum the mixture may be blown with air or distilled with steam at 340° to produce the desired asphalt. B. M. V.

Manufacture of asphalt. P. C. KEITH, JUN., Assr. to GASOLINE PRODUCTS Co., INC. (U.S.P. 1,891,890, 20.12.32. Appl., 10.7.28).—The tar residuum from

the cracking of petroleum is maintained for a considerable time at the cracking temp. and pressure in a digester, the product being continuously discharged into low-pressure (*A*) and vac. zones in turn and maintained under vac. until the non-volatile matter is suitable for use as asphalt. A proportion of tarry petroleum oil may be added in *A*. B. M. V.

Simultaneous treatment of crude petroleum or the like and bituminous coals or the like. F. S. WOLDICH (B.P. 396,054, 20.1.32. Fr., 20.1.31).—Coals of high volatile matter content are pulverised and intimately mixed with tar or mineral oil etc., the mixture is heated under pressure, and passed, with partial relaxation of the pressure, into a separator (*S*), whence the more volatile constituents pass to a rectifier. The heater consists of a no. of concentric cylinders forming thin annular chambers through which the material is passed. The remaining non-volatilised constituents from *S* pass through a distillation and reaction column countercurrent to the gases from a converter (*C*), and then pass into *C*, wherein they are heated under pressure in a hydrogenating atm. In *C* the liquid mixture flows over metal trays of successively higher temp. The products consist of a motor spirit of high anti-knock val. and a colloidal liquid fuel. A. B. M.

Dehydration of crude oil emulsions. J. N. HUNTER, ASSR. to GULF PIPE LINE CO. OF OKLAHOMA (U.S.P. 1,879,849, 27.9.32. Appl., 8.3.30).—The emulsion is mixed with approx. 10 vol.-% of light oil distillate, b.p. < 176°, and the mixture is brought into intimate contact with oil vapours at > 150°, the evolved vapours being condensed and the H₂O and oil separated. H. S. G.

Distillation and conversion of mineral oils. E. W. REMBERT, ASSR. to TIDE WATER OIL CO. (U.S.P. 1,892,534, 27.12.32. Appl., 11.5.29).—Crude oil, fuel oil, etc. is sprayed into a stream of hot, non-oxidising combustion gases in such a manner that thermal equilibrium at > 510° is attained practically instantaneously throughout the mixture, which is passed through a thermally-insulated reaction zone of sufficient length to give the desired reaction time, e.g., 0.2 sec.; the temp. of the products is then instantly lowered by bringing them into intimate contact with a spray of cooling liquid. A high yield of gasoline of high anti-knock val. is obtained; no coke is formed and the production of gas is small. A. B. M.

Conversion of hydrocarbon oils. TEXACO DEVELOPMENT CORP. (B.P. 396,517, 19.5.32. U.S., 19.5.31).—A condensate oil is heated to cracking temp. and passed to a reaction zone (*A*) maintained under pressure. From *A* liquid is withdrawn at a rate sufficient to prevent accumulation, while vapours are passed through a heater to a second reaction zone (*B*) maintained under cracking conditions of temp. and pressure, the temp. being regulated by the introduction of a fresh quantity of charging stock at a relatively low temp. together with some or all of the liquid withdrawn from *A*. Further separation occurs and the liquid is continuously withdrawn. The vapours are fractionated to produce a final light distillate and a condensate suitable for further cracking. H. S. G.

Conversion of hydrocarbon oils. R. CROSS, ASSR. to GASOLINE PRODUCTS CO., INC. (U.S.P. 1,892,038, 27.12.32. Appl., 30.9.26).—The oil is passed in series through (*A*) a preheater, (*B*) a restricted conduit in a furnace, (*C*) a reaction chamber, (*D*) a cooler, (*E*) an evaporator, (*F*) a dephlegmator, and, vapours only, to (*G*) a condenser. *A* derives its heat from *D*; in *B* and *C* the oil is at cracking temp.; in *D* it is cooled to < 371°; the pressure in *B*, *C*, *D* is > 500 lb./sq. in.; the condensate from *F* is re-treated. Provision is made for injecting a gas containing O₂ into *C*—*G* to improve the anti-knock qualities, the supplies to *C* and *D* being usual and to *C* allowed to burn to maintain the temp. B. M. V.

Treatment [conversion] of hydrocarbons. I. W. HENRY, ASSR. to IONIZING CORP. OF AMERICA (U.S.P. 1,881,406, 4.10.32. Appl., 15.8.29).—Hydrocarbon oil or vapour is sprayed countercurrent to the outflow of generated vapours into a place of partial confinement adjacent a high-frequency, oscillatory, electromagnetic field, thereafter expanding the spray, and passing it into the actual field. Suitable apparatus is described. (Cf. U.S.P. 1,709,814—5; B., 1929, 506.) H. S. G.

Treatment of hydrocarbons. P. LA F. MAGILL, ASSR. to ROESSLER & HASSLACHER CHEM. CO. (U.S.P. 1,890,881, 13.12.32. Appl., 23.3.29).—Hydrocarbons are freed from S and unstable hydrocarbons by treatment, at a temp. high enough to prevent any substantial condensation, with Na finely distributed by agitation in solid polymerides from previous purifications. Starting (without polymeride) may be effected with molten Na only; discharge of excess polymeride from the agitator is downward in countercurrent to the hydrocarbon vapours, a negligible amount of Na being wasted with it. B. M. V.

Treating hydrocarbon oil. R. E. MANLEY, ASSR. to TEXAS CO. (U.S.P. 1,892,283, 27.12.32. Appl., 27.12.27).—A wax-bearing lubricating oil is mixed with an inert comminuted filter-aid (containing > 1% H₂O) that has been recovered from a previous dewaxing operation, and then chilled and maintained at a low temp. The oil is separated from the ppt. and finally the filter-aid is separated from the wax. H. S. G.

Manufacture of hydrocarbon products. W. O. SNELLING, ASSR. to GASOLINE PRODUCTS CO., INC. (U.S.P. 1,880,189, 27.9.32. Appl., 9.7.26).—Normally gaseous hydrocarbons of the CH₄ series are heated at 400—649° while under pressure (800—3000 lb. per sq. in.). The liquid products are separated by condensation under a lower pressure, and a portion of the uncondensed gas is returned for further treatment. H. S. G.

Coking of liquid hydrocarbons. A. S. KNOWLES, ASSR. to TAR & PETROLEUM PROCESS CO. (U.S.P. 1,879,983, 27.9.32. Appl., 8.9.27).—Heavy liquid hydrocarbon material is passed downwardly through a mass of loose coke which is progressively hotter towards the bottom and allowed to drip into a second bed of coke maintained in a state of agitation. The liquid residue is deposited in a layer upon a surface heated to coking temp., where distillation and carbonisation take place and from which the carbonaceous material can be periodically removed. H. S. G.

Decomposition of liquid hydrocarbons. H. S. NUTTING and H. H. ROWLEY, Assrs. to DOW CHEM. CO. (U.S.P. 1,887,658, 15.11.32. Appl., 26.7.30).—Hydrocarbon oil is converted into unsaturated gaseous compounds, *e.g.*, C_2H_2 , by spraying it into an electric arc formed between two rotating electrodes. The gases leaving the arc are immediately cooled by sprays of the same oil. D. K. M.

Solidification of liquid hydrocarbons. A. A. PRUSSIN, Assr. to PETRO-SOL CORP. (U.S.P. 1,880,211, 4.10.32. Appl., 20.11.30).—A liquid hydrocarbon (96½ vol.-%) is mixed with albumin (1½%) and heated to 40°. The mixture is cooled and $COMe_2$ (2%) is added. The ppt. formed is removed and the mixture solidified by heating to 60°. H. S. G.

Production of resins or resin-like bodies from cracked hydrocarbon products. J. C. MORRELL, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,888,044 15.11.32. Appl., 6.1.28).—Resinous material removed from cracked hydrocarbon products by passage through an absorbent, *e.g.*, fuller's earth, is dissolved by a suitable solvent, *e.g.*, CCl_4 , and after removal of the solvent is hardened by oxidation in air, O_2 , or O_3 , under the influence of actinic or ultra-violet rays and in the presence or absence of polymerising agents, *e.g.*, heavy-metal salts, at 66–149°. D. K. M.

Concentration of olefines. V. VOORHEES and M. A. YOUTZ, Assrs. to STANDARD OIL CO. (U.S.P. 1,875,311, 30.8.32. Appl., 22.11.29).—Gases containing olefines, *e.g.*, gases from cracking operations, are scrubbed under pressure with a H_2O -sol. solvent, *e.g.*, 95% EtOH, and finally with H_2O . The solvent solution is passed into a flash tower and the gases from this after scrubbing with H_2O are collected. The aq. liquids are distilled to recover the solvent. D. K. M.

Treatment of oils. F. L. CRAISE, H. G. VESPER, and H. G. GRIFFITH, Assrs. to STANDARD OIL CO. OF CALIFORNIA (U.S.P. 1,891,402, 20.12.32. Appl., 5.9.28).—Oil to be brightened is mixed with adsorbent and then heated under pressure and expanded into reduced pressure twice, the second heating being to $>121^\circ$ and the final pressure reduced to a vac. B. M. V.

Treatment of mineral oils. R. K. STRATFORD, Assr. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,892,655, 27.12.32. Appl., 26.3.29).—The oil is purified by a selective solvent comprising PhOH 65–95% and a polyhydric alcohol, *e.g.*, glycol, 35–5%, the quantity required being 1–3 times the vol. of oil. B. M. V.

Treatment of crude oil. J. B. JENNINGS and G. P. ESTES (U.S.P. 1,891,987, 27.12.32. Appl., 8.10.31).—A composition suitable for removing H_2O and bottom settlings comprises castor oil 25, HNO_3 15, NaCl 10, diluent (petrol) 50%. B. M. V.

Refining treatment of hydrocarbon oils. A. L. MOND, From UNIVERSAL OIL PRODUCTS CO. (B.P. 395,448, 7.3.32).—Crude motor spirits etc. are treated in the heated vapour phase with HCl in the presence of a contact material containing metal in a free and/or combined form. The contact material preferably contains one electronegative and one electropositive metal,

e.g., Cu and Zn, and may be incorporated with relatively inert siliceous material, *e.g.*, fuller's earth, SiO_2 gel, etc. A. B. M.

Purification of hydrocarbon motor spirit. W. C. HOLMES & CO., LTD. (B.P. 395,635, 11.2.33. Fr., 11.2.32).—The spirit is subjected, successively, to treatment with alkali (A), H_2SO_4 (B), and again with alkali (C); treatment A is effected before the spirit has been long in storage, treatment B is effected with such a small proportion (*e.g.*, 0.5 vol.-%) of 95–96% H_2SO_4 as to remove only the basic substances and the more highly unsaturated compounds, the acid-treated spirit is allowed to remain for a prolonged time before neutralisation, and then treatment C is carried out for sufficient time to ensure complete neutralisation and decomp. of any H_2SO_4 compounds in the spirit. Treatment B may be effected in two stages, in the first of which 1–1½ vol.-% of acid tar may be used. A. B. M.

Fuels for internal-combustion engines. J. E. SOUTHCOMBE, and GERM LUBRICANTS, LTD. (B.P. 396,427, 2.2.32).—To a light Diesel fuel oil is added $>2^\circ$ (preferably $<1^\circ$) of an org. acid of high mol. wt. (*e.g.*, oleic acid or a mixture thereof with lubricating oil). H. S. G.

Preparation of water-soluble sludge acid. S. P. and J. A. COLEMAN, Assrs. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,892,650, 27.12.32. Appl., 13.1.32).—Acid sludge is washed with H_2O containing a small amount of alkali to a point at which it just floats, the alkali being insufficient to neutralise all the H_2SO_4 . After removal of the wash-liquor as far as possible a large amount of H_2O is added to dissolve the sludge acids and separate them from remaining sludge. B. M. V.

Treatment of lead sludge [from treatment of hydrocarbon oils]. P. W. MERCHANT, Assr. to TEXAS CO. (U.S.P. 1,875,088, 30.8.32. Appl., 24.8.29).—Pb sludge from spent "doctor" solution is heated to distil off oil and H_2O , and the residue is converted into compounds sol. in caustic alkali by atm. oxidation. D. K. M.

Cleaning and gas-freeing of hydrocarbon-storage tanks. J. W. FITZGERALD (U.S.P. 1,891,592, 20.12.32. Appl., 26.7.32).—The sealed tank is treated first with CCl_4 or similar solvent, and then with $CaCl_2$ or other heavy aq. solution to float the oily matter; the vapours are finally "condensed" by admission of steam, and the sludge is removed. B. M. V.

Preventing accumulation of solid matter in oil wells, pipe-lines, and flow-lines. M. DE GROOTE, Assr. to TRETOLITE CO. (U.S.P. 1,892,205, 27.12.32. Appl., 23.2.26).—Compositions as described in U.S.P. 1,467,831; 1,595,457, 1,596,590, 1,596,593—4; 1,641,804; 1,656,622—3 (B., 1923, 1061A; 1926, 973, 908, 908; 1927, 901; 1928, 253) are added to a clean producing well or pipe-line or one that contains "non-cutting" oil in order to keep the solid matter in non-flocculent condition. B. M. V.

Lubricating compositions. YACCO, S. A. F. (B.P. 395,867, 24.6.32. Belg., 1.3.32. Addn. to B.P. 371,643; B., 1932, 636).—An NH_4 soap is used in conjunction with a metal soap in making up the composition described in the prior patent; *e.g.*, the composition

may contain mineral oil 90%, NH_4 oleate 1%, NH_4 stearate 1%, Cu oleate 0.25%, vegetable oils 7.75%.
A. B. M.

Colour stabilisation of lubricating oils. C. E. ADAMS, Assr. to STANDARD OIL Co. (U.S.P. 1,888,023, 15.11.32. Appl., 8.6.28).—Discoloration of the oils is reduced by the addition (0.05—1.0%) of an aliphatic or substituted aliphatic amine, preferably one containing two hydroxyalkyl groups and one alkyl group. Suitable compounds are indicated.
D. K. M.

Apparatus for treating petroleum and other hydrocarbons. C. P. DUBBS, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,901,950, 21.3.33. Appl., 1.11.28).

Treatment of hydrocarbons. (A) H. J. HALLE, (B) W. R. HOWARD, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,900,105 and 1,900,113, 7.3.33. Appl., [A] 6.2.26, [B] 21.2.27. Renewed [A] 18.11.29, [B] 4.2.31. S. R. BOLLES, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,904,196, 18.4.33. Appl., 18.1.28).

Treatment of hydrocarbon oils. D. J. BERGMAN, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,900,153, 7.3.33. Appl., 11.8.30). O. BEHMER, Assr. to TEXAS Co. (U.S.P. 1,902,056, 21.3.33. Appl., 10.2.28).

Treatment of [heavy] oil. R. T. POLLOCK, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,901,931, 21.3.33. Appl., 22.9.20).

Treating an oil gas. A. E. HARNSBERGER, Assr. to PURE OIL Co. (U.S.P. 1,900,057, 7.3.33. Appl., 8.5.29).

Thermal decomposition of natural gas. C. E. STARR (U.S.P. 1,903,247, 28.3.33. Appl., 2.9.30).

Cracking of hydrocarbons. E. C. HERTHEL, Assr. to SINCLAIR REFINING Co. (U.S.P. 1,900,110, 7.3.33. Appl., 29.9.27).

Cracking of [hydrocarbon] oil. N. E. LOOMIS and A. H. TOMLINSON, Assrs. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,900,116, 7.3.33. Appl., 1.10.26).

Cracking and distilling fuels. R. CARTER (U.S.P. 1,903,749, 11.4.33. Appl., 13.2.26).

Distillation of oil. C. R. EWING and T. MONTGOMERY, Assrs. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,904,213, 18.4.33. Appl., 3.1.29).

Oil fractionation. J. S. WALLIS, Assr. to FOSTER WHEELER CORP. (U.S.P. 1,900,085, 7.3.33. Appl., 14.1.30).

Condenser control apparatus [for hydrocarbon vapours]. F. L. KALLAM (U.S.P. 1,901,104, 14.3.33. Appl., 3.1.29).

Separation of cracked hydrocarbon material. N. E. LOOMIS, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,899,897, 28.2.33. Appl., 22.10.27).

Treatment [cracking of hydrocarbon] oils. W. G. LAIRD, Assr. to HEAT TREATING Co. (U.S.P. 1,894,355, 17.1.33. Appl., 30.7.26). J. DELATRE-SEGUY, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,897,593, 14.2.33. Appl., 4.4.27).

Treatment of hydrocarbon oil. C. H. ANGELL, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,897,628, 14.2.33. Appl., 11.2.32).

Eliminating water hazard in treating [hydrocarbon] oils. C. D. BAYNE, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,899,889, 28.2.33. Appl., 25.4.29).

(A) Apparatus for, (B) process of, treating hydrocarbons. H. T. DARLINGTON, Assr. to OIL CORP. OF AMERICA (U.S.P. 1,896,165—6, 7.2.33. Appl., [A] 23.4.27, [B] 11.8.28).

Pyrolytic conversion of petroleum oils. F. A. HOWARD, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,899,895, 28.2.33. Appl., 29.6.27).

Conversion of hydrocarbon materials. W. MILLER, A. HENRIKSEN, and P. ZURCHER, Assrs. to CONTINENTAL OIL Co. (U.S.P. 1,895,081, 24.1.33. Appl., 26.1.31).

Conversion of hydrocarbon oils. (A) J. G. ALTHER, [B, c] C. P. DUBBS, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,897,567 and 1,897,576—7, 14.2.33. Appl., [A] 23.1.22, [B] 1.6.25, [c] 30.7.27. Renewed [B] 12.6.29).

(A) Process of, (B) apparatus for, distilling oil. H. L. DOHERTY, Assr. to HEAT TREATING Co. (U.S.P. 1,898,245—6, 21.2.33. Appl., [A] 4.2.20, [B] 7.7.20).

Pressure distillation of hydrocarbon oils. R. E. WILSON, Assr. to STANDARD OIL Co. (U.S.P. 1,898,414, 21.2.33. Appl., 13.3.25).

Oil-fractionating [apparatus]. C. F. DENNEY, Assr. to FOSTER WHEELER CORP. (U.S.P. 1,899,081, 28.2.33. Appl., 3.7.30).

Purification of oil. J. S. MAIN, Assr. to OIL RECLAMATION Co. (U.S.P. 1,894,958, 24.1.33. Appl., 8.5.29. Renewed 18.3.32).

Apparatus for refining hydrocarbon oil. A. E. HARNSBERGER and A. L. CHRISTY, Assrs. to PURE OIL Co. (U.S.P. 1,897,389, 14.2.33. Appl., 12.3.29).

Production of motor fuel. S. SCHWARTZ, Assr. to JENKINS PETROLEUM PROCESS Co. (U.S.P. 1,896,723, 7.2.33. Appl., 7.12.25).

Oil-[conversion] treatment. H. C. KIRK (U.S.P. 1,901,172, 14.3.33. Appl., 8.12.27).

Conversion of hydrocarbons. E. F. NELSON, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,902,808, 21.3.33. Appl., 28.6.29).

Hydrocarbon oil conversion. O. H. FAIRCHILD, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,900,174, 7.3.33. Appl., 24.4.30). L. C. HUFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,901,969, 21.3.33. Appl., 3.1.28).

Conversion of [hydrocarbon] oils. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,900,170—1, 7.3.33. Appl., [A, B] 31.10.21. Renewed [A] 9.6.26, [B] 15.12.28).

(A) Heating of oil. (B) Conversion of heavy hydrocarbons into lighter hydrocarbons. A. E. HARNSBERGER and C. L. SMITH, Assrs. to GYRO PROCESS Co. (U.S.P. 1,901,592—3, 14.3.33. Appl., [A] 29.1.29, [B] 15.11.29).

Apparatus for refining oil. C. B. FORWARD, Assr. to FORWARD PROCESS CO. (U.S.P. 1,903,810, 18.4.33. Appl., 13.10.19. Renewed 22.11.27).

Refining of [heavy hydrocarbon] oils. W. G. LAIRD, Assr. to HEAT TREATING CO. (U.S.P. 1,900,862, 7.3.33. Appl., 6.8.27).

Refining hydrocarbons. T. T. GRAY, Assr. to GRAY PROCESSERS CORP. (U.S.P. 1,901,158, 14.3.33. Appl., 29.7.30).

Decolorising oils [by means of clay]. K. FULLER, Assr. to CONTACT FILTRATION CO. (U.S.P. 1,904,682, 18.4.33. Appl., 28.9.29).

Apparatus for making emulsified compounds including hydrocarbons. R. H. RUSSELL, Assr. to GAS FUEL CORP. (U.S.P. 1,904,952, 18.4.33. Appl., 25.3.31).

Hydrogenation of phenols.—See III. **Precipitants for oil.**—See XI.

III.—ORGANIC INTERMEDIATES.

Condensation of formaldehyde with sulphonated hydrocarbons. L. AIMOND (Caoutchouc et Gutta-percha, 1933, 30, 16,522—16,525).— $C_{10}H_7 \cdot SO_3H$ (sulphonation with H_2SO_4 at 66°) condenses with 40% CH_2O at 140° to give directly a CH_2O resin (naphthoform-*A*), which is colloidal, infusible, and insol., absorbs colouring matter, and possesses valuable antiseptic and therapeutic properties. Introduced (10—60%) during the vulcanisation process in the prep. of ebonite it reduces the period of vulcanisation and gives a product (*d* 1.17—1.19) of superior mechanical and heat-resisting properties. Addition of 40% CH_2O followed by H_2SO_4 to $C_{10}H_8$ gives a fusible naphthoform-*B*, m.p. 100 — 120° , which may be used as a lac or a plastic. The probable structure, similar to those of $PhOH \cdot CH_2O$ resins, are briefly discussed. J. W. B.

Analysis of technical chlorobenzene. K. G. MIZUTSCH and K. N. POLIKARPOVA (Anilinokras. Prom., 1933, 3, 185—192).—The customary method of fractionation is slow and untrustworthy, but good results are obtained with Bourion's method (B., 1920, 425A, 466A, 480A). G. A. R. K.

Rectification.—See I. **Distillation [products] of sunflower-seed hulls.**—See II. **Decolorising glycerol. Chloronaphthalenes.**—See XII. **Determination of $CHCl_3$.**—See XX. **Wool-scouring wastes.**—See XXIII.

See also A., Sept. 902, **Influence of gelatin on solubility.** 914, **Electro-reduction of $COPh_2$.** **Formation of org. N_2 -compounds electrolytically.** **Oxidation of tartrates at high anode potential.** 930, **Synthesis of C_2F_4 .** 931, **Isolation of Et_2O from dil. solutions.** 936, **Prep. of aldehydes and ketones from alcohols.** 937, **anhyd. CH_2O .** **Catalysts for synthesis of $COME_2$ from $MeCHO$.** 940, **Salts of diguanide and of guanidine.** 944, **Synthesis of perylene.** 956, **Prep. of acridones etc.** 960, **Prep. of oxazoles from α - NH_2 acids.** 963, **Analysis of propylene-cyclopropane mixtures.** 983, **Prep. of Ac_2 by fermentation.**

PATENTS.

Carrying out organic chemical reactions in improved reaction media. C. DREYFUS (U.S.P. 1,872,700, 23.8.32. Appl., 20.4.26).—In org. reactions in which H_2O or H halide is formed, and which are usually carried out in presence of H_2SO_4 , H_3PO_4 containing preferably a little H_2SO_4 is substituted. B. M. V.

Apparatus for drying hexachloroethane. R. D. MYERS (U.S.P. 1,890,654, 13.12.32. Appl., 25.6.29).—The substance is melted in a closed vessel which may be oscillated and the liquid H_2O separated by gravity. B. M. V.

Preparation of halogenated hydrocarbons [from vinylacetylene]. E. I. DU PONT DE NEMOURS & Co. (B.P. 395,131, 11.5.32. U.S., 26.5.31. Addn. to B.P. 387,325; B., 1933, 296).—Gaseous vinylacetylene is passed into a solution of HCl or HBr at suitable velocity, e.g., such as to prevent addition of HCl or HBr to the β -halogeno- $\alpha\gamma$ -butadiene first formed. Preferably a succession of solutions of decreasing acidity and temp. and increasing time of contact is used. The continuous prep. of β -chloro- $\alpha\gamma$ -butadiene, b.p. 60° , is described. C. H.

(A, C, D) **Hydration, (B) manufacture of addition products, of olefines.** H. DREYFUS (B.P. 394,375—6, 394,389, and 394,674, [A, C, D] 22.12.31, [B] 22.12.31 and 21.4.32).—The olefine (C_2H_4) is hydrated with steam, preferably under pressure, in presence of (A) a pyrosulphate (e.g., of Ba at 300°), (B) an org. acid ($AcOH$ or $CCl_3 \cdot CO_2H$ at 450°), (C) an anhyd. phosphoric acid, e.g., at 150 — 350° , or (D) a liquid or molten catalyst comprising a phosphate, e.g., $NaPO_3$ and $LiPO_3$, at 150 — $350^\circ/1$ —25 atm. C. H.

Production of alcohols [from olefines and sulphuric acid]. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 395,202, 30.9.32. Holl., 21.10.31).—The aq. alcohol is dehydrated, e.g., with $CuSO_4$, CaO , etc., or by means of an entraining liquid, so as to prevent formation of the ternary mixture, alcohol- H_2O -polymeride, in the subsequent fractional distillation to remove polymeride. C. H.

Manufacture of alcohols [by hydrogenation of mixed organic-inorganic acid anhydrides]. HENKEL & Co. G.M.B.H. (B.P. 395,198, 23.9.32. Ger., 14.11.31).—A mixed org.-inorg. acid anhydride is hydrogenated in presence of active catalysts (Cu chromite), preferably under pressure and at raised temp. Examples are: $C_{18}H_{37} \cdot OH$, m.p. 58° , b.p. 206 — $208^\circ/13$ —14 mm., from stearoboric anhydride, m.p. 71° , or stearosilicic anhydride, m.p. 67 — 68.5° ; $C_{12}H_{25} \cdot OH$, b.p. 134 — $140^\circ/15$ mm., from lauroboric anhydride; $CH_2Ph \cdot CH_2 \cdot OH$, b.p. 213 — 217° , from phenylacetosilicic anhydride; and alcohols from mixed anhydride from coconut oil acids and boric or silicic acid. C. H.

[Production of glycols by] hydrolysis of olefine oxides. M. A. YOUTZ, Assr. to STANDARD OIL CO. (U.S.P. 1,875,312, 30.8.32. Appl., 4.11.29).—Olefine oxides (1 mol.), e.g., $(CH_2)_2O$, are hydrolysed to glycols without the formation of polyglycols by heating at 100 — 110° with H_2O (20 mols. or such quantity that the concn. of the glycol solution is $> 25\%$) and a catalyst, e.g., H_2SO_4 . D. K. M.

Manufacture of cyclic ethers [from aldehydes and glycols]. H. DREYFUS (B.P. 394,678—9, 30.11.31).

—(A) The reactants are fed continuously into the reaction zone as the cyclic ether is removed by distillation. (B) The reaction is catalysed by H sulphates, H phosphates, pyrosulphates, or pyrophosphates, *e.g.*, NaHSO_4 , at 140° . C. H.

Manufacture of aliphatic [acetic] anhydrides.

H. DREYFUS (B.P. 394,689, 31.12.31).—Aliphatic acids are anhydridised in presence of H_3PO_4 combined with a plurality of metals ≤ 1 of which is at least as electro-negative as Ba; *e.g.*, $\text{K}_2\text{Ba}(\text{PO}_3)_4$ in molten KCl and NaCl at 700° , or pumice impregnated with Ba phosphotungstate at 600° . C. H.

Manufacture of α -aminocarboxylic acids, imino-dicarboxylic acids, and their salts. J. Y. JOHNSON.

From I. G. FARBENIND. A.-G. (B.P. 395,074, 26.2.32).—An aliphatic aldehyde (MeCHO , CH_2O) is condensed with NH_4CN in presence of ≤ 1 equiv. of NH_3 , preferably at -5° to 25° ; the aminonitrile may be hydrolysed with aq. alkali or alkaline-earth hydroxide stronger than $\text{Ca}(\text{OH})_2$. C. H.

Production of substituted carboxylic acids or carbonyl compounds. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 395,193, 14.9.32. Holl., 6.10.31).

—Mono-olefins are condensed with substances containing the grouping $\cdot\text{C}\cdot\text{C}\cdot\text{CO}\cdot$, preferably $>160^\circ$. Amylene and cracking benzene give cryst. additive compounds with maleic anhydride, diisobutylene with crotonaldehyde. C. H.

Manufacture of urea. G. BARSKY, Assr. to AMER.

CYANAMID Co. (U.S.P. 1,889,944, 6.12.32. Appl., 13.5.30).—A slight deficiency of CaCN_2 is added to aq. Na_2CO_3 or Na_2SO_4 at 60 – 80° and, as the NaHCN_2 first formed is converted into urea and NaOH by hydrolysis, more CaCN_2 is added to keep the NaOH concn. as low as possible. A. R. P.

Manufacture of carbamic acid chloride. J. Y. JOHNSON.

From I. G. FARBENIND. A.-G. (B.P. 396,870, 15.4.32).— COCl_2 is passed over NH_4Cl at 150 – 340° at the rate of 12 litres per hr. per kg., whereby 95% of the gas is converted into NH_2COCl . A. R. P.

Separation of [methyl]amines. RÖHM & HAAS Co. (B.P. 394,475, 17.5.32. U.S., 18.5.31).

— NMe_3 forms a const.-boiling mixture with NH_2Me or NH_3 . Mixtures of the 3 amines are distilled, preferably under pressure, with enough NH_3 to remove all NMe_3 , and the NH_2Me and NHMe_2 are separated by fractional distillation. C. H.

Manufacture of carbazole-2[3]-ketones [3-carbazolyl ketones]. I. G. FARBENIND. A.-G. (B.P. 395,000, 7.1.32. Ger., 12.1.31).

—*N*-Acetylcarbazole is condensed with an acid chloride in presence of AlCl_3 and a little I, preferably in CS_2 or CCl_4 ; the Ac group may be removed by hydrolysis with aq.-alcoholic NaOH. 3-Carbazolyl Me ketone has m.p. 227° . C. H.

Manufacture of 3:5-di-iodo-4-pyridone. I. G. FARBENIND. A.-G. (B.P. 394,387, 18.12.31. Ger., 20.12.30).

— γ -Pyridone is iodinated; or 4-aminopyridine is iodinated (mono-, m.p. 100° ; di-, m.p. 134°) and diazotised; or, preferably, $\text{C}_5\text{H}_5\text{N}$ is treated with SOCl_2

to give 4-pyridylpyridinium chloride, which is heated with H_2O at 150° and the resulting γ -pyridone, without isolation, is iodinated. C. H.

Manufacture of pyridino-compounds [Skraup's quinoline synthesis]. J. Y. JOHNSON.

From I. G. FARBENIND. A.-G. (B.P. 394,416, 1.2.32).—In the Skraup reaction with mono-, di-, and tri-nuclear amines (excluding hydroxy- and alkoxy-anilines, and amines of the anthraquinone series) 40–75% H_2SO_4 , preferably 60–70%, is used with an oxidant [PhNO_2 , $\text{C}_6\text{H}_4(\text{NO}_2)\cdot\text{SO}_3\text{H}$, As_2O_5] and, if desired, an oxidation assistant (V_2O_5 , SeO_2), preferably at 110 – 160° . If the glycerol is added gradually as consumed, 40–85% H_2SO_4 may be employed. Examples of amines used are: NH_2Ph , 2-chloro-, 2:4-di-, 3:4:5- and 2:4:5-tri-chloro-anilines, *p*- $\text{C}_6\text{H}_4\text{Me}\cdot\text{NH}_2$, *p*- $\text{C}_6\text{H}_4(\text{NO}_2)\cdot\text{NH}_2$, *p*- $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{CO}_2\text{H}$, 4:4'-diaminobenzophenone, *p*-aminoacetanilide, 6-aminoquinoline, 6-aminonaphthastaryl, 5-nitro- α -naphthylamine, 1:5-naphthylenediamine, γ -acid, 3:6-diaminoacridine, etc. [Stat. ref.] C. H.

Manufacture of quinaldines. J. Y. JOHNSON.

From I. G. FARBENIND. A.-G. (B.P. 395,063, 11.2.32).—Suitable amines are condensed with crotonaldehyde (which may be produced *in situ* in H_2SO_4 , preferably 70–90% at 120 – 150° , in presence of $\text{C}_6\text{H}_4(\text{NO}_2)\cdot\text{SO}_3\text{H}$ or other sol. mild acid oxidant, with addition of NH_4VO_3 if desired. Quinaldines are so obtained from NH_2Ph , *o*- $\text{C}_6\text{H}_4\text{Me}\cdot\text{NH}_2$, *o*- $\text{C}_6\text{H}_4\text{Cl}\cdot\text{NH}_2$, β - $\text{C}_{10}\text{H}_7\cdot\text{NH}_2$, *p*- $\text{C}_6\text{H}_4(\text{NH}_2)_2$ (m.p. 175 – 176° , b.p. 230 – $231^\circ/19$ mm.), *N*PhAc, 2:7-diaminoacridine (m.p. 264°), benzidine (m.p. 206 – 208°), *p*- $\text{C}_6\text{H}_4(\text{NH}_2)\cdot\text{CO}_2\text{H}$ (m.p. 261 – 262°), Brönnner acid, *o*- $\text{C}_6\text{H}_4(\text{OH})\cdot\text{NH}_2$, 1:3- $\text{C}_{10}\text{H}_6(\text{NH}_2)_2\cdot\text{SO}_3\text{H}$. C. H.

Hydrogenation of (A) heterocyclic compounds,

(B) primary aromatic amines. GOODYEAR TIRE & RUBBER Co. (B.P. 395,231–2, 23.11.32. U.S., 27.6.32).

—Hydrogenation is effected in liquid phase in presence of the Ni catalyst of B.P. 394,576 (B., 193, 785) at raised pressure and temp., *e.g.*, (A) 150 – $22^\circ/100$ – 220 atm., (B) 175 – $250^\circ/150$ – 250 atm. Examples are the prep. of: (A) α -pipercoline, b.p. 116 – 118° ; β -pipercoline, b.p. 123 – 127° ; tetrahydroquinoline; γ -benzylpiperidine, b.p. 266 – 271° ; 2- and 4- β -phenylethylpiperidines, b.p. 135.5 – $138.5^\circ/3$ mm. and 126 – $130^\circ/3$ mm., respectively; (B) cyclohexylamine, b.p. $133.5^\circ/740$ mm.; hydrogenated benzidine, b.p. 190 – $22^\circ/8$ – 9 mm. C. H.

Hydrogenation of phenols. F. D. KAMM, and

IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 395,370, 13.1.32).

—Phenols are reduced to the corresponding aromatic hydrocarbons by treatment with H_2 at pressures <15 atm., and at 350 – 500° , in the presence of a catalyst containing Mo or W in the form of sulphide, H_2S being present in the gas in order to maintain the catalyst as sulphide. A. B. M.

Manufacture of bis(halogenohydroxyaryl) oxides.

