BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

SEPT. 15 and 22, 1933.*

I.—GENERAL; PLANT; MACHINERY.

Prevention of boiler corrosion by the action of gases from boiler slime. H. SCHULZ (Chem.-Ztg., 1933, **57**, 541—542).—Causes of boiler corrosion are discussed. The attack is reduced by using a feed-H_2O preheater. E. S. H.

Colloidal method of boiler feed-water conditioning. J. S. MERRY (Proc. S. Wales Inst. Eng., 1933, **49**, 283—298).—A general description and discussion of the process. C. E. M.

Elimination of noxious constituents from flue gases and treatment of resulting effluents at Battersea Power Station. G. W. HEWSON, S. L. PEARCE, A. POLLITT, and R. L. REES (Chem. Eng. Group, July 11, 1933. Advance proof, 35 pp.).—Experimental methods on a large scale for the removal of S gases from flue gas produced at > 1 million cu. ft. per min. are described. The gas containing approx. 1% S is washed with H_2O, both being in contact with Fe oxide which greatly increases efficiency. After a further spray-washing with H_2O, preferably in counterflow, the gas enters a final scrubber wetted with an alkaline solution, e.g., 0·25% chalk slurry. Calc. at N.T.P. the time of contact is 30—35 sec., and about 20 tons of H_2O and 10—12 lb. of chalk are used per ton of coal with a 90% removal of S. The wash-H_2O and the effluent from the whole plant is aërated to oxidise sulphites and the reducing power of the effluent may be made equiv. to approx. 3 grains of S per gal., a val. which may be reduced still further by the catalytic effect of a small quantity of Mn in solution. After filtration the effluent is diluted with a considerable quantity of return condensing H_2O which is sufficiently alkaline to neutralise the acidity of the effluent. Methods of analysis are also given. C. A. K.

Soviet bleaching earths, their activation and application. A. MARKMAN and F. VUISHNEPOLSKAYA (Masloboino-Zhir. Delo, 1932, No. 4—5, 45—48). P. BUKREEVA (Ibid., 49—50).

Preparation of filter-plates. V. N. UFIMTZEV and N. N. URIUPINA (J. Chem. Ind. Russ., 1933, No. 3, 57—59).—Satisfactory filter-plates are prepared by heating quartz sand at 220—250° under pressure with crude carbolic acid, formalin, and $(CH_2)_6N_4$. R. T.

Humidity chart applicable to most industrial gases. S. HATTA (J. Soc. Chem. Ind., Japan, 1933, **36**, 354—363 B).—Charts are given showing molal humidity, humid molal vol., saturated molal vol., and molal heat of evaporation of H_2O each plotted against temp., humid molal heat capacity plotted against molal humidity, and also adiabatic cooling lines. Being on a molal basis they are applicable to most industrial gases, and separate charts are provided for the ranges 0—120° and 0—400°. A. G.

Microscopical examination of solids.—See XIV.

PATENTS.

Rotary kilns or dryers. COLAS PRODUCTS, LTD., A. G. TERRY, and L. BRIGGS (B.P. 395,358, 11.1.32).—In a rotary kiln arranged with the usual countercurrent flow of material (m) and gases (g), g are prevented from contacting with m, until they have reached a point where m is still wet, by means of an internal cylindrical baffle. B. M. V.

Methods of cooling sintered material. J. E. GREENAWALT (B.P. 395,619, 23.1.33).—The material is dumped into a hopper (A) and passed over a screen (B); in A and under B are H_2O sprays, and air is allowed to pass over B. The total gases are drawn by a fan through the sinter in A and the dust is delivered to settling chambers, the nett effect being that the dust is cooled only by gases, the undersize twice by H_2O, and the oversize once by H_2O and by air. B. M. V.

Treatment of clay. C. V. ZOUL, Assr. to COEN COMPANIES, INC. (U.S.P. 1,884,954, 25.10.32. Appl., 20.7.29).—Clay for absorption is finely ground, treated, in turn, with acid and aq. $AlCl_3$, partly dehydrated, and re-ground. B. M. V.

Protection of solid compounds. G. BAUME and A. GLORIFET (B.P. 395,421, 20.1.32. Fr., 20.1.31).—Substances such as CaC_2 are protected against reactive liquids or vapours by impregnation with an inert, non-volatile distillate of carbonaceous material (e.g., fuel oil) mixed with a substance of low surface tension compared with H_2O (e.g., an aliphatic ester of an oil or fat acid) and a H_2O-sol. alcohol or ketone. H. R.-D.

Drying of fibrous or granular materials. BRIT. CELANESE, LTD., J. E. JONES, and D. R. JOHNSTON (B.P. 394,975, 1.1.32).—The material is mangled into the form of a sheet, adherence to the rollers being relied on to remove the H_2O to such an extent that a multi-stage apparatus may have the rollers of each pair in horizontal planes, the pairs being superposed. Provision is made for removing any adhering material and returning it to the first nip. B. M. V.

Washing or classifying apparatus. W. W. TRIGGS. From DORR CO., INC. (B.P. 395,412, 16.1.32).—A circular, inclined, sand-washing table (A) is combined with a sloping-bed, rake classifier (B) (twinned if desired) in such a way that the feed may be either to A or to B. B. M. V.

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

Apparatus for concentrating solutions by circulation. ESCHER WYSS MASCHINENFABR. A.-G. (B.P. 395,287, 14.2.33. Switz., 25.2.32).—A horizontal vaporising drum is superposed upon a horizontal heater, and they are connected by vertical conduits at each end; the liquid is rapidly circulated by a propeller in the downward return conduit, evaporation being prevented in the lower drum.   B. M. V.

Conducting exothermic gaseous reactions. C. B. CLARK, Assr. to GEN. CHEM. CO. (U.S.P. 1,883,570, 18.10.32. Appl., 5.11.26).—The gases are adiabatically expanded between stages of a reaction that is to be effected at successively lowered temp. or to prevent rise of temp. by exothermic heat, e.g., the oxidation of SO_2. Conveniently the converters consist of a no. of vessels of increasing size with throttling devices between.   B. M. V.

Separation of gases. A. H. STEVENS. From AMER. SMELTING & REFINING CO. (B.P. 395,641, 23.2.33). —A scheme for the separation of, e.g., SO_2 from mixed gases is described; after compression and cooling to room temp. of the whole mixture (a, s) part of the SO_2 (s_1) is liquefied by the total cold residual gas (a_1, a_2) and the other part (s_2) is liquefied by the evaporation of s_1 and s_2, both remainders, a_1 and a_2, being cooled in an expansion engine and utilised as stated. The evaporated SO_2 may be reliquefied by compression and cooling to room temp.   B. M. V.

Fluid analysis. G. W. SMITH, Assr. to J. M. HOPWOOD (U.S.P. 1,884,896, 25.10.32. Appl., 29.7.27).—The pressure drop (A) of a fluid in lamellar flow is proportional to vol. $\times$ viscosity and is independent of d; in turbulent flow A varies with vol.$^2 \times d$ and is independent of viscosity. The sample, e.g., of boiler gases, is therefore passed in series through a long constriction and a sharp orifice at const. total loss of pressure, the pressure at the intermediate point being a measure of the proportion of gas of high d, e.g., CO_2. In practice, the lamellar drop is made comparatively high and the turbulent drop alone is measured. For accuracy the sample must be brought to standard temp. and humidity.   B. M. V.

Rotary retorts, furnaces, etc.—See II. **Conditioning gases.**—See XI.

II.—FUEL; GAS; TAR; MINERAL OILS.

Northumberland and Durham coalfield. Durham area. Hutton seam. ANON. (Dept. Sci. Ind. Res., Fuel Res., Survey Paper No. 27, 1933, 126 pp.).—Analyses of 23 pillar samples and 17 channel samples of the Hutton seam, taken from sites distributed over the area, are given. The seam consisted mainly of uniformly clean, bright, good quality coal with little durain and but few layers of vitrain. The H_2O content was < 2—3%; 17 of the samples examined contained $< 4\%$ of ash, and 34 of them $< 6\%$ of ash; the volatile matter content ranged from 29·5 to 42·1%. Ultimate analyses gave C 84·4—87·8, H 4·9—5·6, N 1·6—2·0, S (average) 2·0, P (average) 0·003%. The calorific val. ranged from 13,300 to 14,980 B.Th.U. per lb. (14,930 to 15,740 on dry, ash-free coal). The average fusion point of the ash was 1250° and 1395° for reducing and oxidising atm. respectively. On carbonisation at 600° the coal gave a highly-swollen coke.   A. B. M.

Spontaneous combustion in the western area of South Wales coalfield. W. M. THOMAS, T. D. JONES, and J. I. GRAHAM (Proc. S. Wales Inst. Eng., 1933, 49, 201—236).—Spontaneous combustion depends on the thickness of the coal seam, the method of working, and the friable nature of the coal, rather than on the presence of any carbonaceous material in the seam. Where combustion is met with in seams of normal thickness the initiating cause appears to be in the oxidation of finely disseminated pyrites. The accumulation of pyritic matter is of more importance in steam coals than in anthracite as the oxidation of the former increases very rapidly with rise of temp. Anthracite seams are not liable to spontaneous combustion; where this occurs it is due to the presence of bastard coal containing finely disseminated pyrites. The presence of wood props by acting as chimneys probably aids the combustion if the gobs are not solidly packed.   C. E. M.

Rational examination of coal. W. FRANCIS (J. Inst. Fuel, 1933, 6, 301—313).—The formation and rational analysis of coal are discussed (cf. B., 1932, 630; 1933, 451). The "rank" of a coal can be determined either by the reactivity of ulmin towards oxidising agents or by ultimate analysis. The ulmin is best determined in the vitrain of a coal and corrections made for the resin and hydrocarbon present as shown by analysis. The C content of the ulmin is a measure of the "rank" of the coal. The appearance and composition of the vitrain, clarain, durain, and fusain present in bituminous coal are discussed and figures are given for the analyses and limits of these bands. A diagram embodying these details and plotting the C against the H content gives a basis for the rational classification of coals. The analysis of the vitrain of a coal together with an investigation of its "type" will segregate coals suitable for various industrial purposes.   C. E. M.

Coking of Transvaal coals and blends. P. E. HALL (J. Chem. Met. Min. Soc. S. Africa, 1933, 33, 258—268, 294—327).—Data are given relating to full-scale coking and washing tests, from which conclusions are derived as to the best means of utilising these coals.   A. B. M.

Combustion of cokes in a domestic heating stove. M. KUROKAWA (J. Soc. Chem. Ind., Japan, 1933, 36, 244—245 B).—The efficiencies of an up-draught stove when burning 2 gas cokes and 2 semi-cokes have been determined. The total efficiency with gas coke falls from 70·8% to 62·9% when the H_2O content of the coke is increased from 3·1 to 22·8%, but the convection efficiency changes little; with semi-coke, however, increase of the H_2O content results in an increase of total efficiency, although the radiation efficiency is somewhat reduced.   H. F. G.

Coke and charcoal. XIV. Correction of volatile matter in the combustion characteristics of carbon materials. Y. OSHIMA and Y. FUKUDA (J. Soc. Chem. Ind., Japan, 1933, 36, 248—249 B).—If A g. of the sample (ash and H_2O-free) lose X g. when heated in air to a given temp., and Y g. when heated in N_2 to the same temp., the loss of volatile matter, x, in the latter case is

$X(A-Y)/(A-X)$, since $A-Y$ is the quantity of the sample remaining and $X/(A-X)$ is the distribution ratio of carbonaceous to volatile matter up to the temp. in question. The nett combustion loss is then the difference between the total loss and x. H. F. G.

Combustion. XIII. "A" and "C" layers of the Tandjoeng-Enim coal deposits. D. J. W. KREULEN (Chem. Weekblad, 1933, 30, 504—507; cf. B., 1933, 689).—The ultimate analyses and results of low-temp. carbonisation of 22 samples are given, together with typical time–vol. curves obtained during carbonisation. H. F. G.