I. G. FARBENIND. A.-G. (B.P. 394,026, 22.12.31. Ger., 23.12.30).—Bis(hydroxyaryl) ethers are halogenated directly or by replacement of suitable groups (*e.g.*, NH_2) by halogen; the OH groups may be protected by alkylation and the products subsequently dealkylated. 5:5'-Dibromo- (m.p. 126°), 5:5'-dichloro- (m.p. 50 – 60°),

5:5'-di-iodo-, and 3:3':5:5'-tetrabromo- (m.p. 162—163°) -2:2'-dihydroxydiphenyl ethers, and 5:5'-dibromo-6:6'-dihydroxy-2:2'-dinaphthyl ether, m.p. 125°, are described. Dinitro-*o*-dianisyl ether, m.p. 177°, gives a Br-compound, m.p. 195°.

C. H.

Manufacture of fluorinated aromatic hydrocarbons. I. G. FARBENIND. A.-G. (B.P. 395,227, 9.11.32. Ger., 9.11.31).—The side-chain Cl in CCl_3 -substituted aromatic compounds is exchanged for F by the action of HF, e.g., at 110—160°/10—14 atm., in absence of a catalyst. The following are described: *p*- $\text{C}_6\text{H}_4\text{Cl}\cdot\text{CF}_3$, b.p. 137—138° (86% yield); *o*- $\text{C}_6\text{H}_4\text{Cl}\cdot\text{CF}_3$, b.p. 149—152°; 1:3:5- $\text{C}_6\text{H}_3\text{Cl}_2\cdot\text{CF}_3$, b.p. 177—180°; *m*- $\text{C}_6\text{H}_4(\text{CF}_3)_2$, b.p. 114—116°, from *m*- $\text{C}_6\text{H}_4(\text{CCl}_3)_2$, m.p. 40°, b.p. 165—169°/12 mm.; *p*- $\text{C}_6\text{H}_4(\text{CF}_3)_2$, b.p. 116—118°.

C. H.

Production of organic persulpho-compounds [arylpersulphonates]. FLESCH-WERKE A.-G. F. GERBSTOFFFABRIKATION U. CHEM. PRODUKTE (B.P. 394,989, 27.11.31. Ger., 27.11.30).—Org. sulphonyl chlorides are oxidised with peroxides in anhyd. solvents; stabilisers may be added. The products find application as bleaching, oxidising, disinfecting, degumming, and cleansing agents. Persulphonates are prepared from $\text{C}_6\text{H}_4\text{Me}\cdot\text{SO}_2\text{Cl}$, $\text{C}_{10}\text{H}_7\cdot\text{SO}_2\text{Cl}$, chlorosulphonylstearic acid, and aminonaphthalenesulphonyl chloride, with Na_2O_2 or CaO_2 in MeOH or EtOH.

C. H.

Manufacture of *p*-aminodiphenyl and derivatives thereof. I. G. FARBENIND. A.-G. (B.P. 395,152, 24.6.32. Ger., 24.6.31).— C_6H_6 hydrocarbons or their halogen derivatives are condensed with *N*-chloroacetanilides in presence of AlCl_3 etc.; the Ac group may be removed by hydrolysis. Products described are 4-aminodiphenyl (Ac derivative, m.p. 169—170°; COEt derivative, m.p. 182—183°) and its 4'-Cl- (m.p. 134°), 3-Me (m.p. 43°; Ac derivative, m.p. 158°; Bz derivative, m.p. 189°), 3- CO_2H - (m.p. 200—202°; Ac derivative, m.p. 205—206°), 3:4'- Me_2 (b.p. 205—207°/4 mm.); Ac derivative, m.p. 199—200°, 4'-Cl-3-Me (m.p. 125°; Ac derivative, m.p. 226°), 3:5- Me_2 (Ac derivative, m.p. 203—204°) derivatives.

C. H.

Isolation and purification of terpene alcohols and hydroaromatic alcohols or separating them from other substances. HOWARDS & SONS, LTD., J. W. BLAGDEN, and W. E. HUGGETT (B.P. 394,979, 4.1.32).—The process of B.P. 376,356 (B., 1932, 974) is applied to other hydroaromatic alcohols, e.g., borneol, cyclohexanol, terpineol, fenchyl alcohol.

C. H.

Manufacture of halogen derivatives of the benzophenone and anthraquinone series. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 394,990, 29.12.31).—Ketones, $\text{Ar}\cdot\text{CO}\cdot\text{Ar}'$, in which Ar carries 1 halogen and 2 Me groups and Ar' has < 1 free *ortho* position, are halogenated as fully as possible in the Me groups, and the products are hydrolysed to aldehydes or acids; where 1 Me is *ortho* to the CO hydrolysis and cyclisation may be effected simultaneously or successively. 4-Chloro-2:5-dimethylbenzophenone, m.p. 50°, is hexachlorinated and the product, m.p. 182°, gives with H_2SO_4 at 80—90° 2-chloroanthraquinone-3-carboxylic acid, m.p. 280°. 4:5'-Dichloro-2:5:4'-trimethylbenzophenone is similarly converted *via* the monochlorinated compound,

m.p. 230°, into 2:6-dichloroanthraquinone-3:7-dicarboxylic acid, m.p. 360°. 2-Chloro-3-aldehydeanthraquinone, m.p. 230°, is obtained from pentachlorinated 4-chloro-2:5-dimethylbenzophenone.

C. H.

Manufacture of halogen derivatives of the anthraquinone series. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 394,995, 29.12.31. Addn. to B.P. 394,990; preceding abstract).—By complete halogenation of Me groups, followed by simultaneous hydrolysis and ring-closure, suitable diaryl ketones containing halogen and *ortho*-Me groups are converted into halogenated dianthraquinonyls or dianthraquinonylenes. 4:4'-Dichloro-2:2'-dimethylbenzophenone, m.p. 148—150° (from *m*- $\text{C}_6\text{H}_4\text{MeCl}$ and 4:4'-diphenyldicarboxylic chloride) is converted *via* its Cl_6 -derivative, m.p. 370—380°, into 7:7'-dichloro-2:2'-dianthraquinonyl. The mixed ketones, m.p. 195—200°, from *m*- $\text{C}_6\text{H}_4\text{MeCl}$ and naphthalene-1:5-dicarboxylic chloride give by hexachlorination and treatment with H_2SO_4 at 150° 7:7'-dichloro-1:2:2':1'-dianthraquinonylene, m.p. > 290°.

C. H.

Manufacture of 1-amino-10-anthrones and 1-aminoanthraquinone compounds. I. G. FARBENIND. A.-G. (B.P. 395,166, 18.7.32. Ger., 17.7.31).—A 2-*o*-aminobenzylbenzoic acid is cyclised, e.g., in 96% H_2SO_4 at 60—65°, or ClSO_3H at 0—10°, or $\text{NaCl}\cdot\text{AlCl}_3$ at 120—125°. The prep. of 1-amino-10-anthrone, m.p. 172—173°, and its 3-Me (m.p. 193°), Ac (m.p. 255°), and Bz (m.p. 244—245°) derivatives is described. 2-*o*-Acetamidobenzylbenzoic acid, m.p. 205°, gives a 5'- NO_2 -compound, m.p. 218—220°, which is cyclised to 4-nitro-1-acetamido-10-anthrone, m.p. 270—272°.

C. H.

Manufacture of the tetrasulphuric ester of leucoanthraquinone-1:2:2':1'-azine. I. G. FARBENIND. A.-G. (B.P. 394,887, 29.12.32. Ger., 29.12.31).—The sulphuric ester of leucoanthraquinonyl- β -sulphamic acid is oxidised with PbO_2 or $\text{K}_3\text{Fe}(\text{CN})_6$ in neutral or alkaline aq. medium at 15—65°.

C. H.

Dispersing and emulsifying processes. H. DREYFUS (B.P. 394,657, 18.9.31).— H_2O -insol. substances, e.g., 1-amino-4-methylaminoanthraquinone, are dispersed in H_2O with the aid of condensation products from aminoalcohols and naphthenic or rosin acids, e.g., naphthenic- β -hydroxyethylamide.

C. H.

[Preparation of] granular [crystalline] organic material. O. V. D. LUFT and C. J. SCHWINDT (U.S.P. 1,891,891, 20.12.32. Appl., 10.11.31).—Phthalic anhydride, anthraquinone, or other org. compound in the form of dust or crystals is tumbled in the presence of the same compound in the molten state, sprayed or poured in, with the production of granular material having a hard but porous surface.

B. M. V.

H_2 etc. from CH_4 . **Concn. of olefines. Aromatic hydrocarbons by hydrogenation.**—See II. **Wetting agents.**—See VI. **CS_2 .**—See VII. **By-products from sugar extraction.**—See XVII. **EtCO_2H by fermentation.**—See XVIII.

IV.—DYESTUFFS.

See A., Sept., 912, **Reduction of vat dyes.** 946, **Colour and constitution. Azo chromophore. Azo dyes from brominated β - $\text{C}_{10}\text{H}_7\cdot\text{OH}$.** 958, **Coloured**

derivatives of phenobarbital. Viologen indicators. Pyrrole-blue. 979. Yellow oxidation enzyme.

PATENTS.

Manufacture of dyes [having soap-like properties]. F. B. DEHN. FROM DEUTS. HYDRIERWERKE A.-G. (B.P. 394,343, 11.9.31. Cf. B.P. 393,966; B., 1933, 823).—An aliphatic or naphthenic hydrocarbon radical $>C_9$ is introduced into OH or NH_2 groups in dyes, or in intermediates which are subsequently converted into dyes. Examples are products from: *p*-hydroxyazobenzene with $C_{15}H_{37}Cl$; 1-chloro-2:4-dinitrobenzene with $C_{12}H_{25}ONa$, reduced to diamine, and coupled with diazo compounds; aminoazobenzene with cetyl chloride, sulphonated; Michler's ketone with $C_{12}H_{25}NPhMe$, sulphonated; benzoflavine with $C_{12}H_{25}Cl$. C. H.

Manufacture of carbocyanine dyes [photographic sensitisers]. KODAK, LTD., Assees. of L. G. S. BROOKER (B.P. 394,692, 31.12.31. U.S., 31.12.30).—A 2-methylbenzthiazole quaternary salt is condensed with an alkyl ortho-ester other than ortho-formate and -acetate, preferably in C_5H_5N . Examples include: condensations with $CH_2R \cdot CO(OMe)_3$ in which $R = Me, Pr^i, Bu, Bu^s, Ph, \cdot CH_2 \cdot CH_2 \cdot OPh$, and with $COPh(OEt)_3$ and *p*- $C_6H_4(COMe)(OMe)_3$. The quaternary salts used are 2-methylbenzthiazole ethiodide, metho- and etho-*p*-toluenesulphonates, allyliodide, and 2:6-dimethylbenzthiazole metho- and etho-*p*-toluenesulphonates. C. H.

Anthraquinone dyes and the application thereof. IMPERIAL CHEM. INDUSTRIES, LTD., N. H. HADDOCK, and F. LODGE (B.P. 394,312, 13.11.31).—An α -hydroxyanthraquinone or a leuco-derivative thereof is condensed, e.g., in C_5H_5N or $NPhMe_2$, with an amino-3-keto-2:3-dihydrobenz-1:4-thiazine, and the lactam product is hydrolysed to the corresponding anthraquinonylaminoaniline-*o*-thioglycolic acid, which gives on wool, after lactamisation on the fibre, green shades fast to potting. Examples are products from the 6-, 7-, and 8- NH_2 -compounds with leucoquinizarin and leuco-1:4:5-trihydroxyanthraquinone. C. H.

Manufacture of [direct] azo dyes. I. G. FARBENIND. A.-G. (B.P. 394,981, 4.1.32. Ger., 3.1.31).—The bisacetoacetyl compound of benzidine or its 3:3'-disubstituted derivatives is coupled with 1 or 2 mols. of an *o*-aminobenzoic acid, the components being chosen so as to include $\leq 1 SO_3H$ group. Examples are bisacetoacetyltolidine with diazotised 4- or 5-sulphoanthranilic acid (1 or 2 mols.) or with 1 mol. of this acid and 1 mol. of diazotised anthranilic acid. The coppered shades are green-yellow. C. H.

Light-sensitive materials.—See XXI.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Structure of the wool fibre and its relation to finishing. J. B. SPEAKMAN (J. Text. Inst., 1933, 24, p 166—172; cf. B., 1933, 618).—Large mols. are unable to enter the structure of wool and cannot be used in finishing except in solution in a solvent of low mol. wt., such as H_2O , which causes swelling. In producing a permanent set with steam the free NH_2 groups play an essential part; deaminated fibres shrink more rapidly and further than normal fibres when re-steamed. Ab-

sorption of H_2O by wool is a min. at 40° ; the increased absorption at $>40^\circ$ is due to the creation of fresh surfaces by subdivision of the micelles. Raising the temp. of drying diminishes the affinity for H_2O . A. G.

Hydration of fibres. I. Sorption of water. II. Desorption of water. H. SOBUE and M. NAGANO (J. Soc. Chem. Ind., Japan, 1933, 36, 475—479 B, 479—482 B).—I. The rate of sorption of H_2O by fibres from moist atm. agrees with the calc. val., assuming the process to be one of adsorption followed by diffusion; the diffusion consts. for viscose rayon, cuprammonium rayon, silk, wool, raw cotton, and bleached cotton are 0.018, 0.015, 0.007, 0.010, 0.058, and 0.048, respectively.

II. Measured rates of loss of H_2O from fibres exposed first to 100% and then to 20% R.H. agree with those calc., assuming the process to be diffusion through the fibre and through air. A. G.

Determination of fat, cellulose, and waxy materials in poplar fibre. N. I. VENKOV (Mat. Tzentr. Nauch.-Issledov. Inst. Textil Prom., "Nite," 1930, No. 4—5, 16).

Cloth milling with acids. A. YEWDALE (J. Text. Inst., 1933, 24, p 173—177).—The use of acid instead of soap or grease for milling woollen cloth has the advantages that the shrinkage, cloth strength, and extensibility are greater and the milling time and loss of wt. are less. H_2SO_4 is better than HCl or AcOH, and the best concn. is 6—8%. A. G.

Transmission of heat through fabrics. M. C. MARSH (Proc. Physical Soc., 1933, 45, 414—424).—The effects of air-permeability and of perforations on the thermal-insulating properties of fabrics are discussed. W. R. A.

Some general sources of faults in textile materials. L. L. LLOYD (J. Text. Inst., 1933, 24, p 161—165).—Common causes of faults in woollen fabrics are uneven acid distribution during carbonising, use of unsuitable dyes for sighting yarns for weaving, use of paraffin wax rods when weaving fabric containing cellulose acetate, knitting together yarns of different colours, presence of rust on weaving or knitting machines, and the use of dyed jute packs. A. G.

Chemical analysis of rayons. II. Micro-determination of metals in commercial rayon yarns. B. P. RIDGE, M. CORNER and H. S. CLIFF (J. Text. Inst., 1933, 24, p 293—308; cf. B., 1931, 581).—The determination of amounts of metals of the order of 2—5 mg. per 100 g. of rayon necessitates preliminary ashing, and under suitable conditions serious losses of Cu or Zn can be avoided. Cu may be determined (a) by pptg. and weighing as thiocyanate, (b) colorimetrically with Et_2 dithiocarbamate, or (c) by a method depending on the catalytic acceleration by Cu of the reduction of Fe^{III} salts by $Na_2S_2O_3$; method (c) is recommended. Fe^{III} is determined by reduction to Fe^{II} with Mg and HCl and titration with $K_2Cr_2O_7$. Zn is pptd. as ZnS after removal of Cu, then redissolved, pptd. with 8-hydroxyquinoline, and weighed. A. G.

Erratum.—In the abstract of the paper by H. L. Parsons on "Determination of the acetyl content of

carbohydrate acetates" (B., 1933, 584), in lines 11—14 of the abstract the sentence "Since . . . analysed" should be replaced by "When the Et₂O used for extracting AcOH from H₂O is carefully purified, all types of acetate give the same analytical factor."

Suitability of Chinese pines and chamæcyparis from Fukien Province, China, for pulp and paper manufacture. T. H. WANG (Lingnan Sci. J., 1933, 12, No. 1, 37—42).—Chinese pine and cedar, both suitable for pulping by the soda process, afforded, respectively: Et₂O-sol. 1.00, 1.64; cold H₂O-sol. 2.4, 2.1; hot H₂O-sol. 2.9, 3.0; NaOH-sol. 12.9, 15.2; lignin 30.0, 32.9; cellulose 50.1, 49.9; ash 0.6, 0.7%.

CH. ABS.

Utilisation of sunflower-seed hulls. G. PETROV and S. DIMAKOV (Masloboino-Zhir. Delo, 1932, No. 8, 36—40).—Using HCl at 4 atm., sunflower seeds afford only 11% of furfuraldehyde, although 37% of pentosan is present. Probably polymerisation and adsorption occur. Extraction of the cellulose with C₆H₆ + EtOH afforded a resin.

CH. ABS.

Character of changes in the fibre in the process of grinding. M. RESH and L. KANTOR (Bumazhn. Prom., 1933, 12, No. 1, 53—60).—The swollen cellulose becomes more reactive.

CH. ABS.

Digestion of wood. II. Effect of cooking on α -cellulose content, bleachableness, and viscosity of pulp. K. NAKAMURA and K. ICHIJO (J. Cellulose Inst., Tokyo, 1933, 9, 213—218; cf. B., 1933, 501).—With increasing duration of cooking, the α -cellulose content and bleachableness rise to maxima, the β -cellulose content rises without reaching a max., and the γ -cellulose content and the viscosity fall.

A. G.

Comparison between flint pebbles and porcelain balls as a means of hydrating in the pebble-mill test [for wood pulp]. II. F. C. PETERSON and D. C. BEYER (Paper Trade J., 1933, 97; T.A.P.P.I. Sect., 41—44; cf. B., 1932, 717; 1933, 542).—In general, porcelain balls (I) give higher and more uniform burst and tear vals. at the peak of the strength curve than do flint pebbles (II), but the strength development is slower with (I) than with (II). Pulp beaten with (I) has a much lower ash content than that beaten with (II).

H. A. H.

Proposed methods for the dirt count of pulp and paper. F. A. SIMMONDS, P. S. BILLINGTON, and P. K. BAIRD (Paper Trade J., 1933, 97; T.A.P.P.I. Sect., 44—46).—The various methods in use are reviewed, and two composite methods are formulated, one for pulp and the other for paper. For pulp, the dirt content is based on unit wt.; for paper, on unit area.

H. A. H.

Screen analysis of beaten pulp. K. DITTRICH and W. BOOS (Papier-Fabr., 1933, 31, 425—431, 439—445).—The action of a laboratory hollander (I) and the Lampén mill (II) is compared by screening into 4 fractions an unbleached sulphite pulp beaten to different wetness. Beating with (I) from 50° to 70° S.R., the fine fraction increases from 21.4% to 39.1%, whilst with (II) the increase is only from 22.1% to 24.8%. With both beaters the amount of the coarse fraction decreases correspondingly, of which at 70° S.R. none

is obtained with (I), and (II) gives 25%. The proportion of the fine fraction governs the wetness of the unscreened pulp. It has a very high wetness which is not clearly shown on the Schopper-Riegler (S.R.) instrument and is better depicted by drainage time, which in the case of the fine fraction from (II) increases by 195 sec., on beating from 50° to 70° S.R. of the unscreened pulp. The drainage time of the fine fraction from (I) decreases on beating to 70° S.R. The sheet tensile strength of the fractions is < that of the unscreened pulp, though in all cases that val. for stock beaten in (II) is > that from (I). The coarsest fractions had the highest "zero breaking length" (unit fibre strength); the difference between sheet strength and unit fibre strength gave the adhesive capacity of the fibres, those of the fine fraction from (II) showing the highest adhesive capacity. Hence the superior sheet strength of pulp beaten in (II) is ascribed to the superior adhesive properties of the fine fraction which acts as a cement for the coarse fractions, which in turn form the basic strength factor. (I) has a severe cutting action as opposed to the crushing action of (II).

D. A. C.

Newsprint from boiled wood. A. E. PARRETT (Pulp and Paper Canada, 1933, 34, 515—516, 530, 532).—The factors affecting the use of mechanical pulp made from boiled wood (I) by the Fish process are considered. After a preliminary soaking with hot H₂O, the barked logs are heated under vac. with H₂O containing KOH and turpentine. The resins and gums are removed, and the bulk of the H₂O can be used again. There is a close relation between method of boiling, colour, and strength. In general, the longer the cooking time the darker and stronger is the pulp, but it is very difficult to control the process adequately. (I) is always darker and tougher than untreated wood (II) and the grinding conditions must be more carefully controlled. Grinding pressure must be lower for (I) than for (II). (I) gives a stronger pulp with longer fibres than (II), but the formation of the finished paper is much wilder in consequence. The properties of (I), when stored for > a week, revert to those of (II). Appreciable economy of sulphite pulp in newsprint is possible using mechanical pulp from (I), but the colour of the paper is too drab, even when bleaching is resorted to. The method has been discontinued.

H. A. H.

Utilisation of proteins of depilatory liquors for sizing paper. M. ROBINOV and P. ZOTOV (Bumazhn. Prom., 1933, 12, No. 1, 64—67).—The waste liquor is neutralised with H₂SO₄; the pptd. protein is dried at 35° and used in sizing paper with good results.

CH. ABS.

Interpretation of tests on paper. J. G. ABEL (Paper-Maker, 1933, 86, ts 157—160).—The usual mechanical and other tests on paper are discussed.

H. A. H.

New process for moisture control of paper. R. H. MCKEE and J. S. G. SHOTWELL (Paper Trade J., 1933, 97; T.A.P.P.I. Sect., 61—70).—A method of conditioning paper by varying the atm. humidity at the dry end of the paper machine is given. It is much more rapid, more uniform, and more flexible than the use of sprays of either steam or H₂O, or than the passage of the paper web over wetted rolls. The conditioning

plant is described, and several applications, other than the actual addition of moisture to the sheet, are discussed, especially those affecting printing properties, finish, and flatness. The factors affecting the equilibrium conditions and the rate of moisture change are reviewed and further investigated. The moisture content of paper in equilibrium with the surrounding atm. is considered to vary with the abs. humidity (A.H.) (and not with the R.H., as is usually maintained) between 16° and 40°, and even at const. temp. the relation between moisture content and A.H. is closer than that to R.H. Outside the 16–40° range, variations in temp. materially affect the moisture–A.H. relationship. At const. R.H., moisture content changes appreciably with temp. throughout the range 5–100°. The rate of moisture regain when conditioned air impinges on the paper surface is extremely rapid, except near equilibrium. There is a hysteresis effect depending on whether moisture is being added or removed, unless a very long time is allowed. The rate also varies with the furnish, but the max. rates are about the same for all papers. The apparatus used is described, and many graphs are given. The curves showing the variation in the moisture content of different kinds of paper with that of the atm. show two breaks, which, it is suggested, may correspond approx. to (a) a mol. proportion of 1 H₂O mol. to 3 or 4 glucose mol., and (b) a unimol. layer of H₂O around the cellulose micelles. When the moisture content is as low as 3%, it is postulated that no free H₂O is present, this H₂O of constitution being removed only on further drying by the formation of anhydride substances. This would account for the marked change in physical properties of paper when absolutely dry. H. A. H.

Bleaching wood pulp.—See VI. [Cellulose from] **tomato seed.**—See XII. **Filter-cloths [for sugar-cane juice].**—See XVII. **Wool-scouring wastes.**—See XXIII.

See also A., Sept., 892, **Cotton fibre.** 901, **Viscosimetry of cellulose ester solutions.** 938, **Converting cellulosic material into sugar.** 939, **Nitration of cellulose.** **Cellulose acetates.** 989, **Hemicelluloses of mesquite wood.**

PATENTS.

Treatment of wool [for its removal from skins]. A. GOUGH (B.P. 396,428, 3.2.32).—After softening by soaking in an aq. liquor the skins are carried forward on an endless travelling belt between squeezing rollers; excess H₂O is thereby removed so that drying of the wool separated from the skins at a later stage is accelerated. A. J. H.

Manufacture of artificial staple fibre. BRIT. CELANESE, LTD., and W. I. TAYLOR (B.P. 394,702, 30.12.31).—A large no. of multiple-filament threads of org. derivatives of cellulose are drawn from a series of packages, and these are combined together as a thick, compact, continuous bundle, which is either cut into equal lengths continuously with its formation, or wound in the form of a large package and subsequently unwound for cutting; preferably the bundles are wetted with a solution of a hygroscopic substance before cutting. (Cf. B.P. 387,003—4; B., 1933, 264.) F. R. E.

Dry-spinning of artificial fibres. “CHATILLON” SOC. ANON. ITAL. PER LA SETA ARTIFICIALE (B.P. 395,115, 18.4.32. Addn. to B.P. 372,503; B., 1932, 795).—The evaporative medium is cooled by passing through an externally cooled condenser and, on entering at the bottom of the spinning cell, is divided into two currents differing in temp., one of which is adapted to dry the filaments and the other, at the higher temp., to impinge at right angles on the extruding filaments. F. R. E.

Manufacture of spun cakes of artificial silk. ALGEM. KUNSTZIJDE UNIE N.V. (B.P. 394,922, 20.2.33. Ger., 21.3.32).—The freshly spun filament is centrifuged against an endless embracing wall which makes depressions in the cake during its formation, whereby shrinkage of the yarn is rendered uniform. F. R. E.

Treatment [crêping] of artificial silks. C. CLEMENCON (B.P. 394,793, 4.5.32).—Viscose threads are subjected to a hard twisting, e.g., approx. 2200 turns per m. for a thread titre of 100 deniers, after bringing to the required physical state by shrinking with a swelling agent (aq. NaOH) following finishing or simultaneously with desulphurisation, or by omitting the usual stretching during drawing so that a thread with an elongation of 30–35% is produced. F. R. E.

Manufacture of skins from cellulose solutions. J. P. BEMBERG A.-G. (B.P. 395,251, 15.12.32. Ger., 15.12.31).—Cellulose solution issuing from adjacent slots is passed into a pptg. bath, where the layers are combined, by pressure if desired, to a composite skin which is then further treated; the still plastic skins may be combined by pressure with layers of textiles, metal, wood, paper, etc. F. R. E.

Production of ethers of cellulose esters. H. DREYFUS (B.P. 396,796, 12.2.32).—A cellulose ester or mixed ester is treated at elevated temp. and pressure (> 10 atm.) with a liquid or gaseous hydroxyalkylating agent [CH₂Cl·CH₂·OH, (CH₂)₂O], either in absence of bases or in presence of an org. base but not of a strong inorg. base, under such conditions that no substantial saponification of the ester occurs. F. R. E.

(A) **Preparation of fibrous cellulose esters.** (B) **Manufacture of cellulose esters.** C. F. BOEHRINGER & SOEHNE G.M.B.H. (B.P. 396,575 and 396,657, [A] 4.10.32, [B] 18.3.33. Ger., [A] 5.10.31, [B] 19.3.32. Addns. to B.P. 387,533; B., 1933, 301).—(A) The process of the prior patent is applied to the prep. of esters other than acetates and of mixed esters, a mixture of different substituted or unsubstituted org. anhydrides or acids, of which one may be Ac₂O or AcOH, being used in the esterification. (B) The original or modified process (A) is carried out without addition of substances which prevent the esterification products from going into solution, and without limitation of the temp. to > 40°, except at the beginning of the reaction. F. R. E.

Manufacture of artificial [cellulosic] filaments and the like. BRIT. CELANESE, LTD., E. KINSELLA, and R. H. J. RILEY (B.P. 396,792, 10.2.32).—The filaments are extruded into a current of evaporative medium (A) flowing in a direction similar or opposed to that of extrusion, while < 2 streams of A are directed against

the filaments, near the point of extrusion, from different sides and at different distances therefrom. *A* may be introduced from outside the spinning cell, or produced by heating the spinning cell and suitably deflecting the resulting upward currents of *A*. F. R. E.

Treatment of artificial fibres, more particularly of artificial silk. HEBERLEIN & Co. A.-G. (B.P. 397,046, 9.3.33. Ger., 10.3.32).—Artificial silk yarn is overtwisted to a coeff. of twist (*A*) \leq 4 times the normal val., on to bobbins where it is moistened, with the aid of wetting agents if desired, in boiling H_2O or by steaming under pressure, and is afterwards dried; it is then twisted in the reverse direction beyond *A* = 0. The product resembles wool in having a permanent curl, increased resilience, and diminished heat-conductivity. F. R. E.

Manufacture of artificial threads and other products from cellulose compounds. L. LILJENFELD (B.P. 393,932 and 393,941, [A] 12.9.31, [B] 14.9.31).—(A) To the coagulating-plasticising bath for cellulose derivatives previously described there is added (i) a polybasic acid ester of a mono- or poly-hydric alcohol ($MeHSO_4$), or (ii) glycerophosphoric or -sulphuric acid, or (iii) a sulphonic acid ($OH \cdot CH_2 \cdot SO_3H$), or (iv) $SO_2 \cdot (CH_2 \cdot CO_2H)_2$ or $SO_3H \cdot CH_2 \cdot CO_2H$, or (v) nitrogenous aromatic sulphonic acids, or (vi) H_2SO_4 ($< 35\%$ with acid sulphates). (B) With the cellulose derivatives at any stage of manufacture there are incorporated substances which lead to a finished material of delustrated appearance, or with hollow spaces or bubbles, e.g., mineral or vegetable oils or soaps, aromatic hydrocarbons, org. bases, inorg. pigment-like materials. C. H.

Manufacture of regenerated silk yarn. S. YAMAMOTO (B.P. 396,901, 30.5.32).—The filaments are elongated by subjecting them to successive deflexions with frictional drag, increasing progressively or by graduated stages, around friction members suitably arranged in the coagulating liquid between the spinning nozzle and the drawing roller. F. R. E.

Production of films and foils [of cellulose derivatives]. BRIT. CELANESE, LTD., and E. KINSELLA (B.P. 396,424, 30.1.32).—The film is formed on a drum provided with a tough, corrosion-resistant, and substantially permanent surface of stainless steel or cold-worked Ni, or on a band of either of these metals secured to a core. F. R. E.

Production of artificial films or foils. BRIT. CELANESE, LTD., and E. KINSELLA (B.P. 396,723, 30.1.32 and 19.10.32).—Apparatus for carrying out the process of B.P. 396,424 (preceding abstract) is claimed. F. R. E.

Apparatus for manufacture of artificial films and foils. BRIT. CELANESE, LTD., and E. KINSELLA (B.P. 396,398, 30.1.32).—The film-forming solution is transferred to a roller (*R*) which contacts with a travelling support (*S*) for the film, *R* having a surface of resilient material or of rigid material supported on a resilient core, or being resiliently mounted so as to have yielding contact with *S*. F. R. E.

Casting of cellulose sheets from solutions of cellulose. C. H. VON HOESSLE, Assr. to CHEM. FABR. VON HEYDEN A.-G. (U.S.P. 1,892,657, 27.12.32. Appl.,

3.11.30. Ger., 7.11.29).—Cellulose solution is caused to flow over a substantially vertical surface for some distance before entering the pptg. liquid in which the guiding surface (*A*) dips, the pptd. sheet being bent back around the lower edge to the back of *A*. B. M. V.

Manufacture of [hard-wood] pulp. E. P. STEVENSON, Assr. to A. D. LITTLE INDUSTRIAL CORP. (U.S.P. 1,887,863, 15.11.32. Appl., 15.11.29).—The wood is digested under heat and pressure in presence of H_2O and an insol. alkaline substance ($CaCO_3$), which progressively neutralises the org. acids liberated. F. R. E.

Production of high-grade chemical pulps. Alkaline fibre liberation. G. A. RICHTER, Assr. to BROWN Co. (U.S.P. 1,880,043—4, 27.9.32. Appl., [A] 18.12.29, [B] 28.2.30).—(A) Pulp of high α -cellulose content, low pentosan content, and low solution viscosity is obtained by first treating the raw chipped wood with dil. mineral acid (e.g., with 1% H_2SO_4 for 2 hr. at $< 100^\circ$) to hydrolyse pentosans, and then subjecting the treated and preferably washed, material to an ordinary alkaline digestion process. (B) Pulp of similar characteristics is obtained by first soaking the chips (preferably $\frac{1}{4}$ — $\frac{1}{2}$ in. in length) for 6—24 hr. at room temp. in 10—25% alkali solution (NaOH alone or NaOH- Na_2S) and then digesting the treated material with alkali (25% of NaOH on the wt. of wood) for, e.g., 3 hr. at 168°. If an easy-bleaching product is required the NaOH-soaked chips may be washed and treated with aq. Cl_2 before pressure-digestion. D. J. N.

Multi-stage pulping of raw cellulosic material. G. A. RICHTER, Assr. to BROWN Co. (U.S.P. 1,880,048, 27.9.32. Appl., 18.2.31).—The raw material is digested first with H_2O at 125—175°, e.g., for 4 hr., and then with aq. Na_2SO_3 , e.g., at 180° for 6 hr. Small quantities of NaOH, Na_2S , or $NaHSO_3$ may be present in the Na_2SO_3 liquor. D. J. N.

Production of pulp. L. BRADLEY and E. P. MCKEEFE, Assrs. to BRADLEY-MCKEEFE CORP. (U.S.P. 1,887,899, 15.11.32. Appl., 2.3.25).—Wood chips are charged into a digester from which air is removed and replaced by SO_2 , which penetrates the wood; acid sulphite liquor is then introduced and the wood is partly cooked, excess of alkali being afterwards added to produce an alkali sulphite liquor for completion of the cooking process. F. R. E.

Paper pulp extractor. L. V. REESE and G. W. JOHNSON, Assrs. to AMER. LAUNDRY MACHINERY Co. (U.S.P. 1,887,955, 15.11.32. Appl., 2.3.31).—Centrifugal apparatus is described for separating both lighter and heavier impurities, and delivering the pulp with its proper H_2O content. F. R. E.

Manufacture of paper. MEAD CORP., Assees. of W. E. BAIR, JUN. (B.P. 396,063, 4.3.32. U.S., 9.3.31).—The two-sided effect shown by heavily-loaded machine-made papers is considerably minimised if a suspension of filler (and, optionally, size) is applied to the wire side of the web through the wire by, e.g., a roller, preferably positioned between the suction boxes and the (suction) couch roll. D. J. N.

Manufacture of air-porous paper. C. ARNOLD. From AIR-WAY ELECTRIC APPLIANCE CORP. (B.P.

396,142, 29.2.32).—Long-fibred pulp, rag, sulphite, or sulphate pulp, optionally with addition of jute or hemp, is lightly beaten, without materially cutting or hydrating the fibres, and run on a Fourdrinier machine at 250—500 ft. per min. Suction boxes are used and help to open up the wet sheet. The paper is then preferably crêped. It is impervious to, *e.g.*, wheat flour, but sufficiently porous for use in making dust-collecting bags for vac. cleaners. D. J. N.

Manufacture and treatment of paper. L. MELLERSH-JACKSON. From BROWN Co. (B.P. 396,980, 21.11.32).—The development of objectionable odours during storage by viscose-treated paper, *e.g.*, kraft towelling, is prevented if the paper is treated during or after manufacture with an oxidising agent, *e.g.*, highly dil. $\text{Cl}_2\text{-H}_2\text{O}$, gaseous Cl_2 or O_3 . D. J. N.

Composition of matter [from paper material]. M. DARRIN, Assr. to F. N. BURT Co., LTD. (U.S.P. 1,889,088, 29.11.32. Appl., 3.9.30).—Paper material is impregnated with a mixture of S and 15—80% of chlorodiphenyls containing a substantial amount of the higher compounds; the product is hard, resistant, impervious, and fireproof. F. R. E.

Marking and production of designs on [kraft or coloured] paper. O. KRESS (U.S.P. 1,887,934, 15.11.32. Appl., 5.6.29).—A bleaching agent (NaHSO_3) is applied in the desired design to the damp sheet web of paper. F. R. E.