Losses of volatile matter in [analysis of] coal by standard method. Water of hydration and carbon dioxide of mineral matter. W. A. SELVIG and W. D. POHLE (Ind. Eng. Chem. [Anal.], 1933, 5, 239—241).— With the exception of zoisite, all the minerals examined were deprived of the total H_2O of hydration when heated at 950° for 7 min. Under these conditions the amount of CO_2 liberated from $CaCO_3$ varies. $CaCO_3$ is determined satisfactorily, however, in the standard method for determining ash content. E. S. H.

Effect of grain size and lime salt content on the decolorising effect of bone char. N. N. KUDELYA and I. E. TUGAI (Nauk. Zapiski Tzuk. Prom., 1932, 9, No. 15, 149—155).—With decrease in size of the bone-char grains the C and $CaSO_4$ contents decrease whilst the $CaCO_3$ content increases. The decolorising power of the char varies inversely with the size of the grains, irrespectively of decrease in C or $CaCO_3$. $CaSO_4 > 1\%$ noticeably decreases the decolorising effect. The efficiency of C which has absorbed 1—2% of $CaCO_3$ is greatly increased by treatment with HCl. CH. ABS.

Complete gasification of coal. I. Effect of heating rate on the carbonisation. II. Reactivity of coke towards carbon dioxide. T. NAMIKAWA (J. Soc. Chem. Ind., Japan, 1933, 36, 240—242 B, 242—243 B).—I. Experiments on carbonisation at 550°, with rates of heating varying between 0·55° and 7·6° per min., show that with increase of the rate the yields of tar, liquor, and gas increase whilst the yield of coke diminishes. The coke obtained with the higher rates is more porous and has a lower ignition temp. (53·2% and 308° at 7·6° per min. as compared with 31·9% and 387° at 0·55° per min.). X-Ray study of the coke shows that by secondary decomp. of the tar, which is the more pronounced the lower is the rate of heating, an increased quantity of graphitic C is produced both on the surface and in the interior of the coke.

II. The reactivity of coke towards CO_2 increases with increase of the rate of carbonisation, owing to the reduction of the quantity of tar decomposed on the surface and of the content of amorphous C. The differences of reactivity become very small, however, at temp. $> 1200°$. The observed degree of reactivity increases very rapidly with reduction of the rate of flow of the CO_2 over the coke. H. F. G.

[Gas] interferometer as an aid in works control. H. A. J. PIETERS and H. KOOPMANS (Chem. Weekblad, 1933, 30, 516—518).—No known absorbent extracts only C_6H_6 quantitatively from coal gas (cf. B., 1932, 918). Both norit and SiO_2 gel may be used for determining C_6H_6 in C_6H_6-air mixtures but they also absorb heavier hydrocarbons and CO_2 from gas. Paraffin oil does not remove C_6H_6 quantitatively. H_2S in air can be determined by using the interferometer in conjunction with $CdCl_2$ solution. S. C.

Alkaline pyrogallate solution in gas analysis. J. S. HALDANE and R. H. MAKGILL (Analyst, 1933, 58, 378—379).—Solutions of pyrogallol in dil. (20%) KOH give low vals. for O_2 in the Haldane apparatus owing to the formation of CO. In conc. (80%) KOH low vals. are obtained in fresh solutions only. CO is not formed if the solution is kept for 70 hr. at room temp. or for 1 hr. at 100° before use. E. C. S.

Use of [sewage] sludge gas for power production. Cause and effect of variations in composition of gas. T. R. HASELTINE (Sewage Works' J., 1933, 5, 482—501).—The composition and heat val. of sludge digestion gas may vary considerably but the heat val. of the gas-air mixture used in an internal-combustion engine will not be affected by > 3 or 4% and the gas consumption per B.H.P. will be fairly uniform for a given engine loading. The CH_4 may vary from 60 to 80% and to ensure max. efficiency careful adjustments of the proportions of gas and air will be needed. H_2S may cause corrosion if $> 0·1\%$; H_2O should be removed. A low C : N ratio and an alkaline reaction in the digesting sludge favour high CH_4 and low CO_2 and H_2S production. C. J.

Catalytic reduction of carbon dioxide by hydrogen. H. KOCH and H. KÜSTER (Brennstoff-Chem., 1933, 14, 245—251).—The Ni and Co catalysts used in the benzine synthesis have proved to be effective also in the reduction of CO_2 by H_2 ($CO_2 + 4H_2 = CH_4 + 2H_2O$). The reaction was appreciable at 150°, whilst the reduction was almost complete at 250°, even with rates of gas passage of 16 litres/hr. (the catalyst occupying a length of 30 cm. in a tube of 15 mm. internal diam.). No appreciable formation of higher hydrocarbons or of oxygenated compounds was observed. Addition of steam to the reacting mixture caused a somewhat greater decrease in the rate of reaction than was to be expected from the law of mass action. The H_2 in a $CO_2 : H_2 : N_2$ (30 : 24 : 45) gas mixture prepared by passing blast-furnace gas and steam over an Fe–Cr catalyst was similarly converted into CH_4 at 200—300° in presence of the Ni or Co catalyst. MeOH was completely decomposed at 200° in contact with the Ni catalyst. The catalysts were poisoned with respect to the above reaction by the addition of small quantities of H_2S to the reacting gases. A. B. M.

Hydrogen : a commercial fuel for internal-combustion engines. R. A. ERREN and W. H. CAMPBELL (J. Inst. Fuel, 1933, 6, 278—291).—The advantages of H_2 as engine fuel are discussed with reference to H_2-air, oxyhydrogen, and Diesel engines. C. E. M.

Benzol wash oils from some coke-oven tars of the Donetz basin. K. FREY (Brennstoff-Chem., 1933, 14, 241—245).—A no. of tars have been analysed and fractionated, and the properties of the fractions suitable for use as benzol wash oils (approx. boiling range 200—300°) have been investigated. These fractions

were freed from material crystallising at 15°, from phenols, and from C_5H_5N. The quality and yield of the wash oils could be improved by refractionation of the tar oils.   A. B. M.

Determination of the oil content of crude naphthalene. H. A. J. Pieters (Chem. Weekblad, 1933, **30**, 520).—The oil content of $C_{10}H_8$ is most accurately determined from the setting point (data and curve given).   S. C.

Determination of naphthalene in tar oil. H. A. J. Pieters (Chem. Weekblad, 1933, **30**, 519—520).—A compact apparatus for carrying out this determination by the picric acid method is described. The oil is treated with $KMnO_4$ and H_3PO_4 and air-blown at 70°, and the volatilised $C_{10}H_8$ scrubbed through KOH solution. The whole apparatus with the exception of the final absorption tube is immersed in a beaker of H_2O at 70°. S. C.

Catalytic hydrogenation of phenolic oil in low-temperature tar. I. S. Andō (J. Soc. Chem. Ind., Japan, 1933, **36**, 243—244 b).—A phenolic fraction of primary tar, distilling 0% < 170°, 28% at 170—210°, and 98% > 300°, was hydrogenated at 380—490°/40—90 atm. (initial). A typical fraction of the products, of b.p. < 170°, had d 0·8364 and contained 65% of aromatic, 33% of saturated, and 2% of unsaturated hydrocarbons, the yield being 20%. The 170—210° fraction (up to 41·7%) consisted chiefly of phenols, of which the S content was the lower, the greater were the temp. and duration of the hydrogenation. Further treatment of the 170—250° fraction at 250°/80 atm. gave an oil, of which 78·3% distilled between 160° and 200°, consisting chiefly of compounds of the *cyclo*hexanol type. In the primary hydrogenation, the yields of gas (up to 14·2%) and of low-b.p. fractions increased with increase of the temp. and initial pressure.   H. F. G.

Free carbon in pitch. I. **Preparation of free carbon.** Y. Oshima, Y. Fukuda, and K. Miyanaga (J. Soc. Chem. Ind., Japan, 1933, **36**, 249 b).—The % solubilities of 2 high-temp. tar pitches, a low-temp. tar pitch, and a petroleum pitch in C_6H_6 and in C_5H_5N have been determined.   H. F. G.

Rapid and accurate analysis of bituminous materials. D. M. Wilson (Chem. and Ind., 1933, 579—581).—Modified technique is given for rapid routine analysis by the process previously described (B., 1931, 1051).   C. I.

Formation of artificial bitumen from cellulose without hydrogenation. D. J. W. Kreulen (Chem. Weekblad, 1933, **30**, 518—519).—Cellulose is converted into sol. bitumens when heated in an autoclave to 275° with a liquid (PhCl; $C_{10}H_{12}$). Flocculation experiments with CS_2, C_6H_6, CCl_4, and Et_2O indicate that the product is very similar to asphalt. On carbonisation it forms an extremely voluminous coke.   S. C.

Gasoline fractions of representative Japanese crude petroleums. XII. M. Mizuta (J. Soc. Chem. Ind., Japan, 1933, **36**, 330—331 b).—An analysis of gasoline from the Kinsui field at Taiwan is recorded. It is recommended for aviation.   A. A. L.

Dielectric constants of naphtha products. T. G. Kovalev and V. V. Illarionov (J. pr. Chem., 1933,

[ii], **137**, 257—260).—Measurements of ε of the various fractions of Russian petroleum are in agreement with the vals. calc. from the known content of aromatic, naphthenic, and paraffinic hydrocarbons. This const. is thus a criterion of the source and composition of petroleum products.   H. A. P.

Thermal decomposition of petroleum at high pressure. T. Kato (J. Soc. Chem. Ind., Japan, 1933, **36**, 226—227 b).—Fractions of Tarakan heavy oil of b.p. 210—300°, 300—330°, and 330—360°, respectively, were cracked at pressures between 50 and 300 atm. Losses (as C deposit and incondensable gases) increased with increase of pressure, and were considerable at pressures > 200 atm. At temp. > 400° cracking was followed by polymerisation, especially at pressures > 200 atm. The rate of cracking, the yield of petrol, and the I val. of the petrol decreased with increase of pressure. The cracked spirit was free from disagreeable odour.   H. F. G.

Theory of cracking. G. A. Fester (Anal. Asoc. Quím. Argentina, 1933, **21**, 24—31).—The probable nature of the reactions which occur during the cracking of petroleum in the electric arc is discussed. H. F. G.

Determination of activity of catalysts which accelerate the synthesis of benzine from carbon monoxide and hydrogen at ordinary pressure. S. Watanabe and K. Morikawa (J. Soc. Chem. Ind., Japan, 1933, **36**, 226 b).—The activities of a no. of catalysts have been determined. The lower is the temp. of max. reaction velocity, the higher is the activity of the catalyst as measured by the yield of C_6H_6.
                                    H. F. G.

Dechlorination products of chloroparaffins. Y. Tanaka, R. Kobayashi, and H. Furumoto (J. Soc. Chem. Ind., Japan, 1933, **36**, 228—230 b).—Chlorination of paraffin (m.p. about 48·5°) reduces the m.p. rapidly; substitution of 4·27 atoms of H yields a product of m.p. 1° and viscosity 7 times that of the original material. Eutectic mixtures of numerous isomerides and condensation products are probably formed. High-grade lubricating oil of high viscosity (685 sec., Redwood, at 30°) and very low m.p. (< —20°) is produced by thermal dechlorination at 300° of a chlorinated paraffin containing 42% Cl; from a 49% Cl derivative an oil of 1665 sec. viscosity (Redwood, 50°) was obtained.
                                    H. F. G.

Peat coke for CaC_2.—See VII. **Coal-tar coatings.** —See XIII.

<div align="center">PATENTS.</div>

Flue system for retort coke ovens. J. Becker, Assr. to Semet–Solvay Eng. Corp. (U.S.P. 1,876,593, 13.9.32. Appl., 19.9.21).—On each side of each coking chamber are two sets of horizontal combustion flues, separated by a vertical dividing wall. Each of the sets of flues on one side of the oven is connected with the corresponding set on the opposite side to form an independent heating unit, each such unit having its own set of regenerators.   A. B. M.