Composite sheet [for playing cards etc.]. M. R. HOWARD (U.S.P. 1,888,672, 22.11.32. Appl., 22.9.30).—Paper stock is impregnated with a potentially reactive artificial resin (*e.g.*, $\text{PhOH-CH}_2\text{O}$), sheeted, coated with a pigment, and calendered; after printing, a thin coating of the resin is applied and the sheets are finished by means of heat and pressure. F. R. E.

Surfacing of board. W. A. DARRAH (U.S.P. 1,892,873, 3.1.33. Appl., 9.6.28).—Boards composed of cellulose fibres are treated with a slurry containing a cellulose-dissolving material (H_2SO_4 , ZnCl_2 , cuprammonium solution, Na silicate) and a carrier (gypsum, fuller's earth, SiO_2 , or a viscous liquid such as glycerin), which, after acting to the desired depth, are neutralised with alkali or acid as required. The treated boards, after drying in a substantially flat position, have a relatively porous interior with a hard, dense, H_2O -resisting surface of chemically altered cellulose and mineral matter. F. R. E.

Manufacture of (A) felted fibrous sheet material of high absorptivity, (B) bituminised fibrous webs. G. A. RICHTER and H. A. CHASE, Assrs. to BROWN Co. (U.S.P. 1,888,771—2, 22.11.32. Appl., [A] 5.8.31, [B] 20.10.31).—(A) Unbeaten alkali-refined wood pulp containing $\leq 93\%$ of α -cellulose is felted from H_2O to a sheet having a compactness val. [(wt. in lb. of 2880 sq. ft./thickness in in.) $\times 100$] of 30—60 and an absorptivity of ≤ 6 in. in terms of H_2O crawl up a strip in 5 min., and (B) impregnated with $\leq 250\%$ of asphalt (calc. on the dry wt. of fibre). F. R. E.

Waterproof linen. Dyeing paper pulp, paper, etc.—See VI. Insulating materials.—See XI. Plastic masses etc. Bullet-proof sheet materials.—

See XIII. Rubber products.—See XIV. By-products from sugar extraction.—See XVII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Piece-bleaching machinery. A. GRUNERT (J. Soc. Dyers and Col., 1933, 49, 285—290).—An account of modern plant.

Hydrogen peroxide bleaching of wool, cotton, and silk. I. E. WEBER (J. Text. Inst., 1933, 24, p 178—193).—100-vol. H_2O_2 loses only 2% in concn. when stored for 12 months at 15—20°, but its stability is greatly reduced by traces of metals, especially Fe and Cu. For bleaching wool H_2O_2 is best neutralised with $\text{Na}_2\text{P}_2\text{O}_7$ and $\text{H}_2\text{C}_2\text{O}_4$ or $\text{Na}_2\text{C}_2\text{O}_4$; bleaching is more rapid than when Na silicate is used and there is less liability to metal stains. This bath can also be used for silk. The best material for vessels is Staybrite. The presence of bacteria in wool causes decomp. of H_2O_2 . American cotton can generally be bleached in one H_2O_2 bath, but a preliminary boil and two H_2O_2 baths are sometimes necessary. Details are given of various bleaching processes and of a suitable lining for Fe kiers. A. G.

Bleaching of wood pulp. I. NAKASHIMA and S. OINUMA (J. Cellulose Inst., Tokyo, 1933, 9, 201—213).—Measurements were made (and curves are given) of the consumption of Cl when a sulphite pulp was treated with bleaching powder extract; the concn. of pulp, % Cl, temp., and time were varied. A. G.

Absorption of sulphur dye at different temperatures. I. R. KLYACHKO (Izvest. Textil. Prom. Torgov., 1930, No. 10—11, 86—89).—Full colour of the black S dye was reached at 65°; absorption was then 2.6%. CH. ABS.

Silk dyeing. C. M. KEYWORTH (J. Soc. Dyers and Col., 1933, 49, 245—250).—Application methods for various classes of dyes are reviewed. Silk has only a small affinity for naphthols of the Naphthol AS series, and the developing bath should contain excess of AcOH to prevent coupling of the silk with the diazotised base with consequent yellow to brown staining. It is not satisfactory to dye Sn-weighted silk with vat dyes. Although Indigosol dyes have a high affinity for silk, Indigosol O is exceptional in giving shades of poor fastness and tinctorial val. Several Indigosol dyes, especially Indigosol Brown IRRD, are strongly dichroic even in daylight. A. J. H.

Influence of p_H in the dyeing of leather. M. C. LAMB and L. GOLDMAN (J. Soc. Dyers and Col., 1933, 49, 257—258).—No single dye applicable to leather is available for producing brown—the most common shade in the leather industry—and in using dye mixtures the temp. and acidity of the dyebath very considerably affect the rates at which the individual dyes are absorbed and the resulting shade. Max. tinctorial val. (3—4 times that obtained in neutral dyebaths) is obtained in dyeing pyrogallol-tanned leather with acid dyes by using a dyebath having p_H 2.5—3.0. Pyrocatechol-tanned leather dyed in pale shades under these conditions darkens too rapidly when exposed to light and should therefore be dyed instead with a direct cotton dye in a liquor of p_H ≤ 3.0 . A. J. H.

Dyeing of cotton-viscose-acetate-rayon mixtures. G. RUDOLPH (Kunstseide, 1933, 15, 316—317).—Conditions of dyeing and a full range of selected direct dyes are given, whereby the acetate rayon may be left pure white. A. J. H.

Effect of mercerisation on the "counts" of cotton yarn. O. MECHEELS and G. STÜHMER (Textilber., 1933, 14, 463—464).—Data are given for various single and two-fold cotton yarns. Prep. of yarn for mercerisation by boiling for 1 hr. in 0.05% Na_2CO_3 solution increases the counts by 2%; subsequent mercerisation allowing length changes of -5 and $+5\%$ results in counts changes of -5 and $+10\%$, respectively. Dissolution of the cotton cellulose and impurities during mercerisation increases the counts appreciably. Shrinkage (previous to the usual subsequent stretching) in mercerisation is a reliable means for comparing the consequent lustre increases of cotton yarns only when they have nearly equal original lustre. Data relating to the original and final lustre, and the shrinkage produced in mercerisation, are given for various types of yarns. A. J. H.

Increasing the durability of weighted silk. H. FRANKE (Kunstseide, 1933, 15, 318—319).—Silk weighted with SnCl_4 and Na_2HPO_4 in the usual manner is after-treated with aq. $\text{Al}_2(\text{SO}_4)_3$ followed by Na_2SiO_3 , and then further weighted 20—75% by immersion in aq. basic Pb acetate. It retains its original softness and appearance; after 4 months' exposure under tropical conditions, the weighted silk lost only 2.5% in strength. A. J. H.

Enzymes for textile purposes. J. E. EVANS (J. Soc. Dyers and Col., 1933, 49, 250—256).—A review of the properties and development of starch-liquefying enzymes for desizing purposes with particular reference to Rapidase (I) and malt-diasate (II). The loss of liquefying power of (II) at 78—80° is ascribed to the removal of the diastase by occlusion in the albumin, which coagulates at that temp. (I) is sensitive to heat and differs from (II) in producing less sugar and more dextrin during starch-liquefaction; after similar treatment of starch at 50—60° with (II) and (I) until the products gave no colour with I they contained dextrin 20 and 65% and maltose 80 and 30% respectively. A. J. H.

Determination of starch [in sized textiles]. B. X. HERMAN (Amer. Dyestuff Rep., 1933, 22, 511—514).—The method of Fargher and Lecomber (B., 1932, 61) is simplified by using Benedict's solution for determination of the glucose resulting from hydrolysis of the starch with boiling H_2SO_4 . A. J. H.

Some faults in finished fabrics. P. BEAN (J. Text. Inst., 1933, 24, p 194—201).—Numerous examples of faults are described. A. G.

Faults in textiles. Finishing of wool.—See V. Chlorate solutions [and fabrics].—See XVI.

PATENTS.

Coloration of textile materials. [Production of azo dyes on the fibre.] BRIT. CELANESE, LTD., and G. H. ELLIS (B.P. 394,317, 9.12.31).—The textile (acetate silk, wool, etc.) is impregnated mechanically,

e.g., by a padding mangle or printing, with a dispersion or suspension of arylamine and/or coupling component, and steamed; the colour is developed with HNO_2 , or by acid if NaNO_2 has been applied with the components. The usual methods for uniform colouring or effects may be adopted. Examples are: acetate silk padded with dispersed *p*-aminobenzene- α -naphthylamine, steamed, diazotised, and coupled with dispersed 2:3-hydroxynaphthoic acid (*A*) (black); or padded with dispersed *A* and 5-nitro-*o*-toluidine, steamed, and developed with HNO_2 (blue-red); or dyed with aminoazobenzene \rightarrow PhOH , printed with 4-amino-4'-methoxydiphenylamine and 2:3-hydroxynaphthoic *o*-toluidide, dried, steamed, rinsed, developed with HNO_2 (green on yellow). C. H.

Dry-cleaning or dyeing of fabrics etc. W. M. THEOBALD (B.P. 396,434, 4.1.32).—The original handle and appearance are preserved by using a solvent consisting of, e.g., paraffin wax, olive oil, or other non-volatile vegetable or mineral oil (1 lb.) dissolved in Stoddart solvent (gasoline, flash point $> 38^\circ$) or CCl_4 , C_2HCl_3 , etc. (5 gals.). A. J. H.

Dyeing or printing paper or paper pulp. Soc. CHEM. IND. IN BASLE (B.P. 396,992, 9.12.32. Switz., 18.12.31).—Fast-to- H_2O colourings are obtained by treating the material, simultaneously or separately, with a H_2O -sol. dye (e.g., acid and basic dyes) containing < 1 SO_3H and/or CO_2H group and a H_2O -sol. salt of a compound containing (a) < 1 basic N atom and (b) an aliphatic saturated residue above C_9 , other than a salt of an unsymmetrical mono- or di-acylated diamine or a corresponding quaternary NH_4 compound. In examples, paper halfstuff is soaked in a solution of Benzyl Green B and then treated with a solution of the stearic acid ester of hydroxyethylpyridinium chloride, to give vivid green shades; tissue paper is dyed red by solutions of Direct Safranin B and octadecyltrimethylammonium methosulphate. A. J. H.

Producing [vat dye] prints or discharges on wool. I. G. FARBENIND. A.-G. (B.P. 394,632, 21.3.33. Ger., 26.5.32).—Deleterious effect on the wool by the alkali necessary for the vat dye is prevented by addition to the printing paste of about 2.5% of $\text{NH}_2\cdot\text{CH}_2\cdot\text{CO}_2\text{Na}$. A. J. H.

Production of [discharge] pattern effects on textile and other materials. BRIT. CELANESE, LTD., H. C. OLPIN, and G. H. ELLIS (B.P. 396,736, 9.2.32).—Impoverishment of coloured cellulose acetate and silk materials, especially in discharging with acid substances, is greatly reduced by addition of up to 30% of urea or its derivatives or other weak org. base to the discharge paste. A. J. H.

Warp printing [of cellulose derivative yarns]. C. DREYFUS (U.S.P. 1,883,346, 18.10.32. Appl., 8.9.28).—Sized cellulose acetate (etc.) silk yarn is printed with suitable dyes while being drawn from a beam; it is then dried on "cans" and woven into fabric having coloured patterns with indefinite outlines. A. J. H.

Delustring of fibres or fabrics consisting of or containing cellulose acetate. BLEACHERS' ASSOC., LTD., and G. D. SUTTON (B.P. 394,332—3, 21.12.31).—The textile material is pretreated with 6% H_2SO_4

for about 2 hr. [or longer for more dil. (< 3%) H_2SO_4] so that it may then be delustrated (A) under tension, or (B) more rapidly than is usual, by treatment with a boiling solution of soap and PhOH after removal of the acid.

A. J. H.

[Wetting agents for use in] treating [mercerising] natural and artificial cellulosic fibres with alkali.

ERBA FABR. CHEM. PRODUKTE SPEZIALITÄTEN F. DIE TEXTILIND. (B.P. 394,499, 26.7.32. Ger., 27.7.31).—The penetrative power of a mercerising liquor (e.g., NaOH of *d* 1.3) is increased, even after long keeping, by the addition of 1—2% of a mixture containing PhOH, or a derivative thereof (e.g., $C_6H_4Me \cdot OH$, $C_6H_4Cl \cdot OH$), and 2—30% of a naphthene alcohol (obtained by partial or complete reduction of crude naphthenic acids).

A. J. H.

Manufacture of waterproof linen. AKTIEB. RENOKRAGAR (B.P. 396,653, 7.3.33. Swed., 6.10.32).—Starched and ironed linen fabric is sprayed on one side with a lacquer while being subjected to suction on the other.

A. J. H.

Flame-proofing of combustible [fibrous] materials. E. C. CROCKER, Assr. to A. D. LITTLE, INC. (U.S.P. 1,891,258, 20.12.32. Appl., 14.2.24).—Se, preferably the gray form in a paste with dextrin, is applied to flexible cords between the insulation (for a wire) and the braiding.

B. M. V.

Arylper sulphonates, Dispersing etc. processes.—See III. Anthraquinone dyes.—See IV.

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

Apparatus for measuring the quantity of acid sprayed in sulphuric acid towers. S. KRIVOSHEEV (Khimstroi, 1933, 5, 1998—1999).—The vac. created by a siphon is measured.

CH. ABS.

Control of the production of synthetic ammonia. I. UPOLOVNIKOV (Khimstroi, 1933, 5, 2055—2057).— N_2 and H_2 in waste gases are determined by a differential *d* method.

CH. ABS.

Manufacture of alkali nitrates. W. SCHNEIDER and P. KUBELKA (Chim. et Ind., 1933, 29, Spec. No., June, 743—746).—The optimum theoretical yield of $NaNO_3$ from the reaction $Ca(NO_3)_2 + 2NaCl = CaCl_2 + 2NaNO_3$ by direct crystallisation at 0° is 17%. This can be improved only by previous removal of $CaCl_2$, which can be effected by pptn. as $CaCl_2 \cdot 3CaO \cdot 16H_2O$. By adding $Ca(OH)_2$ and filtering it is possible to obtain a direct yield of 69%. If in practice concn. is stopped when a 64% yield of $NaNO_3$ is obtained the remaining mother-liquor can be used for another reaction and yields of 96—98% obtained. The $Ca(OH)_2$ is recovered by washing the ppt. with H_2O at 20—30°. The H_2O to be evaporated is 1.8 kg. per kg. of $NaNO_3$. The process, which has been worked out on a laboratory scale, is equally applicable to KNO_3 .

C. I.

Preparation of sodium sulphide from sodium sulphate and its causticisation. T. OKUNO, T. MASUMI, and M. FUKUYAMA (J. Soc. Chem. Ind., Japan, 1933, 36, 466—468 B).—When Na_2SO_4 is reduced to Na_2S by CO at 700—900° the occurrence of side reactions is shown

by the decrease in gas vol. and the production of S, Na_2CO_3 , and SO_2 . Suggested reactions are: $3Na_2SO_4 + Na_2S = 4Na_2O + 4SO_2$ — 396,350 g.-cal.; $4Na_2O + 4CO_2 = 4Na_2CO_3 + 303,840$ g.-cal.; $4SO_2 + 8CO = 8CO_2 + 2S_2 + 203,740$ g.-cal. The yield of Na_2S rises to a max. and then falls, the greatest yield being about 96% after heating for 1 hr. at 850°.

A. G.

Production of potassium chlorate by way of magnesia. I. S. MOROZOV (Trans. State Inst. Appl. Chem., Leningrad, 1932, No. 15, 46—56).—Chlorination of MgO and $Mg(OH)_2 > 170$ g. per litre of H_2O causes thickening of the suspension and foaming, which impedes the absorption of Cl_2 at the surface. The $Mg(ClO_3)_2$ is converted into $KClO_3$ with KCl. The $MgCl_2$ is reconverted into MgO.

CH. ABS.

Should dry or dissolved soda be used in the production of fluorides? V. POCHIVALOV (Khimstroi, 1933, 5, 2038—2040).—In the production of cryolite and NaF solutions of acid Al fluoride and HF must be poured into aq. Na_2CO_3 , and not conversely. For the prep. of HF, aq. Na_2CO_3 must be filtered.

CH. ABS.

Rapid analysis of water-glass. F. S. PERTSCHIK (Z. anal. Chem., 1933, 94, 23—24).— SiO_2 is determined by adding HCl and NH_4Cl , filtering, washing, and igniting the ppt. Na_2O is determined by titrating to Meorange with HCl.

E. S. H.

High-temperature preparation and the optical properties of sodium aluminate. K. KAMMERMEYER and A. B. PECK (J. Amer. Ceram. Soc., 1933, 16, 363—366).— $Na_2O \cdot Al_2O_3$ (m.p. $> 1700^\circ$) was identified in $Na_2CO_3 \cdot Al_2O_3$ mixtures heated at 1100—1700°, and its optical properties were measured. The formation of the compound is facilitated, especially at lower temp., by the presence of Fe_2O_3 (3.5%).

J. A. S.

Cuprammonium solution. V. Formation of cuprammonium salt by the air-bubbling process. N. ISHII (J. Soc. Chem. Ind., Japan, 1933, 36, 472—474 B; cf. B., 1933, 541).—The compositions of solutions obtained under various conditions are given, and mathematical formulæ to express the dynamics of the process are proposed.

A. G.

Gas-volumetric determination of lead dioxide. A. P. KRESCHKOV and V. K. ILJUCHIN (Z. anal. Chem., 1933, 93, 180—188).— PbO_2 can be determined in the commercial prep. and in Pb_3O_4 by treating with H_2O_2 containing HNO_3 and measuring the vol. of O_2 evolved. The results compare favourably with those of standard methods. Determination of PbO_2 by oxidation of $H_2C_2O_4$ and measurement of the vol. of CO_2 is not satisfactory.

E. S. H.

Gas-volumetric determination of lead dioxide. M. LE BLANC and E. EBERIUS (Z. anal. Chem., 1933, 93, 447; cf. A., 1932, 921; and preceding).—Polemic.

D. R. D.

Purification of [electrolytic] chlorine from hydrogen. G. P. LYUBINSKAYA (Trans. State Inst. Appl. Chem., Leningrad, 1932, No. 15, 56—70).—The Cl_2 is dried with H_2SO_4 and then passed at 180—200° over activated birch C, the HCl being absorbed in H_2O .

CH. ABS.

Regeneration of sulphuric acid used in the drying of chlorine. M. E. POZIN (Trans. State Inst. Appl. Chem., Leningrad, 1932, No. 15, 43—46).—The acid is heated at 220° to remove Cl₂, and then conc. at 300° to *d* 1.83. Alternatively, passing air (135 litres per litre of H₂SO₄) removes nearly all the Cl₂, and the acid can be conc. without corrosion of the apparatus. CH. ABS.

Rectification.—See I. Metals for CCl₄ production. —See X.

See also A., Sept., 891, P₂O₅. 897, (NH₄)₂SO₃. 902, Coagulation of TiO₂ sols. 907, System Na₂SO₄—(NH₄)₂SO₄—NH₃—H₂O. 913, Formation of S₂O₆²⁻ by oxidation of K₂SO₃. 914, Electrolysis of BaCl₂. Formation of O₃ in the a.-c. corona discharge. 916, Ca₃(AsO₄)₂. 918, Prep. of POCl₃. 919, "Blue acid" of the Pb chamber process. Prep. of heavy-metal polythionates. 920, Recommended specifications (various). 920—924, Determination of various salts, non-metals, etc. 922, Proximate analysis of limestone. 927, P₂O₅ as drying agent.

PATENTS.

Preparation of strong hydrogen halide gas. S. B. HEATH, Assr. to DOW CHEM. CO. (U.S.P. 1,892,652, 27.12.32. Appl., 4.10.29).—An aq. halogen acid of any concn. above the const.-boiling mixture is distilled in a column which is heated only by the direct contact of vapour of *o*-C₆H₄Cl₂ or other immiscible inert liquid that has a higher b.p. than the acid. In the case of HCl, if 70° is the upper outlet temp. the vapours will be 95% HCl. B. M. V.

Purification of phosphoric acid. G. F. MOORE, Assr. to U.S. PHOSPHORIC PRODUCTS CORP. (U.S.P. 1,889,929, 6.12.32. Appl., 25.9.30).—Crude H₃PO₃ is treated with Na₂CO₃ to produce Na₂HPO₄, the filtered solution is evaporated to obtain Na₂HPO₄ crystals, and a solution of these crystals is treated with gypsum to form Na₂SO₄ and CaHPO₄. The washed CaHPO₄ is treated with the theoretical quantity of H₂SO₄ to regenerate H₃PO₄, and the recovered CaSO₄ is returned to the previous stage. A. R. P.

Dissolution of salts. T. F. COURTHOPE and W. H. MCGUIRE, Assrs. to RETSOF MINING CO. (U.S.P. 1,892,331, 27.12.32. Appl., 9.9.29).—The solvent is admitted through a ring-pipe in the upper part of a charge of the salt (*A*) and the solution is drawn off under a bell submerged in *A*; the upper level of *A* is kept const. by means of a hopper and bell. B. M. V.

Manufacture of potassium salts [or hydroxide] from [natural] potassium chloride. L. HACKSPILL, D. CLAUDE, L. E. ANDRES, and P. A. A. ROLLET (U.S.P. 1,892,341, 27.12.32. Appl., 23.1.31. Ger., 5.2.30).—Natural KCl is treated with H₃BO₃ to form the pentaborate (I) (K₂O, 5B₂O₃; cf. A., 1931, 181), which is decomposed by the acid of the salt desired. Alternatively, the KCl is treated with H₃BO₃ and NH₃ to obtain (I) and NH₄Cl; (I) is repeatedly dissolved in H₂O and mixed with Ca(OH)₂ to form KOH in solution and to ppt. Ca₃(BO₃)₂ (II). The previously formed NH₄Cl is then added to (II) and the mixture heated at > 100° to separate CaCl₂ and recover H₃BO₃ and NH₃. B. M. V.

Manufacture of alkali nitrates [from nitric acid]. H. LAWARRÉE (U.S.P. 1,891,426, 20.12.32. Appl., 2.3.31. Belg., 25.3.30).—In a cyclic process, HNO₃ is caused to react with aq. NaCl in presence of basic Pb chloride (I); NaNO₃ is removed and the liquor treated with Ca(OH)₂ to regenerate (I) and form CaCl₂, which is drawn off. B. M. V.

Manufacture [and separation] of sodium nitrate and ammonium chloride. W. STEUDEMANN (B.P. 397,290, 14.7.32. Ger., 28.7.31).—A solution containing equiv. wts. of NH₄NO₃ and NaCl is cooled, e.g., to 15°, to ppt. NaNO₃, which is removed; the mother-liquor, after dilution and the addition of NaCl or NaCl + NH₄NO₃, is then cooled to -24°, whereupon almost pure NH₄Cl is pptd. The final mother-liquor is used again in the first part of the process. L. A. C.

Production of ammonium sulphate. APPAREILS & ÉVAPORATEURS KESTNER (B.P. 397,271, 10.6.32. Fr., 10.6.31).—(NH₄)₂SO₄ solution is caused to circulate through a neutralising column (*A*) charged with H₂SO₄ and NH₃, a receiver below *A*, and an evaporator maintained under vac. so that the salt separates in large crystals which are collected in a sieve, the mother-liquor returning to *A*. An externally heated, auxiliary evaporator may be provided to remove excess H₂O. L. A. C.

Apparatus for manufacturing volatile chlorides. R. J. MCINERNEY, E. F. WILLIAMS, and H. L. GLAZE, Assrs. to MINERALS INCREMENT CO. (U.S.P. 1,888,996, 29.11.32. Appl., 19.3.28).—TiO₂, C, and Cl₂ are heated at 600° and the TiCl₄ is led to an expansion chamber maintained at 136°, in which FeCl₃ is condensed; the vapours then pass through a filter-plate, also at 136°, to a condenser, receiver, and reflux condenser. B. M. V.

Manufacture of alkali chlorates. C. CARTER, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 396,701, 4.2.32).—Cl₂ preheated at 110° is passed on the countercurrent principle over an alkali carbonate (e.g., Na₂CO₃) in presence of 3—20% of H₂O so that the temp. of the reaction zone is maintained at 60—80°. A. R. P.

Production of bleaching powder. I. G. FARBENIND. A.-G. (B.P. 396,256, 2.11.32. Ger., 2.11.31).—Chlorination of Ca(OH)₂ is effected at < 40° and at reduced pressure, so that no substantial amount of H₂O of reaction is removed, a moderate content of available Cl being obtained without the wet point being reached. In a subsequent stage in which the temp. is raised to 50—55°, treatment with Cl₂ is continued and the H₂O continuously removed in such proportions that the granular nature of the material is preserved and further absorption of Cl₂ is not prevented. W. J. W.

Manufacture of cobalt nitrosocarbonyl and/or cobalt nitrosyl. J. Y. JOHNSON, From I. G. FARBENIND. A.-G. (B.P. 396,717, 8.2. and 11.8.32).—Finely-divided Co obtained by reduction of CoO, or material containing CoO, with H₂ at 300° is treated with CO containing 5% NO at < 250° (60—70°) under pressure to obtain Co nitrosocarbonyl, or with CO containing > 15% NO to obtain Co(NO)₃. A. R. P.

Production of catalysts [for synthesis of ammonia]. "S.I.R.I." SOC. ITAL. RICERCHE INDUSTRIALI (B.P. 397,369, 16.1.33. Italy, 23.2.32).—Natural or artificial magnetites are heated to fusion, in the presence of promoters if desired, and the ratio $\text{Fe}_2\text{O}_3:\text{FeO}$ is increased to $> 1:1$ mol. by adding Fe_2O_3 and/or by the action of O_2 or other oxidising agents. L. A. C.

Separation of iron and aluminium oxides. J. G. STEIN & Co., LTD., J. F. HYSLOP, and R. MACKENZIE (B.P. 397,288, 11.7.32).—The mixed oxides are heated at $< 1000^\circ$ (1200°) and subsequently cooled to $> 800^\circ$ in the presence of, e.g., H_2 or CO to yield insol. Al_2O_3 (suitable for refractories) together with Fe and FeO ; further cooling is effected in the presence of air or O_2 to convert the Fe etc. into Fe_2O_3 , which is extracted with, e.g., HCl . L. A. C.

[Nickel] catalysts [for oil hardening etc.]. W. W. MYDDLETON (B.P. 397,295, 26.7.32).—A mixture of Ni_2O_3 with a readily hydrolysed H_2SiO_3 ester, e.g., Et orthosilicate dissolved in PhMe, is coagulated by the addition of conc. aq. NH_3 , and the product, after granulation and air-drying, is heated at $< 500^\circ$ (480°) in a current of H_2 or other reducing gas. L. A. C.

Preparation of catalytic materials [active molybdenum trioxide]. G. H. B. DAVIS, ASSR. to STANDARD I. G. Co. (U.S.P. 1,888,978, 29.11.32. Appl., 29.11.30).—Active MoO_3 for hydrogenation purposes is prepared by dissolving the acid in 6–7% aq. NH_3 (up to d 1.2–1.4), pptg. in acid ending with a 1–4% excess of HCl or solution of similar final p_{H} , and heating the ppt. at 400 – 815° for 2–10 hr. B. M. V.

Catalytic and like contact masses containing platinum. SILICA GEL CORP. (B.P. 396,712, 6.2.32. U.S., 7.2.31).—A pptd. hydrated gel, containing < 1 of the following: SiO_2 , Al_2O_3 , WO_3 , SnO_2 , TiO_2 , BeO , is impregnated with $(\text{NH}_4)_2\text{PtCl}_6$ and a promoter, e.g., MnSO_4 , CuSO_4 , VOSO_4 , and, after drying and granulating, either heated at a temp. sufficient to form Pt-black, or treated with H_2S and then roasted in air to convert the PtS_2 into Pt . A. R. P.

Recovering bromine from sea-water and the like. J. J. GREBE, ASSR. to DOW CHEM. Co. (U.S.P. 1,891,888, 20.12.32. Appl., 18.12.30).—The solution containing Br is acidified to p_{H} 3–4, dosed with NH_2Ph sufficient to form $\text{C}_6\text{H}_2\text{Br}_3\text{NH}_2$, and chlorinated or otherwise oxidised. B. M. V.

Apparatus for manufacture of carbon disulphide. C. C. SCHWEGLER, ASSR. to DOW CHEM. Co. (U.S.P. 1,892,191, 27.12.32. Appl., 9.10.30).—In an electrically heated shaft furnace comprising a charge of charcoal heated in the lower part by a ring of radial C electrodes and a corresponding no. of S inlets, each electrode and inlet is provided with a control; there is also a main axial S inlet. B. M. V.

Production of argon and neon. E. C. CURTIS, ASSR. to MATHIESON ALKALI WORKS (U.S.P. 1,892,186, 27.12.32. Appl., 7.11.30).—Purge gas from atm. NH_3 synthesis may contain H_2 65, N_2 30, $\text{A} > 3$, $\text{O}_2 > 1\%$, Ne trace, also CO_2 and NH_3 , which are easily separated by known means. The H_2 is burned with Cl_2 and the HCl removed by aq. NH_3 ; after further purification

and drying with NaOH , solution and solid, the gas is compressed and cooled to -200° , Ne and H_2 gas product being separated and the N_2 , A , and O_2 liquid being partly gasified and refractionated to separate an 86% A concentrate. The Ne may be returned to the NH_3 synthesis to allow it to build up. B. M. V.

Liquefaction and rectification of air or other gaseous mixtures. I. H. LEVIN (U.S.P. 1,892,155, 27.12.32. Appl., 31.7.30. Fr., 3.8.29).—One portion of air, purified, compressed, and cooled in the usual manner, is further cooled by heat exchange with NH_3 or similar refrigerant and expanded with or without work. After separation of any liquid air (not much is desired at this stage) the cold gas is used to cool another portion of compressed air, which is then liquefied by expansion. B. M. V.

Fire-extinguishing powder.—See I. H_2 from CH_4 . [H_2 from] natural gas.—See II. Acid-resistant alloy.—See X. Blanc fixe.—See XIII. Fertilisers.—See XVI. By-products from sugar extraction.—See XVII. Na_2BiI_5 .—See XX.

VIII.—GLASS; CERAMICS.

Magnesia as a substitute for sodium oxide in the mechanised manufacture of glass. I. I. KITAIGORODSKI and N. S. BREGMAN (Keram. i Steklo, 1933, 9, No. 2, 23–26).—Partial replacement of Na_2O by MgO (3–3.5%) is recommended. The thermal stability and working properties of the glass are improved. CH. ABS.

Preparation of high-melting glasses. M. K. HOFFMANN (Fortschr. Min. Krist. Petr., 1932, 17, 420–421; Chem. Zentr., 1933, i, 1337).—The magnetically deflected arc is employed; the molten drops fall into H_2O . Cr_2O_3 is readily melted at 2200° ; BeO and Al_2O_3 give alexandrite, whilst ZrO_2 and SiO_2 give zircon. Phenacite, beryl, mullite, alexandrite, corundum, zircon, fluorite, MgO , BeO , ThO_2 , and ZrO_2 dissolve in glass. A. A. E.

Colour changes in flint glass. A. K. LYLE and D. E. SHARP (J. Amer. Ceram. Soc., 1933, 16, 380–384).—The colour effects due to small amounts of impurities (especially Fe) and the technique of decolorising are described in some detail. J. A. S.

Determination of boric acid in glasses and enamels. P. N. GRIGORIEV (Keram. i Steklo, 1933, 9, No. 1, 21–22).—Wherry and Chapin's method is modified. The powdered glass or enamel (0.3–0.5 g.) is fused with Na_2CO_3 in a Pt crucible; the mass is treated with cold H_2O , the solution being filtered and the residue washed with cold 1% Na_2CO_3 solution. The neutralised filtrate, treated with 7 c.c. of HCl (d 1.19), is boiled, cooled, neutralised with CaCO_3 , and filtered, the residue being washed (total vol. > 100 c.c.). The solution is boiled for 20 min. with excess of CaCO_3 , the residue being washed with freshly boiled H_2O free from CO_2 . Filtration and washing are repeated. The cold solution is titrated with 0.1N- NaOH free from CO_2 in presence of glycerol or mannitol (phenolphthalein). CH. ABS.

Determination by X-ray methods of crystalline compounds causing opacity in enamels. A. I.

ANDREWS, G. L. CLARK, and H. W. ALEXANDER (J. Amer. Ceram. Soc., 1933, 16, 385—392).—The various cryst. opacifying agents were identified as SnO_2 , Sb_2O_5 , CaF_2 , and NaF (from Na_3AlF_6 and Na_2SiF_6). A cryst. compound of Zr was not identified, but $\text{Ca}_3(\text{PO}_4)_2$ appeared to be present. J. A. S.

Acid-proof enamelled apparatus. VI. V. LOKSHIN (Khimstroi, 1933, 5, 2035—2037).—The enamel contained 0.75 Na_2O , 0.25 CaO , 0.075 Al_2O_3 , 2.8 SiO_2 , 0.08 B_2O_3 , 0.2 F, corresponding with sand 527, kaolin 65, borax 57, CaCO_3 85, Na_2CO_3 230, Na_2SiF_6 42.

CH. ABS.

Resistance to sudden temperature change of some bodies of the system talc-clay-mullite. R. M. KING and C. L. EVANS (J. Amer. Ceram. Soc., 1933, 16, 360—362).—The vitrified bodies, including a 20% talc saggar mix, had high resistances to thermal shock. Microscopical examination showed the presence of cordierite (not enstatite) and a high-MgO glass.

J. A. S.

Use of auxiliary fluxes in dinnerware bodies. G. A. LOOMIS (J. Amer. Ceram. Soc., 1933, 16, 356—359).—Laboratory and plant tests on the replacement of the felspar of an earthenware body by Na_2O - CaO - SiO_2 glasses (3%) showed that vitrification occurred at a lower temp., but that the plasticity of the body was destroyed (overcome by adding slight excess of HCl in the slip) and there was increased warping, especially in the glost fire.

J. A. S.

Difficulties in firing decorated whiteware. J. T. ROBSON (J. Amer. Ceram. Soc., 1933, 16, 345—355).—“Spit out” or blistering is due to excessive H_2O in the kiln atm., or to the use of old glost ware (which has adsorbed H_2O), and/or too high a firing temp., which allows bubbles to rise through the glaze. Glost ware (2 years old) which blistered badly during decoration gave no trouble if first re-fired through the glost kiln. Crazing of ware was prevented in the same way. Uneven colouring of a red Se overglaze was due to volatilisation and condensation amongst too closely packed ware. Overglaze specks, caused by deposition of C from the varnish, were eliminated by increasing the felspar content to make a smoother glaze.

J. A. S.

Action of waste-wood ash on refractories. K. G. SKINNER and N. L. FIELD (J. Amer. Ceram. Soc., 1933, 16, 393—403).—Laboratory corrosion tests were carried out by blowing ash against brick panels heated in an oil flame. Corrosion depends on the composition, texture, and porosity of the brick, and the temp. and conditions of operation of the furnace. Recryst. SiC brick had the least reaction with the ash, and, for fireclay and diaspore refractories, the porosity was of more importance than the $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio. Mullite was observed at the slag interface in all the SiO_2 - Al_2O_3 materials. The higher temp. attained in oil-firing causes increased corrosion.