(a) **Retorts,** (b) **process, for distillation treatment of materials containing hydrocarbons.** E. W. Brocklebank and W. B. Mitford (B.P. 393,601—2,

[A] 5.12.31, [B] 5.12.31, 11.2. and 14.6.32).—(A) A mixture of finely-pulverised solid fuel with a hydrocarbon oil is charged into an externally heated, slightly inclined, rotary retort (A), the interior of which is provided with baffles so designed as to convey the mixture slowly from the higher (cooler) end to the lower (hotter) end of A, whence it is discharged through a H_2O-seal on to a conveyor. The initial mixture is prepared by conveying the coal by means of a current of gas from the pulveriser to the mixer, wherein it is brought into intimate contact with the oil, e.g., by being passed beneath the surface thereof. (B) The initial mixture may contain 50% of solid fuel and is preferably preheated to about 65°. A is heated by gas burners adjusted to give a temp. gradient from about 250° at the inlet end to 500° at the outlet end. The vapours and gases evolved are continuously withdrawn from the higher end of A. A catalyst may be used and may, e.g., be deposited on the inner wall of A. If desired, steam may be introduced at the lower end of A. A. B. M.

(A) **Low-temperature carbonisation or distillation of carbonaceous materials.** (B—D) **Rotary retorts, furnaces, and similar apparatus.** Brit. Coal Refining Processes, Ltd., and P. M. Salerni (B.P. 393,297, 393,303, 393,305—6, [A, C, D] 17.9.31, [B] 20.11.31 and 2.2.32, [C] 18.9., 9.10., and 30.11.31, 19.1., 21.1., and 17.2.32, [D] 22.9.31 and 17.2.32).—(A) Coal is mixed with finely-pulverised coke or semi-coke and, if desired, with a suitable binder, e.g., pitch, and is carbonised in an externally-heated rotary retort (A). The product is a smokeless fuel in the form of hard, dense balls. (B) A is provided with scrapers flexibly suspended from a cable running the length of A and attached to the stationary ends thereof. (C) A horizontal rotary retort comprises two elements (B, C), B being the outer cylinder which rests on rollers, by means of which it is rotated, and C a double-walled inner cylinder supported within B in such a manner that it can expand without straining the pin and socket or key connexions between them. C is heated by the circulation of hot gases through the double walls. A gaseous cooling medium, e.g., flue gas, is circulated through the annular space between B and C so as to prevent heating of B. C rotates between stationary heads provided with the requisite charging and discharging facilities, respectively, and with an offtake for the volatile products of distillation. The heads also have annular chambers providing for the introduction and withdrawal of the heating medium. (D) The heads are so designed as to allow for the expansion of the retort without any sliding movement between the respective parts, escape or entry of gas being prevented by means of gaseous labyrinthine seals. A. B. M.

Production of activated carbon. P. Zurcher, Assr. to Continental Oil Co. (U.S.P. 1,875,795, 6.9.32. Appl., 13.8.28).—C, e.g., petroleum coke, to which is added, if desired, about 15% of a hydrocarbon oil, is mixed with about 20% of H_3PO_4 or HPO_3, and the mixture is then subjected to the action of steam at 850—1100°. The process is preferably carried out continuously, the C being passed countercurrent to the steam in a rotary furnace. A. B. M.

Manufacture of pure carbon in a very finely-divided state. G. Antonoff and J. Freedland (B.P. 393,677, 26.9.32).—Lignite or brown coal is treated with aq. alkali and the solution of humic acids (I) is separated from the insol. matter by decanting or centrifuging. The (I) are pptd., preferably by the addition of gelatinous $Al(OH)_3$ admixed with alkali, e.g., 1 pt. of dry material, 1 pt. of Na_2CO_3, and 1 pt. of NaOH, and carbonised at 500—700° in a non-oxidising atm. The product is washed with H_2O and dil. HCl. A. B. M.

Manufacture of carbon black. E. B. Spear, Assr. to Thermatomic Carbon Co. (U.S.P. 1,880,512, 4.10.32. Appl., 9.8.29. Can., 7.9.28. Cf. B., 1931, 1020).—A mixture of a hydrocarbon gas with hot combustion gases is passed through a chamber filled with chequerbrick which has been preheated by the combustion of fuel gas therein. The product is cooled and filtered to recover the C black (cf. U.S.P. 1,520,115; B., 1925, 119). The apparatus preferably comprises two chambers (A, B), the combustion gases formed while A is being heated up being utilised for the decomp. of the hydrocarbon gas in B. A. B. M.

Recovery of ammonia from coal gas and like gases. Inst. of Gas Engineers, and A. Key (B.P. 393,678, 24.12.31).—The NH_3 is removed from part of the gas and recovered, e.g., by absorption in H_2O and subsequent distillation of the liquor, and is then added to the remainder. The gas stream, enriched in NH_3 in this manner, is scrubbed with a saturated solution of NH_4HCO_3, whereby the NH_3 in the gas combines with the CO_2 therein and is converted into cryst. NH_4HCO_3. A. B. M.

Distillation of tar. J. Becker, Assr. to Koppers Co. of Delaware (U.S.P. 1,876,594, 13.9.32. Appl., 17.4.28).—The tar is passed down a suitable tower countercurrent to hot gases produced by the combustion of coal gas and the subsequent addition to the combustion gases of a further quantity of the coal gas. After cooling the gases to condense the tar distillates therein, the residual gas mixture is utilised for heating the retorts. A. B. M.

Aqueous emulsions of bodies insoluble or difficultly soluble in water. C. G. Fox and S. Stockell (Fox, Stockell & Co.). From G. Rodewald (B.P. 393,868, 19.11.32).—Aq. emulsions of tar etc. are prepared by using as emulsifiers or stabilisers products obtained by subjecting proteins, e.g., casein, to the action of CH_2O, and thereafter to treatment, e.g., heating with aq. alkali or with H_2O under pressure, whereby products sol. or dispersible in H_2O are obtained. Keratin-containing materials, e.g., horn, hair, etc., may also be used; they are treated with aq. NaOH, followed by dil. acid, and then with CH_2O etc. as described above. A. B. M.

Use of pine oil in emulsion breakers. F. E. Fuchs, Assr. to S. J. Singer (U.S.P. 1,890,849, 13.12.32. Appl., 13.9.30).—The efficiency of emulsion breakers containing mineral and fatty oils or their sulphonated derivatives in the cold is increased by the addition of pine oil or its sulphonated derivative. D. K. M.

Treatment of emulsions of mineral oils or the like. W. B. Lerch, Assr. to Curo Process Co. (U.S.P.

1,890,789, 13.12.32. Appl., 11.10.29).—A mixture of chlorinated fatty oil, e.g., cottonseed oil, and an equal amount of a hydrocarbon material, especially that rich in cyclopentenes or cyclopentadienes, e.g., Blau gas tar, is treated with H_2SO_4 at about 49°; or chlorinated tar may be added to a mixture of the fatty oil and H_2SO_4. The product is washed, neutralised with NH_3, and heated to 93° approx., and is then used as a demulsifying agent.   D. K. M.

Petroleum tar. C. D. READ, Assr. to STANDARD OIL CO. (U.S.P. 1,875,823, 6.9.32. Appl., 23.6.27).— A hydrocarbon oil is mixed with CaO, e.g., 0·5 lb. per barrel, and is cracked to produce a pressure distillate of desired character, and a pressure tar residue containing CaO and carbonaceous matter in readily filterable agglomerates. The latter is filtered while hot.
                                              A. B. M.

Separation of metallic-base reaction products from other derivatives in the treatment of hydrocarbon oils. A. KINSEL, Assr. to LITHARGE RECOVERY CORP. (U.S.P. 1,883,947, 25.10.32. Appl., 26.12.25).— Oils that have been treated with Na plumbite or similar desulphuriser are heated, agitated (preferably in presence of H_2O), and allowed to settle, the oil, H_2O, and ppt. being separated in 3 strata. The initial heating may, if desired, effect distillation of light oils.   B. M. V.

Treatment of gasoline stock. A. LACHMAN, Assr. to RICHFIELD OIL CO. OF CALIFORNIA (U.S.P. 1,890,516, 13.12.32. Appl., 6.10.30).—Gasoline is rendered "sweet" to the "doctor test" by treatment with alkali salt solutions having $p_H > 7·4$, e.g., aq. NaOH or Na_2CO_3, and containing finely-divided activated C in suspension, and agitating with air.   D. K. M.

Refining of gasoline. F. E. KIMBALL (U.S.P. 1,892,801, 3.1.33. Appl., 23.4.31).—Gasoline vapours and steam together with aq. $MgCl_2$ (3—5%) + $CaCl_2$ (60—70%) are brought in contact at about 149°, and then the vapours are passed through layers of limestone lumps into a fractionating tower, the vapours from which yield gasoline on condensation.   D. K. M.

Production of hydrocarbon products [gasoline, lubricating oil] by the action of a metallic halide and a partially chlorinated mineral oil of the carbocyclic series. M. L. CHAPPELL, Assr. to STANDARD OIL CO. OF CALIFORNIA (U.S.P. 1,891,619, 20.12.32. Appl., 7.3.27).—Mineral hydrocarbon oil which has been partially chlorinated at 16—100°, whereby the unsaturated cyclic hydrocarbons have been saturated, is treated with a metallic halide (e.g., 0·2—0·8 lb. of $AlCl_3$ per gal.) at 149—343°/20 lb. per sq. in. The product is then fractionated.   D. K. M.

Treatment of [mineral lubricating] oils. J. B. HILL, Assr. to ATLANTIC REFINING CO. (U.S.P. 1,883,374, 18.10.32. Appl., 21.5.31).—The superior solubility of naphthenic hydrocarbons in furfuryl alcohol is utilised to separate them from paraffinic hydrocarbons.   B. M. V.

Regenerators for gas-retort settings etc. J. R. MASTERS (B.P. 395,593, 17.12.32).

Varnish and paint oil. [Oil-resistant] plastic compositions. Protective coating.—See XIII.

III.—ORGANIC INTERMEDIATES.

By-products of the calcium carbide industry: manufacture of ethylidene diacetate and vinyl acetate. G. O. MORRISON and T. P. G. SHAW (Trans. Electrochem. Soc., 1933, 63, 197—219).—The effects of various factors on the yields of these esters obtainable by direct interaction of C_2H_2 and AcOH have been investigated. The catalyst ($HgSO_4$) must be pptd. from AcOH solution, and its effectiveness is dependent on the temp. of pptn., whether H_2SO_4, oleum, or SO_3 is used as precipitant, and the excess of H_2SO_4 added. Good results are obtained with HgO treated with a small excess of $AcHSO_4$. The material of the reaction kettles has an important influence. Use of $Hg_3(PO_4)_2$ as catalyst favours formation of vinyl acetate (I), but with the sulphate catalysts the proportions of the two esters obtained can be varied over a wide range by control of temp. and rate of removal of (I), especially by varying the rate of circulation of C_2H_2. Data for batch operations and continuous runs are given. The process is operated commercially by Shawinigan Chemicals, Ltd. A laboratory continuous still is described, and the physical and chemical properties of the esters are summarised.   H. J. T. E.

Determination of phenols plus cresols in creoline and similar products. R. K. JUNIOR (Chimica, 1933, 1, 96—97).—The creoline sample (5 g.) is treated with NaOH and extracted thrice with Et_2O; the aq. liquors, freed from excess Et_2O, are acidified and treated with $BaCl_2$ and $Ba(OH)_2$ and the filtrate therefrom is acidified and distilled. The I absorption of the distillate (which is collected in NaOH solution) is determined titrimetrically and furnishes a measure of "phenols plus cresols" in the original creoline.   E. L.

Quinonaphthalone. S. UENO and T. SUZUKI (J. Soc. Chem. Ind., Japan, 1933, 36, 195—196 B).—The yield of quinonaphthalone from quinaldine and $o\text{-}C_6H_4(CO)_2O$ is higher in the absence of $ZnCl_2$, which reacts with the quinaldine. No isoquinonaphthalone could be detected in the product whether $ZnCl_2$ was present or not.   A. A. L.

Hydrogenation of phenolic oil.—See II. Dicyanodiamide.—See VII. Epihydrinaldehyde.—See XII. βγ-Butylene glycol. — See XVIII. $CHCl_3$. Gluconic acid.—See XX.