J. A. S.

Modern methods in the manufacture of refractory articles. L. LITINSKY (Feuerfest, 1933, 9, 121—131).—A lecture.

NaAlO_2 .—See VII.

See also A., Sept., 892, **Bauxites and mullites.** 926, **Apparatus glass.** 929, **X-Ray examination of ceramic raw materials.**

PATENTS.

Control of heat conditions in glass furnaces. E. GENTIL (U.S.P. 1,892,462, 27.12.32. Appl., 10.5.30).—The room in which a glass tank is placed is subdivided by partitions, and very const. conditions of air pressure are maintained by fans etc. irrespective of wind and barometer.

B. M. V.

Manufacture of safety glass. C. W. BONNIKSEN (B.P. 396,713, 6.2.32).—Material indistinguishable from plate (safety) glass is produced by polishing the outer surfaces of ordinary drawn (safety) glass. Before polishing with rouge, the hard surface skin is removed with fine emery.

J. A. S.

[Tunnel] kiln. C. A. COLEMAN (U.S.P. 1,891,469, 20.12.32. Appl., 13.2.31).—Bricks or other ceramic articles are fired on a perforated conveyor in a tunnel kiln having countercurrent air supply, combustion of which takes place in an intermediate zone.

B. M. V.

Firing of ceramic ware. J. T. BAMFORD (B.P. 397,339, 5.11.32).—The bedding material consists of a mixture of SrSO_4 and Al_2O_3 produced by calcining a 1:1 or 3:2 mixture of SrSO_4 and $\text{Al}(\text{OH})_3$.

L. A. C.

Moulding of graphite refractory compositions. A. M. HANAUER, ASSR. TO LAVA CRUCIBLE CO. OF PITTSBURGH (U.S.P. 1,891,979, 27.12.32. Appl., 28.12.31).—Moulded graphite crucibles made from a moist mix have part (up to 50%) of the H_2O replaced by a more volatile, immiscible liquid, e.g., petrol, to accelerate drying.

B. M. V.

[Apparatus for] tempering glass by jets of air directed at right angles to the surface. SOC. ANON. DES MANUF. DES GLACES ET PROD. CHIM. DE ST. GOBAIN, CHAUNY & CIREY (B.P. 397,395, 6.3.33. Fr., 24.3.32. Addn. to B.P. 361,277).

Fe-free Al_2O_3 .—See VII.

IX.—BUILDING MATERIALS.

Operating lime kilns with air enriched with oxygen. V. SOKOLOV (Khemistroi, 1933, 5, 1979—1984).—Use of air enriched with O_2 to obtain gases with a high CO_2 content is possible and profitable.

CH. ABS.

Special Portland cements containing a little chromium and manganese. K. AKIYAMA and J. UNOZAWA (Bull. Waseda Appl. Chem. Soc., 1933, 19, 1—7).— Cr_2O_3 , but not Mn_2O_3 , accelerated the combination of CaO in Portland cement and prevented the dusting of the clinker. Cement from clinker containing 0.5—1% Cr_2O_3 had greater mechanical strength during the initial period; Cr-Mn cement behaved similarly.

CH. ABS.

Properties of α - and β -dicalcium silicate and the dicalcium silicates of Portland cement clinkers. N. SUNDIUS (Z. anorg. Chem., 1933, 213, 343—352).—Crystallographic properties of the α - and β -silicates are recorded. The transformation of the β - into the γ -form is hindered by rapid cooling in air in presence of foreign

substances (e.g., Cr_2O_3). Solid solutions of foreign substances (e.g., Al_2O_3) in clinkers cannot be detected by any change in the optical properties of the β -disilicate.

H. J. E.

"False" set of cement. F. WHITWORTH (Cement, 1933, 6, 179—180).—Complete disagreement is expressed with the view of Schachtschabel (B., 1933, 269) that "false" set is due to a mechanical removal of H_2O . It is considered, not as a setting of the cement proper (I), but to be due to recrystallisation of the hemihydrate into gypsum with sufficient interlocking to register an initial set by needle tests. (I) meantime continues a normal set.

C. A. K.

Effect of sugar on mortars. J. BASSO (Cement, 1933, 6, 259—261).—The addition of 6% of sugar increased the tensile strength of CaO mortar from nil to 64 lb./sq. in. (7 days) and from 52.5 to 88 (28 days). In the presence of sugar the setting and hardening processes cannot develop normally as the $\text{Ca}(\text{OH})_2$ liberated combines to produce Ca saccharate (I), which hastens the reaction of the aluminates and produces the "quick set." The latter abstracts H_2O and the silicates react very slightly, retarding normal hardening. Increase in vol. due to (I) produces unsoundness. Sugar improves white CaO mortars, but has an injurious effect on Portland cement mortars.

C. A. K.

See also A., Sept., 916, Synthetic Ca silicates. $3\text{CaO}, \text{SiO}_2$ from basic slag.

PATENTS.

Manufacture of cement powders. I. G. FARBENIND. A.-G. (B.P. 396,964, 31.10.32. Ger., 29.10.31. Addn. to B.P. 328,538; B., 1930, 665).—A hydrous readily sol. silicate in solid form is mixed with substances capable of binding the silicic acid produced, to form insol. silicates. A filler may be added. Thus pulverised Na silicate may be mixed with BaO , Ca Al silicate, or salts of alkaline-earth metals which dissociate in contact with H_2O .

C. A. K.

Concrete. C. L. NORTON (U.S.P. 1,891,269, 20.12.32. Appl., 14.11.30).—A mortar or "rendering" is formed of hydraulic cement and hard-burned kaolin of the same order of fineness.

B. M. V.

Treatment of wood. P. J. WIEZEVICH, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,892,658, 27.12.32. Appl., 21.12.31).—Wood, fibre board, etc. are pretreated with HCl , Cl_2 , or other acidic gas (diluted with inert gas) prior to impregnation with montan or other wax of high m.p.

B. M. V.

Insulation material.—See I. Surfacing of board.—See V. Kiln.—See VIII. Rubber products.—See XIV.

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

Agglomeration of high-grade Krivorog iron ore. A. M. PARFENOV (Gorno-Obogat. Delo, 1932, No. 9, 11—21).—Sintering begins at 1050° and is complete at 1200° . With up to 8% of coke the yield varied inversely with the size of the coke.

CH. ABS.

Agglomeration of Bakal iron ores. A. M. PARFENOV (Gorno-Obogat. Delo, 1933, No. 1, 13—17).—

The ore (Fe 46.46—59.45%) was roasted to a form suitable for the blast furnace.

CH. ABS.

Concentration of ferro-quartzites from the Staro-Sokol district in Kursk. G. G. EGOROV (Gorno-Obogat. Delo, 1932, No. 4—5, 11—20).—The magnetite (Fe 32—38%) afforded a concentrate (50%) containing 60—62% Fe.

CH. ABS.

Production, casting, and treatment of Thomas rail-steel ingots. K. EICHEL (Stahl u. Eisen, 1933, 53, 521—532).—An account is given of the method of making rail steel used in a Saar steelworks with especial reference to the make-up of the charge, the time of blowing, the deoxidation, killing, and carburisation of the steel, method of casting, type and dimensions of moulds, and rolling practice.

A. R. P.

Effect of the silica content of iron ores on the smelting costs. K. GRETHE, J. STOECKER, and M. PASCHKE (Arch. Eisenhüttenw., 1933—4, 7, 1—6).—Statistics of the cost of smelting various Fe ores over a period of 8 years are summarised; the data show that smelting costs are raised considerably with an increase in the SiO_2 content of the charge and this increased cost is not fully compensated for by the lower price of siliceous ores.

A. R. P.

Calculations for soaking pits [for steel]. W. HEILIGENSTAEDT (Arch. Eisenhüttenw., 1933—4, 7, 25—36).—Mathematical. Expressions are deduced and graphs constructed from data obtained in practice for determining the heat balance, heat consumption, and heat losses from various sources in continuous soaking pits.

A. R. P.

Cupola cast irons with low and very low carbon content. G. DELBART and E. LECŒUVRE (Rev. Mét., 1933, 30, 296—297).—Cast irons containing C 1.7—2.5, Si 1.6—4.5, Mn 0.36—3.75, Cr 0—0.77, P 0.07—0.37, and S 0.026—0.097% have been prepared in a cupola and their properties examined. Max. strength of 35—40 kg. per sq. mm. is obtained with C 2—2.4, Si 2.9—3.0, Mn 0.5, and P + S 0.08%, the other alloys having 30—35 kg. per sq. mm. Max. hardness is obtained with 1.6—1.8% Si, but alloys with 2.5—3% Si and >2% Mn are evenly hard in thin and thick sections. A high Mn content gives low vals. for the bending and shear strength, but restrains growth. With >1.6% Mn the Si content must be increased to prevent the formation of mottled Fe in thin sections of the casting. High-Mn cast Fe should be tempered at 300° to obtain the best mechanical properties combined with max. hardness.

A. R. P.

Volume and production of [iron] blast furnaces; importance of pretreating the charge. P. ROUBINE (Rev. Mét., 1933, 30, 63—69).—The effect of vol. of the furnace and cross-sectional area at the tuyères on the output of pig Fe, and modern practice in preparing the charge in the principal Fe-smelting countries are discussed.

A. R. P.

Utilisation of the fuel in siderurgy. A. D. WILLIAMS (Rev. Mét., 1933, 30, 222—225).—Comparison of the wet and dry methods of purifying blast-furnace gas shows the former to have an economic advantage of about 10% as regards heating val.

A. R. P.

Equilibria between metals and slags in melts.
IV. Equilibrium $5\text{FeO} + 2\text{P} \rightleftharpoons \text{P}_2\text{O}_5 + 5\text{Fe}$. H. SCHACKMANN and W. KRINGS (Z. anorg. Chem., 1933, 213, 161—179; cf. A., 1933, 126).—The law of mass action is followed only when the regulus contains $>4-5\%$ P, the const. $([\text{FeO}]^5 [\Sigma\text{P}]/[\text{P}_2\text{O}_5] [\text{Fe}]^5)$ being 0.056 and 0.091 at 1450° and 1525°, respectively, concns. being expressed in wt.-%. The thermal val. of the reaction is 40.4 kg.-cal. The const. is unaltered by admixture of Al_2O_3 , is raised by SiO_2 , and is lowered by CaO or MgO . H. J. E.

Desulphurisation of cast iron and action of sodium carbonate on molten cast iron. L. F. GIRARDET and R. LELIÈVRE (Rev. Mét., 1933, 30, 219—220).—To obtain efficient desulphurisation of cast Fe with Na_2CO_3 it is necessary to remove the slag from the metal prior to treatment since the combined action of the NaCO_3 and the C in the metal produces Na which attacks the slag before the S in the metal. Efficient removal of the Na_2S slag before casting is also important. The treatment tends to reduce the Si content of the metal and to refine the grain size. A. R. P.

Carbon of cast iron. E. VROONEN (Rev. Mét., 1933, 30, 238—253).—Since 1% P reduces the C present as eutectic in cast Fe by 0.276% and 1% Si reduces it by 0.129% the index of carburisation of cast Fe is given by: $i = \% \text{C} / [4.3 - (0.276 \times \% \text{P}) - (0.129 \times \% \text{Si})]$. To obtain the best casting properties (*i.e.*, fluidity combined with soundness) it is shown from a series of analyses and mechanical tests that i should be > 93 . A. R. P.

Destruction of grey cast iron by acids. L. F. GIRARDET and TSOU-REN-KOU (Rev. Mét., 1933, 30, 218—219).—The dissolution of grey cast Fe in N -acid is controlled by the e.m.f. of the graphite-ferrite-pearlite eutectoid and the Fe_3C -eutectoid couples, and the activity of these couples depends on the conditions of the test; any change in structure which increases the no. or activity of these couples increases the corrosion. A. R. P.

Effect of added elements on polymorphism of iron. J. N. SVETCHNIKOV (Rev. Mét., 1933, 30, 200—211).—Mathematical analysis of the curves defining the γ -field in alloys of Fe with other metals has shown that they are all curves of the second order; in the systems where the γ -field enlarges with increasing % of added elements (A) and the A3 line falls, the A3 and A4 curves can be considered as parts of a single curve joined by an imaginary line to the left of the temp. axis. These curves are ellipses when the at. vol. of A differs relatively slightly from, and hyperbolæ when it is much $>$ or $<$, that of Fe. In the systems with Al, V, Mo, Cr, and Ni the curves are ellipses, and in the systems with Be and Sn hyperbolæ. There appears to be a definite relation between the at. vol. of A and the angles formed by the axes of the ellipse with the co-ordinates; this has been determined for the above systems and equations have been calc. for the curves. A. R. P.

Cast iron with a low carbon content. H. PORTIER (Rev. Mét., 1933, 30, 297—301).—The effects of Mn and Si on the properties of thin and thick sections of cast

Fe containing 2.5—2.6% C are shown in a series of graphs. A. R. P.

Effect of annealing temperature on the form of graphite precipitated [in cast iron]. R. LE ROMANCER and A. LE THOMAS (Rev. Mét., 1933, 30, 301—303).—On annealing cast Fe (C 3.41, Si 0.94, Mn 0.37, S 0.09, P 0.22%) at $< 900^\circ$ the graphite is pptd. in a very finely-divided form and then collects into nodules; above 1000° pptn. occurs in the form of well-defined lamellæ, whilst at intermediate temp. ill-defined mixtures of both forms are obtained. A. R. P.

Malleable cast iron containing nickel or nickel and chromium. L. THIERY (Rev. Mét., 1933, 30, 308).—Replacement of part of the Si necessary to cause graphitisation by an equiv. quantity of Ni causes the graphite to be pptd. on annealing in a finer and more evenly disseminated state and the cementite gradually to be converted first into pearlite and then into ferrite as the amount of Ni is increased. Addition of Cr tends to restrain graphitisation, increase the hardness, and reduce the elongation and resistance to shock; the structure of malleable cast Fe containing Ni and Cr consists of graphite and carbides disseminated in an extremely fine-grained pearlite matrix. A. R. P.

Tempering anomalies of cast iron: connexion with oxidation in the liquid state. A. LE THOMAS (Compt. rend., 1933, 197, 408—410; cf. B., 1928, 94).—The capacity for tempering, measured by the depth tempered in a block of cast Fe ($20 \times 80 \times 50$ mm.) poured against a large block of Fe, ordinarily displays "heredity." It is independent of temp. of pouring and chemical composition, but depends on the oxidation or deoxidation effected during melting, being a min., and const., when melting is effected under a deoxidising slag. The difference between this min. and the actual under other circumstances is termed the "tempering anomaly" for those circumstances. C. A. S.

I. Influence of titanium on cast iron. II. Natural titanium-vanadium cast irons. J. CHALLANSONNET (Rev. Mét., 1933, 30, 292—294, 294—296).—I. Ti in cast Fe tends to cause an alloy which normally solidifies in the white form to solidify in the grey form, *i.e.*, it lowers the temp. at which Fe_3C decomposes; at the same time it raises the Acl and Ar1 points. A small Ti content accelerates graphitisation of hypereutectoid cementite, but restrains graphitisation of pearlitic cementite; it has no effect on the mechanical properties of grey cast Fe. Some evidence of the formation of Ti cyanonitride in certain titaniferous cast irons has been found.

II. Addition of V to cast Fe increases the hardness and the bending and shear strengths and tends to convert grey cast Fe into white. Sand-cast natural V-Ti cast irons show a very regular graphite distribution; the Ti tempers the pronounced quenching effect of V. A. R. P.

Effect of molybdenum on cast iron. J. COURNOT and J. CHALLANSONNET (Rev. Mét., 1933, 30, 260—265).—Up to 2% Mo can be added to cast Fe (3.4—3.6% C, 2.2—2.4% Si) without producing separation of complex carbides and without producing white cast Fe; the Mo causes the pearlite to become granular and the graphite

to separate in more finely-divided form. With up to 3% Mo the increase in hardness is linear, and the hardness may be raised still further by quenching from 800—900°, preferably in oil. A. R. P.

Potentiometric analysis in ironworks laboratories. V. Determination of molybdenum. P. DICKENS and R. BRENECKE (Mitt. Kaiser-Wilh.-Inst. Eisenforsch., 1932, 14, 249—259; Chem. Zentr., 1933, i, 1325—1326).—Mo is accurately determined by using Mo foil as indicator electrode, $N\text{-Hg}_2\text{Cl}_2$ electrode as reference electrode, and HgClO_4 or $\text{Pb}(\text{ClO}_4)_2$ as titration liquid. With the former Cl⁻ must be absent. Mo must be separated from Fe with NaOH. Addition of HCO_2Na retains Al in solution without interfering with the Pb pptn. Separation of Mo from Cr, V, and W is effected by Kassler's method, and Na_2SO_3 may be added to reduce Fe³⁺. Rousseau's method is not recommended. Trzebiatowski's method of titration with SnCl_2 gives good results under specified conditions. A. A. E.

Graphitisation of cast iron: effect of high silicon content. A. LE THOMAS and M. OLINGER (Rev. Mét., 1933, 30, 305—308).—The Ac point of cast Fe is increased by 45° by every 1% Si present and reaches 1030° with 7% Si. The graphitisation temp. falls from 900° with 1% Si to a min. of 690° at 3.5% Si, then rises slowly to 760° with 7% Si; it cannot be detected dilatometrically with > 7% Si, the dilatation for a 7.5% Si cast Fe being completely reversible between 20° and 1030°. Cast Fe with 7—10% Si is remarkably resistant to scaling on heating at $\geq 1030^\circ$. A. R. P.

Special cast irons. L. GUILLET and M. BALLAY (Rev. Mét., 1933, 30, 256—260).—The effects of additions of Si, Al, Ni, Mo, Cr, and Cu on the structure and properties of cast Fe are briefly reviewed. A. R. P.

Rôle of nickel in nitriding steels. H. J. FRENCH and V. O. HOMERBERG (Japan Nickel Rev., 1933, 1, 177—191).—Addition of Ni to nitriding steels strengthens and toughens the case and slightly decreases the case hardness, the most effective additions being 2—3.5% N. The core is also strengthened and hardened, and provides increased support for the case. In steels containing appreciable proportions of Al, Ni develops dispersion-hardening phenomena during nitriding. Soft articles thus automatically acquire improved core strength and elastic properties by nitriding. Sp. examples of the effects of Ni addition to Al—Cr—Mo steels are discussed. H. E. B.

Welding wire for the acetylene welding of steel. E. STREB (Azetylen Wiss. Ind., 1932, 35, 36—40, 55—60; Chem. Zentr., 1933, i, 845).—Sputtering is due to separation of gases, particularly H_2O formed by interaction of flame gases with FeO inclusions. The effect of various minor constituents of the Fe wire on the process is discussed. The SiO_2 content should be minimal. A. A. E.

Red-shortness of copper steels and its prevention. F. NEHL (Stahl u. Eisen, 1933, 53, 773—778).—In the hot-working of steel containing > 0.5% Cu a film of metallic Cu forms along the grain boundaries of the Fe below the scale; if the working temp. exceeds the m.p. of Cu this film produces hot-shortness characterised by surface-cracking during bending or similar

severe deformation. Heating in a non-oxidising atm. hinders the development of this trouble, and heating in H_2 prevents it entirely since no scale is formed. The trouble can also be overcome by adding Ni to the steel in an amount > half the Cu content, whereby the m.p. of the Cu segregate is raised above the temp. at which the steel is worked (1250°). The presence of Ni also improves the mechanical properties of Cu steels, vals. being obtained equal to those of pptn.-hardened Cu steel, and these can be still further increased by heat treatment to produce pptn.-hardening. A. R. P.

Protective coating on steel formed by heating in air. H. VON SCHWARZE (Mitt. Forsch. Inst. Verein. Stahlwerke A.-G., 1932, 2, 263—277; Chem. Zentr., 1932, ii, 3953).—For unalloyed steels of different origins the velocity of atm. oxidation at 300—400° is independent of the composition and mode of production. Observations on steel heated at 700° in dry air show that the character of the forge scale plays a greater part than the velocity of diffusion of O_2 through the oxide layer. The effect of addition of Al ($\geq 14\%$) and Cr ($\geq 18\%$) in steel heated at 900—1200° has been investigated in relation to the formation of "white" and "black" scale. A. A. E.

Corrosion and residual current. L. W. HAASE (Korrosion u. Metallschutz, 1932, 8, 281—288; Chem. Zentr., 1933, i, 846).—The corrosion current measured in presence of O_2 consists of the O_2 -depolarisation current and a current depending on the material and temp. The statement that at $p_{\text{H}} 5\text{—}9$ Fe dissolves only in presence of O_2 holds at room temp. but not at 50—90°. The theoretical quantity of SO_3 does not protect against corrosion; a 5—10% excess is necessary. A. A. E.

Simultaneous effect of the degree of cold-work and of the temperature on the mechanical properties of mild steel, copper, and nickel. A. ANCELLE (Rev. Mét., 1933, 30, 266—274, 309—318).—The mechanical properties (P) of cold-drawn wires of Cu, Ni, and mild steel after annealing at various temp. (T) and after various degrees of cold work (W) are shown in a series of graphs. The curves relating to mechanical properties and temp. can be divided into four zones. (I) The properties are affected only slightly by rise in T , the effect being greater the greater is W ; when W is small T has no effect. Complete annealing is never produced however long the treatment is prolonged. (II) Sharp and rapid changes occur in P ; when W is $< 50\%$ the temp. range (R) of this zone is higher and broader the smaller is W , and when W is very high R is very narrow, but mechanical equilibrium can be obtained only at a definite temp. independent of W . (III) The mechanical properties of the annealed wire are better the greater is W ; this zone is generally very narrow and the phenomena which occur in it are often masked by rapid grain growth or by the effect of transformations in the metal. (IV) Coarse crystal structures develop rapidly and the mechanical properties are seriously affected; the metal is over-annealed. A. R. P.

Molybdenum high-speed steels. J. V. EMMONS (Trans. Amer. Soc. Steel Treat., 1933, 21, 193—220).—Properties have been compared with those of W steels.

For similar C contents the Mo steels show fewer carbides than do W steels. CH. ABS.

Determination of the loss in weight in corrosion tests on ferrous metals. J. COURNOT (Rev. Mét., 1933, 30, 280—283).—Removal of the rust by boiling the specimen with 20% NaOH and 30 g. of Zn per litre is recommended instead of brushing. A. R. P.

Determination of the loss in weight in corrosion tests. A. PORTEVIN (Rev. Mét., 1933, 30, 275—279).—Methods of cleaning metallic specimens from the products of corrosion are discussed with especial reference to Fe and steel. Rust can readily be removed from ferrous metals without attacking the metal by treatment with a freshly prepared solution containing 30 c.c. of conc. HCl, 1 c.c. of 40% CH_2O , 0.2 g. of As_2O_3 , and 0.5 g. of SnCl_2 per 100 c.c. A. R. P.

Akimov's theory of structure corrosion. H. RÖHRIG (Korrosion u. Metallschutz, 1932, 8, 313—314; Chem. Zentr., 1933, i, 1345).—An exemplification and discussion. A. A. E.

Roasting of weathered pyrites containing sulphates. J. JELINEK (Chim. et Ind. 1933, 29, Spec. No., June, 725—726).—Pyrites which is exposed to the action of the weather suffers from sulphate (I) formation on the surface, as shown by white efflorescence, and the (I) cements it into a hard mass. In a mechanical furnace it does not become ignited so quickly as fresh pyrites owing to the thin layer of (I) on the grains. In a particular case the (I) content of the cinders was 1.52% with weathered pyrites as against traces with the same pyrites kept dry. C. I.

Depressing action of zinc hyposulphite on Ridder ores. N. V. ZASHIKHIN (Gorno-Obogat. Delo, 1933, No. 1, 18—25).— ZnS_2O_4 is preferable to $\text{NaCN} + \text{ZnSO}_4$ as a depressing agent in the concn. of Ridder Pb-Zn ores by flotation; smaller quantities are required, and Au is not dissolved. CH. ABS.

Effect of deformation by cold- and hot-rolling on the density of zinc. O. BAUER and P. ZUNKER (Z. Metallk., 1933, 25, 149—153).—The d of cast electrolytic Zn (7.133) is reduced considerably by hot-rolling owing to the development of fissures between the grains; this effect is not observed in ordinary refined Zn since the Pb inclusions (1—1.6% Pb) are sufficiently plastic to fill the voids between the Zn crystals. After > 40% reduction by rolling the casting structure of Zn disappears and the d then increases with further rolling until cracking occurs with > 72% reduction. Cold-rolling without cracking is possible only after a 50% reduction by hot-rolling. A. R. P.

Concentration of low-grade nickel ores. V. V. DOLIVO-DOBROVOLSKI (Gorno-Obogat. Delo, 1932, No. 2—3, 59—68).—Max. extraction of Ni (> 94.4%) and Fe (> 84.9%) from ores containing Ni 0.40—1.34, Fe_2O_3 22.64—63.10, Cr 0.36—0.87% was effected by treatment with 10% H_2SO_4 for 12 hr. CH. ABS.

Action of alkali xanthates on galena. T. C. TAYLOR and A. F. KNOLL (Amer. Inst. Min. Met. Eng., 1933, No. 26, 16 pp.).—Reaction in H_2O involves ionic interchange of xanthate with SO_4'' , SO_3'' , other S-O ions, and CO_3'' . S'' takes no part. S'' ions in the

galena lattice acquire O and form SO_4'' , SO_3'' , etc. at the surface; it is these ions which are displaced to give the oriented H_2O -repellent layer utilised in froth flotation. The stability of alkali xanthates is discussed. CH. ABS.

Analysis of certain lead alloys. B. S. EVANS (Analyst, 1933, 58, 450—461).—In the determination of Tl by titration with KBrO_3 , Pb is removed as PbI_2 in a solution of aq. $\text{NH}_3\text{-NH}_4$ citrate, incomplete pptn. of the iodide being avoided by addition of a little AgNO_3 ; to eliminate Sb, a solution of the residue in HCl is pptd. alkaline with Na_2S and a solution in Br-HCl of the resulting ppt. reduced by SO_2 . Te is determined as for As (A., 1932, 1010) and separated from it by pptn. as metal by H_3PO_2 in the presence of H_2SO_4 (Pb having been removed as acid tartrate), subsequent oxidation beyond the Te^{IV} state being achieved by addition of KI and H_2SO_4 before the I. Ce is pptd. in the presence of Pb or Mn by addition of NaBO_3 to a slightly acid solution, and is converted into the Ce^{IV} state by NaBiO_3 and titrated by the FeSO_4 and KMnO_4 method (A., 1931, 1261). Cu is determined rapidly after removal of Pb and Sb with $\text{Na}_2\text{S}_2\text{O}_4$ (A., 1929, 1030), and Cd with Na_2S . Under the conditions described and in the absence of Cu, Ni may be determined directly from the colour produced with dimethylglyoxime. Methods for Ca, Ba, Hg, and Sn are also discussed. J. G.

Concentration of molybdenum ore from Khibin deposits. V. P. KULLANDA and K. V. LANDSBERG (Gorno-Obogat. Delo, 1932, No. 2—3, 54—58).—The ore contained 0.7—2.65% Mo. By flotation with kerosene and pine tar a concentrate (15%) containing 10% Mo was obtained. Four flotations afforded a 30% Mo concentrate. CH. ABS.

Composition and concentratability of the Khapcherang tin ore deposits. V. P. KULLANDA (Gorno-Obogat. Delo, 1932, No. 12, 6—10).—Flotation afforded sulphide, ferrous, quartz, and siliceous fractions. Most of the SnO_2 is associated with the quartz. Grinding to < 1 mm. is advocated. CH. ABS.

Sodium content of silumin. E. SCHEUER (Z. Metallk., 1933, 25, 139—141, 157—160).—Na can be determined in silumin (I) by melting the alloy in air and extracting with H_2O the NaOH formed; the solution is then titrated with standard acid. A modified grain structure of (I) is obtained equally well by treating the molten alloy with Na salts as by adding Na, but this does not occur with < 0.003% Na; normally modified (I) contains 0.01% Na, and 0.015% Na causes over-modification. The amount of Na taken up from fused Na salts is a max. at about 800° and relatively small at 1000° and at the m.p. Similarly, the rate of oxidation of the Na on remelting in air is greatest at 800° and smallest at 600°. Pure Al absorbs less Na than does (I); the amount absorbed falls steadily with rise in temp. from 675° to 1000°. A. R. P.

Prevention of grain growth in wrought aluminium alloys. D. R. TULLIS (Metallurgia, 1933, 8, 129—130).—Current methods, particularly those in which an element such as Ti or B is added, are discussed briefly. Addition of B to metal intended for the production of

chill castings prevents grain growth resulting from combined plastic deformation and heat treatment.

H. F. G.

Corrosion at riveted joints in duralumin structures. G. V. AKIMOV (Korrosion u. Metallschutz, 1932, 8, 309—313; Chem. Zentr., 1933, i, 1346).—A difference of 2.5% in Cu content in the bolt has no noticeable effect. In contact with the plate the bolt with a low Cu content behaves as an anode, or with a high Cu content, as cathode.

A. A. E.

Dissolution of the products of corrosion from light and ultra-light alloys. P. BASTIEN (Rev. Mét., 1933, 30, 284—286).—The corrosion products on Al and its alloys are best removed by treatment with conc. HNO_3 at 30° for 30 min., whilst those on Mg and its alloys can be removed with only a very slight attack on the metal by treatment with boiling 20% H_2CrO_4 containing 1% Ag_2CrO_4 if the products contain Cl. The rate of corrosion of Al-Mg alloys in 1% HCl falls to a min. at 8% Al (limit of solid solubility) and then increases rapidly with increasing separation of Mg_4Al_3 ; in 1% citric acid the rate decreases rapidly with increasing Al above 6%. In 1% HCl the rate of corrosion of Si-Mg alloys increases sharply with up to 2% Si, then decreases rapidly with further rise in Si.

A. R. P.

Interpretation of tensile tests at high temperatures. SAUVAGEOT (Rev. Mét., 1933, 30, 319—322).—In determining the creep limit at high temp. the results are affected by the rate of heating, time of keeping at the high temp. before applying the load, rate of application of the load, and the definition adopted for the elastic limit. These points are illustrated by the results obtained on a steel after 3 different heat-treatments.

A. R. P.

Testing the resistance of metals under the conditions of carbon tetrachloride production. L. VERNITZ and A. KUDINOVA (Trans. State Inst. Appl. Chem., Leningrad, 1932, No. 15, 39—43).—Al and Cu are attacked by S_2Cl_2 ; Cr-Fe resists dry S_2Cl_2 and SCl_2 , but not a mixture of HCl and dry S_2Cl_2 . Ni is very, and Pb comparatively, resistant.

CH. ABS.

Serrated discontinuity on the load-extension diagram and age-hardening of metals and alloys. T. KAWAI (Sci. Rep. Tôhoku, 1933, 22, 354—374).—Only alloys which undergo age-hardening (I) after stretching show a serrated discontinuity on the load-extension diagram, and then only when the test is made at a temp. at which (I) is significant.

A. R. P.

Vacuum fusion method for determination of gases in metals. L. REEVE (Amer. Inst. Min. Met. Eng., Contrib. No. 56, July, 1933, 21 pp.).—The graphite melting crucible (I) is supported by a flange on its rim on the top of a sillimanite protection tube which is spaced from the lower portion of (I) and is itself contained in a SiO_2 tube placed just inside the coil of the induction furnace. The specimen is suspended above (I) until this has been degassed in vac. at 1720°/0.05 mm. and is lowered into (I) when the temp. has fallen to 1570°; addition of Sn to (I) facilitates degassing and reduction of the oxides in the metal. By temp. regulation it is possible to determine the state of combination of the O; FeO is reduced at 1050—1075°, MnO at

1150°, SiO_2 at 1300°, and Al_2O_3 at 1570°. In all cases the gas is pumped off until the pressure falls to 0.004—0.006 mm. and analysed separately. Since the N in steel, especially weld steel, is evolved in steps similarly to the O it is concluded that the N in steel exists in several forms. Most of the H is evolved at 1100° and the remainder at about 1300°.

A. R. P.

Use of hot blast in smelting minerals in a water-jacketed furnace. R. BOGITCH (Compt. rend., 1933, 196, 1324—1325).—The flue gases from a water-jacketed furnace, e.g., as used for smelting Ni ore, contain only about 18% CO and after the cooling entailed in pptn. of dust are difficult to burn; if, however, the gases be drawn off from the middle of the mass of mineral by vertical tubes (to avoid accumulation of dust) and burned, without further purification, with heated air (300—650°), and the mineral contains < 13% H_2O , they can be satisfactorily used, with a saving of 10—20% in coke consumption.

C. A. S.

Use of coloured indicators for detecting heterogeneity in alloys. A. COTTON (Compt. rend., 1933, 197, 501).—Prot and Goldovsky's method (B., 1933, 791) and Quillard's (B., 1928, 94) are identical.

C. A. S.

Electrodeposition of nickel and chromium. J. W. CUTHBERTSON (Metallurgia, 1933, 8, 109—110).—Details are given of the baths and methods of operation for producing bright Cr deposits. Pb or Sb-Pb anodes are preferable to those of Fe, as Fe has a lower O_2 overvoltage and in solution decreases the throwing power.

H. F. G.

Determination of boric and citric acids in nickel [-plating] baths. E. VINCKE (Chem.-Ztg., 1933, 57, 695—696).— H_3BO_3 (I) is determined, after removing Ni by electrolysis and NH_3 by boiling with Na_2CO_3 , by adding glycerin and titrating to phenolphthalein with 0.1N-NaOH. If citric acid (II) is also present, the concn. should be adjusted so that the (II) content is 4—8 g. per litre. (II) is determined by oxidising with KMnO_4 to COMe_2 , adding KI, treating the pptd. CHI_3 with dil. H_2SO_4 , and titrating the liberated I with 0.1N- $\text{Na}_2\text{S}_2\text{O}_3$. (I) and tartaric acid do not interfere.

E. S. H.

Effect of metallic impurities on technical zinc electrolysis. P. RÖNTGEN and R. BUCHKREMER (Metall u. Erz, 1932, 29, 449—456; Chem. Zentr., 1933, i, 1343).—Cu and Co separate as sludge in relatively large quantities from quite dil. solutions; Ni separates the less readily. As and Sb have a low crit. c.d., but readily form protective coatings. The effects of Cd and Fe are also described.

A. A. E.

Electrodeposition of silver on basis metal containing phosphorus. Electrolytic degreasing. H. MOSER, K. W. FRÖHLICH, and E. RAUB (Angew. Chem. 1933, 46, 562—565).—A lecture, illustrating the deleterious effects of Cu_3P and Cu_2O on the deposition of Ag on Ag-Cu alloys. During the cathodic degreasing PH_3 is evolved.

E. S. H.

Open-hearth furnaces.—See I. **Corrosion of pipe-lines.**—See II. **Foundry-core binders.**—See XII. **Protective painting.**—See XIII. **Chlorate solutions [and corrosion].**—See XVI.

See also A., Sept., 891, Crystallisation of ingots. 894, Resistance of metals, alloys, etc. 895, Au-Rh, Ag-Rh, Ni-Fe, Pb-Bi, Pt-Co, and Ni-Co alloys. 896, Ferrosilicons. Cu-rich alloys containing P. Cu-Sn-P alloys. W and Mo steels. 908, Passage of current in liquid alloys. 913, Electrolysis of org. Cu salts, and of Pb salts. 914, Electro-depositing metals and alloys. 916, $3\text{CaO}\cdot\text{SiO}_2$ from basic open-hearth steel slags. 920, Quant. analysis by spectroscopic methods. 923, Determining Pb and heavy metals. 925, Pt/Pt-Rh thermocouples.