<center>PATENTS.</center>

Production of anhydrous ethyl alcohol. DEUTS. GOLD- U. SILBER-SCHEIDEANSTALT (B.P. 391,213, 22.10.31. Ger., 29.6.31).—In the process of B.P. 368,793 (B., 1932, 700) the fusible dehydrating agent, e.g., KOAc, is continuously regenerated by evaporation and fusion, the anhyd. substance being returned molten to the mixing vessel.   C. H.

Manufacture of fluorine derivatives of hydrocarbons. KINETIC CHEMICALS, INC. (B.P. 391,168, 13.7.31. U.S., 20.9.30).—An alkyl or aralkyl halide other than fluoride is heated with HF and a metal halide ($SbCl_3$ or $SbCl_5$) which is converted by HF into a fluoride capable of exchanging halogen with the org. halide. Thus HF and CCl_4 with $SbCl_5$ at 60° give

CCl_2F_2 (54% yield) and CCl_3F (36%); $CHCl_3$, $CPhCl_3$, and $o\text{-}C_6H_4Cl\cdot CCl_3$ (giving $o\text{-}C_6H_4Cl\cdot CF_3$, b.p. 151—152·5°) behave similarly. C. H.

[Manufacture of] fluosilicates of aliphatic and heterocyclic amines [insecticides]. E. I. DU PONT DE NEMOURS & CO. (B.P. 391,141, 16.10.31. U.S., 16.10.30).—The base and acid are combined in presence of H_2O, preferably in equiv. proportions, at $< 60°$, to give insecticides. Fluosilicates of NH_2Bu, $NHBu_2$ (m.p. 179—184°), NBu_3, $CH_2Ph\cdot NH_2$, $N(CH_2\cdot CH_2\cdot OH)_3$, $NH_2\cdot C_2H_4\cdot NHPh$, $C_2H_4(NH_2)_2$, C_5H_5N, $C_5H_{11}N$, quinoline (m.p. 156—160°), 2-amino-6-ethoxybenzthiazole, and nicotine are described. C. H.

Production of anthraquinone derivatives [2-chloro-1-aminoanthraquinone]. IMPERIAL CHEM. INDUSTRIES, LTD., R. F. THOMSON, and R. J. LOVELUCK (B.P. 391,209, 22.10.31).—1 : 2-Dichloroanthraquinone is condensed with an arylsulphonamide ($p\text{-}C_6H_4Me\cdot SO_2\cdot NH_2$) in presence of an acid-absorber (K_2CO_3) and a Cu catalyst above 170° in a suitable solvent ($o\text{-}C_6H_4Cl_2$). The product, on hydrolysis with conc. H_2SO_4 and dilution to 70—80% H_2SO_4, gives at 80° pure 2-chloro-1-aminoanthraquinone. C. H.

Manufacture of dye intermediates and dyes [from 1 : 3 : 3-trialkyl-2-methyleneindoline]. IMPERIAL CHEM. INDUSTRIES, LTD., F. W. LINCH, and H. A. PIGGOTT (B.P. 391,215, 22.10.31).—A 1 : 3 : 3-trialkyl-[methyl]indolenine, which may be produced in situ from the corresponding 2-methyl-3 : 3-dialkylindolenine alkiodide and KOAc, is treated with nitrosylsulphuric acid in presence or absence of solvent (AcOH, Ac_2O, $C_2H_2Cl_4$). With 1 mol. of each the 2-oximino-compound is formed; with 2 mols. of the indolenine a yellow dye, hexa-alkylindocyanine, is obtained (as perchlorate). C. H.

Mordants.—See VI. **Non-acidic carbonyl compounds.**—See VII. **Gluconic acid.**—See XVIII.

IV.—DYESTUFFS.

Anthraquinoneazo derivatives. VI. Water-soluble azo dyes from 1-aminoanthraquinone-sulphonic acids and J-acid. VII. Water-soluble azo dyes from 1-aminoanthraquinonesulphonic acids and γ-acid. T. MAKI and M. YOSHIDA (J. Soc. Chem. Ind., Japan, 1933, 36, 204—207 B, 207—210 B).—VI. Diazoanthraquinone-5-, -6-, -7-, and -8-sulphonic acids by alkaline coupling with J-acid (2 : 5 : 7-aminonaphtholsulphonic acid) give Na salts of dyes which give red-brown shades on silk and wool. The position of the SO_3H has little influence. The colours are improved by further coupling on the fibre, a violet-black being produced with 1-diazonaphthalene. Substantive properties are shown towards cotton. Similar Na salts from acid coupling give black (6-sulphonic acid) to red-brown (5-sulphonic acid) on wool, and dark brown on silk. The 7- and 8-SO_3H derivatives dye cotton dark brown in the presence of Na_2CO_3, the others being less active. Further coupling on the fibre improves the colours. Pure J-acid free from γ-acid gives only a weak dark violet fluorescence.

VII. A similar series of Na salts using γ-acid (the 2 : 8 : 6-acid) is described. Those produced by alkaline coupling give brownish colours on animal fibres, but have no affinity for cotton. The affinities for animal fibres of those produced by acid coupling are in the following order of the position of the SO_3H group: $6 > 7 > 5 > 8$. They have no affinity for cotton. The colours are all improved by further treatment on the fibres. A. A. L.

Indanthrene fusion. VIII. The reddish-brown impurity in 2-aminoanthraquinone. T. MAKI (J. Soc. Chem. Ind., Japan, 1933, 36, 199—202 B).—The substance, $C_{28}H_{20}O_2N_2$, m.p. 278° (corr., decomp.) [Bz_2 derivative of leuco-compound, m.p. 298·6° (corr.), not identical with 2-aminoanthrahydroquinone dibenzoate, m.p. 302·7° (corr.)], is still present in 2-aminoanthraquinone prepared from purified materials. It is not 2-aminoanthrone, and is probably 2 : 2'-diamino-10 : 10'-dihydrodianthrone. A. A. L.

Violanthrone fusion in presence of phenols. IV. Preparation of 7-chlorobenzanthrone. T. MAKI and Y. NAGAI (J. Soc. Chem. Ind., Japan, 1933, 36, 196—199 B).—Conditions for obtaining pure 7-chlorobenzanthrone, m.p. 182·4—183·4° (corr.), by chlorinating benzanthrone are described. A. A. L.

S dyes.—See VII.

PATENTS.

Manufacture of vat dyes [from naphthalenetetracarboxylic dianhydride and o-diamines]. I. G. FARBENIND. A.-G. (B.P. 391,259, 8.1.32. Ger., 12.1.31. Addn. to B.P. 237,294; B., 1925, 840).—In place of the dianhydride a diaryldi-imide is used, 2 mols. of arylamine being displaced by 2 mols. of o-diamine. C. H.

Dyes.—See III.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Theory of milling. II. J. B. SPEAKMAN, E. STOTT, and H. CHANG (J. Text. Inst., 1933, 24, T 273—292).—For milling shrinkage to be possible a fibre must be scaly, be easily stretched, and recover well from extension. The rate of milling increases with increase in these qualities, and also with the length and fineness of the fibres. Rate of shrinkage (r) is a min. at p_H 4—8 where the work of extension is a max., and is a max. at p_H 10 because in more alkaline solutions recovery from extension is poor; r increases with rising temp. up to 45° in agreement with increasing ease of extension, but above this r falls because the power of recovery diminishes. The apparent sp. vol. of several wools was determined at a range of temp. in C_6H_6 and in H_2O. Absorption of H_2O from a saturated atm. is a min. at about 40°, and the swelling of wool in H_2O is a min. at 37°. Unshrinkability is normally attained by impairing the scale structure and wear is thus diminished; it might also be produced by reducing extensibility by strengthening the salt linkings between NH_2-acid groups. A. G.

Determination of textile fibres. R. EDGAR, M. WESTON, F. BARR, E. FISHER, and J. ROSS (Iowa State Coll. J. Sci., 1933, 7, 57—82).—Solubilities (%) of cotton cellulose, silk fibroin, and wool keratin in various solutions are recorded. Schweitzer's reagent and H_2CrO_4 are ineffective for the separation of viscose

from cellulose. $NH_3-Ni(OH)_2$ is unsatisfactory as a solvent for silk. Glacial AcOH and NH_2Ph are less satisfactory than $COMe_2$ for the dissolution of cellulose acetate ; determination of the latter by means of the Ac val. is inaccurate. CH. ABS.

Microchemical methods as applied to spots on textile fibres. I. W. GROTE (Amer. Dyestuff Rep., 1933, **22**, 446—448).—A review of methods used for examining spots containing grease and/or metals.
A. J. H.

Microchemical detection and determination of metals [for textile purposes]. K. M. HERSTEIN (Amer. Dyestuff Rep., 1933, **22**, 442—444).—Tables of the reactions of 24 metals are given. A. J. H.

Ageing [of cloth]. H. B. BRIGGS (J. Text. Inst., 1933, **24**, P 150—155).—Ageing troubles are mainly due to the temp. of the cloth rising considerably above 100°, and it is suggested that this could be minimised by causing the steam to flow between the folds of cloth by circulating it externally from one side to the other of the ager, and by cooling the rollers internally with air at 102°. A. G.

Wet-spinning of cellulose acetate silk. K. ATSUKI and I. KAGAWA (J. Soc. Chem. Ind., Japan, 1933, **36**, 342—348 B).—With coagulating baths containing $CaCl_2$ and glucose, respectively, filaments of max. strength are obtained at concns. of $4N$ and $1·5M$. H_2O and H_2O + EtOH have low pptg. powers and give weak filaments of circular cross-section. $CaCl_2$ and glucose are stronger precipitants so that the outside of the filament is at once pptd. as a skin, and the thread obtained is strong, lustrous, and transparent and the cross-section is elongated. A. G.

Determination of acetic acid in cellulose acetate. K. ATSUKI and I. KAGAWA (J. Soc. Chem. Ind., Japan, 1933, **36**, 340—342 B).—0·5—0·6 g. of cellulose acetate is added to an exactly weighed amount (about 2 c.c.) of 55—60 wt.-% H_2SO_4. After 1—3 days at 20—40° the mixture is washed with about 30 c.c. of H_2O into 50 c.c. of N-NaOH in a stoppered vessel, and after keeping for 2 hr. at 20—30°, with shaking, it is back-titrated with N-HCl and phenolphthalein. A. G.

Thixotropic viscosity of cellulose esters. I. S. A. GLIKMAN (Plast. Massi, 1932, No. 2—4, 16—23).— A review. " Thixotropic viscosity " is the anomalous viscosity of sols which are about to become gels.
CH. ABS.

Danube grass for papermaking. D. M. WATSON (Paper-Maker, 1933, **86**, No. 1, Suppl., 56, 58, 60, 66, 67).—Various factors, both technical and practical, affecting the possible substitution of esparto by Danube grass (*Phragmites communis*) are considered, and the characteristics of the fibre and of paper made from it are described. H. A. H.

Sulphite cooking with special reference to the viscosity of the cellulose. H. OKADA, E. HAYAKAWA, and Z. UMEDA (J. Soc. Chem. Ind., Japan, 1933, **36**, 219—220 B).—The viscosity η commences to fall rapidly towards the end of the cooking and is accompanied by a proportional darkening in colour of the sulphite liquors. η is also related to the acidity of the liquors, but the

relation is different at different temp. The relation between η and the bleaching properties is little influenced by the conditions of cooking. The Cu no. and α-cellulose content are little affected until η becomes low, whilst the solubility in boiling 1% NaOH increases with decreasing η. A. A. L.

Purification of unbleached wood pulp. K. NAKAMURA (J. Cellulose Inst. Tokyo, 1933, **9**, Abs., 17). —Removal of impurities by treatment with Cl_2-H_2O followed by NaOH at 125° under pressure has been investigated. Keeping the % Cl_2 const. (1·5% of wt. of pulp), α-cellulose (I) increases, and Cu no. and yield decrease, with increasing quantities of NaOH. With NaOH const. (20%) (I) decreases, the yield is unaffected, and Cu no. increases, with increasing amounts of Cl_2 from 1·5 to 5·0%. Below 1·5% Cl_2, however, (I) again decreases, indicating a max. val. at this concn.
H. A. H.