PATENTS.

Substitute for natural feed ore [in manufacture of steel]. J. M. HUGHES, J. H. CARTER, and L. B. PERKINS, Assrs. to SHARON STEEL HOOP Co. (U.S.P. 1,891,889, 20.12.32. Appl., 21.6.30).— Fe_3O_4 (in any form, scale or ore) is briquetted with about 7% of Portland cement, so as to form lumps that will sink through the slag in an open-hearth furnace. B. M. V.

Puddling. C. HART, Assr. to WROUGHT IRON Co. OF AMERICA (U.S.P. 1,892,271, 27.12.32. Appl., 14.6.30).—In a rotary or oscillatory furnace (A) the charge is retained by a dam (B) the effective height of which can be varied by rotating A to different positions; when B is below the surface of the bath the skimmings are run into an end compartment from which they are automatically discharged when A is rotated to raise B.

B. M. V.

Elimination of arsenic and antimony from iron ores and manganese ores. VEREIN. STAHLWERKE A.-G. (B.P. 396,058, 26.1.32. Ger., 9.2.31).—The ores are heated at $500\text{--}1000^\circ$ ($<$ sintering temp.) in an atm. of CO_2 and a reducing gas, e.g., blast-furnace, coke-oven, or water-gas. The CO_2 content should be increased up to even 100% towards the end of the reaction.

C. A. K.

Annealing furnace. W. E. MOORE and G. L. SIMPSON, Assrs. to PITTSBURGH RESEARCH CORP. (U.S.P. 1,892,112, 27.12.32. Appl., 2.12.31).—The annealing box comprises a hood sealed to a baseplate by means of a gasket; means are provided for the supply of a treatment gas in such a manner that it sweeps the air out of the box, and for maintaining the internal atm. at a pressure $>$ that of the heating gases outside.

B. M. V.

Treatment of ferrous sheets and plates [to prevent sticking during annealing]. J. C. WHEZZEL, Assr. to AMER. SHEET & TIN PLATE Co. (U.S.P. 1,892,560, 27.12.32. Appl., 25.9.31).—Sticking of the sheets is prevented by immersion, after pickling, in an aq. suspension of MnO_2 (0.001–0.2%), or in a KMnO_4 solution of about the same concn.

B. M. V.

Pickling of ferrous metals. J. R. McELHANEY, Assr. to AMER. SHEET & TIN PLATE Co. (U.S.P. 1,892,312, 27.12.32. Appl., 16.6.31).—The articles are immersed in H_2O at $65\text{--}100^\circ$ before being pickled.

B. M. V.

Pickling or cleaning of iron and steel and production of substances suitable for use therein. ROBINSON BROS., LTD., D. W. PARKES, and C. D. MITCHELL (B.P. 396,053, 20.1. and 18.11.32).—Homologues of $\text{C}_5\text{H}_5\text{N}$ or quinoline and/or other cyclic nitro-

genous bases, e.g., piperidine, which have been heated with S or S_2Cl_2 are used as restrainers during the pickling process.

C. A. K.

Refining of steels. P. GIROD (B.P. 395,158, 7.7.32. Ger., 9.7.31).—The refining slag and the metal bath are heated to a high temp. and poured simultaneously into a ladle so that intimate mixing takes place. De-oxidising agents and alloying elements for the steel may be added simultaneously to the stream or placed in the bottom of the ladle prior to pouring.

A. R. P.

Armour plate [steel]. F. KRUPP A.-G. (B.P. 397,079, 9.5.33. Ger., 26.5.32).—The plate is made of steel containing C 0.05–0.65 (0.35), Cr 1–4.5 (2.6), Mo 0.1–1.5 (0.4), and Co and/or Ni 1–5%, and is hardened on one side only. Part of the Mo may be replaced by 1.5–3 times as much W, and the Co content is $<$ 1 (1.6)%.

A. R. P.

Stainless steel alloys for use in turbine blading. W. H. HATFIELD and J. F. BRIDGE (B.P. 396,809, 13.2.32).—The steel contains Cr 16–30 (21), Ni 6–15 (9), C 0.2–0.8 (0.3), Si 0.8–2 (1.1), Ti 0.8–2.5 (1.6), Mn 0.7, and V, Mo, or Be \geq 1%; it is softened by air-cooling from $800\text{--}1150^\circ$.

A. R. P.

Non-corrosive steel alloy. H. A. MITCHELL, A. W. GREGG, and R. H. FRANK, Assrs. to BONNEY-FLOYD Co. (U.S.P. 1,892,316, 27.12.32. Appl., 26.12.29).—A heat-resisting steel contains C 0.5, Mn 14, Al 11, Si 0.5%, and, if desired, Cr, Ni, or Mo 1–5%.

B. M. V.

Improving the properties of a ferromagnetic material [nickel-iron alloy]. INTERNAT. GEN. ELECTRIC Co., Inc., Asses. of ALLGEM. ELEKTRICITÄTS GES. (B.P. 395,050, 27.1.32. Ger., 27.1.31).—A coil with a Ni-Fe alloy core for weak alternating fields is loaded with d.c. during operation to such an extent that the permeability is reduced by 50% and thereby the hysteresis losses are reduced by 50%. The d.-c. magnetisation is kept const. by inserting a H_2 -Fe resistance in the d.-c. circuit.

A. R. P.

Manufacture of metallic [copper] powder [for incorporation into carbon brushes etc.]. Soc. ANON. LE CARBONE (B.P. 396,250, 27.10.32. Fr., 16.11.31).—Cu powder (300-mesh) is agitated with 0.25% aq. AgNO_3 to coat the particles with a film of Ag, and the product after drying is mixed with graphite and pressed into shape.

A. R. P.

[Copper] alloy. W. H. BASSETT, JUN., and R. H. LEACH, Assrs. to ANACONDA WIRE & CABLE Co. (U.S.P. 1,891,495, 20.12.32. Appl., 20.2.31).—Bronze trolley or lead-in wires are formed from Cd 0.25–1.00 and Ag 0.125–0.75% melted as a pre-alloy and added to the Cu.

B. M. V.

Recovery of certain metals of the third periodic group. F. G. McCUTCHEON, Assr. to ONEIDA COMMUNITY, LTD. (U.S.P. 1,886,825, 8.11.32. Appl., 8.2.31).—In the process described in U.S.P. 1,855,455 (B., 1933, 312), the metal added may be additional Zn or any that is sol. in H_2SO_4 and pptd. by H_2S , e.g., Cd.

B. M. V.

Selective separation of ores [by flotation]. L. J. O'MALLEY (U.S.P. 1,891,776, 20.12.32. Appl., 14.6.30).—Highly excited electrodes are placed in the

froth, one being in the upper part and the other at about the junction of pulp and froth; the apparatus is especially suitable for the initial separation of PbS from other sulphides. B. M. V.

Refining of lead. W. F. GROSS and C. N. SAPPINGTON, Assrs. to AMER. SMELTING & REFINING CO. (U.S.P. 1,891,978, 27.12.32. Appl., 22.1.27).—Pb is freed from Cu by pumping the Pb over an exposed surface and adding S, the whole being returned to the bath below the surface. B. M. V.

Manufacture of fusible alloy. W. J. HAWKINS, Assr. to AMER. MACHINE & FOUNDRY CO. (U.S.P. 1,892,273, 27.12.32. Appl., 13.9.27).—A dark alloy is formed of Pb and 0.1% of Pb phosphide, and this is lightened by the addition of 1% of brightening metal, e.g., Sn, Sb, Zn. B. M. V.

Hard-metal alloys. TOOL METAL MANUFACTURING CO., LTD. (B.P. 396,940, 15.8.32. Ger., 17.8.31).—Sintered alloys containing 1–14% ZrC and/or ThC together with WC or TaC and \geq 25% Ni, Co, Fe, or Mn are claimed. A. R. P.

Treatment of cobalt-tungsten alloys. VEREIN STAHLWERKE A.-G. (B.P. 396,380, 25.1.32. Ger., 18.2.31. Addn. to B.P. 356,089; B., 1931, 1103).—Alloys containing Co 41–85, Cr \geq 40, and W \leq 5%, together with \geq 5% in all of 1 or more of the following: Mo, Mn, Ni, Cu, Al, V, Ti, are quenched from $>$ 1000° and annealed at 500–900° to produce pptn.-hardening. Fe may replace part of the Cr, but \leq 5% Cr must be present with 35% Fe. A. R. P.

Metal compositions [containing tantalum carbide]. BRIT. THOMSON-HOUSTON CO., LTD., Asses. of F. C. KELLEY (B.P. 395,064 and 396,129, [A] 11.2.32, [B] 12.2.32. U.S., [A] 4.2.31, [B] 14.2.31).—Hard tool alloys are made of sintered mixtures of (A) TaC (87%) bonded with 3–25 (13) % of a 90–10 : 10–90 (70 : 30) Co–W mixture, or (B) 5–40% NbC, 82–47% TaC bonded with 3–25% of a mixture of Fe, Co, or Ni with Mo and/or W. A. R. P.

Production of [chromium] alloys. HERAEUS-VACUUMSCHMELZE A.-G., and W. ROHN (B.P. 395,060, 9.2.32. Ger., 27.2.31).—H₂ is passed over a bath of molten Fe, Ni, Co, or mixtures of these, on which the requisite quantity of Cr₂O₃ is floating. Purification of the H₂ from traces of H₂O is unnecessary. By using a 91 : 9 Fe–Ni alloy as the bath stainless Fe alloys free from C can be produced directly. V₂O₅, Ta₂O₅, and U₃O₈ can be similarly reduced and alloyed with Fe or Ni. A. R. P.

[Acid-resistant] metal alloy. J. L. COX and F. B. FOLEY (U.S.P. 1,892,384, 27.12.32. Appl., 7.10.31).—An alloy resistant to dil. mineral acids comprises Cr 20–25, Cu 70–15, Ni 1 to \leq 4, and Si 2–8%, the remainder being mainly Fe. B. M. V.

Casting of readily oxidisable metals [magnesium]. DOW CHEM. CO., Asses. of J. A. GANN (B.P. 396,645, 24.2.33. U.S., 3.3.32).—The metal is cast into green sand moulds containing as bonding material, *inter alia*, HBF₄ or a volatile salt thereof, e.g., NH₄BF₄. A. R. P.

Treatment of non-ferrous [aluminium] alloys to protect them against corrosion. H. C. HALL (B.P. 396,746, 4.2.32).—Al alloys with $>$ 80% Al are immersed in a hot (e.g., 130°) 6% solution of H₃PO₄ in ethylene glycol, trimethylene glycol, or glycerol and the coated alloy is heated at 100–200°. A. R. P.

Treatment of aluminium alloys. N. B. LANE and W. T. ENNOR, Assrs. to ALUMINUM CO. OF AMERICA (U.S.P. 1,891,549, 20.12.32. Appl., 3.12.30).—Intermediate the various stages of manufacture of, e.g., a rivet, the metal is dipped in aq. NaOH. B. M. V.

Working of aluminium-base alloys. A. H. STEVENS, From ALUMINIUM, LTD. (B.P. 395,273, 21.1.33).—Al alloys with 5–15% Mg are annealed at $>$ 288°, preferably $>$ 400°, for a long period, cooled to 315–250°, and rolled or forged at $>$ 245°. A. R. P.

Removal of rust, scale, and sediment from the interior of metal surfaces. F. C. BATTISTELLA, Assr. to SANITATION HOLDING CORP. (U.S.P. 1,892,093, 27.12.32. Appl., 10.12.29).—In, e.g., a hot-H₂O system a comparatively dil. acid solution (H₃PO₄ 40, AcOH 10, BuOH 30, EtOH 20%) is circulated under pressure and at considerable speed so that erosion has considerable effect, the solid matter being continuously filtered off. B. M. V.

Cleaning of moulds [used in rubber-curing]. G. G. ANDREWS, Assr. to GOODYEAR TIRE & RUBBER CO. (U.S.P. 1,891,197, 13.12.32. Appl., 6.2.28).—The mould is filled with aq. NaOH (15%) and heated until the pressure reaches 110 lb. per sq. in. The mould is then emptied by releasing the pressure from the bottom. A. R. P.

Apparatus for effecting the electrodeposition of metals. G. E. ADEY (B.P. 397,609, 2.5.32).—Apparatus comprising a motor-driven d.-c. generator, connected with an electrode made of the metal to be deposited and with the surface upon which metal is to be deposited arranged in an electrolyte, and provided with a vernier device for controlling the output of the generator, is claimed. J. S. G. T.

Electroplated chromium article. D. GRAY and B. K. NORTHROP, Assrs. to ONEIDA COMMUNITY, LTD. (U.S.P. 1,892,051, 27.12.32. Appl., 14.2.29).—Cr or other metal having a passive or filmed surface is flash-plated with Cu in strongly acid solution and then plated with Ag. B. M. V.

Electrolytic treatment of aluminium or its alloys. E. WINDSOR-BOWEN (B.P. 396,743, 6.1.32).—A protective oxide coating on Al is obtained by anodic treatment in a 25–55% solution of H₂SO₄ and Na₂SO₄·10H₂O in the ratio 1 : 3.2; \geq 1% of NaNO₃, K₂S₂O₈, or NaBO₃ together with a small quantity of org. colloid may be added to modify the structure of the films produced. A. R. P.

Method of [oxide] coating [aluminium anodically]. H. BENGSTON, Assr. to ALUMINUM COLORS, INC. (U.S.P. 1,891,703, 20.12.32. Appl., 27.5.32).—During the process, precautions are taken to have the temp. of the bath uniform throughout. (Cf. B.P. 378,521; B., 1932, 991.) B. M. V.

(A) Purification of mercury which has been used as a cathode in electrolysis. (B) Electrolysis with the use of a mercury cathode. K. W. PALMAER (B.P. 396,041 and 396,415, 18.1.32. Swed., [A] 1.5.31, [B] 30.4.31).—(A) The Hg used for removing Fe, Co, and Ni from solutions by electrolysis is purified for re-use by treatment with aq. $\text{Fe}_2(\text{SO}_4)_3$, HOCl, or HNO_3 . (B) Aq. HgNO_3 is used as the purifying medium, the Hg being circulated from cell to purifying vessel so that a const. content of ≥ 0.5 (0.3)% of impurity is retained in it. [Stat. ref. to (B)]. A. R. P.

XI.—ELECTROTECHNICS.

Practical application of conductivity measurement in industry. H. REICHELT (Chem. Fabr., 1933, 6, 341—342).—Electrical circuits involving an alarm bell are described, whereby the end of a process accompanied by changes in electrical conductivity can be ascertained automatically. E. S. H.

Use of asphalt-vaseline mixtures as fillers in high-voltage work. J. GÖBEL (Chem. Weekblad, 1933, 30, 562—563).—Several asphalts which are commercially available conform to the Dutch specification. Mixtures of vaseline with commercial blown asphalts comply with the German specifications for both underground and indoor work. The drop point (Ubbelohde) of the mixtures passes through a min. at 15—30% of vaseline, and it is therefore possible to obtain a low viscosity by adding a considerable quantity of vaseline, without producing too low a drop point. H. F. G.

Electrolytic Cl_2 .—See VII. Analysis in ironworks. Ni- and Cr-plate. Zn electrolysis. Ag deposition on P-containing metal.—See X. Chloronaphthalene waxes.—See XII. Plastics.—See XIII. Measuring p_H of soils.—See XVI.

See also A., Sept., 887, Emission from oxide-coated cathodes. Conductivity of CuO. 894, Resistance of metals, alloys, etc. 895, Ni-Fe alloys. 908, Passage of current in liquid alloys. 913, Electrolysis of org. Cu salts. Formation of $\text{S}_2\text{O}_6^{--}$. Electrolysis of Pb salts. 914, Electrodeposition of metals and alloys. Electrolysis of BaCl_2 . Reduction of COPh_2 . Formation of org. NO_2 -compounds. Oxidation of tartrates. Formation of O_3 in the a.-c. corona discharge. 925, Producing a controlled-temp. Ca target for X-rays. X-Ray tubes. Photoelectric spectrophotometer, and comparator. Apparatus for measuring p_H . Vac.-tube electrometer.

PATENTS.

Electrical condenser. J. C. DAVIDSON (U.S.P. 1,891,345, 20.12.32. Appl., 16.5.28).—A pair of strips of metals, at least one of which is film-forming, is passed with interleaved strips of fabric through a solution of substances which contain H_2O in combination, should not be hygroscopic, should be substantially neutral, and on crystallisation should form a relatively hard outer layer with soft core, e.g., a mixture of Na_2CO_3 , $\text{Na}_2\text{B}_4\text{O}_7$, and malic acid. After rolling or otherwise shaping the condenser it should be dipped in insulating varnish or wax. B. M. V.

Manufacture of cathode-coating composition. J. A. HEANY, ASST. to SIRIAN LAMP Co. (U.S.P. 1,892,528, 27.12.32. Appl., 7.9.28).—The coating comprises an alkaline-earth compound and a tung oil soap binder. BaO_2 is useful to oxidise the C from the binder. B. M. V.

Fluorescent screen [for X-ray work]. SIEMENS-REINIGER-VEIFA GES. F. MEDIZIN. TECHNIK M.B.H. (B.P. 396,601, 7.12.32. Ger., 16.12.31. Addn. to B.P. 372,827; B., 1932, 734).—Colouring matter incorporated in the screen only partly absorbs the fluorescent light, so that the emitted light, from, e.g., Cd tungstate, appears yellowish-green, and increased sharpness of image of light of max. colour sensitivity to the eye is obtained. J. L.

Manufacture of electric insulating materials. INTERNAT. GEN. ELECTRIC Co., INC., ASSEES. of ALLGEM. ELEKTRICITÄTS-GES. (B.P. 396,858, 24.3.32. Ger., 25.3.31).—Fibrous material, e.g., paper pulp, treated with a suspension of quartz and, if desired, mica dust, in a solution of varnish or artificial resin, is moulded and compressed. J. S. G. T.

Electric insulating material or other substances which need to be very hard and with insulating properties. E. A. HAILWOOD (B.P. 396,151, 15.3.32).—Powdered or broken pieces of glass are mixed with a resinous material, and the mixture is heated and moulded under pressure. C. A. K.

Electric insulating material. MICAFIL A.-G. (B.P. 396,068, 20.1.32. Switz., 26.1.31).—Oil-proof electric insulations, e.g., for use between the phase windings of transformers, consist of a no. of layers of insulating material bound together with a binder so that spaces exist between the layers to provide absorptive capacity for transformer oil or similar liquids. C. A. K.

Insulation of high voltages in electrical precipitators [for oil]. R. T. HOWES, ASST. to A. A. ANDERSON and L. A. SNYDER (U.S.P. 1,891,645, 20.12.32. Appl., 29.1.30).—In the separation of H_2O from oil by electrical discharges through the oil itself, the bushing for the live electrode is surrounded by an insulating bell which is kept full of an insulating gas to prevent deposition of C on the bush. B. M. V.

Conversion of hydrocarbons. Decomp. of liquid hydrocarbons.—See II. Flame-proofed fibres.—See VI. Ferromagnetic alloy. C brushes. Ore flotation. Electrodeposition of metals. Plated Cr articles. Treating Al. Purifying Hg cathodes.—See X. Insulating materials.—See XIII.

XII.—FATS; OILS; WAXES.

Stability tests on fats containing oxidation accelerators and inhibitors. H. D. ROYCE (Oil & Soap, 1933, 10, 123—125).—In a modification of Wheeler's accelerated oxidation apparatus (*ibid.*, 1932, 9, 89) the samples can be irradiated during ageing; the photocatalysed oxidation then proceeds faster, but is similar in type and comparable to the reaction occurring in the dark. Determinations of peroxide val. (I), or the methylene-blue (fading time) test (cf. Royce, B., 1933, 753; 1932, 516) give corresponding indications of stability. Purified gossypol (0.01—0.03%) acted as a strong antioxidant. Cu (e.g.,

0.00025% added as soap) can be used as a positive catalyst when testing very stable fats. When both Cu and gossypol were present, (I) increased more slowly than usual at first, but then rose rapidly to a val. \gt that obtained in the presence of Cu alone. E. L.

Accelerated stability test [for fats], using the peroxide value as an index. A. E. KING, H. L. ROSCHEN, and W. H. IRWIN (Oil & Soap, 1933, 10, 105—109).—Apparatus and manipulation for a convenient stability test are described in detail. Three similar samples of fat are exposed to air-blowing at consecutive hr., and inspected hourly. When the first sample develops a rancid odour, the peroxide val. (I) of each of the samples is determined, and the stability of the fat is reported in terms of the time elapsing before the fat has acquired a certain min. for (I) (determined empirically for each particular fat, e.g., 20 milliequiv. per kg. of fat in the case of lard), which under the standardised conditions selected for aeration, temp., etc. can be taken as indicative of the incidence of rancidity. For fats of high stability the use of an oxidative catalyst might prove advantageous. Typical curves showing the change of (I) during such artificial ageing are shown. E. L.

Quantitative comparison of various accelerated stability tests. E. FREYER (Oil & Soap, 1933, 10, 129).—Data give by King *et al.* (preceding abstract) are calc. to a common basis for comparison; it is shown that the results of stability measurements by 7 different methods, applied in 4 laboratories, are in good agreement. E. L.

Is Täufel and Thaler's ketone-rancidity test reliable for the evaluation of edible fats? P. FÖRNER and A. RÖTSCH (Chem.-Ztg., 1933, 57, 714—715).—This test (B., 1932, 515) gave a weak red reaction with fresh butter, a stronger red with rancid butter, and negative reactions with fresh or rancid margarine, beef tallow, or coconut oil. "Cooking butter" gives more reliable results than "tea-butter." J. G.

Synthetic acids (from oxidised naphtha) in the soap industry. I. STETZENKO and M. BUMAN (Masloboino-Zhir. Delo, 1932, No. 9, 18—28).—The acids obtained by oxidation of solar oil give greasy, black soaps, the detergent power of which is 50—33% of that of fatty acid soaps; the former are similar to naphthenic acid soaps. The OH-acids present possess the same detergency as the CO₂H-acids. CH. ABS.

Application of activated carbon in the decolorisation of glycerol. G. VUKOVSKI (Masloboino-Zhir. Delo, 1932, No. 11, 51—53).—Complete decolorisation is facilitated by dilution; temp. \gt 60° do not interfere. CH. ABS.

Determination of refractive index of glycerols by the immersion refractometer. L. F. HOYR (Oil & Soap, 1933, 10, 43—45).—The n_D^{20} has been determined (with a Bausch-Lomb multiple-prism immersion refractometer) of 12 samples of pure aq. glycerols (concn. 25—99.8%); the graph of the readings approximates very closely to a straight line. With care the concn. of aq. solutions of pure and dynamite glycerols may be determined by this method with an accuracy

of about 0.1%. The n_D is valueless for assessing crude glycerols containing inorg. salts. E. L.

Effect of heat on protein in the fat industry. A. GOLBOVSKI (Masloboino-Zhir. Delo, 1932, No. 8, 30—36).—The effect of heat on the protein constituents of oil-bearing seeds during drying and roasting is discussed. CH. ABS.

Determination of free fatty acids in cottonseed. G. S. JAMIESON and R. S. MCKINNEY (Oil & Soap, 1932, 9, 228—231; 1933, 10, 9—11).—It is essential to effect complete separation of all the kernels from the hulls, and to extract practically all the oil from the meats (cold percolation with light petroleum), since the oil extracted from meats obtained by the first passage(s) of the seed sample through the hulling machine has a considerably higher acid val. than oil from meats separated at later stages in the reduction. Satisfactory results can be obtained by heating the (whole) seed to 130° for 2 hr. before grinding and extracting, but this method is more tedious and troublesome. Low acid vals. were obtained on oils prepared by cold-pressing, or when using the Albert method of titration. The Méloy sampler achieved better mixing of seed samples than the Maclellan mixer. E. L.

Oil-bearing seeds. D. KRAFT (Masloboino-Zhir. Delo, 1932, No. 6, 55—56).—Oils of seeds of *Salvia sclarea* and *Melissa officinalis*, L., have high I vals. (174 and 194, respectively). CH. ABS.

Seed of wild Cruciferae. V. MILASHEVSKI (Masloboino-Zhir. Delo, 1932, No. 10, 46—47).—Oil from seeds of *Eruca sativa* and *Thlaspi arvense* had, respectively, d_{4}^{15} 0.920, 0.9234; n_D^{20} 58.21, 61.83; viscosity at 20° 10.19, 9.6; f.p. 17—24°; acid val. 2.35, 6.87; sap. val. 178.14, 178.78; I val. 98.63, 111.43. CH. ABS.

Cooking cottonseed meats containing high moisture. R. H. FASH (Oil & Soap, 1933, 10, 125—126).—Live steam (e.g., at 80 lb. pressure) is passed through the meats during cooking, which facilitates drying and produces a pale, soft cake. E. L.

Cooking of cottonseed meats in various gases. Effect on properties of the expressed oil. E. FREYER (Oil & Soap, 1933, 10, 143—145).—Preliminary laboratory experiments indicate that paler crude oils, showing a lower refining loss, are obtained when O₂ has been excluded from the meats (e.g., by passing live steam) during cooking; the improvement (if any) in colour of the refined oils is negligible. The uses of a CH₄ atm. during cooking offered no special advantage for the prep. of expressed or extracted oils. E. L.

Solvent extraction [of cottonseed]. D. WESSON (Oil & Soap, 1933, 10, 151).—Solvent extraction of cottonseed meats can yield a satisfactory oil, and should be practicable commercially, when suitable plant has been developed. The extracted cake, mixed with fat and H₂O, can be used as a meat substitute. E. L.

Increase of free fatty acid in cottonseed. F. R. ROBERTSON and J. G. CAMPBELL (Oil & Soap, 1933, 10, 146—147).—Cottonseed containing $<$ 10% H₂O is stable under ordinary storage conditions; when $<$ 14% H₂O is present the free fatty acid content rises rapidly unless the seed is dried or kept in cold-storage. Seeds

that have been killed by heating to 79.5° develop acidity in a moist atm. more rapidly than living seeds.

E. L.

Ozonisation of the fatty acids of cottonseed oil. I. RUFIMSKI (Mas. obojno-Zhir. Delo, 1932, No. 6, 53—54).—After 18 hr. the m.p. had risen from 29.6° to 37.9°; the mol. wt. decreased from 283.87 to 212.50 (air) or 178.71 (O₂) and the I val. from 111.48 to 8.86 (air) or 3.60 (O₂).

CH. ABS.

Change in the peroxide values of corn [maize] and cottonseed oils under various storage conditions. L. B. KILGORE (Oil & Soap, 1933, 10, 66—68).—Organoleptic rancidity (*A*) appears to be due to the decomp. of peroxides which have been formed in the oil by oxidation of unsaturated constituents. Maize oils stirred continuously while exposed to air developed *A* at peroxide vals. (*B*) (modified method of Lea) of about 80, whilst in sealed samples (*i.e.*, with restricted air supply) *A* duly ensued, although *B* was > 7 at any stage (*B* usually decreased as taste rancidity set in). In O₂-free samples of oil, stored under N₂ for 220 days, no peroxides were formed, neither did rancidity develop.

E. L.

Water-washing of crude cottonseed oil. J. J. GANUCHEAU and E. L. D'AQUIN (Oil & Soap, 1933, 10, 49—50).—After treating the crude oil with filter-cel and H₂O-washing (7 min. by the official method) the "refining loss" (*A*) as measured by the official refining test was reduced, but on repeating the H₂O-refining pretreatment a second and third time, *A* increased to a val. even > that for the crude oil (*e.g.*, 7.8% and 6.8%, respectively). Similarly, H₂O-washing for 1 hr. increased *A* of the oil.

E. L.

Decolorisation of palm oils. F. GUICHARD and C. AUBERT (Ann. Musée colonial Marseille, 1932, 40, 5—36, 37—50; Chem. Zentr., 1933, i, 862—863).—The oil at 110—115° is ladled over a filter cloth in air until the colour has been removed. The oil after filtration is light yellow. The characteristic vals. are but slightly altered. The red pigment appears (absorption spectrum) to be more closely related to chlorophyll than to carotene. The yellow pigment exists before treatment, during which it suffers change. The red oil contains several colouring matters; 3 have been isolated. Oxidation changes the carmine into a greenish-brown, and the red into a yellow pigment; the red substance could not be regenerated by reduction. The presence of fatty acids, particularly unsaturated ones, appears necessary for the air-bleaching of palm oil.

A. A. E.

Characterisation of sanza oil. F. BERNARDINI and E. A. GAUTHIER (Giorn. Chim. Ind. Appl., 1933, 15, 329—330).—Identification of sanza oil (*I*) is not always possible by showing the presence of traces of solvent, as this is difficult, and different solvents are used. Expressed olive oil contains 72% of liquid glycerides (triolein and a little linolein), the rest being tripalmitin and small amounts of glycerides of volatile acids and unsaponifiable matter (phytosterols). Besides these components, (*I*) contains OH-acids (up to 12%), unsaponifiable matter (up to 8%), Ca soaps (up to 30%), resins, etc. Direct use of Morawski's or Pettenkofer's reaction is valueless, as phytosterols, as well as resins, give these reactions.

(*I*) may, however, be detected by dissolving the phytosterols and resin in 70—75% EtOH, saponifying the resin with KOH, extracting the phytosterol with Et₂O, liberating the resin acids from the residual alkaline liquid by HCl, and testing both the phytosterol and the resin acids by the above two reactions.

T. H. P.

Olive oil foots oleine. H. P. TREVITHICK (Oil & Soap, 1933, 10, 133—134).—Acidified soap stock (*i.e.*, acid oil) from the refining of CS₂-extracted olive oils (*A*) (misnamed "olive oil foots") is being marketed under the name "olive oil foots oleine" (*B*) and contains about 60—70% of free fatty acids. Typical analyses of *A* and *B* are quoted.

E. L.

Hazelnut (filbert) oil. H. A. SCHUETTE and C. Y. CHANG (J. Amer. Chem. Soc., 1933, 55, 3333—3335).—The expressed (50%) (*a*) and residual extracted (*b*) oils of *Corylus avellana*, L., contain saturated acids, (*a*) 4.87, (*b*) 5.20 [myristic, palmitic, and stearic, (*a*) 0.22, 3.06, and 1.59; (*b*) 0.46, 3.61, and 1.13%, respectively], and unsaturated acids, (*a*) 90.97, (*b*) 91.45 [oleic, linoleic, and linolenic, (*a*) 88.1, 2.87, and 0; (*b*) 86.87, 4.58, and 0%, respectively]. Chemical constns. for both oils are recorded.

R. S. C.

Pine-nut oil. A. H. GILL (Oil & Soap, 1933, 10, 7—8).—The Et₂O-extracted pale yellow oil from seeds of *Pinus monophylla* had *d*₂₀²⁰ 0.911, acid val. 5.4, sap. val. 183.9, unsaponifiable matter 1.95%, I val. (Hanus) 102.1, CNS val. 78.8, saturated acids (corr.) 8.1% (containing myristic 5.0, palmitic 2.7, and stearic acid 0.4), unsaturated acids (I val. 122.6) 84.5% (corr.), glycerol 8.9%. The oil did not dry on exposure for 30 days at 50°.

E. L.

California apricot[-kernel] oil. G. S. JAMIESON and R. S. MCKINNEY (Oil & Soap, 1933, 10, 147—149).—Apricot kernels contain 40—45% of oil having I val. (Hanus) 108.4, sap. val. 189.8. The refined oil had *d*₂₀²⁰ 0.9158, *n*_D²⁰ 1.4700, smoke point 165—168°, acid val. 0.41, sap. val. 190.2, I val. 108.7, Reichert-Meissl val. 0.2, Polenske val. 0.1, Ac val (André-Cook) 4.2, unsaponifiable matter 0.7%, saturated acids (corr.) 3.57% of the oil (consisting of palmitic 2.43, stearic 1.09, and lignoceric acid 0.05), unsaturated acids (corr.) 90.56% (consisting of oleic acid 60.61, linoleic 29.95 by calculation). The cake is suitable for use as fertiliser, or, after removal of the essential oil (1.5%), as cattle food. The smoke points of a no. of fats determined by McCoy (*cf.* B., 1932, 69) are given.

E. L.

Tomato-seed oil. N. BARSKI (Maslobojno-Zhir. Delo, 1932, No. 6, 56).—The oil has acid val. 13, I val. 131.3, sap. val. 184.6, *d* 0.924. The cake contains crude protein 38.13, fat 11.63, N-free extractive matter 24.43, cellulose 5.90%.

CH. ABS.

Oil of ergot. G. W. FIERO (J. Amer. Pharm. Assoc., 1933, 22, 608—616).—50 litres of oil were examined; the mixed fatty acids (separated by fractional distillation of the Me esters) consisted of myristic 3.0, palmitic 25.0, stearic 2.11, oleic 20.9, ricinoleic 35.8, linoleic 13.2%, and linolenic acid traces.

E. H. S.

Para rubber-seed oil as a substitute for linséed oil in foundry-core binders. L. W. GREENE and

J. M. F. LEAPER (Oil & Soap, 1933, 10, 28—29).—Laboratory tests indicate that rubber-seed oil (I) is a satisfactory substitute for linseed oil; the light inferiority in strength of cores made with (I), which is revealed by quant. tests, is not appreciable in the ordinary handling of the cores. Tung oil also has high binding strength.

E. L.

Bleaching of palm oil with benzoyl peroxide.

W. H. DICKHART (Oil & Soap, 1933, 10, 88).—The red colour val. of the oil treated with 6% of Bz_2O_2 was much reduced.

E. L.

Turtle oil. MAISON G. DE NAVARRE and S. RUSZKOWSKI (Amer. Perfumer, 1933, 28, 16—18).—The oil has f.p. 20—22°, sap. val. 197—210, d^{25}_4 0.914—0.919, n^{20}_D 1.4658—1.4715, I val. 89—97, free acid 0.1N-KOH v/x —0.05 to 0.1% per g. of oil. Genuine samples show a wide range of vals.

CH. ABS.

Determination of aldehydes in fish oils and in the fat of marine animals. K. P. PETROV (Maslo-boino-Zhir. Delo, 1932, No. 12, 49—52).—The oil (2—8 g.) is distilled with H_2O (150 c.c.) and the distillate tested with Fellenberg's reagent.

CH. ABS.

Votator process for chilling and aerating oils and fats. L. L. DAWSON (Oil & Soap, 1933, 10, 51—53).

—The fat is chilled during passage through a narrow, annular conduit provided with a revolving agitator to mix the material and scrape it from the wall of the tube; the system is enclosed so that air and H_2O can be excluded, if preferred, or gases (e.g., air, N_2) may be incorporated as required during the chilling, which can be conducted under pressure if desired.

E. L.

Gum guaiac—a new antioxidant for oils and fats. D. P. GRETIE (Oil & Soap, 1933, 10, 126—127).

—Gum guaiac appears to be non-toxic and is an effective antioxidant for lard (e.g., at 0.05% concn.), the preservative effect persisting in the presence of H_2O , and in bakery goods made from the lard. It is a suitable antioxidant for cracklings, fatty stock foods, etc., but not sufficiently active to protect cottonseed oil from autoxidation.

E. L.

Iodine-bromine values [of oils and fats as determined] by the rapid method. L. W. WINKLER (Z. anal. Chem., 1933, 93, 172—175).—The procedure described formerly (B., 1927, 669, 883) has been modified. Equally good results are obtained by the new method, and by the $KBrO_3$ procedure. Vals. are given for a no. of vegetable oils and fats.