1% caustic soda solubility of pulp and wood. ANON. (Paper Trade J., 1933, **96** ; T.A.P.P.I. Sect., 327 ; ibid., 97, 34).—The TAPPI tentative standard methods are described. H. A. H.

Weighing, sampling, and testing wood pulp for moisture. ANON. (Paper Trade J., 1933, **97** ; T.A.P.P.I. Sect., 19—21).—Standard methods are described. H. A. H.

Dirt content of [wood] chips. W. M. OSBORNE (Paper Trade J., 1933, **97** ; T.A.P.P.I. Sect., 12).— An empirical dirt count method is described.
H. A. H.

Noll method for determination of lignin in pulps. H. F. LEWIS, W. E. KOONCE, and G. H. YOUNG (Paper Trade J., 1933, **96** ; T.A.P.P.I. Sect., 324—327).— The method of Noll, Bolz, and Fiedler (B., 1933, 12), using 78% H_2SO_4 and $NPhMe_2$, gives comparable results with the 72% H_2SO_4 method only in the case of spruce pulps. With unbleached aspen soda pulp wide discrepancies occur, and it is concluded that the method cannot be acceptable until the variables have been further investigated. In particular, the time and temp. of digestion are shown to be very important.
H. A. H.

Estimation of shiviness of mechanical pulps. J. L. SOMMERVILLE (Paper-Maker, 1933, **86**, TS 132— 134).—A method of estimating the no. and size of shives in mechanical pulp consists essentially in concentrating them into a fraction of the original pulp, suitably dyeing, and making a thin sheet of paper from this fraction, using a special screening apparatus (B., 1933, 342) and the British standard pulp evaluation sheet machine. Estimation is by area measurement, using a projection apparatus ; vol. and wt. determinations are impracticable. The accuracy is satisfactory if certain precautions are observed. H. A. H.

Variations in yield and quality of sulphite pulp made of spruce from different sources. B. JOHNSEN and C. H. REESE (Paper Trade J., 1933, **97** ; T.A.P.P.I. Sect., 8—10).—Appreciable variations in yield and in physical and chemical properties occur in sulphite pulps from American, Canadian, and Russian spruce woods, when cooked under identical conditions in laboratory digesters. H. A. H.

Estimation of dirt in pulp and paper. J. d'A. Clark (Paper Trade J., 1933, 96; T.A.P.P.I. Sect., 319—320).—A graduated chart enables the "equiv. black area" of dirt (estimated area of a spot in terms of the area of a black spot which would make the same visual impression against a pure white background) to be determined. H. A. H.

Functions of mineral fillings in printing papers. J. Strachan (Paper-Maker, 1933, 86, ts 129—131).—Fillers produce a level surface, reduce air space, and increase ink reception. China clay is the most efficient. Factors affecting the printing qualities of paper are indicated. H. A. H.

Opacity and whiteness test for paper-coating pigments. H. R. Rafton (Paper Trade J., 1933, 96; T.A.P.P.I. Sect., 322—324).—A coating of standard wt. is produced on a coloured paper using a mixture of the desired pigment and adhesive, and the extent to which the colour is obscured is observed visually. A no. of necessary precautions are described. H. A. H.

Determination of foaming tendency of casein. C. W. Richards and L. W. McFail (Paper Trade J., 1933, 97; T.A.P.P.I. Sect., 1—2).—The casein–pigment mixture is agitated under standardised conditions, and the wt. of 100 c.c. compared with that of a similar vol. of the original mixture, to indicate the amount of aëration. The difference in wt. is termed the "foam index." Correlation with large-scale performance is in general satisfactory, although caseins giving a low foam index on agitation may give trouble in practice owing to their high acidity. Accuracy is within 10%. H. A. H.

Artificial bitumen from cellulose.—See II. **Absorption of tannic acid by fibres.**—See VI. **Detergent efficiencies of soap builders.**—See XII. **Bast fibres.**—See XVI.

Patents.

Protective treatment of fibre products [against attack by insects and fungi]. E. C. Lathrop and (a) F. A. Irvine, (b, c) T. B. Munroe, Assrs. to Celotex Co. (U.S.P. [a] 1,880,965, [b, c] 1,880,971—2, 4.10.32. Appl., [a] 19.6.31, [b] 29.5.30, [c] 27.12.30).—(a) Fungicides (or fire- or water-proofing agents) are added as a slurry to the dil. stock just prior to sheet formation. The prep. of suitable slurrys containing gelatinous basic arsenites, e.g., of Al or Fe, is described. (b) An aq. dispersion (in K stearate) of a halogen derivative of an aromatic hydrocarbon or a OH derivative thereof is added to the pulp and pptd. with alum. Chlorinated $C_{10}H_8$ (49% Cl) is particularly suitable. (c) A sol. As compound, e.g., Na_3AsO_3, is added to the stock together with a waterproofing agent (rosin size). A sol. Fe^{III} salt is then added to ppt. the size and form a $Fe(OH)_3$-As_2O_3 complex. 1—4% of H_3AsO_3, 0·5—2% of rosin size, and 1—8% of $FeCl_3$ are suitable. D. J. N.

Preparing tubular bodies from cellulose. J. Voss, Assr. to Visking Corp. (U.S.P. 1,887,446, 8.11.32. Appl., 5.9.28. Ger., 15.9.27).—In the manufacture of such bodies by spinning, e.g., viscose solution through an annular nozzle, difficulties due to accumulation of gases inside the tube are minimised if the length of travel of the tube outside each treating bath is approx. the same as its length of travel in it. D. J. N.

Purification of cellulose solutions. J. J. Stoeckly and E. Witte, Assrs. to Amer. Glanzstoff Corp. (U.S.P. 1,886,504, 8.11.32. Appl., 24.4.30. Ger., 17.4.29).—The cellulose solution is filtered and 0·2—2% of a suitable org. liquid (liquid paraffin) is emulsified therewith, optionally with the aid of about 0·01% of Turkey-red oil. After, e.g., 24 hr., the solution is again filtered. D. J. N.

Manufacture of partially acetylated cellulose. Kodak, Ltd., Assees. of C. J. Staud and R. H. VanDyke (B.P. 394,359, 23.12.31. U.S., 24.12.30).—Native cellulose in the form of thread, fabric, or paper is partly acetylated in the presence of sufficient non-solvent for cellulose triacetate (CCl_4) to preserve its fibrous structure. The products have an insulation resistance several hundred times that of the starting material. D. J. N.

Manufacture of pressed or filtered wood products. F. L. Carson, Assr. to Pacific Lumber Co. (U.S.P. 1,884,563, 25.10.32. Appl., 7.1.31).—Raw vegetable fibre, particularly shredded red wood bark, is mixed with an aq. solution of starch and alkali-metal soap and converted into a board. This is treated with aq. $Al_2(SO_4)_3$ to form a H_2O-resistant Al soap on the fibre. The resulting products are resilient and of low thermal conductivity. D. J. N.

Preparation of straw pulp. Manufacture of straw paper. P. Drewsen, Assr. to Hinde & Dauch Paper Co. (U.S.P. 1,880,898—9, 4.10.32. Appl., 13. and 20.10.30).—(a) Straw is cooked with < 10% (on the wt. of dry straw) of CaO and < 1% of S (or CS_2 or other S compound) for, e.g., 6—8 hr. at 30 lb. steam pressure. (b) The straw is pulped in a hot (66—100°) alkaline liquor (7—12% of NaOH on wt. of dry straw) in a beater at a consistency of about 5% for 1—2 hr. The pulp is separated from the alkaline liquor (which after addition of more NaOH is used again), lightly washed, and, after further beating, is substantially neutralised, e.g., with alum or H_2SO_4 and sheeted. D. J. N.

Bleaching of paper pulp. S. D. Wells, Assr. to Nekoosa-Edwards Paper Co. (U.S.P. 1,883,193, 18.10.32. Appl., 13.1.30).—Pulp which bleaches with difficulty, e.g., sulphate pulp from loblolly pine, is subjected first to an acid bleach, e.g., with about 4·5% of Cl_2 (on wt. of fibre) at a pulp consistency of about 3%, and then, after washing, to an alkaline hypochlorite bleach at a consistency of 6—18% at ⊁ 38°, the alkalinity during this stage being maintained by addition of NaOH. D. J. N.

Continuous bleaching of fibrous materials [wood pulp]. E. Ekeberg (U.S.P. 1,887,587, 15.11.32. Appl., 27.8.30. Swed., 6.9.29).—Streams of pulp and a bleaching liquor are continuously discharged together and thereby mixed into a horizontal annular container which rotates slowly, the mixture being continuously withdrawn by means of an elevator at a remote point. A. J. H.

Manufacture of duplicating papers etc. Unichem Chemikalien-Handelsges. A.-G. (B.P. 395,225, 3.11.32. Ger., 3.11.31).—An aliphatic alcohol of high mol. wt., which may contain substituent CO or CHO groups, halogens, or aromatic radicals, e.g., cetyl alcohol, is used, optionally in admixture with (carnauba) wax and

(sesamé) oil, as dye solvent. Papers thus prepared are durable, non-smudging, and of high colour strength.

D. J. N.

Sizing of paper. I. G. FARBENIND. A.-G. (B.P. 395,155, 1.7.32. Ger., 1.7.31).—Emulsions of waxes etc. which do not flock when diluted with hard H_2O but are readily pptd. with, e.g., alum are obtained by using a monocarboxylic acid ester of a polyglycerol as emulsifying agent. The acid val. of the sizing agent should be $\not< 2$ and $\not> 40$. E.g., carnauba wax (acid val. 2) (50 pts.), polyglycerol coconut oleic acid ester (6·5 pts.), and H_2O (30 pts.) are heated together with stirring and then treated wth 2N-KOH (20 pts.). Papers thus sized, e.g., with 2% of carnauba wax, are photographically inert and therefore particularly suitable as protective papers for films etc.   D. J. N.

Waterproofing paper by means of viscose. SOC. ANON. PAPETERIES NAVARRE (B.P. 395,197, 22.9.32. Fr., 22.9.31).—The paper travels vertically through viscose solution (entering the bath through a slot in the bottom) and, after passing between adjustable squeezing rolls, is led into a coagulating bath containing neutral salts or weak acids, then into a pptg. bath containing a mineral acid, and finally washed and dried.   D. J. N.

Method and means for indicating paper dryness. S. A. STAEGE, Assr. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,884,331, 25.10.32. Appl., 28.5.30).—The H_2O content of the paper is indicated by the friction developed between the travelling web of paper and a roll rotating in contact therewith under a predetermined and adjustable pressure at a peripheral speed differing from the speed of the web to such an extent that the amount of slippage exceeds a certain crit. val. The current in the armature of the motor driving the roll is a measure of the friction and hence of the H_2O content of the paper.   D. J. N.

Coatings for cells.—See XI. **Printing of paper etc. Washable wallpaper. Rosin size. Colouring cellulose plastics.**—See XIII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Absorption of tannic acid by the principal textile fibres. I—III. Absorption of tannic acid by viscose silk under varying conditions. K. HISHIYAMA and M. TOMONARI (J. Soc. Chem. Ind., Japan, 1933, 36, 211—213 B).—The effects of time, temp., and concn. of the bath are recorded. The largest amount is absorbed if the fibre is immersed in a hot bath which is allowed to cool. HCl, AcOH, NaCl, and Na_2SO_4 do not affect absorption. HCO_2H and NaOAc hinder, whilst $NaNO_3$ assists, absorption.   A. A. L.

Quantitative research on the dyeing of viscose yarns. J. BOULTON, A. E. DELPH, F. FOTHERGILL, and T. H. MORTON (J. Text. Inst., 1933, 24, P 113—128).— Dyes were purified by repeated salting out with NaOAc and their purity was confirmed by titration with $TiCl_3$ and by determination of Na. Solutions of purified Benzopurpurine 4B and Chrysophenine G were optically empty, that of Sky Blue FF contained a few ultramicrons which may have been an impurity. Dye on fibre was determined colorimetrically after dissolution

in aq. C_5H_5N. Dyeings were made on 1-g. skeins of viscose at a liquor ratio of 40/1 in closed bottles at controlled temp. The equilibrium absorption of dye is the same for different rayons, it is diminished by a rise of temp., and increased by addition of salts especially of multivalent metals. The time to half equilibrium absorption depends on the quality of the rayon, decreases with rising temp., and for level is < for unlevel dyeing colours. Cuprammonium rayon dyes faster than viscose. Modification of viscose by heat, alkali, or acid does not affect the equilibrium absorption but modification by NaOCl at p_H 7 diminishes it. The time to half equilibrium absorption is increased by heat, acid, and NaOCl but diminished by 4% aq. NaOH. For optical reasons dyed fine-filament yarns appear lighter than coarse-filament yarns with the same % of dye; the shades should theoretically appear the same when the amounts of dye are inversely proportional to the linear dimensions of the filaments. When the two yarns are dyed together the fine-filament yarn at first appears the darker, but later the lighter. Whittaker's temp.-range and time-range tests are shown to depend on the rates of diffusion of dyes, i.e., on the speed at which equilibrium is attained. Cellulose is not dyed from solutions of dyes in org. solvents unless it is first swollen in H_2O. Dyes probably form co-ordinated mol. compounds with cellulose. Kinetically dyeing may be described as a diffusion process.   A. G.

Behaviour of direct cotton dyes [in dyeing]. S. M. NEALE (J. Soc. Dyers and Col., 1933, 49, 216—218). —By dyeing sheet viscose in boiling solutions containing a large excess of nearly pure dyes, stripping with 25% C_5H_5N, and comparing the extracts with standards it was found that the amount of dye absorbed increased with time up to an equilibrium val. which was reached in 5 hr. with Chlorazol Sky Blue FF (A) and Benzopurpurine 4B (B), and in 20 min. with Chrysophenine G (C). The outside of the sheet was dyed immediately, followed by internal diffusion of the dye at a rate proportional to the gradient of concn. Chemically pure A is not absorbed by viscose sheet, but as NaCl was added, both the rate of diffusion and the amount of absorption at saturation point also rose, the former to a max. and the latter continuously; B behaved similarly but showed a higher absorption and a slower diffusion, whilst C was absorbed about 0·1 as much but diffused 10 times as rapidly as A. A is much faster to soaping when dyed on viscose than on cotton. In H_2O, direct dyes and cellulose ionise and absorption of dyes is initially a reaction between ions and anions.   A. J. H.

Absorption of direct dyestuffs by cellulose. S. M. NEALE and W. A. STRINGFELLOW (J. Text. Inst., 1933, 24, P 145—149).—Quant. dyeing experiments have been made using dyes purified by repeated salting out with NaOAc and EtOH, controlling the temp. to within 0·2°, using resistance glass vessels with Hg-sealed ground-in condensers, and using a sufficiently large liquor/cellulose ratio to avoid significant concn. changes. Cellulose sheet was dyed at 90° in baths containing (per litre) 5 g. of NaCl and 0·05 g. of five direct colours, and the dye was then dissolved from the cellulose with aq. C_5H_5N and determined colorimetrically. The shape

of the time–dye absorption curves and penetration of the dyed sheets indicated that the dyeing process was essentially one of diffusion. The dyes used differed widely in equilibrium absorption (I) and in time to half saturation or apparent diffusion coeff. (II). In the absence of salt dye absorption is negligible : addition of NaCl steadily increases (I) whereas (II) rises to a max. and then falls. If D is the amount of dye absorbed and C the concn. of the dyebath $D = kC^n$, where n is a const. (between $0 \cdot 3$ and $0 \cdot 7$). The five dyes tested are about equally affected by temp. ; a rise of $20°$ halves (I) and increases (II) fourfold. It is suggested that dyes should be quantitatively characterised by (I), (II), the proportion washed out, and the ratio of the amounts absorbed by viscoses of different qualities, all determined under standard conditions. A. G.

Behaviour of vat dyestuffs on cotton. F. SCHOLEFIELD and H. A. TURNER (J. Text. Inst., 1933, **24**, P 130—142).—Tendering of cotton dyed with vat yellows, oranges, and reds when exposed to light is probably due to absorption of ultra-violet rays in the region 3600—4000 Å. This absorption probably produces excited dye mols. which oxidise cellulose (I) with simultaneous reduction to the leuco-compound ; re-oxidation of this by air may result in peroxide formation and consequent further oxidation of (I). If a second dye is present this may be similarly oxidised and if the yellow dye is suspended in EtOH MeCHO is produced. A no. of dyes lie in the same order for absorption of rays of 3600—4000 Å., destruction of (I) when illuminated, and production of MeCHO. The tendering of (I) dyed with these dyes when bleached with hypochlorite in the light is similarly explained, and much evidence is brought forward in support of these views. A. G.

Application of Indigosol dyes. K. STIERWALDT (Textilber., 1933, **14**, 411—412).—Solubility data for, and methods of dyeing even shades with, certain Indigosol dyes are indicated. In applying mixtures of substantive and non-substantive Indigosol dyes even results are promoted by raising the temp. of the dye liquor since this reduces the affinity of both types of dyes ; an addition of $0 \cdot 025$—$0 \cdot 1\%$ of Rongalite C to such hot liquors prevents premature oxidation (development) of the dye. With certain dyes which require development in a bath containing $>$ the usual amount of H_2SO_4, the process is complete within 30 sec. and if prolonged the NO_2 present decomposes the developed portion of the dye. A. J. H.

Fur dyeing. E. BEELEY (J. Soc. Dyers and Col., 1933, **49**, 218—222).—Dyeing methods are reviewed and discussed, reference being made to natural dyes, Ursols, the methyl-ω-sulphonic acids of aminoazo dyes (similar to Ionamines), vat, basic, and acid dyes, Cr-tanned leather, and Indigosols. A. J. H.

Measurement of the fastness [of dyed materials], to light. G. MARTIN, J. NIEDERHAUSER, J. PINTE, and R. TOUSSAINT (Rev. gén. Mat. col., 1933, **37**, 241—242).—Details are given for calculating the degree of fastness of a dyed fabric with reference to a standard dyeing from data obtained by exposing, in an automatically controlled apparatus, the sample and standard

dyeings constantly perpendicular to an accurately specified amount of sunlight, and measuring afterwards, by means of a photoelectric cell, the changes produced in the intensity of light reflected from the dyeings in 6 parts of the spectrum. A. J. H.

Anthraquinoneazo derivatives.—See IV.

PATENTS.

Bleaching agents. R. FEIBELMANN, ASST. to CHEM. FABR. VON HEYDEN A.-G. (U.S.P. 1,890,603, 13.12.32. Appl., 25.10.28. Ger., 1.3.28).—p-Toluenesulphondichloroamide is mixed with a H_2O-sol. salt with an alkaline reaction, e.g., Na_2CO_3. L. A. C.

Washing and bleaching of textile materials. V. WEERTS, JUN., and MAXIMINE SOC. ANON. (B.P. 394,874, 25.11.32. Belg., 1.12.31).—Preliminary steeping in a warm $0 \cdot 1\%$ suspension of active C is followed by a mild scour in a neutral or slightly alkaline soap solution. A. J. H.

Bleaching apparatus [for yarn in package form]. W. P. HORNBUCKLE and R. F. CRAIG (U.S.P. 1,889,442, 29.11.32. Appl., 26.3.31).—Bleaching and other liquors are forced by means of a rotary pump upwards and outwards through a no. of vertical perforated hollow tubes within a vat and around each of which are packed bobbins or beams of yarn. A. J. H.

Mordants. M. L. CROSSLEY and M. L. DOLT, Assrs. to CALCO CHEM. CO., INC. (U.S.P. 1,882,777—8, 18.10.32. Appl., 19.12.29).—(A) PhOH (48 pts.) and S (28 pts.) are fused together at $120°$ with about $0 \cdot 6\%$ of NaOH and the temp. is raised gradually to $230°$ during 4—5 hr. (under reflux). After 12 hr. at $230°$ the temp. is gradually raised to $245°$ and excess of PhOH distilled off in vac. The cooled condensation product is ground with about 25% of NaOH and heated to fusion (100—110°) until reaction is complete. The product is sol. in cold H_2O and has a mordanting power on cotton 3—5 times that of tannic acid. (B) By conducting the PhOH–S condensation at $180°$ for 6 hr. mordants are obtained which, in contradistinction to those of (A), are capable of fixing basic dyes on paper. D. J. N.

Dyeing [with vat dyes]. J. WATTERS (U.S.P. 1,886,857, 8.11.32. Appl., 2.9.30).—Even dyeing of fabric is effected in an ordinary winch machine by running the fabric in a preliminary bath containing NaOH and $Na_2S_2O_4$ to which are subsequently added the usual amounts of NaOH, $Na_2S_2O_4$, and vat (indanthrene etc.) dye, with the further addition to the same liquor (after completion of dyeing) of $Na_2Cr_2O_7$ or $NaBO_3$ to oxidise the absorbed dye. A. J. H.

Dyeing of warp threads in a beamed condition. J. ANNICQ (B.P. 394,900, 19.1.33).—Apparatus is claimed. A. J. H.

Dyeing and printing process. J. MARTIN (dit GAUDIT) (U.S.P. 1,886,412, 8.11.32. Appl., 10.7.30. Fr., 2.8.29).—Almost instantaneous fixation of acid, basic, alizarin, and mordant dyes on textile materials, especially animal fibres, is obtained in cold dyeing and printing processes by application of the dye from a paste or solution containing 10—50% of HCO_2H. A. J. H.

Viscose-treating apparatus. S. A. Neidich, Assr. to Sylvania Industrial Corp. (U.S.P. 1,884,811, 25.10.32. Appl., 12.2.29).—The viscose filament contained in a circular rotatable series of trays is dipped in turn into 8 stationary tubs of various liquids for delustring and dyeing purposes.   B. M. V.

Treatment of fabric containing cellulose esters. C. Dreyfus and G. Schneider, Assrs. to Celanese Corp. of America (U.S.P. 1,884,622, 25.10.32. Appl., 28.7.28).—The whole surface of acetate (etc.) filaments is treated with an aq. pasty composition of gum or other thickening agent and an alkali (NaOH) to cause surface hydrolysis and thus increase the safe-ironing point and permit cotton dyes to be used.   B. M. V.

[Calendering] treatment of textile fabrics. G. H. Gray (B.P. 394,761, 1.3.32).—Fabric is shrunk in length up to 10% by passage through a calender comprising an upper hard bowl and a lower compressible bowl under a pressure of 50—400 lb. per linear in. (in the nip), the upper bowl being driven faster than the lower, and its crimped appearance is then removed by ironing in a blanket calender so that it retains part of the shrinkage gained in the first calendering.
                            A. J. H.

Embossing of circular knit fabrics. C. Dreyfus (U.S.P. 1,889,062, 29.11.32. Appl., 3.6.27).—Fabrics and stockings containing cellulose acetate (etc.) are embossed as a double-layer material after softening by application of 25—50% aq. $COMe_2$ or other softening agent.   A. J. H.

Embossing fabrics and articles containing organic derivatives of cellulose. C. Dreyfus (U.S.P. 1,889,045, 29.11.32. Appl., 12.2.27).—Permanent pattern or ciré effects are obtained by spraying or impregnating cellulose acetate (etc.) fabric with 40—50% aq. $COMe_2$ or other softening agent and then passing it through an embossing or friction calender.
                            A. J. H.

Bleaching pulp.—See V. **Colouring plastics.**—See XIII.

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

Distribution of arsenic in contact systems. S. Bychovski (J. Chem. Ind., Russ., 1933, No. 4, 57—59). —99% of the As present in pyrites is volatilised by roasting at 600—800°, as compared with 15% at 214—590°; these temp. limits should therefore not be exceeded in H_2SO_4 plants.   R. T.