E. S. H.

Study of the Bolton and Williams grouping of fatty oils according to the iodine value of their unsaponifiable matter. G. S. JAMIESON and R. S. MCKINNEY (Oil & Soap, 1933, 10, 69—71).—Erratic results have been obtained by using the Bolton-Williams procedure (B., 1930, 202). The prescribed extractions with light petroleum are insufficient to remove all the unsaponifiable matter (A), and the washing operations are unsatisfactory. Discordant vals. (in duplicate analyses) are found for the I val. of A, which varies inversely with the amount of A extracted, as the more saturated constituents are the more difficult to extract. The modified Kerr-Sorber method (B., 1925, 16) for the (Et_2O) extraction of A leads to more concordant

results for % and I val. (I_{10}) of A. The vals. of I_{10} for olive oils, however, range from 190 (first-pressing Sfax oil) to 268 (Andalusian oil), i.e., within wider limits than those defined by Bolton and Williams. Vals. of I_{10} for a second-pressing Sfax oil, a refined pulp oil, tea-seed oil (3 samples), refined cottonseed oil, rape oil, and arachis oil were, respectively, 180, 119, 151—164, 107, 108, 113.

E. L.

Synthetic waxes from chlorination of naphthalene. ANON. (Synth. and Appl. Finishes, 1933, 4, 143—153, 156).—Tables are given of the physical properties of chloronaphthalenes and of the general characteristics of commercial chloronaphthalene (I), paraffin (II), ceresin (III), and montan waxes. (I) are marked by large m.-p. range, high sp. inductive capacity (which is maintained when hot), small contraction when solidifying, and compactness, and their application in the manufacture of condensers, for impregnating coils, and flame-proofing is described and discussed. If quite free from H_2O they are stable at 150°; at 250° decomp. becomes measurable only after continued heating. The insulation is reduced by prolonged processing (data given), presumably in consequence of the formation of traces of HCl by the action of H_2O ; nevertheless, condensers made with (I) have breakdown voltages as high as those made with (II). Graphs show the variation with temp. of the capacity of condensers made with (I), (II), (III), and high m.-p. mineral wax.

S. M.

Sunflower-seed hulls. See II and V. Fat etc. in poplar fibre.—See V. [Oils in] Chinese drugs.—See XX. Fat in Gorgonzola cheese.—See XIX. Wool-scouring wastes.—See XXIII.

See also A., Sept., 924, Micro-determination of m.p. [of fats]. 933, Ester-interchange between fats etc. 964, Micro-reaction for cholesterol. 967, Lipins of mammalian liver. 989, Spinach fat. Fat from seeds of *Vateria indica* and of *Picramnia Sow*.

PATENTS.

Improving the taste of hydrogenated fatty oils. D. HILDISCH (B.P. 397,039, 27.2.33).—After hydrogenation the hot fat (130—70°) is stirred for some hr. with small amounts of substances which evolve vapours on heating, e.g., NH_4 carbonate, carbamate, or nitrate, di- or tri-ethanolamines, NH_3 , CO_2 , or steam may also be blown through the oil during treatment.

E. L.

Separation of unsaponifiable matter from oils, fats, waxes, mixtures containing fatty acids, and crude soaps. J. Y. JOHNSON. FROM I. G. FARBENIND. A.-G. (B.P. 396,769, 8.2.32).—Volatile unsaponifiable matter of high b.p. is removed from materials such as the oxidation products of hydrocarbons, fats, waxes, etc. by melting (at about 250—300°) the crude alkali soaps therefrom under pressure (< 10 atm.), releasing the pressure in order to remove the H_2O , and then distilling off the volatile constituents from the anhyd. melt at the same or a higher temp., *in vacuo*, and/or while passing steam or inert gas through the melt if desired.

E. L.

Lubricants.—See II. Alcohols from anhydrides.—See III. Ni catalyst.—See VII.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Scientific study of protective painting. S. C. BRITTON and U. R. EVANS (Trans. Electrochem. Soc., 1933, 64, 9—21).—The protective val. of paint depends as much on chemical inhibition of corrosion as on mechanical exclusion of corrosive influences. Since few paints are quite watertight the lowest coat should contain a chemically inhibitive pigment such as red lead; the outer coats should be of mechanically protective type. The behaviour of painted metal work on outdoor exposure depends on the metal; presence of mill-scale, rust, H₂O, salt, etc. between metal and paint; the paint, including its content of pigment, oil, thinner, and drier; and the atm. Inclusion of salt below the paint causes particularly rapid breakdown. Varieties of Fe which corrode most slowly in the bare state do not necessarily behave best when painted. (Cf. B., 1932, 728.) H. J. T. E.

Testing of minute quantities of material from pictures and works of art. A. P. LAURIE (Analyst, 1933, 58, 468).—Micro-technique for the ordinary reactions for wax and resins, N, P, S, and SO₄ is described. J. G.

Properties of soya-bean protein. IV. [Use as binder] for water paint. V. Reactivities with formaldehyde. T. IINUMA and M. MASHINO (J. Soc. Chem. Ind., Japan, 1933, 36, 455 B, 455—456 B).—IV. Protein obtained from soya-oil cake by extraction with NaOH and coagulation with H₂SO₄ is inferior to casein as a binder, due, it is considered, to residual impurities owing to method of prep. Extraction with the azeotropic mixture of benzine and MeOH gives a protein of improved adhesive properties, comparable with casein. Extraction with MeOH increases the hygroscopicity of the protein and its tendency to become mouldy.

V. Reaction products of CH₂O with soya-bean protein extracted from the oil cake by various methods were examined. Protein extracted by MeOH alone or in azeotropic mixture with benzine gives most promise in this connexion, being hard and semi-transparent. S. S. W.

Determination of relative evaporation characteristics of volatile liquids [varnish solvents]. ANON. (Synth. and Appl. Finishes, 1933, 4, 154—156).—The volatility of 9 common varnish solvents and thinners was determined by suspending on a balance arm a filter paper soaked in the liquid and recording the loss in wt. at definite time intervals. The results are plotted side by side with their distillation ranges, and a plea is made for a standardised method of measurement. S. M.

Plastics: their use in the electrical industry. K. G. MAXWELL (Chem. & Ind., 1933, 755—758).—A lecture.

Products from CH₂O-sulphonated hydrocarbons.—See III. [Resin from] sunflower-seed hulls.—See V. Wool-scouring wastes.—See XXIII.

See also A., Sept., 923, Analysis of ultramarine.

PATENTS.

Production of [solid] driers of improved stability and solubility. I. G. FARBENIND. A.-G. (B.P. 397,276,

20.6.32. Ger., 17.7.31).—Driers which consist of metallic salts, e.g., Co naphthenate, are rendered non-oxidising and more readily sol. in org. solvents by fusion with > 10% of a solid, saturated fatty (C₁₆—C₂₀) acid (I), or solid, lower member of the olefinic (e.g., crotonic) or aromatic (e.g., BzOH) carboxylic acids (II), or their substitution products, e.g., hippuric and salicylic acids. Thickening of the mass is retarded by using a mixture of (I) and (II). S. M.

Lithographic processes and materials. R. BERGER (B.P. 397,365, 4.1.33. Ger., 28.9.32).—To prevent the smudging and creeping of the print, a drier of the type used for oil varnishes is either added to the ink or dusted upon the printed sheet. S. M.

Manufacture of blanc fixe. GEWERKSCHAFT GEVENICH, O. ENGLERT, and W. BECKER (R. ENGLERT UND DR. F. BECKER CHEM. FABR.) (B.P. 397,001, 19.12.32. Ger., 27.1.32).—A product consisting of amorphous particles not larger than those obtained by pptn. is made from barite and NaCl or Na₂SO₄ by introducing the fused mass, which is rich in BaSO₄, into H₂O or aq. NaCl in a thin stream > 2 cm. in diam. so that dissolution is rapid. The particle size is controlled by varying the temp. of the molten mass and the temp. and concn. of the aq. medium. S. M.

Manufacture of intaglio printing inks. H. KURZ and K. ALBERT (B.P. 396,654, 9.3.33. Austr., 19.3.32. Addn. to B.P. 371,527; B., 1932, 687).—Stickiness and the necessity for adding high-b.p. solvents are reduced if the vehicle is prepared by first saponifying the resin and then adding the H₂O-sol. medium. S. M.

Manufacture of [intaglio] printing inks and their use. W. DENZLER (B.P. 396,618, 10.1.33. Ger., 18.1.32).—A solution or suspension in a volatile org. liquid of a H₂O-insol. agglutinant (resins, asphalts, waxes, etc.) is emulsified with an aq. dispersion of a hydrophilic stabiliser (soaps, saponins, Turkey-red oil, etc.), the pigment or dye is incorporated, and the η adjusted by addition of H₂O. The pigment may also be the stabiliser and a phenol or alcohol may be added to the aq. dispersion to lower its γ . S. M.

Production of [cellulose esters or ethers suitable for] plastic masses, foils, varnish coatings, and the like. ZELLSTOFFFABR. WALDHOF, and O. FAUST (B.P. 397,404, 17.3.33. Ger., 13.2.33).—The starting material is a soda or sulphate pulp which has been made from only one kind of wood. S. M.

Manufacture of varnishes, lacquers, or putty masses. DEUTS. HYDRIERWERKE A.-G. (B.P. 396,924, 4.7.32. Ger., 4.7.31).—The use of esters made from higher alcohols and fatty acids containing > 6 C atoms, e.g., cetyl acetate, is claimed. S. M.

Coating composition. J. FELTER (U.S.P. 1,891,878, 20.12.32. Appl., 27.5.31).—Mg oxychloride cement having the usual fillers, e.g., sand, asbestos, and/or sawdust, is mixed with a cellulosic material which has been pretreated with C₁₀H₇Cl or other non-inflammable solvent before mixing-in the MgCl₂ solution. B. M. V.

Coating material. E. F. JOHNSTON (U.S.P. 1,892,576, 27.12.32. Appl., 10.4.31).—A gelatinous, resinous, or cellulosic wrapping is printed with a transparent ink and

coated with a composition containing cellulose nitrate or acetate, an oil, a gum, and a softener for the base material. B. M. V.

Polymerisation of vinyl compounds. CARBIDE & CARBON CHEMICALS CORP., Assees. of L. C. SHRIVER (B.P. 397,364, 3.1.33. U.S., 29.1.32).—The vinyl compound is heated at 40° with 0.15–0.3% of $BzAcO_2$ until resinification takes place. S. M.

[Manufacture of] moulded insulating materials. BRIT. THOMSON-HOUSTON CO., LTD., Assees. of F. J. GROTEN (B.P. 397,405, 18.3.33. U.S., 18.3.32).—The arc-resistance of cold-moulded, heat-hardened products is increased and the shrinkage reduced by using a binder which consists of an alkyd resin, preferably oil-modified, intimately dispersed in a mixture of a drying oil–natural gum varnish (*e.g.*, linseed oil–copal) and an asphalt (*e.g.*, gilsonite). The shrinkage is further reduced when Portland cement forms part of the filler. S. M.

Ignition insulation composition. O. B. HUSKEY (U.S.P. 1,892,105, 27.12.32. Appl., 14.3.31).—A composition that may be applied to damp surfaces and is therefore suitable for telephone cables etc. contains boiled linseed oil 52, japan dryer 26, olive oil 20, pumice stone 1, and pigment 1%. B. M. V.

Relatively bullet-proof sheet materials or moulded compositions. BRIT. THOMSON-HOUSTON CO., LTD. From GEN. ELECTRIC CO., LTD. (B.P. 396,405, 2.2.32).—Sheets of glass paper or alternate layers of an abrasive (*e.g.*, powdered glass, quartz) and a fibrous material (*e.g.*, paper, canvas) are impregnated and bonded together with a resin or varnish by heat and pressure. S. M.

Making an adhesive composition. W. F. ZIMMERLI and R. S. HAVENHILL, Assrs. to B. F. GOODRICH CO. (U.S.P. 1,892,123, 27.12.32. Appl., 12.4.28).—A composition remaining plastic after prolonged weathering contains resin gum (100) dispersed in reclaimed rubber (50–200 pts.), the viscosity being reduced by volatile solvents. B. M. V.

[Manufacturers of] plasticisers for cellulose derivatives and their application. E. I. DU PONT DE NEMOURS & Co. (B.P. 393,619, 7.12.31. U.S., 6.12.30).—See U.S.P. 1,869,660; B., 1933, 822.

Resins from hydrocarbons.—See H. **Insulating materials.**—See XI. **Maize gluten.**—See XVII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Microscopical examination of rubber. A. J. WILDSCHUT (Chem. Weekblad, 1933, 30, 576–578).—A brief account is given of the application of microscopical technique to the examination and control of known fillers and mixes and to the analysis of unknown materials therein. H. F. G.

Nature of action of organic accelerators for rubber vulcanisation. VII. **Effect of heat on surface tension of rubber solutions.** K. SHIMADA (J. Soc. Chem. Ind., Japan, 1933, 36, 450–454B; cf. B., 1933, 640).—The surface tension (drop-wt. method) at 25° of solutions of rubber in xylene increases asymptotically to a max. when the solutions are heated at 100°; this is ascribed to the scission of long mols. Solu-

tions in C_6H_6 , PhMe, and xylene have min. surface tensions (by stalagmometer) at 0.5–0.7% concn. A. G.

Products from CH_2O –sulphonated hydrocarbons.—See III. **Rubber-seed oil.**—See XII.

PATENTS.

Manufacture of unvulcanised indiarubber from rubber latex. RUBBER GROWERS' ASSOC., INC., and G. MARTIN (B.P. 396,880, 23.4.32).—Unvulcanised rubber in crumb form is produced by adding to latex prior to coagulation substances, such as stearic acid, NH_4 stearate, palm oil, lecithin, ZnO , C black, or clay, which weaken the eventual coagulum so that the wet, thinly creped rubber can easily be disintegrated by mechanical means. Immersion in dil. aq. NH_3 during crepeing and dusting, *e.g.*, with Zn stearate, before the final disintegration, is beneficial. D. F. T.

Concentration, preferably with simultaneous compounding, of aqueous dispersions of or containing rubber or the like materials. DUNLOP RUBBER CO., LTD., ANODE RUBBER CO., LTD., W. McCOWAN, E. W. B. OWEN, and D. F. TWISS (B.P. 396,919, 24.6.32).—During concn. by evaporation, pulses are applied so as to induce concurrently dispersive agitation within the dispersion and a wave or waves, whereby thin layers are spread periodically on the walls of the vessel, which itself is preferably stationary. D. F. T.

Preparation of (A) soft rubber, (B) unvulcanised indiarubber in crumb or powder form. RUBBER GROWERS' ASSOC., INC., and G. MARTIN (B.P. 395,774–5, 3.2.32).—(A) Unvulcanised rubber substantially softer than ordinary crepe or sheet is produced by adding a nitrite ($NaNO_2$) to latex prior to coagulation with an acid; the softness of the product may be intensified by heating the coagulum with H_2O to $\geq 180^\circ$. (B) An aq. solution of a nitrite, *e.g.*, 1% of $NaNO_2$, is added to rubber latex; the coagulum obtained by treatment with acid, *e.g.*, $AcOH$, is pressed, preferably after thorough washing with H_2O , to form a crumbly slab or block which can then be disintegrated, *e.g.*, by being rubbed through a sieve or perforated disc. In using alkali-preserved latex for the purpose it is desirable to add also a protective colloid (casein) before coagulation. D. F. T.

Manufacture of rubber products. M. DUPRET (B.P. 396,503, 27.4.32).—Soft-rubber material suitable for floor- or wall-covering etc. is obtained by forming a sheet of dry rubber from latex spread on a plate, the surface of which may be engraved, and applying thereto a porous, fibrous, or granular reinforcing material, utilising liquid latex as the binding and adhesive agent. Two such treated sheets may be united and dried to give a combination with an intermediate reinforcing mass suitable for sound- and heat-insulation. D. F. T.

Manufacture of goods containing rubber or similar materials. DUNLOP RUBBER CO., LTD., ANODE RUBBER CO., LTD., E. A. MURPHY, and E. W. MADGE (B.P. 396,158, 24.3.32).—Porous or microporous goods of ebonite etc. are produced by mixing fibrous materials, such as asbestos, with flocculent or granular ppts. obtained from aq. dispersions of rubber, compacting the mixture by a filtering operation, and

vulcanising under conditions preventing evaporation of the entrained H_2O . If desired, the mixture can be removed from the filter and moulded in the wet condition before vulcanisation. D. F. T.

Manufacture of compositions containing rubber or similar materials. DUNLOP RUBBER CO., LTD., ANODE RUBBER CO., LTD., E. A. MURPHY, and A. NIVEN (B.P. 396,159, 24.3.32).—Dough- or paste-like compositions containing rubber and asbestos are obtained by mixing asbestos fibre with aq. flocculent or granular ppts. of rubber, the latter, if desired, being employed in a paste-like condition produced, e.g., by filtration. D. F. T.

Manufacture of conversion products of rubber and of chlorinated and brominated products thereof. F. S. SHADBOLT (B.P. 396,154, 16.3.32).—Rubber is converted into products, e.g., of thermoplastic type, by treatment in the presence of a solvent with a compound of P, O, and Cl, containing a greater proportion of O than has $POCl_3$; this agent may be obtained by partial hydrolysis of PCl_5 or $POCl_3$ or by heating either of these with H_3PO_4 . The corresponding Br compounds may also be used. The conversion products may be further chlorinated, e.g., in solution, basic substances such as Na_2CO_3 , with or without H_2O , being added during the chlorination or subsequently. Products of high solubility are obtained. D. F. T.

Vulcanisation of rubber. IMPERIAL CHEM. INDUSTRIES, LTD., M. JONES, and W. J. S. NAUNTON (B.P. 395,705, 18.1.32).—In the use of a mixture of dibenzothiazyl disulphide (I) and tetraethylthiuram disulphide (II) for acceleration purposes, the danger of scorching is diminished by using < 40 pts. of (I) to > 60 pts. of (II). D. F. T.

Cleaning rubber-curing moulds.—See X. Adhesive.—See XIII. Chewing-gum base.—See XIX.

XV.—LEATHER; GLUE.

Determination of water in leather. V. KUBELKA, V. NĚMEC, and S. ZURAVLEV (Chim. et Ind., 1933, 29, Spec. No., June, 1111—1116).—10 g. of the finely-divided leather are dried at 100° for 1 hr., extracted with petroleum spirit, dried at 100 – 103° , and weighed (B g.). The extracted grease is dried to const. wt., C. The moisture is given by $10 - (B + C)$. D. W.

Comparative physicochemical and mechanical properties of liquid and solid bone glue. D. VIRNIK and O. FEDOTOVA (Masloboino-Zhir. Delo, 1931, No. 10, 50—53).—No important differences were observed. Acidity is lower in the dry glue owing to loss of SO_2 ; this slightly increases the m.p. and mechanical strength and reduces the keeping qualities. CH. ABS.

Dyeing of leather.—See VI. [Tannin in] Ma Huang.—See XX.

PATENTS.

Finishing of pelts and skins. I. G. FARBENIND. A.-G. (B.P. 396,495, 7.4.32. Ger., 6.5.31).—The pelts etc. are treated with a mono-ester (A) of a polyhydric alcohol with a carboxylic acid, or with wood shavings or the like which have been impregnated with a solution or emulsion of A. D. W.

Making leather. UNITED SHOE MACHINERY CORP., Assees. of M. M. MERRITT (B.P. 397,129, 11.2.32. U.S., 24.10.31.)—A small no. of skins, a small amount of H_2O , a waxed paper bag containing a weighed quantity of Cr tanning salt, and, if desired, a fabric bag containing some dyestuff are drummed together, and when finished are struck out, spread on a portable support which carries them to a drying support, and dried in an extended condition. D. W.

Removing wool from skins.—See V. Adhesive.—See XIII.

XVI.—AGRICULTURE.

Classification of chernozem soils in relation to silica mottling. V. M. PLIKO (Khim. Sotzial. Zemled., 1932, No. 7, 23—34).—The mottling effect of SiO_2 is one of the characteristics of a degraded chernozem. Other chemical properties should be considered. CH. ABS.

Pretreatment of soil samples for mechanical analysis. V. GÖSSL (Z. Pflanz. Düng., 1933, 31, A, 113—154).—Naturally-moist soil samples are preferable to air-dried samples for mechanical analysis. For light, sandy soils, soaking in H_2O for 24 hr. followed by thorough trituration is a sufficient pretreatment. Heavier soils require further prep. The "cold cooking" process of Nostitz (B., 1927, 855) is suitable for soils of low humus content. For humus soils treatment with H_2O_2 by the International "A" method (omitting extraction with HCl) is recommended. A. G. P.

Pretreatment of soils for mechanical analysis by the pipette method. F. ALTEN and E. KNIPPENBERG (Z. Pflanz. Düng., 1933, 31, A, 193—208).—The soil sample (25 g.) is suspended in H_2O containing 500 milliequiv. of $Ca(OAc)_2$ and stirred by means of an air current for 1—2 hr. After settling and removal of the supernatant liquid the process is repeated using 100 milliequiv. of $Ca(OAc)_2$ and then with CO_2 -free H_2O till no more SO_4^{2-} appears in solution. Suspensions which now settle very slowly or incompletely may be coagulated by addition of 100 c.c. of aq. $Ca(OH)_2$. To the suspension are added 500 c.c. of 0.2% $Li_2C_2O_4$, and after further air-stirring the customary pipette method may be used for analysis. Residual oxalate or hydroxide in the sample withdrawn for determining the clay fraction is determined by titration of a centrifuged sample of the suspension and a correction is applied. A. G. P.

Basis of reaction changes in soil. I. F. RADU (Landw. Versuchs-Stat., 1933, 116, 267—322).—Variations of pH, buffer power, exchange and hydrolytic acidity, degree of saturation and dispersion of profiles over a considerable period are recorded and the effect of storage of samples at laboratory temp. is examined. For the characterisation of soils according to their saturation status the vals. "S" and "T—S," and not "T" and "V," are of chief importance. The buffer action of soil is represented as a chemico-colloidal function (neutralisation). The stability of the colloidal complex in soils depends on the valency of the adsorbed ions and on the degree of dispersion. The complex in steppe soils is more resistant to decomp. by soil- H_2O than is that of podsols. Soil reaction is not a const. val. but is influenced by the nature of the soil-formation process, temp., and especially by the H_2O content. A. G. P.

Nature of soil acidity. D. L. ASKINASI (Z. Pflanz. Düng., 1933, 31, A, 166—176).—The H ions of the adsorptive complex in soils may be replaced by cations of neutral salts, of salts of strong bases and weak acids, or of free alkalis. The energy of exchange increases with the p_H of the salt solution. Hence the total, hydrolytic, and exchange acidities, as customarily determined, must be in the (descending) order of magnitude named. Prolonged treatment of soil with neutral salt solution (e.g., $BaCl_2$) removes as much H from the complex as does the usual treatment with solutions of salts of strong bases and weak acids. The various types of acidity represent phases of one general phenomenon. A. G. P.

Cause of the decreased adsorption capacity in some soils after treatment with 0.05N-hydrochloric acid. Nature of soil acidity. E. I. RATNER (Z. Pflanz. Düng., 1933, 31, A, 346—353).—The effect of pretreatment of soil with 0.05N-HCl on the apparent adsorption capacity, as determined by leaching with NaCl, is ascribed to the lowered p_H of the complex and consequent reduction in the energy of replacement of adsorbed H by Na. The Gedroiz method is modified by mixing soil with excess of $CaCO_3$ prior to leaching with NaCl. A. G. P.

Absorptive capacity of soils. I. F. RADU (Landw. Versuchs-Stat., 1933, 116, 323—339; cf. B., 1931, 601).—In Knop's method for determining this val., contact for 1 hr. suffices and the addition of $CaCO_3$ is unnecessary. The absorption of NH_4 is rapid. Using a const. ratio of soil to solution and period of reaction, the recorded absorptive capacity increases, but not proportionally, with the concn. of the solution used. With a definite vol. and concn. of solution, vals. obtained vary inversely with the size of the soil sample. A. G. P.

Rates of reaction with acid soils of finely-divided soil-liming materials. W. H. METZGER (J. Amer. Soc. Agron., 1933, 25, 377—383).—Changes in p_H and CaO requirement of soils were unsatisfactory indicators of the rate of reaction of soil with liming materials. The p_H of limed soil attained an approx. const. val. after 7 days, whereas the CaO requirement reached a min. val. in 7—14 days and subsequently increased considerably. When compared on the basis of the disappearance of CO_3 , dolomitic limestone was less reactive with soil than a high-Ca limestone. A. G. P.

Relation of soil acidity to decomposition of organic residues. C. THOM and N. R. SMITH (J. Amer. Soc. Agron., 1933, 25, 392—396).—A review of the literature. A. G. P.

Acidity determinations in forest soils. III. G. DEINES and R. KLEINSCHMIT (Z. Pflanz. Düng., 1933, 31, A, 303—322; cf. B., 1933, 359).—The electrometric titration method of Goy is modified for use with forest soils. A. G. P.

Field apparatus for electrical p_H measurements [of soils]. A. UHL (Z. Pflanz. Düng., 1933, 31, A, 161—166).—Details of the apparatus are recorded and its use is explained. A. G. P.

Presence of sulphuric acid in acid forest humus. B. HEIMATH (Z. Pflanz. Düng., 1933, 31, A, 229—251).

—Acid forest humus and corresponding soil solutions contain SO_4 . Accompanying titratable acidity contains much free H_2SO_4 or SO_4 derived from hydrolysis of sulphates. In humus from smoke-injured areas the complex is largely decomposed by the H_2SO_4 present. Sulphates occur chiefly as $(NH_4)_2SO_4$. Electro-ultrafiltration of soil removes considerable amounts of SO_4 in the early stages, but in many cases a further amount of SO_4 appears in the filtrate after treatment for 5—6 hr. A. G. P.

Ultimate analysis of humus. G. JOHN (Z. Pflanz. Düng., 1933, 31, A, 37—39).—Combustion of humus materials by customary methods of analysis frequently yields unsatisfactory results. Finely-powdered CuO is preferable to granular CuO. For the retention of SO_2 , oxides of N, and halogens a mixture of PbO_2 and Pb_3O_4 with asbestos fibre is used. Pretreatment of material with dil. H_3PO_4 is unnecessary. A. G. P.

Porosity and water absorption of forest soils. J. T. AUTEN (J. Agric. Res., 1933, 46, 997—1014).—The greater porosity of forest (A) than of field (B) soils results from differences in soil structure rather than from greater org. contents. Absorption of H_2O by A is most rapid at 1 in. depth and decreases with depth. B are less absorbent. Grazing or burning-off of litter reduces the porosity of A. Cultivated soils planted with forest trees regain porosity in 20—25 years. A. G. P.

Soil cultivation. J. APSITS (Z. Pflanz. Düng., 1933, 31, A, 322—340).—Effects of various cultural operations on soil structure and its relation to plant growth are discussed. A. G. P.

Cultivation properties of tropical red soils. F. HARDY (Empire J. Exp. Agric., 1933, 1, 103—112).—The distribution, formation, and chemical composition of red soils are discussed. A. G. P.

Experimental methods for the study of soil cultivation. B. A. KEEN (Empire J. Exp. Agric., 1933, 1, 97—102).—The arrangement of experimental plots is discussed and a system of sieving tests described, whereby the effects of cultural processes on soil structure may be examined. A. G. P.

Comparison of various methods for determining the fertiliser needs of certain soils. F. B. SMITH, P. E. BROWN, and O. R. NEAL (J. Amer. Soc. Agron., 1933, 25, 383—391).—Measurements of the available P of soils by the Truog (0.002N- H_2SO_4) method agreed closely with those by the A. niger and Neubauer methods and with cropping trials. Application of $NaNO_3$ to these soils increased the solubility of soil-P. A. G. P.

Are field trials or laboratory methods the more suitable for determining the fertiliser requirement of soils? H. NEUBAUER (Z. Pflanz. Düng., 1933, 31, A, 154—161).—A discussion. A. G. P.

Electrodialysis compared with the Neubauer method for determining mineral nutrient deficiencies in soils. P. H. BREWER and R. B. RANKIN (J. Amer. Soc. Agron., 1933, 25, 414—417).—Results of the two methods showed general similarity. Both satisfactorily recorded the depression of available K due to liming and also the added available P following application of fertilisers. The period of electrodialysis

requisite to produce suitable results need not exceed 8 hr. for P and 12 hr. for K. A. G. P.

Adsorption of phosphoric acid by soil. E. RAUTERBERG (Z. Pflanz. Düng., 1933, 31, A, 39—42).—The adsorption of P per unit wt. of soil increases with the $[PO_4^{''}]$ of the solution with which it is placed in contact; it is also influenced by the amount of $PO_4^{''}$ already present in the soil, the proportion and composition of clay particles, and the soil reaction. The use of adsorption curves for calculating the manurial requirement of soils is discussed. A. G. P.

Influence of the lime content of soil on the determination of phosphate requirements by the Aspergillus method. G. VILSMEIER (Z. Pflanz. Düng., 1933, 31, A, 279—286).—The wt. of mycelium produced in this test is influenced by the proportion of Ca present in the soil. In calcareous soils low vals. for assimilable P contents are recorded, and where $CaCO_3$ is $> 10\%$ results are very unreliable. A. G. P.

Manurial trials with obole-sandstone. K. SCHARRER and W. SCHRÖPP (Landw. Versuchs-Stat., 1933, 116, 227—244).—Comparison is made of various P fertilisers with sandstone deposits of *Obolus*, on various soils and with a no. of crops. In general, the sandstone was satisfactory only on soils poor in $CaCO_3$ and when used in conjunction with physiologically acid fertilisers. A. G. P.

Importance for plant growth of adsorbed cations in soils. H. JENNY and E. W. COWAN (Z. Pflanz. Düng., 1933, 31, A, 57—67).—Adsorbed cations have not the same significance for plant growth as the free diffusible ions in the soil solution. From nutrients of low $[Ca^{''}]$ soya-bean plants took up diffusible $Ca^{''}$ more freely than adsorbed $Ca^{''}$ (A). In high concns. the reverse was the case. Plants grew best in systems containing A. Intake of A was by a process of ion exchange, H ions being liberated from the plant. Adsorbed H⁺ was less injurious than free H⁺. Acid injury to plants is caused more particularly by lack of nutrient bases than by excessive [H⁺]. A. G. P.

Sand and water [plant]-culture trials with nickel and cobalt. K. SCHARRER and W. SCHRÖPP (Z. Pflanz. Düng., 1933, 31, A, 94—113).—Addition of $CoSO_4$, even in small concn., to nutrients in sand cultures of a no. of plants reduced crop yields except in the case of maize and barley, with which at certain $[Co^{''}]$ stimulatory effects were observed. Of the plants examined maize showed the greatest and peas the least resistance to Co toxicity. The effects were intensified in H_2O cultures. The order of sensitiveness to Ni salts differed from the above, peas showing the greatest and lucerne the least resistance. In H_2O cultures plants grown in the presence of Ni had lower H_2O contents than the controls. In all cases Co was relatively more toxic than Ni. A. G. P.

Ability of different plants to utilise calcium phosphate. V. V. BUTKEVITSCH (Z. Pflanz. Düng., 1933, 31, A, 67—94).—The utilisation by plants of nutrients from difficulty sol. compounds depends on the solubilising power of the plant, on the absorptive power of the plant for the dissolved element, and on the extent to which the element contributes towards the production

of org. matter in the plant. The ability of the plant to bring Ca phosphates into solution is influenced by the pH of the nutrient surrounding the roots, and on the relative velocity of intake of $Ca^{''}$ and H_2O . The plant affects the reaction of the nutrient as a result of the relative velocity of intake of cations and anions. Plants may be classified according to the energy of absorption of $PO_4^{''}$ from dil. solutions. Except in the case of *Gramineæ* there is no relationship between the P content of the seed and the P accumulation in the crop. Plants which rapidly absorb $Ca^{''}$ (mustard, buckwheat, lupins) and consequently readily utilise Ca phosphates, when grown in media of high $[Ca^{''}]$ and wide $CaO : P_2O_5$ ratio, take up relatively small amounts of P and produce a poor crop. The deleterious effect of excess of $CaCO_3$ on the growth of lupins is thus explained. A. G. P.

Response of certain soil types to various rates of application of calcium arsenate. W. R. PADEN (Proc. Assoc. Southern Agric. Workers, 1932, 33, 29).—Effects on cotton and cowpeas are described. Neutralising the soils with $Ca(OH)_2$ tended to increase As tolerance. CH. ABS.

Response of some common field crops to various rates of application of calcium arsenate to several soil types. W. B. ROGERS (Proc. Assoc. Southern Agric. Workers, 1932, 33, 30—31).—Crop increases and decreases on various soils are reported. $FeSO_4$ is preferred to $MnSO_4$ or dolomitic limestone as a corrective for As injury. CH. ABS.

Calcium-magnesium ratio in soils and its relation to crop growth. F. MOSER (J. Amer. Soc. Agron., 1933, 25, 365—377).—No relationship was apparent between the total Ca and Mg contents of soils and the proportions of these bases in the exchangeable form, or between the Ca : Mg ratio and crop yields. The beneficial action of CaO on crop production results from the increased amount of replaceable Ca (A) and not from changes in the Ca : Mg ratio. Application to soil of $MgCO_3$ increased the replaceable Mg without influencing A. Similarly $CaCO_3$ affected only A. A. G. P.

Action of various nitrogenous fertilisers on growth and yield of oats with varying soil-moisture contents. W. KRÜGER, G. WIMMER, and H. LÜDECKE [with J. GRIMM] (Landw. Versuchs-Stat., 1933, 116, 245—265).—In pot cultures, with all N fertilisers examined, higher soil- H_2O contents favoured the growth of grain and straw, root extension, and fibrous root growth, but tended to reduce the grain : straw ratio. Average vals. for grain production with different N sources were in the order $Ca(NO_3)_2 > NaNO_3 > NaNO_3 + (NH_4)_2SO_4 > NH_4NO_3$, and for straw growth $NaNO_3 > NaNO_3 + (NH_4)_2SO_4, Ca(NO_3)_2, NH_4NO_3$. Increased grain yields and increased N intake by grain varied in the same order, but for straw there was no definite relationship. For the production of unit wt. of dry matter in the aerial portion of the plants 500 units of H_2O were necessary. A. G. P.

Effect of small applications of farmyard manure on yields of cereals in Nigeria. K. T. HARTLEY and M. GREENWOOD (Empire J. Exp. Agric., 1933, 1, 113—121).—The response of crops to relatively small applications

of farmyard manure was $>$ that to be anticipated from its N, P, and org. matter contents. A. G. P.

Nitrogen manuring in vegetable culture. A. GEHRING (Z. Pflanz. Düng., 1933, 12, B, 353—362).—Results of trials with a no. of crops, using various forms of N fertilisers, are recorded. A. G. P.

Symptoms of fertiliser injury to potatoes. J. BUSNELL (J. Amer. Soc. Agron., 1933, 25, 397—407).—When placed in soil in close proximity to seed potatoes, fertilisers caused a retardation of sprouting and a reduced absorption of soil- H_2O by the tubers. Healing of the surface of cut seed was retarded, and under drought conditions fertilisers drilled immediately above the seed injured emerging sprouts. The effects are probably osmotic and not due to any sp. chemical action. A. G. P.