Influence of admixtures of sodium sulphate to magnesium sulphate carriers on the activity of platinum catalyst in the reaction $2SO_2 + O_2 \rightarrow 2SO_3$. N. S. Artamonov (J. Chem. Ind., Russ., 1933, No. 3, 59—62).—The activity of Pt catalyst pptd. on $MgSO_4$ is greatly diminished by the presence of Na_2SO_4 in the carrier. At the same time, the adsorptive power of the carrier for Et_2O vapour diminishes with increasing Na_2SO_4 content.   R. T.

History of Nordhausen sulphuric acid. O. Vogel (Chem.-Ztg., 1933, 57, 601—602, 622).

Modified Le Blanc soda process. H. Sinozaki and Z. Okamoto (J. Soc. Chem. Ind., Japan, 1933, 36, 144—145 b).—The formation of Na_2CO_3 from CO_2, H_2O, and commercial anhyd. Na_2S or the product obtained by reducing Na_2SO_4 with wood charcoal or coal is heterogeneous, one solid and two gases being involved. When twice the theoretical quantities of CO_2 and H_2O are present the reaction is complete within 10 min. at 300—500°. Crude Na_2S, containing free C, reacts very rapidly, possibly as a result of the accelerating action of active C, which separate experiments show to be an effective accelerator. The whole of the S is recovered as H_2S.   H. F. G.

Electrolytic plant of the Canadian International Paper Co., at Temiskaming, Que. J. Hedalen (Trans. Electrochem. Soc., 1933, 63, 183—189).— NaOH and Cl_2 are produced in 240 Nelson cells, each with 14 graphite anodes. By using thoroughly purified brine, with careful regulation of temp. and rate of flow, and suitable asbestos for diaphragms, an average current efficiency of 90% and energy efficiency of 53% are maintained. NaOH solution at d 1·5 goes to electrically heated fusion pots which consume 1410 kw.-hr. per ton of NaOH fused. Some details of plant producing bleaching liquors are also given. H. J. T. E.

Behaviour of sodium carbonate during isothermal heating. M. A. Besborodov (J. Soc. Glass Tech., 1933, 17, 9—21 t).—The loss of wt. of Na CO_3 on heating increases with reduction of the depth of the charge and with rise of temp. from 800° to 1000°. In Pt vessels the loss after 3 hr. is of the order of 1·6% at 1000° and 0·2—0·3% at 800°, whereas in porcelain vessels chemical reaction with the walls results in large losses (41%). Addition of cullet, even in a Pt crucible, causes the loss to approach 4% at 1000° but has little influence at 800°. In all cases the loss is due to evolution of CO_2.   H. F. G.

Calcination of limestone. I, II. T. Noda and and E. Ueda (J. Soc. Chem. Ind., Japan, 1933, 36, 137—139 b, 139—141 b).—I. The rate of calcination of $CaCO_3$ at 1100°, as determined by the rate of penetration of the edge of the calcined zone into the interior of a 4-cm. diam. test cylinder, is approx. twice that at 1000°. The CO_2 partial pressure in the atm. of the furnace, and small quantities of H_2O, have very little influence on the rate, but greater quantities of H_2O accelerate the reaction. The decomp. temp. is 925—950°.

II. If an alkali or alkaline-earth chloride is added to the stone the calcination zone becomes more regular, the decomp. temp. is lowered to 905—930°, and the resulting CaO is softer and more porous; KCl has the greatest influence, and $SrCl_2$ the least.   H. F. G.

Addition of sodium chloride during calcination of lime. T. Noda (J. Soc. Chem. Ind., Japan, 1933, 36, 324—326 b).—The ratio Na/Cl in CaO calcined with 0·2—0·5% of NaCl showed that other chlorides are present. The rate of hydration was retarded in proportion to the Cl present. Treated quicklimes settled more rapidly than those without NaCl in contradistinction to the hydrates. Single crystals of larger size occurred in the treated CaO, which had twice the strength of CaO without NaCl.   C. A. K.

Purification of brine for electrolysis. A. F. SAGAIDATSCHNY and M. I. RAVITSCH (J. Chem. Ind., Russ., 1933, No. 4, 42—50).—Elimination of SO_4'', Ca'', and Mg'' is effected by addition of $BaCl_2$, NaOH, and Na_2CO_3, and removing the ppt., together with other insol. matter originally present in suspension. The best results are obtained by using the following quantities of reagents (g. per litre of brine): $BaCl_2,2H_2O$ 122·15($[SO_4''] + A$), NaOH 40($[Mg''] + [HCO_3'] + B$), and Na_2CO_3 53($[Ca''] + [HCO_3'] + A + B$), where A is the necessary excess of $BaCl_2$ (g.-equiv.), B that of NaOH, and C that of Na_2CO_3. The val. of B is very close to zero, as even a small excess of NaOH augments the solubility of $CaCO_3$; C is independent of temp., and depends on $[Ca'']$, and A depends on C and on the interval of time elapsing between addition of $BaCl_2$ and NaOH. Applying the above formulæ, and keeping the brine 2 days before filtration, a filtrate is obtained containing $BaSO_4$ 0·4, $BaCO_3$ 0·5, $CaCO_3$ 1·1, and MgO 0·05 mg. per litre.
R. T.

Utilisation of waste products for preparation of sulphur and of sulphide dyes. M. S. VASSERMAN, S. S. VASSERMAN, and L. G. DILBEK (J. Chem. Ind., Russ., 1933, No. 4, 66—67).—Na_2SO_3, a by-product of the manufacture of PhOH from $PhSO_3H$, reacts with Na_2S in acid solution to yield S, which combines with excess of Na_2S to give Na polysulphide, which with dinitrophenol (I) yields sulphide-black (II). The acid reaction necessary for pptn. of S as above is achieved by addition of spent acid from nitration of PhOH, containing traces of (I) thus recoverable as (II).
R. T.

Causticising sodium sulphate by the cyclic process, using baryta. K. I. LOSEV and NOSENKO (J. Chem. Ind., Russ., 1933, No. 4, 51—53).—A quant. study of Kurikov's process [$BaSO_4 \rightarrow BaS$; $BaS + H_2O \rightarrow Ba(OH)_2 + H_2S$; $Na_2SO_4 + Ba(OH)_2 \rightarrow 2NaOH + BaSO_4$] shows that 30% aq. suspensions of BaS give > 95% yields of $Ba(OH)_2$ after boiling during 3 hr., with passage of steam through the suspension, and that 75% yields of NaOH are obtained from 30% Na_2SO_4, using a 3% excess of $Ba(OH)_2$. The final product is contaminated with Na_2S, but not more so than in the Leblanc process.
R. T.

Volumetric determination of magnesium in salt lake saline, using 2-hydroxyquinoline. N. V. KOMAR and R. E. KIRILLOVA (J. Appl. Chem., Russ., 1933, **6**, 358—361).—Mg is determined by pptn. with 2-hydroxyquinoline in presence of excess of aq. NH_3 and NH_4Cl; Ca and Na do not interfere.
R. T.

Transformation of ammonium thionates and thiocyanate under pressure into sulphate and sulphur. HARNIST (Compt. rend., 1933, **196**, 1800—1802).—The varying mixtures of NH_4 polythionates and/or thiosulphates with or without H_2O and/or sulphites resulting from scrubbing gases containing H_2S and NH_3 with liquors containing SO_2, when heated under pressure yield all their NH_3 and S as $(NH_4)_2SO_4$, H_2SO_4, and S thus: $3(NH_4)_2S_nO_6 + 2H_2O = 3(NH_4)_2SO_4 + 2H_2SO_4 + (3n-5)S$ (complete at 180°); $2(NH_4)_2S_nO_6 + (NH_4)_2S_2O_3 + H_2O = 3(NH_4)_2SO_4 + H_2SO_4 + (2n-2)S$; $(NH_4)_2S_nO_6 + 2(NH_4)_2S_2O_3 = 3(NH_4)_2SO_4$

$+ (n+1)S$ [quant. if $\Rightarrow 2(NH_4)_2S_2O_3$]; $5(NH_4)_2S_nO_6 + 2(NH_4)_2S_2O_3 + 3(NH_4)_2SO_3 + 2NH_4HSO_3 + H_2O = 11(NH_4)_2SO_4 + 2H_2SO_4 + (5n-4)S$; $(NH_4)_2S_2O_3 + (NH_4)_2SO_3 + 10NH_4HSO_3 = 7(NH_4)_2SO_4 + H_2SO_4 + 4H_2O + 5S$; and $(NH_4)_2S_2O_3 + 2NH_4HSO_3 = 2(NH_4)_2SO_4 + H_2O + 2S$. Any thiocyanate is hydrolysed (quantitatively at 180°): $3NH_4CNS + 2H_2O + 4H_2SO_4 = 3(NH_4)_2SO_4 + 3CO_2 + 4S$. In this way there is no loss of NH_3 or S and the restriction of the ratio $NH_3 : H_2S$ to 2 : 1 is unnecessary (cf. B., 1911, 1381; 1913, 602; 1920, 818).
C. A. S.

Preparation of acid ammonium fluoride. N. I. SPITZIN, G. V. SOKOLOVA, T. M. POPOVA, and I. I. ZORIN (J. Chem. Ind., Russ., 1933, No. 3, 50—52).—H_2O is saturated with HF, NH_3 is passed into the cooled solution to neutralisation of HF, and an equal vol. of HF to that originally taken is introduced. Pptd. NH_4F,HF is centrifuged off, the centrifugate is returned to the absorption vessel, and the process is repeated. > 21% of NH_4F,HF is lost by volatilisation during concn. of its aq. solutions at 85°.
R. T.

Application of peat coke to manufacture of calcium carbide. B. K. KLIMOV, V. A. LANIN, and Z. K. KOROTKIN (J. Chem. Ind., Russ., 1933, No. 3, 24—27).—The expenditure of current for production of CaC_2 from peat coke is 10% < from ordinary coke, but the S, P, and As contents of the product are somewhat higher, and electrode consumption is twice as great. These disadvantages are to a large extent removed by coking at a higher temp.
R. T.

Recovery of ferrous sulphate from bisulphate solutions used for pickling ironware. N. A. GOLUBEV (J. Chem. Ind., Russ., 1933, No. 4, 64—66).—The spent pickle liquor, containing 34% of $FeSO_4,7H_2O$ (I), together with Na_2SO_4, is conc. to a H_2O content corresponding with that necessary for formation of (I) and of $Na_2SO_4,10H_2O$. The cryst. mass is then exposed to the atm. with frequent stirring during 10 days at about 20°, and the resultant powdery effloresced Na_2SO_4 is separated by sieving from unchanged crystals of (I). The powder passing through the sieve contains 25% of (I) and 75% of Na_2SO_4, whilst the residue is 91% (I) and 9% Na_2SO_4, yielding 99% (I) after one recrystallisation.
R. T.

Purification of zinc sulphate solution, and increase of stability to light of lithopone prepared from it. I. N. SAPGIR and V. L. DAVIDOVSKAJA (J. Chem. Ind., Russ., 1933, No. 3, 44—50).—Fe and Mn are removed from aq. $ZnSO_4$ as basic salts by addition of $CaOCl_2$ or NaOCl, and Cu and Cd as sulphides by Na_2S. $CoSO_4$ (0·1 mg. Co per g. Zn) is then added, and ZnS and $BaSO_4$ are pptd., using a slight excess of BaS. The product thus obtained is pure white, and does not darken after 20 min. exposure to ultra-violet light. Satisfactory lithopone may also be obtained by substituting SrS for BaS in the above process.
R. T.

Decomposition of phosphates. I. Treatment of calcium phosphate with chlorine and carbon. Y. KATO and S. FUJINO (J. Soc. Chem. Ind., Japan, 1933, **36**, 132B).—When a mixture of $Ca_3(PO_4)_2$ and C is treated with Cl_2 at 700°, a 95% yield of $POCl_3$ is obtained. The

reaction proceeds smoothly, since the $CaCl_2$ formed partly fuses and therefore does not hinder the action of the gas.   H. F. G.