Vitamins. VI. Effect of fertilisers on the vitamin-C content of spinach. F. V. VON HAHN and J. GÖRBLING (Z. Unters. Lebensm., 1933, 65, 601—616; cf. B., 1931, 903).—Spinach has max. vitamin-C (I) when grown on soil neutralised with CaO and fertilised with a balanced mixture of K, PO_4''' , and N. Over-fertilisation with PO_4''' has the least, and with N the greatest, effect in lessening (I). Any factor tending to disturb the nutrition of the plant has the effect of diminishing (I). E. C. S.

Grassland management and its influence on the sward. II. Management of a clovery sward and its effects. M. G. JONES (Empire J. Exp. Agric., 1933, 1, 122—128).—Comparison of variously stocked pastures receiving N and P with those receiving P indicate only that the N dressing, although approx. doubling the yield, had little effect on the botanical composition of the sward. The latter was largely influenced by the system of grazing. A. G. P.

Relation of ash constituents of carpet grass from fertiliser plants to the oxidation-reduction potentials of the metallic nutrient elements. H. P. COOPER, J. H. MITCHELL, and E. D. KYZER (Proc. Assoc. Southern Agric. Workers, 1932, 33, 35—36).—The plant appears to absorb selectively metallic nutrient elements according to the relative strengths of their ions. The Fe content was very low. CH. ABS.

Value of manurial trials with flax by the microscopical method. F. TOBLER (Z. Pflanz. Düng., 1933, 31, A, 208—215; cf. B., 1929, 488).—Technique for the examination of flax-fibre quality is described. K manuring increased the yield of both straw and seed. Microscopical examination indicates that K tends to produce large and compact fibre bundles and individual fibres of uniform diam. and relatively thick walls. A. G. P.

Field experiments with sugar cane. II. C. H. B. WILLIAMS and R. R. FOLLETT-SMITH (Brit. Guiana Dept. Agric. Sugar Bull., 1933, No. 2, 50 pp.; cf. B., 1933, 563).—Applications of $(NH_4)_2SO_4$ increase total sugar yields, but heavier dressings (4—6 cwt. per acre) in some cases reduced the % sucrose in the cane. Additional dressings tended to increase the glucose ratio. Different varieties of cane probably have different N requirements. Divided applications of N have no advantage over those applied wholly at one time. Treatment with limestone (I) improved yields under varied growth conditions, but a

residual action on the first ratoon crop was apparent only on pegassy clay. Ground (I) and $Ca(OH)_2$ produced similar effects. A. G. P.

Field experiments [with sugar cane] in Java, 1932. E. DEMANDT (Arch. Suikerind. Nederl.-Indië, 1933, 41, Meded. No. 7, 209—231).—The average optimum width of row with POJ 2878 cane was 111.8 cm., compared with 112—113 in previous years, but the differences were not significant. Loss of yield due to wider rows cannot be made good by closer planting in the rows. Experiments on dusting mosaic-infected canes with S appear to have given favourable results. J. P. O.

Fertiliser experiments [with sugar cane] in Java, 1932. E. DEMANDT (Arch. Suikerind. Nederl.-Indië, 1933, 41, Meded. No. 5, 143—175).—Experiments with Chili saltpetre did not show any advantage over $(NH_4)_2SO_4$, which was also found distinctly preferable to $CaCN_2$. The average optimum amount of double superphosphate (A) was found to be about 134 lb. per acre. Ammophos and Leunaphos I.G. were found equal if not slightly superior to A. As in previous years, the best results with molasses as a fertiliser were obtained on light soils, and a residual action in the 2-year rotation was clearly observable in practically all cases. J. P. O.

Changes in the carbon dioxide content of the air by gassing with carbon dioxide in the field. R. BALKS and P. RINTELEN (Z. Pflanz. Düng., 1933, 31, A, 44—56).—Increased CO_2 in the air over gassed soil was considerable in still weather and decreased with rising wind velocity. The $[CO_2]$ of air immediately in contact with gassed soil was inversely related to the temp. No relationship obtained in untreated areas. A. G. P.

Iron as a corrective for chlorosis in yellow lupins (*Lupinus luteus*) on calcareous and limed soils. S. TRIWOSCH (Z. Pflanz. Düng., 1933, 31, A, 14—27).—Chlorosis is directly attributable to the $CaCO_3$ in soil and increases with the $CaCO_3$ content. It is not influenced by soil reaction. Applications of Fe in a sol. form and in appropriate proportion to the $CaCO_3$ present reduce chlorosis. Excessive proportions of Fe are injurious to growth. Chlorosis is unrelated to the activity of nodule bacteria. A. G. P.

Application of chlorates as weed-killers. IV. Chlorate solutions containing chlorides. M. HESSENLAND, F. FROMM, and L. SAALMANN (Chem.-Ztg., 1933, 57, 641—643; cf. B., 1932, 618).—The addition of a 2% solution of any chloride, whether hygroscopic or not, to a 2% chlorate solution reduces the fire risk if clothing is splashed with the solution (cf. B., 1932, 769). Field trials show no difference in efficiency of conc. solutions, with or without chlorides, but with dil. solutions containing chlorides weeds reappeared sooner. Laboratory corrosion tests, in which an attempt was made to reproduce conditions which would be met with in practice on a railway track, showed that the corrosion of Fe, Zn, Cu, and brass was greater if chlorides were present. C. I.

Solubility of copper compounds in fungicides. J. RIBÉREAU-GAYON (Compt. rend., 1933, 197, 267—268).—The concn. of Cu^{++} in Bordeaux or Burgundy mixture is

best determined electrometrically, a beaker containing 0.1N-CuSO₄ being connected by a 0.1N-K₂SO₄ bridge with one containing the mixture. Mixtures prepared by neutralising (to phenolphthalein) 0.1N-CuSO₄ with aq. Ca(OH)₂ or aq. Na₂CO₃ contained, respectively, 2.2×10^{-6} and 1.8×10^{-3} mg. Cu per litre. Most of the Cu in Bordeaux mixture is therefore present as complexes, which are decomposed by CO₂. C. A. S.

Effects of formaldehyde on *Ceratostomella fimbriata* and the sweet potato. R. F. POOLE (J. Agric. Res., 1933, 46, 281—290).—The action of various concns. of CH₂O on the spores of the fungus and on the tissues of the sweet potato are recorded. In general, injury to the latter occurred under conditions which failed to control the fungus. A. G. P.

Selenium as an insecticide. E. M. NELSON, A. M. HURD-KARRER, and W. O. ROBINSON (Science, 1933, 78, 124).—Se in soil is assimilated by plants and a particularly toxic compound is formed. 15 p.p.m. of Se as Na₂SeO₄ produce distinct chlorosis and stunting of wheat; 1 p.p.m. has no visible effect on the plant, but the grain or straw from such plants produces pronounced toxicosis in rats and guinea-pigs. Wheat containing 8—10 p.p.m. of Se, absorbed from the soil, produces fatal injury. Possible danger of toxic foods resulting from spraying with Se compounds (I) are pointed out: there is evidence that soil organisms can reduce (I), so that spray residues considered to be innocuous may become available to a plant. L. S. T.

Examination of arsenical insecticides. P. A. ROWAAN (Pharm. Weekblad, 1933, 70, 848—863).—As^{III} is determined by oxidation with either I or HBrO₃, the latter being used in presence of Hg. As^V is difficult to determine since Fe is usually present. Total As is determined by titration subsequent to separation either by distillation of AsCl₃, pptn. as AsI₃ (special precautions must be taken if Cu or Pb be present), reduction by (a) N₂H₄ provided Cu and Hg have been removed, or (b) H₂PO₂ in absence of Hg. Reduction with SnCl₂ does not give satisfactory results. Paris-green should contain 55—58.5% As₂O₃, PbHAsO₄ 31—33.5% As₂O₅ and $\geq 0.5\%$ As₂O₃, and Ca₃(AsO₄)₂ $> 40\%$ As₂O₅ and $\geq 0.5\%$ As₂O₃. Insecticides should contain $\geq 0.4\%$ sol. As as As₂O₃. Fineness and particle size, which should be < 0.05 mm., are most satisfactorily measured microscopically. Sedimentation is measured in a Chan- cel sulphurimeter ($\leq 60^\circ$ after 1 min.; $\leq 40^\circ$ after 15 min.); the bulk density should be ≥ 0.5 . S. C.

Apricot-kernel oil[-cake].—See XII.

See also A., Sept., 901, Deformation of subsoils by pressure. 922, Determining K [in soils], and Ca and Mg in presence of NH₄Cl and NaCl. 923, Determining Mn [in soil extracts etc.]. 924, Determining Fe⁺⁺ in presence of org. matter. 928, Colloidal clay. 929, Composition, classification, etc. of soils. 988, Growth processes in oats. 989, Response of plants to B.

PATENTS.

Production of nitrogenous and/or phosphatic mixed fertilisers of desired composition by treatment of raw phosphates with nitric acid. RUHR-

CHEMIE A.-G. (B.P. 396,092, 26.1.32. Ger., 29.1.31).—The product resulting from the interaction of raw phosphates and HNO₃ is treated with (NH₄)₂SO₄, the CaSO₄ removed by filtration, and the solution evaporated till nearly dry. The mass is extracted with liquid or gaseous NH₃ and the dissolved NH₄NO₃ recovered by evaporation and mixed with the (NH₄)₂HPO₄, previously washed to remove NH₃. Alternatively only a part of the residue of NH₄NO₃, (NH₄)₂HPO₄, and CaSO₄ is treated with NH₃, a suitable quantity of the portion treated being then mixed with the untreated material. W. J. W.

Production of mixed fertilisers. RUHR-CHEMIE A.-G. (B.P. 396,729, 30.1.32. Ger., 9.3.31. Addn. to B.P. 396,092; cf. preceding abstract).—A mixture of NH₄H₂PO₄, NH₄NO₃, and residual CaSO₄, prepared by treating crude phosphate with a suitable quantity of HNO₃ in the presence of (NH₄)₂SO₄ and, after filtration, evaporating the solution to dryness, is treated with liquid or gaseous NH₃ to dissolve out all or part of the NH₄NO₃ and the residue is treated with HNO₃, HCl, or H₂SO₄ (in the presence, if desired, of K salts or other fertilisers) to convert the (NH₄)₂HPO₄ into NH₄H₂PO₄. L. A. C.

Arylpersulphonates.—See III.

XVII.—SUGARS; STARCHES; GUMS.

True sucrose content of [sugar] cane. H. SCHREIBER (Internat. Sugar J., 1933, 35, 326).—The polarisation of the juice defecated with CaO does not represent the sucrose content, owing to the presence of optically-active non-sucrose substances. A clarification effected with pepsin and CaO gave a polarisation about 1% $<$ did CaO alone, the invert sugar content remaining the same. Differences in the polarisation obtained by the two methods of clarification in the case of actual mill juices amounted to 1.2—1.3%. J. P. O.

Unknown losses in two systems of imbibition [in milling cane]. H. J. SPOELSTRA and P. C. NICOLA (Arch. Suikerind. Nederl.-Indië, deel III, Meded., 1933, No. 6, 177—207).—Two different systems of imbibition were compared for an installation consisting of 4 mills (in order, A—D) preceded by two sets of knives, these systems being (1) 3rd mill juice before mill B, 4th mill juice before C, and H₂O just after C; and (2) 3rd mill juice after A, 4th mill juice after B, and H₂O just after C. The polarisation (sugar) introduced compared with the polarisation delivered in the raw juice and last bagasse showed only a slight difference, which now and then was even negative. It was concluded that between the two systems of imbibition no practical difference exists in respect either of milling results or of unknown losses. J. P. O.

Tests with different kinds of fibre for filter-cloths [for cane-sugar factory work]. F. W. FREISE (Facts about Sugar, 1933, 28, 252—253).—Filter-cloth in service in the cane-sugar factory gradually loses its tensile strength and its filtering effect, often also becoming hard and crusty. Splitting is always the result of the effect of Fe salts. More destructive than ordinary usage is careless handling in washing, drying, or storing. Examination of cloths made of different

fibres leads to the following classification in order of durability: tucum, banana, aramina, cotton, hemp, timbo, and munguba. J. P. O.

Practical experience with Spengler pre-defecation. W. GEISE (Deut. Zuckerind., 1933, 58, 301—302).—By adopting this process, the CaO consumption was reduced to 0.9% of the roots. Further advantages were the improved colour of the juice, absence of foaming when stirring in the measuring tanks, and the reduced incrustation of the raw juice heaters. J. P. O.

Scums (settlings) treatment in defecation factories. P. HONIG and W. THOMSON (Arch. Suikerind. Nederl.-Indië, 1933, 41, 233—248).—If the scums are limed to p_H 10—10.5 an improvement in their rate of filtration occurs, which reaches a max. at 11.0, though this practice can hardly be recommended, owing to the rapid rate of decomp. that occurs, the p_H soon falling and the content in Ca salts rapidly rising. Liming accompanied by sulphitation definitely facilitates filtration; liming followed by carbonatation also produces a satisfactory result. Addition of kieselguhr previous to filtration assists the rate of filtration, but the economy of the use of such aids appears doubtful. Good results are obtained by adding bagasse ash, which owes its quality as a filter aid to its structure. Fine bagasse also gives a promising result. J. P. O.

Investigations on first and second carbonatations. K. DOMNING (Centr. Zuckerind., 1933, 41, 200—201).—In the sides of a carbonatation tank 5 small cocks were fixed at different heights and samples of juice during first and second carbonatations taken simultaneously at intervals of $1\frac{1}{3}$ —2 min. It was found that, in general, the lower portions of the column of juice in the tank had the higher alkalinity. Utilisation of the CO₂ was about 80% in the first min. and about 70% in the third. Carbonatation lasted 3—4 min. J. P. O.

Influence of the calcium formate on the rate of carbonatation [of sugar juice]. T. NEMES (Z. Zuckerind. Czechoslov., 1933, 57, 445—450).—Laboratory experiments showed (HCO₂)₂Ca to have a retarding effect on the rapidity of carbonatation, and in direct proportion to the amount present. J. P. O.

Crystallisation-in-motion of low-purity strikes [massecuites]. S. J. SAINT (Internat. Sugar J., 1933, 35, 309—311; cf. B., 1931, 736).—Three low-purity massecuites were allowed to cool in the crystallisers under the following conditions: (1) ordinary air-cooling for 40 hr.; (2) striking temp. (T) held for 24 hr., followed by rapid cooling for 24 hr.; and (3) T held for 10 hr., followed by rapid cooling for 30 hr. It emerged that the controlling factors affecting the velocity of crystallisation of such massecuites are T and the supersaturation (S). A coeff. of supersaturation of 1.25 at 70° or 1.35 at 50° appears to be necessary if an adequate rate of crystallisation is to be maintained. There is no great advantage in maintaining T in the crystalliser, since S soon becomes so reduced that considerable cooling has to take place before it can be raised again for a normal rate of crystallisation to proceed. J. P. O.

Influence of the condition of beets on the effects of preliming [of sugar juice]. O. SPENGLER and

S. BÖTTGER (Z. Ver. deut. Zucker-Ind., 1933, 83, 541—561).—With normally mature beets (Oct.—Dec.), optimum preliming gives decidedly better results in the cold (35—40°) than at 80—85° as regards the rate of filtration after completed liming and first carbonatation (cf. B., 1932, 363, 1131). The reverse is the case with immature beets (Aug.—Sept.) and with over-ripe, i.e., long-stored, beets. In all cases, however, cold preliming yields the palest juices. Long-stored beets, but not immature beets, can be made to yield normal juices, i.e., juices which give better results with cold than with hot preliming, by addition of Na₂CO₃, e.g., 0.3%, to the H₂O supplied to the diffusion battery. This normalising treatment corrects the low natural alkalinity (B., 1928, 421) of juice from long-stored beets; it does not affect the total N of the juice obtained, but it raises the protein-N val. and lowers that of melassigenic N to an equal extent. Addition of Na₂CO₃ to diffusion juice obtained by means of untreated H₂O does not have a normalising effect. J. H. L.

Drying of beet pulp with waste flue gases. R. C. HENNINGER (Z. Zuckerind. Czechoslov., 1933, 57, 365—367, 387—390, 395—398).—In a normal beet factory operating multiple-effect evaporation under vac., and slicing 1000 tons of roots in 24 hr., 69 tons of coal are required and 13.9 tons of slices can be dried by the flue gases, the average pressure of the steam from the boilers being 15 atm., and the temp. of the flue gases 250°. Corresponding figures for a factory of the same slicing capacity, but operating its evaporation under pressure, are: 60.3, 30.1, 22 atm., and 470°. It follows, therefore, that pulp-drying can be much more economically conducted in a pressure-evaporation plant than in the normal type of factory. J. P. O.

Calculation of lactose and sucrose from polarisation data. A. RINCK (Z. Unters. Lebensm., 1933, 65, 616—626). **Determination of lactose and sucrose in milk-chocolate.** A. RINCK and H. MÜLLER (*Ibid.*, 626—635).—A modified method of calculation described previously (B., 1930, 739) is given. The Pb acetate used to clarify the sugar solution is diminished from 10 to 4 c.c. The solution after inversion is conc. to 50% of its bulk. Tables are given facilitating the calculation of sucrose, lactose, and total sugar contents from the rotation before and after inversion. E. C. S.

Determination of the supersaturation of sucrose solutions. S. J. SAINT (Tropical Agric., 1933, 10, 72—73).—An apparatus is described for the determination of the saturation temp. of low-purity mother-liquors, from which figure the coeff. of supersaturation (A) and the saturation coeff. may be calc. Using this method, A could be determined directly on the massecuite. J. P. O.

Oxidation of sucrose by oxygen in presence of lime. M. J. NAKHMANOVITSCH, S. L. BERMAN, M. S. PLACHOTNIK, and J. J. PLETNIK (Z. Ver. deut. Zucker-Ind., 1933, 83, 235—261).—A current of air free from CO₂ drawn through a 15% sucrose solution containing 0.4% of CaO for 3 hr. at 90° decomposed 4.57% of the sucrose, forming 0.77% of Ca salts and lowering the alkalinity to 0.27% of CaO. Unpurified air caused much less decomp., owing to partial neutralisation of

CaO by CO_2 in it. The % of the total sugar decomposed increased with the duration of heating and the amount of CaO present. It was about 3 times as much at 100° as at 40° . For a given ratio of CaO to sucrose, it was greater at sucrose concns. about 30% than at lower or higher concns. The products formed included CH_2O , MeCHO , CO_2 , and other substances not fully identified. In sugar manufacture some decomp. of this kind may occur during liming and first carbonation since the CO_2 used contains some air and the amount of CaO initially present is large. J. H. L.

Glucose from the manioc plant. A. E. WILLIAMS (Chem. Trade J., 1933, 93, 133—134).—Manioc root, dried below the gelatinising temp. of starch, is reduced to fine meal, further dried in vac. to 0.05% H_2O , and exposed in the cold, in an ordinary converter (C), to 0.2% of dry gaseous HCl for 1—2 hr. Steam is then passed into the well-mixed material, with C open, to drive off HCN, and when the temp. has reached 90° 0.4—0.5% of HCl in solution is added and conversion is carried out as usual, for about $2\frac{1}{2}$ hr. under a pressure of 60—70 lb./sq. in. The pretreatment with dry HCl does not affect the starch, but renders the cellulose present saccharifiable in the subsequent conversion, provided this is carried out without delay. The product does not easily yield cryst. glucose, but can readily be conc. to liquid or solid glucose, which, although not so completely fermentable as that from pure starch, is quite suitable for the manufacture of confectionery or adhesives. J. H. L.

Colorimetry in sugar manufacture. I. Stammer colorimetry. II. Leitz absolute colorimeter. O. SPENGLER and E. LANDT (Z. Ver. deut. Zucker-Ind., 1933, 83, 223—234; cf. B., 1931, 745).—I. The Stammer colorimeter should be superseded, preferably by some form of abs. colorimeter. Meanwhile standardisation of the "normal glasses" used with it is necessary, as they are by no means identical in colour. Some in use in sugar factories, when tested with a spectrophotometer, at wave-lengths of 480, 560, and 610 μ , showed differences in extinction up to 118% from the vals. for the corresponding glasses at the Berlin Sugar Institute.

II. The Thiel-Leitz abs. colorimeter (A., 1932, 1225) is not recommended, as the grey solution prescribed for it is not sufficiently stable. Kept in the dark, its extinction coeff. for red rays diminished measurably in a few days and by 15% in a month. Under strong illumination the change was considerable in a few hr. J. H. L.

New method for determining traces of reducing sugars. F. BAERTS and G. BINARD (Bull. Assoc. Chim. Sucr., 1933, 50, 275—276).—The qual. method described previously (B., 1933, 728) has been adapted for quant. purposes, e.g., the determination of invert sugar in white sugars. A solution of 10 g. of the sample in an Erlenmeyer flask is mixed with 0.5 c.c. of 1% methylene-blue solution, 0.5 c.c. of the alkaline component of Fehling's solution (346 g. of Rochelle salt and 100 g. of NaOH per litre), and H_2O to complete 50 c.c., and heated under reflux so that it boils in 2— $2\frac{1}{2}$ min. The time required for decolorisation, measured from the commencement of active ebullition, is related to the % of invert sugar in the sample (figures in sec. are tabu-

lated). With raw beet sugars of the 1932 campaign the method gave results 0.015% high. Decolorisation is more rapid with fructose than with glucose, and more rapid at high than at low alkalinities of the reaction mixture. Increase in sucrose concn. accelerates decolorisation by very small amounts of invert sugar (0.03%), but retards that by larger amounts. J. H. L.

Rapid titration of reducing sugars. G. ROMEO (Annali Chim. Appl., 1933, 23, 307—311).—With Ugarte's method (A., 1932, 206), the end-point is difficult to observe owing to the presence of Cu_2O or, when the dil. reagent is used, to the fact that the blue colour is just visible at the beginning of the titration. If, however, $\text{K}_4\text{Fe}(\text{CN})_6$ is added to the reagent prior to the test, no ppt. is formed on addition of the saccharine liquid, and the blue colour is changed to yellow. Further, if use is made of a standard glucose solution, the reagents need not be prepared so exactly as Ugarte describes. The modified procedure is applied to the determination of sugar in syrups and more dil. sugar solutions, urine, blood, and milk. T. H. P.

Determining starch in sized textiles.—See VI. **Sugar cane.**—See XVI.

See also A., Sept., 902, Swelling of potato starch. 903, Transformation of starch preps. 937, Formation of sugar from CH_2O . 938, Converting cellulosic material into sugar. 964, Determination of sugars in presence of NH_3 .

PATENTS.

Extraction of sugar from cane molasses and the like. G. P. MEADE and R. N. TRAXLER, ASSYS. to CUBAN-AMER. SUGAR CO. (U.S.P. 1,884,798, 25.10.32. Appl., 23.11.29).—The diluted molasses is treated at 85 — 95° with sufficient aq. $\text{Ba}(\text{OH})_2$, free from silicate, to combine with the sucrose (6 Ba to 5 $\text{C}_{12}\text{H}_{22}\text{O}_{11}$), decompose the invert sugar (2 Ba to $\text{C}_6\text{H}_{12}\text{O}_6$), and maintain an excess concn. $> 5\%$ of BaO in the liquid. Under these conditions the decomp. products of the invert sugar remain in solution and can be separated from the saccharate ppt. by washing with 7% aq. BaO. BaS may be substituted for BaO to the extent of 20%. Ba is recovered from the liquors by pptn. with SO_2 . J. H. L.

Extraction of sugar from cane molasses containing glucose. G. L. SPENCER, ASSR. to CUBAN-AMER. SUGAR CO. (U.S.P. 1,884,901, 25.10.32. Appl., 17.10.29).—The diluted molasses is treated hot with sufficient Ba reagent to combine with the sucrose, decompose the invert sugar, and also impart high alkalinity to the mixture. E.g., 100 pts. of molasses containing 38 pts. of sucrose and 15 pts. of invert sugar are treated with about 50 pts. of H_2O (saccharate washings) and 90 pts. of tribasic Ba silicate of about 87% purity. The impure saccharate ppt. is filtered off and washed with 2% aq. $\text{Ba}(\text{OH})_2$ and Ba is recovered from the main filtrate by pptn. with SO_2 . J. H. L.

Recovery of by-products of sugar extraction. E. A. VAZQUEZ, ASSR. to VAZCANE PROCESS, INC. (U.S.P. 1,876,522, 6.9.32. Appl., 31.10.30).—Cane bagasse, after sugar extraction, is stored for 3—4 months in H_2O containing CaO to loosen the fibres, and then separated from the liquor by cane mills or countercurrent washing

and used for papermaking etc. The liquor is clarified by subsidence or filtration. The sludge thus obtained contains Ca salts of H_3PO_4 and org. acids, and may be burned to recover CaO or used as fertiliser or for the recovery of org. acids. The clarified liquor is distilled to recover furfuraldehyde, vanillin, and other products. (Cf. U.S.P. 1,688,904; B., 1928, 940.) J. H. L.

Purification of sugar-factory and refinery juices.

D. TEATINI (B.P. 394,498, 25.7.32. Belg., 23.7.31).—In the treatment of juices the colloidal matters of which can be completely flocculated by CaO or equiv. alkali alone, the SO_2 treatment prescribed in B.P. 351,160 (B., 1931, 1152) is omitted. Sufficient CaO, usually 0.15–0.3%, is added to produce the optimum reaction for flocculation, which is between p_H 10.6 and 12 in the case of beet juice. The ppt. is removed by filtration if necessary, and the juice is further limed so that the total CaO used is about 0.7–1%, and carbonated as usual. J. H. L.

Treatment of sugar juices. J. P. FOSTER (U.S.P. 1,876,491, 6.9.32. Appl., 2.6.30).—Sugar juice is treated at $< 50^\circ$ with CaO or other suitable alkali equal to 1–1.5% of the amount of non-sugars present and then carbonated, sulphited, or phosphated to a point at which saccharate is decomposed but pptd. non-sugars are not redissolved, viz., p_H 11–9.8. After removal of the ppt. the juice is further carbonated etc. to p_H 6.9 and filtered. J. H. L.

Defecation of cane juice. T. B. WAYNE, Assr. to NAT. ALUMINATE CORP. (U.S.P. 1,887,879, 15.11.32. Appl., 8.9.30).—Raw cane juice is treated with Na (or other sol.) aluminate, e.g., a solution of 0.25–1 lb. of $Na_2Al_2O_4$ per 1000 gals., and then limed, e.g., to p_H 8.3–9, heated to 99–104°, and clarified by subsidence. J. H. L.

Preservation of sugar liquors. G. DURET (B.P. 395,527, 12.8.32).—The liquor, e.g., cane, beet, or grape juice, is exposed to ultra-violet rays or heated to about 100°, made alkaline or acidified according as it is intended for extraction of sucrose or fermentation, and then stored in tanks at $< 35^\circ$ under a layer (0.1–0.2%) of a liquid antiferment, such as C_6H_6 or its homologues, with which it is mixed periodically. The alkalisation of cane juice may be effected with sufficient CaO to produce max. flocculation of impurities. J. H. L.

Saturation of lime-containing or lime-treated sugar juices or syrups by gaseous sulphur dioxide or carbon dioxide. A. LEDUC (B.P. 396,136, 22.2.32. Fr., 20.2.31).—Limed cane or beet juice is carbonated or sulphited under pressure, which in the case of beet juice is about 1 atm. The ppt. formed is denser than that produced under atm. pressure. Apparatus for continuous and batch working are described, comprising a closed cylindrical vessel with juice and gas inlets at the bottom, a gas outlet at the top suitably throttled or leading to the bottom of a second vessel containing juice to provide the necessary back-pressure, and in the continuous apparatus a juice overflow pipe connected with a back-pressure siphon or with a second saturation vessel. J. H. L.

Preparation of invert sugars. E. N. EHRHART and L. WICKENDEN, Assrs. to J. J. NAUGLE (U.S.P. 1,886,875,

8.11.32. Appl., 27.9.29).—Raw sugar, preferably cane sugar affined to 99° polarisation, is melted to syrup of 50–53° Brix, which is, if necessary, filtered with Suchar, and then treated with a small quantity of a hypochlorite followed by a phosphate, and again filtered. After concn. to about 67° Brix the syrup is inverted, e.g., with 0.06% of HCl (calc. on sugar), and then adjusted to about p_H 4, conc. to 82–84° Brix, cooled, and seeded with cryst. invert sugar or glucose, crystallised in motion, and thinned to 76–78° Brix with lighter invert syrup. J. H. L.

Manufacture of crystalline dextrose. G. E. CORSON and A. P. BRYANT, Assrs. to CLINTON CORN SYRUP REFINING Co. (U.S.P. 1,886,941, 8.11.32. Appl., 30.11.27).—In crystallising glucose hydrate from starch-conversion syrups, large crystals, easily purged, are obtained by evaporating the syrup to d 1.32–1.42 (preferably to d 1.32–1.38), at $< 60^\circ$, then heating to about 70°, cooling rapidly to $< 35^\circ$, seeding, and allowing the syrup to crystallise substantially at rest. J. H. L.

Treatment of corn [maize] gluten. H. BERLIN, Assr. to INTERNAT. PATENTS DEVELOPMENT Co. (U.S.P. 1,888,785, 22.11.32. Appl., 19.7.29).—Crude gluten, obtained in the manufacture of starch, is treated with "technical" cresol and the remaining starch removed by washing with H_2O . The gluten-cresol residue may be employed in the manufacture of resinous plastics, or may be treated further to produce prolamin and glutelin. E. B. H.

Nitrated carbohydrates.—See XXII.

XVIII.—FERMENTATION INDUSTRIES.

Preparation of yeast for fodder. H. CLAASSEN (Chem.-Ztg., 1933, 57, 653–654; cf. *ibid.*, 462, 475). The cost of production is too high for yeast from wood-sugar to become an economical feeding-stuff for cattle. E. C. S.

Utilisation of marine algæ for obtaining yeast and alcohol. G. K. BURGVIETZ (Bull. Acad. Sci. U.R.S.S., 1933, 837–846).—*Torulopsis*, isolated from the surface of the *Laminaria* and *Alaria* of the Murman coast, will not ferment extracts of these algæ. Yeasts also are unsatisfactory, but *Mucor javanicus* ferments the extracts, especially after these are hydrolysed, giving 8–10.5 litres of EtOH per 100 kg. of air-dried *L. saccharina*. T. H. P.

Ultra-violet irradiation stimulates yeast activity. W. L. OWEN (Food Ind., 1933, 5, 252–254).—Limited exposure of bakers' yeast to ultra-violet light (2300–3100 Å.) gives accelerated fermentation, and a greater sustained fermentation, which produces a greater leavening effect. In consequence, it is stated that if irradiated yeast is used, the required quantity is reduced by 24%. E. B. H.

Modern chips in practice. E. NIUS (Woch. Brau., 1933, 50, 257–259).—The use of bio-chips in the fermenting tun produces variable results. Sometimes an accelerated fermentation, a higher attenuation, and a lower p_H are produced, but in other cases unchipped worts, or worts fermented by a yeast washed free of slime with 0.2% tartaric acid, give an attenuation comparable with that of chipped worts. R. H. H.

[Detection of alcohol additions to] grape must. H. JAHR (Z. anal. Chem., 1933, 93, 82—99).—Addition of EtOH to unfermented or partly fermented grape must reduces the amount of tartaric acid, N, and ash and also the alkalinity of the ash in the material extractable with Et₂O under standard conditions; tests for these constituents therefore serve to distinguish between sweet wine and grape must to which EtOH has been added. A. R. P.

Decolorisation of wine by means of impregnated carbon. J. MILBAUER (Chem. Obzor, 1932, 7, 190—192; Chem. Zentr., 1933, i, 1335).—The red colouring matter is selectively adsorbed by C impregnated with ZnCl₂ and/or CaCl₂, especially when the sample has been heated for a long time during its prep. A photographic evaluation method is described. A. A. E.

Trester wines. F. SELER (Z. Unters. Lebensm., 1933, 65, 640—644).—“Trester” wine (A), i.e., wine made by fermentation of the diluted residues after pressing, either with or without addition of sugar, is characterised by an extract : ash ratio of < 10 : 1, by low lactic and tartaric acid content, and by its typical flavour. These characters enable adulteration of wine with A to be detected. E. C. S.

Detection of fruit wine in grape wine by the sorbitol method of Werder and Zäch. C. VON DER HEIDE (Pharm. Ztg., 1933, 78, 853—854).—100 c.c. of the wine are decolorised with 5—7 g. of animal charcoal, conc. under vac. to a syrup, mixed with 0.1 c.c. of 1 : 1 H₂SO₄ and 4 drops of PhCHO, and kept at 4—5° for 12 hr. The dibenzylidenesorbitol (I) is pptd. by addition of 100 c.c. of H₂O, filtered off, and weighed. Sorbitol is detected, as hexa-acetylsorbitol, by hydrolysis of (I) with N-HCl and acetylation with Ac₂O in the presence of C₅H₅N. (Cf. B., 1929, 619.) R. H. H.

Enzymes for textile purposes.—See VI.

See also A., Sept., 981, Determination of lipase. 982, Alcohol-dehydrogenase from yeast. 983, Prep. of Ac₂.

PATENTS.

Production of yeast. H. and A. BRAASCH (B.P. 395,610, 7.1.33. Ger., 9.1.32).—The fine-aëration process, in which the air is forced through porous diaphragms and the iike, is rendered more effective by addition of small quantities of org. acids (lactic acid, AcOH) to lower the surface tension of the wort and so attain a finer subdivision of the air. J. H. L.

Manufacture of yeast and other micro-organisms. INTERNAT. YEAST CO., LTD., and W. G. BENNETT (B.P. 396,206, 10.6.32).—Yeast rich in ergosterol is produced by cultivation at relatively high temp., e.g., 30—40°, in media deficient in assimilable N and containing oxidising agents, oxidising catalysts, or O carriers, e.g., per-salts or methylene-blue. J. H. L.

Production of propionic acid by fermentation. COMMERCIAL SOLVENTS CORP., Assees. of H. R. STILES (B.P. 396,968, 8.11.32. U.S., 29.6.32).—EtCO₂H (I) fermentations, formerly accelerated by use of symbiotic organisms, e.g., (I)-bacteria + lactic acid or mannitol-forming bacteria, are further accelerated by the addition of bentonite clay or activated alumina. The

yield of (I) and the ratio (I)/undesired alcohols are increased. R. H. H.

Preserving sugar liquors.—See XVII. Stabilising beverages.—See XIX.

XIX.—FOODS.

Manganese content of cow's milk, beef, and other foodstuffs. G. BÜTTNER and A. MIERMEISTER (Z. Unters. Lebensm., 1933, 65, 644—645).—10 samples of cow's milk contained from 0.0058 to 0.031 mg.-% of Mn₂O₃. H₂O from the same districts contained 0.040—0.245 mg.-%. 5 samples of lean beef contained from nil to 0.007 mg.-% [cf. Berg's val. of 19.8 mg.-% (“Nahrung- u. Genussmittel,” 5th ed., Dresden, 1929)]. Raspberry juice, cherry juice, and bilberries contained 14.9, 1.4, and 12.8 mg.-%, respectively. E. C. S.

Reichert-Meissl value of the fat in Gorgonzola cheese. R. C. H. JOHNSON (Analyst, 1933, 58, 469).—The Reichert-Meissl and Kirschner vals. fell by 12.0 and 8.5 respectively, and the Polenske val. rose by 0.3, on storage of the cheese in a large jar covered by a glass plate from September to March. J. G.

Examination of eggs by ultra-violet light. A. SCHREMPF (Z. Unters. Lebensm., 1933, 65, 647—648).—Removal of grading marks by scouring (I) or treatment with acid (II) can be detected by ultra-violet light. (I) gives complete absence of fluorescence on the scoured patch; in (II) the edges of the treated patch can be seen. E. C. S.

Examination of eggs [by ultra-violet light]. F. W. VILTER and O. SCHMIDT (Z. Unters. Lebensm., 1933, 65, 649).—The appearance of dark patches in ultra-violet light does not necessarily mean that grading marks have been removed, since eggs cleansed by scouring present the same appearance. E. C. S.

Determination of the age of eggs during the summer months. E. DINSLAGE and O. WINDHAUSEN (Z. Unters. Lebensm., 1933, 65, 650; cf. B., 1933, 489).—The rate of loss of wt. and diminution in the sp. gr. of eggs is determined not only by the temp. but also by the humidity of the air, and any abnormality in these vals. leads to false results when determining the age of eggs. E. C. S.

Effect of preserving agents and spices on the digestion of proteins. H. AMELUNG (Chem.-Ztg., 1933, 53, 614).—Digestion of albumin is retarded slightly by 0.1% of BzOH, H₃BO₃, salicylic acid, and various condiments and spices, but the retardation is < with 0.5—2% NaCl, which is a normal constituent of prepared foods. A. R. P.

Determination of iodine in salt-water fish and fish-meal. J. H. A. BOUWMAN and J. F. REITH (Z. anal. Chem., 1933, 93, 102—105).—In ashing fish products with KOH part of the I is converted into KIO₃ by the catalytic action of the Ca salts present; this fails to be extracted with EtOH unless previously reduced, e.g., with HCl and Na₂SO₃. A. R. P.

Estimation of the fineness of grinding of chocolate by microscopical and tasting methods. H. M. MASON (Analyst, 1933, 58, 440—448).—The lycopodium method of Wallis was adapted for this purpose, suspensions in mineral oil containing 10% of light petroleum

and in H₂O containing a little NaOH being used for sugar and cocoa particles, respectively; fat is removed in the latter case by treatment successively with C₂HCl₃ and Et₂O. Since the palate is insensitive to particles < 25 μ, results were expressed in terms of the "micro-val." (I), viz., the no. of 25-μ particles present if the larger particles are reduced to this size. A fairly close correlation is then obtained between (I) and the degree of fineness appreciable by the average palate, allowance being made for the fact that differences between coarse samples are more easily detectable than those from fine samples. Routine control and other applications of the method are described. J. G.

Phosphorus requirement of dairy cattle. I. Phosphorus requirement for growth and reproduction from three months of age to first-calving.

C. F. HUFFMAN, C. S. ROBINSON, C. W. DUNCAN, L. W. LAMB, and M. F. MASON (J. Dairy Sci., 1933, 16, 203—223).—With a lucerne-maize silage-maize ration of low P content (< 0.2% P) the inorg. P of the blood remained subnormal during the first 1½ years' growth. High blood-Ca vals. were coincident with low P vals. Heifers receiving such a ration (5.7—9.9 g. of P daily and Ca : P = 4—5 : 1) showed depraved appetite and reduced consumption of hay and silage. Sufficient P was obtained by a supplement of bone meal to give a total of 10.3 g. of P per day. During gestation the blood-Ca and P vals. were normal with both levels of P feeding. The P requirement for growth is not directly proportional to body-wt., but depends on the rate of growth. A. G. P.

The A.I.V. method of preserving fresh fodder. A. I. VIRTANEN (Empire J. Exp. Agric., 1933, 1, 143—155).—The prep. and use of silage made by the author's process is described. A. G. P.

Biological value of protein in various fodders from the viewpoint of its effect on growth. F. SVOBODA (Vestn. českoslov. Akad. Zeměd., 1932, 8, 747—750; Chem. Zentr., 1933, i, 1215).—Dry feed yeast contains 2.74% of lysine and approximates in biological val. (A) to feed of animal origin. The A of the protein in lucerne hay is much > that of protein in other plant feeds so far as its arginine, histidine, and lysine contents are concerned. Cystine was found only in soya bean, dried blood, and dried yeast. A. A. E.

Antioxidant for fats etc. Rancidity of fats. Cottonseed [meat]. Apricot-kernel oil[-cake].—See XII. **Soya-bean protein.**—See XIII. **Se [and spray residues]. Vitamin-C in spinach.**—See XVI. **Determining sugars in milk-chocolate. Titration of reducing sugars. Glucose.**—See XVII. **Yeast prep. for fodder. Yeast activity.**—See XVIII.

See also A., Sept., 903, **Starch and bread-making.** 986—7, **Vitamins (various).** 969, **Methylene-blue reductase test [of milk]. Glycerol as preservative for milk.** 990, **Composition etc. of barley and oat varieties.**

PATENTS.

Making bread and dough. G. TÖRÖK and G. BECZE (U.S.P. 1,894,135, 10.1.33. Appl., 15.12.30. Hung., 27.12.28).—Gas production in bread doughs is increased by the addition to the yeast or dough of acid-forming bacteria or cultures of yoghurt. Suitable kinds of

mildew may also be used. At least one bacterium per yeast cell is required. E. B. H.

Preparation and preservation of bread or other like baked products. ETABL. J. J. CARNAUD & FORGES DE BASSEINDRE (B.P. 396,634, 3.2.33. Fr., 11.2.32).—Bread dough containing a hygroscopic substance (glycerin, glucose, MgCl₂) is baked in a can which is incompletely sealed. After baking, sealing is completed and a further short period of heating is given. Before use, the bread is refreshed by heating the sealed can for 15 min. at 100°. E. B. H.

Stabilisation of cereal beverages. D. COZZOLINO, Assr. to G. COZZOLINO (U.S.P. 1,892,457, 27.12.32. Appl., 15.4.30).—In the process described in U.S.P. 1,766,428 (B., 1931, 178), a proteolytic enzyme or pepsin is used also. B. M. V.

Preservation of eggs. T. L. SWENSON (U.S.P. 1,888,415, 22.11.32. Appl., 21.1.32).—The eggs are immersed in mineral oil, the container is evacuated (20 in.), the eggs are then raised from the oil, and the vac. is released with CO₂. E. B. H.

Preparation of egg powder. F. H. CLICKNER, Assr. to ENDOWMENT FOUNDATION (U.S.P. 1,891,887, 20.12.32. Appl., 11.2.32).—Eggs freed from shells are emulsified with < 15%, preferably 100%, of H₂O and, after straining off non-emulsifiable substances, are spray-evaporated. B. M. V.

Homogenised citrus fruit concentrate. E. R. ALEXANDER, Assr. to VITAMIN CO. OF AMERICA (U.S.P. 1,885,401, 1.11.32. Appl., 28.7.30).—Whole citrus fruit is crushed, screened to remove rind and seeds, conc. by separation of < 50% of the oily and aq. liquids, citrus fruit resin and sugar syrup are added, and the product is homogenised. E. B. H.

Removal of spray residues from fruit and vegetables. R. H. ROBINSON (U.S.P. 1,885,100, 25.10.32. Appl., 11.7.29).—Spray residues containing As, Pb, Cu, etc. are removed by washing, first in a dil. solution of HCl and FeSO₄ and then in H₂O. E. B. H.

Extraction of organisms from organic or inorganic substances. F. H. BENJAMIN (U.S.P. 1,884,989, 25.10.32. Appl., 3.12.31).—Insects are extracted from fruit, vegetables, etc. by immersing the latter in a solution of CH₂O, or other preservative, contained in a special form of tank, which is described. E. B. H.

Jelly preparations. CALIFORNIA FRUIT GROWERS' EXCHANGE (B.P. 396,749, 8.2.32. U.S., 9.2.31).—The rate of setting of confectioners' pectin jelly products can be retarded by adding the salt of a strong base and weak acid e.g., 0.35—0.48% of NaOAc, to the batch. E. B. H.

Treatment of edible nuts. C. K. and J. E. BIZZELL (U.S.P. 1,887,256, 8.11.32. Appl., 15.3.32).—Removal of the skins of Brazil and other nuts, with or without pretreatment with fatty material, is effected by treatment with an alkaline solution (6 oz. per gal.) at 71—93° for 1—7 min., washing with H₂O under pressure (70—80 lb.), treating with HCl or edible acid to remove excess alkali, washing with H₂O, and air-drying. Glycerin may be added to the lye bath as wetting agent. E. B. H.

Treatment of pimentos. J. H. JONES, Assr. to BEST FOODS, INC. (U.S.P. 1,889,123, 29.11.32. Appl., 19.9.30).—Skinned pimentos are heated with 24% AcOH solution and NaCl at 82–93° for 15 min., cooled, and placed in barrels. E. B. H.

Making a food substance from cocoa, sugar, and water. H. A. SCHWEIGART (U.S.P. 1,887,905, 15.11.32. Appl., 23.6.31. Ger., 14.11.29).—Partly defatted cocoa or chocolate, with or without milk, is mixed with a solution of sugar and an acid (e.g., HCO₂H) and heated at the b.p., to form a prep. which does not form a sediment on keeping. E. B. H.

Chewing-gum base. G. A. HATHERELL, Assr. to F. A. GARBUTT (U.S.P. 1,887,930, 15.11.32. Appl., 24.11.30).—The prep. of a base from rubber, a protein, and a (coumarone) resin which is a solvent for rubber is claimed. E. B. H.

Flavouring in canning, preserving, and bottling [food products] operations. G. S. SUPPGER, Assr. to SCIENTIFIC TABLET CO. (U.S.P. 1,887,073, 8.11.32. Appl., 2.1.31).—Flavouring material in compressed tablet form is added after filling the container, which is sealed before appreciable disintegration occurs. E. B. H.

Manufacture of soya-bean flour. SHELLABARGER GRAIN PRODUCTS CO., Assees. of W. L. SHELLABARGER (B.P. 397,692, 17.10.32. U.S., 9.11.31).—See U.S.P. 1,867,541; B., 1933, 570.

Air-porous paper [for flour].—See V. Hydrogenated fatty oils.—See XII. Maize gluten.—See XVII.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Decomposition of anæsthetic ether. H. O. NOLAN (Lancet, 1933, 125, 129).—A trace of quinol prevents peroxide formation in Et₂O exposed to diffused daylight, with occasional sunshine. L. S. T.

Determination of chloroform [as such and] in pharmaceutical mixtures. M. STSCHIGOL (Pharm. Zentr., 1933, 74, 529–531).—A brief survey is made of existing methods. Those involving decomp. by alkali followed by argentometric determination of Cl give low results owing to loss of CHCl₃ vapour. This is avoided by the addition of PhMe or xylene, the effect of which is to raise the b.p. of the mixture. Satisfactory analytical figures are quoted for 11 specimens and 6 mixtures. W. S.

Determination of copper in ferrum reductum and pulveratum. P. KARSTEN (Pharm. Weekblad, 1933, 70, 914–922).—The sample is dissolved in HCl-HNO₃ and the Fe removed either as complex citrate or as FeCl₃ by continuous extraction with Et₂O from 20% HCl. Cu is then pptd. with Na diethyldithiocarbamate (I) and extracted with CCl₄. The extract is evaporated to dryness, the residue dissolved in H₂SO₄, and the Cu determined colorimetrically with (I) and NH₃ in gum arabic solution. Ferrum reductum and ferrum pulv. contain 10⁻⁵ and 10⁻³ g. Cu/g., respectively. S. C.

Chemistry of two Chinese drugs. D. TSAO and E. V. LYNN (J. Amer. Pharm. Assoc., 1933, 22, 720–722).—Fang feng contains chiefly sugars, gums, and free acids; alkaloids and tannins are absent. It has no appreciable effect on rats in high dosage. Hsiung

Chiung (root of *Conioselinum univittatum*, Turcz.) contains a volatile oil and a large quantity of drying oil [n_D^{25} 0.94672, n_D^{25} 1.4821, acid val. 31.5–31.9, sap. val. 200.4–205.2, unsaponifiable matter 1.55–1.64 (several phytosterols present), I val. 70.34–71.2, Reichert-Meißl val. 0.1, Polenske val. 0.25, liquid acids 89.22, titre 24.30] containing OH-acids. Alkaloids are absent. E. H. S.

Chemistry of Ma Huang. A. H. HAYDEN and C. B. JORDAN (J. Amer. Pharm. Assoc., 1933, 22, 616–625).—The following data are given: H₂O 3.64–4.29; other volatile constituents 1.083–1.21; progressive extraction with solvents, viz., light petroleum 1.57–1.65, Et₂O 1.35, CHCl₃ 0.58–0.67, EtOAc 4.47–4.72, EtOH 10.275–11.225, H₂O 9.355–10.395; ash 7.85–8.626 (H₂O-sol. 21.262, HCl-sol. 60.965, insol. 17.764%); crude fibre 19.513–24.163%. Results of alkaloid assay obtained by 8 different methods showed much variation. A new Ba(OH)₂ method is suggested and recommended. 2% of total alkaloids should be obtained. A pyrocatechol tannin, a cryst. substance possessing glucosidal properties, and a saponin were isolated from the drug. E. H. S.

Chemistry of Mikania hirsutissima. D. C. C. H. LIBERALLI (Rev. Soc. Brasil. Quím., 1933, 4, 5–30).—The officinal drug (“cipo cabeludo”) has been examined. Successive extractions with solvents (Allen’s method) gave the following solubility vals. (% on dry material): in C₆H₆, 16.035 (including volatile matter 7.53, fats 5.964); in MeOH, 6.858; in cold H₂O, 7.358; in dil. H₂SO₄, 13.545; in dil. NaOH, 34.137; in Br-aq. NH₃, 5.323; also cellulose 16.622, residual ash 0.122%. The dried drug had total ash 8.663, total N 2.1, tannins 5.756, resinoids 2.2%. Traces of saponins were identified, but alkaloids and glucosides hydrolysable by emulsin are absent. The fresh material contained 13.143% H₂O. E. L.

Assay of pharmaceutical pepsin preparations. A. STASIAK and B. KERÉNYI (Pharm. Zentr., 1933, 74, 519–523, 531–537).—A method is described which is based on a comparison (of proteolytic potency) with a standard pepsin prep., and yields figures consistent and repeatable to ±10%. Coagulated white of egg serves as substrate, and the amount which fails to be hydrolysed (dissolved) under rigidly standardised conditions is assumed to be inversely proportional to the potency of the prep. It is shown experimentally that analytical accuracy is impossible of attainment. W. S.

Assay of preparations containing pepsin official in the national formulary. G. L. JENKINS and E. M. HOSHALL (J. Amer. Pharm. Assoc., 1933, 22, 625–638).—Greenberg’s assay (A., 1931, 1456) and methods based on proteolytic digestion of casein (Foreman, Willstätter and Waldschmidt-Leitz) are unsuitable for pepsin or its preps. The Schütz-Borisssov equation is not applicable when the time of digestion is short (< 24 hr.). A modified Volhard method is described which measures proteolytic activity in such preps. with an accuracy within 10% or less. E. H. S.

Extraction of capsaicin and its colorimetric determination in capsicum fruit and oleo-resin. L. F. TICE (Amer. J. Pharm., 1933, 105, 320–325).—The

method of extraction of capsaicin (I) and its colorimetric determination in the fruit or oleo-resin by VOCl_3 are modified. The (I) content of capsicum varies from 0.1 to 1%, being highest in Mombasa capsicum. The placenta contain most of the (I), the cortex little, and the seeds none. Oleo-resins extracted by CCl_4 are inferior to those extracted by COMe_2 or Et_2O . The presence of Cu is deleterious. VOCl_3 reacts also with other phenols. R. S. C.

Liquid extract of *Equisetum*. B. AZZOLINI (Officina, 1932, 5, 80—82).—The procedure described effects complete extraction; HCl solubilises the SiO_2 , whilst glycerol stabilises the tannic acid, pptn. of which generally entrains Ca salts and SiO_2 . CH. ABS.

Determination of phytin and calcium glycerophosphate. M. Y. TROPP and L. M. SOLTZ (Farm. Zhur., 1932, 11—12, 332—335).—The sample (0.4 g.) is dissolved in 0.6% HCl (100 c.c.) and titrated with FeCl_3 and 4 c.c. of 0.1N- NH_4CNS . 1 c.c. of FeCl_3 (2 g. of Fe and 6 g. of HCl per litre) \equiv 0.00545 g. of org. H_3PO_4 . Ca glycerophosphate (A) (0.2 g.) is dissolved in 20 c.c. of H_2O ; after filtration and washing, the filtrate is titrated with 0.1N-HCl (Me-orange). 1 c.c. of HCl \equiv 0.021017 g. of anhyd. A. CH. ABS.

[Microchemical] identification of salvarsan [derivatives]. M. WAGENAAR (Pharm. Weekblad, 1933, 70, 597—606).—Salvarsan (I) crystals are coloured deep blue-black when treated with $\text{C}_5\text{H}_5\text{N}$ and furfuraldehyde vapours, whilst neosalvarsan (II), salvarsan base (III), and Na-salvarsan (IV) are unchanged. The colour is developed with (II) if the solid is first of all treated with halogens (Br, KI_3), but not with H_2O_2 . (III) and (IV) are coloured blue-green and atoxyl red if pretreated with HCl. The test depends on the quinquevalency of N in (I). It may be used satisfactorily either for identifying traces of (I) in (II) or for detecting impurities in (I). S. C.

Determination of silver in aqueous solutions of protargol in presence of adrenaline. G. A. WEISSMANN and M. M. JAMPOLSKAJA (Pharm. Zentr., 1933, 74, 504—507).—Consistent and accurate results are given by the following method. The 1—2% protargol solution (5—10 g.) containing adrenaline is evaporated to 1—2 c.c., 4 c.c. of H_2SO_4 are added, and the mixture is heated to fuming. HNO_3 (d 1.4) is then added (2—3-c.c. portions) until the AgCl is dissolved and the solution is clear (10—15 c.c. are usually necessary). After cooling, a slight excess of aq. KMnO_4 is added, the mixture diluted with 20—25 c.c. of H_2O , and decolorised with $\text{H}_2\text{C}_2\text{O}_4$. Dil. HNO_3 (5 c.c.) and Fe NH_4 alum solution (5 c.c.) are added, and the solution is titrated with 0.1N- NH_4CNS . E. H. S.

Neutralisation of tobacco smoke. J. M. CLAVERA and A. OCAÑO (Anal. Fis. Quím., 1933, 31, 449—453).—The total basicity of the smoke from a no. of different tobaccos has been determined. The efficacies of various neutralising media increase in the order: FeCl_3 (3% solution), $\text{Fe}^{\text{II}}\text{NH}_4$ sulphate (6% solution in 60% aq. EtOH), lactic acid (A) (5% solution). A may be employed in the form of pellets of wadding soaked in the solution and air-dried. The aroma of the tobacco remains unaltered. H. F. G.

Polarimetric determination of nicotine in tobacco and tobacco smoke. E. TOOLE (Z. anal. Chem., 1933, 93, 188—194).—Under the conditions specified the polarimetric method gives an abs. error of ± 2 mg. of nicotine (I) on a sample containing 30—100 mg. of (I). There is no evidence of racemisation of (I) in tobacco smoke or in the products of denicotinising at 160°.

Isolation of *l*- α -terpineol from Japanese camphor oil. T. MOCHIDA (J. Soc. Chem. Ind., Japan, 1933, 36, 443—444 B).—Camphor is removed from the terpineol fraction (200—230°) of camphor oil by steam-distillation under vac., leaving the less volatile terpineol and saffrole. The terpineol is then separated by fractional crystallisation and recrystallised twice, first as borate and then from 70% EtOH, giving rhombic crystals of *l*- α -terpineol, m.p. 34.8—35°, b.p. 104—105°/14 mm., 90—91°/10 mm., $[\alpha]_D^{25}$ —13.30°. S. S. W.

Products from CH_2O -sulphonated hydrocarbons.—See III. Glycerols. Apricot-kernel oil. Ergot oil.—See XII.

See also A., Sept., 921, Rapid determination of phosphites and hypophosphites. 948, Esters of *p*-aminothiobenzoic acid. Emetics. 953, Resorcinol ketones and C-alkylresorcinols. 956 and 960, Antimalarials. 958, Coloured derivatives of barbital. 960, Local anæsthetics. Synthesis of norm nicotine and nicotine. Determination of quinine and its salts. 961, Prep. of hydrastinine. Camphorcarboxylates of alkaloids. Alkaloids (various). 962, As derivatives of org. sulphides. 964, Detection of org. acids. 965, Erythroquinine reaction. 967, Prep. of thyroglobulin. 977, Local anæsthetics. Standardised prep. of digitalin for injection. 984—5, Antiseptics and trypanocides. 986—7, Vitamins (various). 988, Chemistry of tobacco. 989, Phytochemistry of *Gillenia stipulata*. 990, Alkaloids of fumaraceous plants.

PATENTS

Manufacture of materials [sodium iodobismuthite] for treatment of neurosyphilis. P. J. HANZLIK, ASS. TO BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY (U.S.P. 1,890,508, 13.12.32. Appl., 29.9.30).—A slight excess of NaI is added to a saturated solution of BiCl_3 in EtOAc, the NaCl ppt. removed, and the filtrate evaporated to recover cryst. $\text{Na}_2\text{BiI}_5 \cdot 6\text{H}_2\text{O}$, which is dissolved (6%) in ethylene glycol containing 12% of NaI for use in hypodermic injections. A. R. P.

Manufacture of soluble [organic] calcium salts. CHEM. FABR. VORM. SANDOZ (B.P. 394,596, 28.12.32. Switz., 30.12.31).—Ca (basic) salts of polyhydroxymono-carboxylic acids derived from aldmonoses are treated with Ca bionates derived from aldobioses in H_2O , preferably at 45—100°; the double salts may be pptd. with EtOH, and give solutions suitable for injection. Examples are Ca gluconate or mannionate and lactobionate. C. H.

Manufacture of unsaturated substituted tertiary acetamides having a strong hypnotic action. K. ZIEGLER (B.P. 394,084, 14.3.32. Ger., 13.5.31).—Nitriles, $\text{CRR}'\text{R}''\text{CN}$, in which 2 or all the groups R,

R', and R'' are unsaturated alkyl, are hydrolysed to amides. In the examples, R = R' = R'' = allyl (m.p. 63–65°), or R = R' = allyl and R'' = Et (m.p. 65°) or Pr (m.p. 53°). C. H.

Preparation of aminopyrine borate in combination with acetone. W. G. CHRISTIANSEN and A. E. JURIST, Assrs. to E. R. SQUIBB & SONS (U.S.P. 1,894,666, 17.1.33. Appl., 10.10.29).—A compound of aminopyrine, H₃BO₃, and COMe₂ in the mol. proportions 1:5:1 is prepared by heating a mixture of the solids in COMe₂. E. H. S.

Manufacture of the glucosides of phenols and of substances containing phenolic hydroxyl groups. B. HELFERICH (B.P. 394,195, 6.10.32. Ger., 16.10.31).—Acetylated reducing sugars are condensed with phenols in presence of acid (*p*-C₆H₄Me·SO₃H) or of an acid condensing agent, with or without solvent, and the OAc groups are removed by hydrolysis (e.g., with NaOMe in CHCl₃). The following compounds are described: phenol- α -*d*-glucoside (tetra-acetate, m.p. 115°) and - β -*d*-glucoside (tetra-acetate, m.p. 126–127°); β -naphthol- β -*d*-glucoside, m.p. 184–186° (tetra-acetate, m.p. 135.5°); guaiacol- β -*d*-glucoside, m.p. 157° (tetra-acetate, m.p. 155.5°); phenol- α -*d*-galactoside, m.p. 130.5–132° (tetra-acetate, m.p. 131–132°), - β -*d*-gentiobioside, m.p. 190–193° (hepta-acetate, m.p. 195°), - α -*d*-cellobioside, m.p. 253° (hepta-acetate, m.p. 228°), and - β -*d*-xyloside, m.p. 177.5–179° (triacetate, m.p. 147–147.5°); thymol- β -*d*-glucoside, m.p. 81° (+1H₂O, m.p. 100–101°; tetra-acetate, m.p. 116–116.5°). (Cf. A., 1933, 379.) C. H.

Production of perfumes [of irone type]. Soc. ANON. M. NAEF & Co. (B.P. 394,197, 7.10.32. Switz., 30.10.31).—Methylated *cyclohepten-* and *cycloocten-*aldehydes are condensed with MeCHO, COMe₂, etc., the elimination of H₂O taking place directly or in a second operation. Examples are compounds from: COMe₂ with 3:3:4-trimethyl- Δ^1 -*cyclohepten-1-*aldehyde (b.p. 95–98°/0.2 mm.; aldol, b.p. 95–120°/0.2 mm.), the 3:3:5- (b.p. 93–95°/0.15 mm.), 3:3:7- (b.p. 98–100°/0.2 mm.), 4:4:6- (b.p. 98–100°/0.2 mm.) -Me₃, and 3:3-Me₂ (b.p. 92–94°/0.25 mm.) compounds; COMeEt with the 3:3-Me₂ (b.p. 100–103°/0.3 mm.) and 3:3:4-Me₃ (b.p. 102–104°/0.2 mm.) compounds; COMe₂ with 3:3-dimethyl- Δ^1 -*cycloocten-1-*aldehyde (b.p. 105–108°/0.1 mm.); MeCHO with 3:3:4-trimethyl- Δ^1 -*cyclopenten-1-*aldehyde (b.p. 88–90°/0.2 mm.); EtCHO with the 3:3-Me₂-compound (b.p. 93–95°/0.25 mm.). C. H.

Liver concentrate. J. W. DRESSEL (U.S.P. 1,895,977, 31.1.33. Appl., 8.7.30).—Small pieces of fresh liver are covered with NaCl and, after keeping at 10–15° for 40 hr., the liquid extract thus obtained is separated and evaporated to dryness. E. H. S.

Preparation of extract of parathyroid gland. A. M. HANSEN, Assr. to PARKE, DAVIS & Co. (U.S.P. 1,890,851, 13.12.32. Appl., 30.3.25).—The glands are boiled with 1% HCl and, after cooling, the fat is removed and the solution treated with NaOH until max. pptn. occurs. The filtrate is evaporated and used for hypodermic injections for raising the blood-serum Ca content. A. R. P.

3:5-Di-iodo-4-pyridone.—See III. Disinfection with I.—See XXIII.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Optical intensification [of photographic images]. K. HICKMAN and W. WEYERTS (Brit. J. Phot., 1933, 80, 482–484).—Sulphide-toned images can be intensified and greatly increased in contrast by treating with Ag₂SO₃ or AgNO₃ solutions and exposing to light. The effective light is mainly infra-red and a 200-watt gas-filled lamp is recommended. Full working details and precautions for avoiding stain are given. J. L.

Erratum.—In the issue for June 30, 1933, page 525, col. 2, the title of the first abstract under class XXI should have a comma after **unsensitised** and after **orthochromatic**.

Decolorisation of wine.—See XVIII.

See also A., Sept., 915, **Sensitivity of Ag₂S. Topography of latent X-ray images. Schwarzschild effect with, and light-sensitivity of, colloid-free AgBr. 925. Blackening of plates. Taking X-ray photographs of cryst. powders.**

PATENTS.

Manufacture of light-sensitive materials. I. G. FARBENIND. A.-G. (B.P. 394,893, 11.1.33. Ger., 11.1.32).—Sulphuric and similar ester salts of leuco-vat dyes give by condensation in a suitable solvent with an *N*-nitrosoarylhydroxylamine H₂O-sol. products which, when warmed with dil. acid or exposed to light on a substratum, regenerate the vat dyes. Under a negative positives are obtained having better contrast than when the leuco-ester salts themselves are used. The support may be impregnated with the products or with the separate reactants. Examples are products from: NPh(OH)·NO with leuco-esters from 4:4'-dichloro-5:5'-dibromoindigo (blue) and 5:7:6'-trichloro-4:4'-dimethylthioindigo (blue-red); N(*p*-C₆H₄Cl)(OH)·NO with leuco-ester from 6:6'-dichloro-4:4'-dimethylthioindigo (purple-red). C. H.

Sensitising silver halide emulsions. I. G. FARBENIND. A.-G. (B.P. 389,969, 19.2.32. Ger., 19.2.31. Addn. to B.P. 388,898; B., 1933, 685).—Naphthaselenothiazole isocyanines are suitable for orthochromatic sensitisation. An example is the isocyanine obtained from 6-methylquinoline ethobromide and 2:3-dimethyl- α -naphthaselenazole methosulphate in presence of NaOEt. C. H.

Sensitisation of photographic silver halide emulsions. I. G. FARBENIND. A.-G. (B.P. 394,537, 10.10.32. Ger., 10.10.31).—Penta- and hepta-methine dyes, in which < 1 C atom of the polymethine bridge carries an alkyl substituent, are used as sensitizers. In the examples the polymethine chain carries Me in positions γ , β , δ , or $\alpha\alpha'$; the hetero-nuclei are benz-thiazole, -selenazole, α -naphthathiazole, quinoline (linked in position 4). The nuclei may carry alkyl, OH, alkoxyl, halogen, or substituted NH₂, especially in positions 5 and 6. C. H.

Sensitisation of photographic emulsions. KODAK, LTD., Assces. of L. G. S. BROOKER (B.P. 394,691,

31.12.31. U.S., 31.12.30).—Carbocyanine salts in which two benzthiazole nuclei are connected by the bridge $\cdot\text{CH}:\text{CR}:\text{CH}\cdot$; R being an alkyl $> \text{C}_1$, aralkyl, or aryl, e.g., Et, $\text{isoC}_5\text{H}_{11}$, CH_2Ph , or $\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{OPh}$, sensitise to about 650 m μ . C. H.

Colour photography. I. G. FARBENIND. A.-G. (B.P. 396,585, 28.10.32. Ger., 25.11.31).—The front, blue-sensitive, emulsion layer of the tri-pack described in B.P. 389,341 (B., 1933, 413) is coated with an additional yellow filter layer to reduce the contrast to the degree obtained on the other films. The yellow filter on the green-sensitive layer may be made correspondingly more translucent. J. L.

Carbocyanine dyes.—See IV. Fluorescent screen.—See XI.

XXII.—EXPLOSIVES; MATCHES.

Influence of fatty acids on the chemical stability of smokeless cellulose nitrate powder. C. KRAUZ and A. MAJRICH (Chem. Obzor, 1932, 7, 209—217; Chem. Zentr., 1933, i, 1388—1389).—Mineral acids diminish the stability. Alkylcarboxylic acids (*A*) somewhat, and substituted *A* more markedly, diminish it. Betaine considerably reduces stability. Alkyldicarboxylic acids and acids of the uric acid series are stabilisers. Hydroxydicarboxylic acids are particularly good stabilisers. Horn's method of determining stability is preferred. A. A. E.

See also A., Sept., 939, Complete nitration of cellulose. 959, Derivatives of 1-aminotetrazole.

PATENTS.

Explosive composition. E. H. BURROWS, Assr. to W. HOYT (U.S.P. 1,891,500, 20.12.32. Appl., 2.5.31).—The composition comprises NH_4ClO_4 54, $\text{Ba}(\text{NO}_3)_2$ 29.5, Al powder 1.5, Al granules 9, resin 3 pts., and, if desired, paraffin wax 2 pts. and brown wax 1 pt. B. M. V.

Production of nitrated carbohydrate explosives. P. G. WRIGHTSMAN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,891,255, 20.12.32. Appl., 20.12.27).—The explosive comprises the nitrated product of a solution of sucrose 25% and glucose 15% in glycerin-mono-chlorohydrin mixture 60%, or, more generally, of a monosaccharide $> 5\%$ (preferably up to the solubility limit) and disaccharide $> 20\%$ in a medium composed at least partly of a chlorohydrin. B. M. V.

Bullet-proof sheet materials.—See XIII.

XXIII.—SANITATION; WATER PURIFICATION.

Rotenone in fly sprays. Raising the quality of pyrethrum fly sprays by addition of a constant amount of rotenone. A. E. BADERTSCHER (Soap, 1933, 9, 85—87).—Improvement in pyrethrum sprays brought about by additions of rotenone varies with the initial toxicity of the prep. A. G. P.

Activity of public hydraulic stations in supplying industrial water. R. KLAUSNER (Chim. et Ind., 1933, 29, Spec. No., June, 293—297).—A discussion. C. W. G.

Modified Eijkman test for water analysis. W. L. WILLIAMS, R. H. WEAVER, and M. SCHERAGO (Amer. J. Hyg., 1933, 17, 432—445).—By the use of a medium containing Witte's peptone 1, beef extract 0.6, and

glucose 1% the test for *Es. coli* is more trustworthy and is carried out more rapidly. CH. ABS.

Determination of phenol in river water. NOLTE (Chem.-Ztg., 1933, 57, 654).—The Hinden-Splitzger-Nolte nitroaniline method ("Untersuchung des Wassers," Berlin) is recommended. E. C. S.

Poisoning of fish. W. W. ATKEN (Science, 1933, 78, 59—60).—High concns. of CuSO_4 had no effect on certain kinds of fish; chlorinated CaO (1 lb. per 2000 gals.) killed the fish in < 20 min. L. S. T.

Toxicity to trout of potassium cyanide and *p*-cresol in water containing different concentrations of dissolved oxygen. B. A. SOUTHGATE, F. T. K. PENTELOW, and R. BASSINDALE (Biochem. J., 1933, 27, 983—985).—The toxicity of H_2O containing 0.62 g. of *p*-cresol or 0.011 g. CN' per 100 litres to trout (*Salmo irideus*, Gibb.) varies inversely with the O_2 saturation of the H_2O . F. O. H.

Trade waste problems [in the wool-scouring industry]. R. J. SMITH (J. Soc. Dyers and Col., 1933, 49, 241—244).—A detailed description is given of a new method for treating wool-scouring liquors and of the properties and disposal of valuable products thereby recovered. The older method of "cracking" followed by prolonged sedimentation is replaced by a process in which the liquor, compressed air, and H_2SO_4 are intimately mixed by passage at a high rate (1000 gals./hr.) through a Barber mixing jet and then directed against an abutment to assist coagulation of the fat; the resulting foam rich in lanoline is washed with H_2O to eliminate occluded soaps, and then fractionally and continuously distilled in a Barber autoclave. The overall efficiency of recovery of neutral fat is 85%, and much less acid is used than in the older process. The distillates are rich in cholesterol and also contain C_{12} — C_{27} alcohols; the residual pitch is used for anti-acid corrosive paints, and for emulsifying bitumen. A. J. H.

See also A., Sept., 920 and 921, Determination of F' in H_2O analysis.

PATENTS.

Disinfection with free iodine. J. P. SCHÖNTHAN (B.P. 397,238, 31.3.32. Ger., 2.4.31).—Solid fuels, i.e., paraffin, stearin, etc., are mixed with adsorbent substances containing I or with non-volatile, easily decomposable I compounds, e.g., HIO_3 , with or without the addition of oxidising or reducing materials. The mixture may be moulded into sticks and provided with ignition means. E. H. S.

Germicide. C. B. WOOD (U.S.P. 1,891,462, 20.12.32. Appl., 12.5.28).—Succinchloroimide is claimed as a germicide for potable H_2O . B. M. V.

Treatment [purification] of water. N. K. CHANEY, Assr. to NAT. CARBON Co., Inc. (U.S.P. 1,890,969, 13.12.32. Appl., 13.12.28).—After chlorination, the H_2O is passed through a bed of granules of anthracite which have been pretreated with superheated steam at $> 700^\circ$ (970°), to remove the excess of Cl_2 , and then through activated coconut charcoal to remove objectionable odours and tastes. A. R. P.

Arylper sulphonates.—See III. Scale etc. removal.—See X.