Decomposition of chromite. III. Chromic oxide [production]. Y. KATŌ and R. IKENO (J. Soc. Chem. Ind., Japan, 1933, **36**, 132—133 B).—When $Fe(CrO_2)_2$ is heated at 1000° with NaOH, $NaCrO_2$ and FeO are formed ; on lixiviation with H_2O, Cr_2O_3,H_2O and FeO are produced, and when this mixture is treated with dil. acid, the FeO alone dissolves. The Cr_2O_3,H_2O so obtained is readily oxidised to chromate ; when heated at 650° with CaO, $CaCrO_4$ is formed rapidly. It dissolves easily when heated with conc. H_2SO_4 under pressure.   H. F. G.

Conversion of sodium chromate into dichromate by means of hydrofluoric acid. I. G. RYSS and S. S. ORLOV (J. Chem. Ind., Russ., 1933, No. 4, 53—57).— 50% aq. Na_2CrO_4 on treatment with HF or with 37·5% aq. HF yields $Na_2Cr_2O_7$ (I) and NaF, which can, after reduction of its (I) content to 5—7% by washing, and addition of dinitrophenol, be used for impregnation of wood. The materials used should have low Al and Si contents.   R. T.

Calcium cyanamide. II. Ammonolysis of di-cyanodiamide. Y. KATŌ, K. SUGINO, K. KOIDZUMI, and E. MITSUSHIMA (J. Soc. Chem. Ind., Japan, 1933, **36**, 133—134 B).—The reduction, hydrolysis, and ammonolysis of dicyanodiamide (I) have been studied. A much greater yield of guanidine (II) is obtained when a solution of (I) is heated with an NH_4 salt than when (I) is fused with an NH_4 salt. During the fusion much of the (II) decomposes, owing to the rapid rise of temp. resulting from heat evolved during the reaction, which is largely due to the conversion of biguanide into (II). Guanidine nitrate exhibits marked supercooling (i.e., about 30°).   H. F. G.

Gas interferometer. H_2 as fuel.—See II. **By-products of CaC_2.**—See III. **Artificial MnO_2. H_2SO_4 solutions. H_2-O_2 cells.**—See XI. **Boric acid and borax.**—See XV. **Acidity and basicity of fertilisers. Phosphate rock.**—See XVI. **Hyposulphites. Liquid SO_2.**—See XVII.

PATENTS.

Recovering (A) glaserite, (B) alkali salts, from [Searles Lake] brines. H. T. WOODWARD, Assr. to BURNHAM CHEM. Co. (U.S.P. 1,883,261—2, 18.10.32. Appl., [A] 14.1.29, [B] 3.6.29).—(A) Glaserite, $Na_2SO_4,3K_2SO_4$, is removed from crude salts deposited by solar evaporation by washing with hot dil. H_2SO_4, the Na_2CO_3 being converted into the more sol. Na_2SO_4 and about half the borax into H_3BO_3. In (B) the use of hot (75—100°) H_2O or mother-liquor alone is claimed to dissolve borax out of glaserite, the borax being pptd. on cooling and the mother-liquor being reheated for re-use after wasting an amount sufficient to prevent accumulation of other impurities.   B. M. V.

Production of calcium magnesium chloride. E. O. BARSTOW and S. B. HEATH, Assrs. to Dow CHEM. Co. (U.S.P. 1,884,522, 25.10.32. Appl., 3.3.28).— The marketable product desired is a granular mixture of $CaCl_2,2H_2O$ and $MgCl_2,6H_2O$ and is produced, without

mechanical difficulty, by mixing granular dehydrated salts with crystals of greater hydration or with a solution and redrying in hot air, a portion of the material being overdried for another round.   B. M. V.

Making neutral sodium pyrophosphate. CHEM. FABR. J. A. BENCKISER G.M.B.H., and A. REIMANN, SEN. (B.P. 395,642, 24.2.33. Ger., 9.5.32).—$Na_2HPO_4,2H_2O$ mixed with a small quantity of an oxidising agent, e.g., $NaClO_3$, is dehydrated in one zone of a rotary furnace by means of the hot gases, and then ignited in a second zone to give $Na_4P_2O_7$.   H. R.-D.

Protecting solids. Conducting exothermic gaseous reactions. Separation of gases.—See I. **Recovering NH_3 from gases.**—See II. **Mn resinate.**—See XIII. **Arsenical insecticides.**—See XVI.

VIII.—GLASS; CERAMICS.

Electrical melting of glass. II. Reaction temperature of zinc oxide and amorphous carbon or artificial graphite. S. KONDŌ and C. KAWASHIMA (J. Soc. Chem. Ind., Japan, 1933, **36**, 168—169 B).—The reaction between ZnO and C has been studied in its relation to the use of the former in preventing blackening of the glass by electrode C. Sugar C reacts with ZnO at a temp. about 50° < in the case of artificial graphite. Higher temp. are obtained by the thermal analysis method than by the thermal balance method.   H. F. G.

Surface strength of glass and other materials. F. W. PRESTON (J. Soc. Glass. Tech., 1933, **17**, 5—8 T).— It is considered that the strength of glass is governed by a so-called surface strength j, which has the same dimensions as surface tension, rather than by stress. Published data support this view in that they yield approx. const. vals. of j over wide ranges of stress.   H. F. G.

Formation of sodium sulphate in glass furnaces, and defects arising therefrom. W. E. S. TURNER (J. Soc. Glass. Tech., 1933, **17**, 22—24 T).—SO_2 in the products of combustion of the fuel used reacts with Na_2O, PbO, etc. in the glass to form sulphate. Fuels of high S content should be avoided, as otherwise white deposits or inclusions may appear in the finished products.   H. F. G.

Reaction : $NaCl + NaHSO_4 + SiO_2 = Na_2SiO_3 + SO_3 + HCl$ [in glass manufacture]. O. K. BOTVINKIN and T. E. GOLBA (Keram. i Steklo, 1933, **9**, No. 1, 21).—The reaction was studied at 150—900° and 1000—1300° ; the possibility of producing $Na_2O,2SiO_2$ was proved.   CH. ABS.

Preparation and properties of beryllium fluoride glasses. G. HEYNE (Angew. Chem., 1933, **46**, 473— 477).—The prep. of glasses consisting of compounds of BeF_2 with fluorides of K, Na, Li, Mg, Ca, Al, or Co is described. Addition of Zn, Ti, or Zr fluorides, or of BeO causes the glasses to become turbid, whilst $NaPO_3$ renders them transparent. The glasses are stable in EtOH or $COMe_2$, but are disintegrated by H_2O. The hardness of the glasses is about 4 Moh, and the m.p. range from 160° to 300°. The expansion coeffs. are $215 — 350 \times 10^{-7}$. The glasses are transparent to

ultra-violet light up to 2200 Å. and to infra-red radiation of wave-length $< 5 \cdot 0$—$5 \cdot 5$ μ. There is a marked min. at 3 μ. E. S. H.

Effect of gases on the properties of glass. K. NAKANISHI (J. Soc. Chem. Ind., Japan, 1933, **36**, 330 B). —The chemical stability of glass was improved when it was heated at 115—120° in air, N_2, or in vac. for approx. 60 hr. The increased stability was restricted to the surface and is attributed to the evolution of absorbed gases. In vac. the surface turned matte at the higher temp. and the stability was $<$ when treated in air.
C. A. K.

Methods for calculating the " working interval " **of glasses.** V. G. VOANO (Keram. i Steklo, 1933, **9**, No. 1, 22—24).—Knapp's formulæ (Keram. Rundsch., 1932, Aug. 18) are invalid. CH. ABS.

Drop reaction to detect free basic oxides in glass. F. FEIGL (Mikrochem., 1933, **13**, 139—140).—Free basic oxides may be detected by their reaction with $MnSO_4 + AgNO_3$ (cf. A., 1933, 798). J. S. A.

Glass-forming moulds: material and design. T. WARDLEY (J. Soc. Glass Tech., 1933, **17**, 50—67 T).— The design of moulds is discussed in some detail. A cast alloy steel containing Ni, Cr, W, Cu, and Si is promising but expensive. A 37–17–46 Ni–Cr–Fe alloy is very suitable for moulds for pressed ware, but it cannot be cast. Electrodeposition of Ni or Cr does not appear to offer any advantage. Photomicrographs are given and discussed of a no. of specimens of cast Fe which have proved satisfactory or unsatisfactory for moulds. Chilling is not essential if a suitable alloy is chosen and precautions are taken with regard to melting. H. F. G.

Glass-making moulds. H. W. HOWES (J. Soc. Glass Tech., 1933, **17**, 68—84 T).—The principles underlying the design, construction, and operation of glass-forming moulds of various types are discussed.
H. F. G.

X-Ray analysis of Seger cones. T. NAKAI and Y. FUKAMI (J. Soc. Chem. Ind., Japan, 1933, **36**, 170— 171 B).—The influence of heating on the cryst. structure of quartz, kaolin, and Al_2O_3, and the chemical reactions between these materials when they are heated together, have been studied in relation to the mechanism of the softening of Seger cones. H. F. G.

Magnesite refractories. II. Influence of composition on quality. S. KONDŌ and H. YOSHIDA (J. Soc. Chem. Ind., Japan, 1933, **36**, 167—168 B).— The influence of impurities such as FeO, CaO, SiO_2, etc. on the physical and mechanical properties, and on the resistance to slaking by steam at 3 atm. pressure, of calcined magnesites from six different mines in S. Manchuria has been studied. The properties of the dead-burned materials have been compared with those of a dead-burned breunnerite from Austria. H. F. G.

Tercod—a new refractory brick for electric furnaces. G. S. DIAMOND (Trans. Electrochem. Soc., 1933, **63**, 323—326).—" Tercod " bricks, consisting of a mixture of SiC, with or without graphite, a C bonding material, and a borosilicate glaze to prevent oxidation, have an extremely low coeff. of thermal expansion and are unattacked by acid or neutral slags, molten Fe with

$> 3\%$ C, or molten non-ferrous metals. The electrical and thermal conductivities are high. H. J. T. E.

Electrochemical products. See XI.

Metallic treatment of vitreous materials. A. GREINER, Assr. to R. E. SCHIRMER and L. L. WITTER (U.S.P. 1,884,665, 25.10.32. Appl., 5.10.29).—A compound of the metal is applied to the vitreous body in heated condition, and the coating, part at least of which is below the surface, is subsequently reduced.
B. M. V.

IX.—BUILDING MATERIALS.

Utilisation of cement dust. I. S. KONDŌ and C. KAWASHIMA (J. Soc. Chem. Ind., Japan, 1933, **36**, 168 B).—The properties of the dust collected by the Cottrell precipitators have been studied, particularly from the viewpoint of the use of the dust for glass manufacture. The system SiO_2–Na_2CO_3–dust has been compared with the system SiO_2–Na_2CO_3–CaO.
H. F. G.

Precipitation and titration of magnesium oxyquinolate in the presence of calcium oxalate, and its application in the analysis of Portland cement and similar silicates. J. C. REDMOND (Bur. Stand. J. Res., 1933, **10**, 823—826).—The removal of CaC_2O_4 before titrating with standard bromate–bromide solution is unnecessary (cf. Shead and Valla, A., 1932, 588). Details of the application of the process to Portland cement are given. N. M. B.

Artificial drying of wood. F. MOLL (Engineering, 1933, **136**, 31).—The effect of temp. on the rate of drying and the relation between this rate and the density of structure were studied, and an equation is formulated for the curve separating the effects of wood and air. Adsorption of H_2O by the wood fibre varies as the R.H. of the air but is very small in relation to the condensation of H_2O within small capillaries. The equilibrium H_2O content of wood decreases logarithmically with increase in temp., and the low val. for the conducting power of wood for H_2O vapour does not warrant the use of high temp. during drying. C. A. K.

Suggested wood preservatives. I. HATFIELD (Proc. Amer. Wood Preservers' Assoc., 1932, 330—339). —Results for C_6H_6 derivatives; Hg Et and Ph compounds; NH_2Ph and F compounds; proprietary and miscellaneous materials are tabulated. CH. ABS.

Fireproofing wood. G. M. HUNT, T. R. TRUAX, and C. A. HARRISON (Proc. Amer. Wood Preservers' Assoc., 1932, 71—93).—Of the 61 substances tested, only $(NH_4)_2HPO_4$, $NH_4H_2PO_4$, and H_3PO_4 are highly effective in reducing both flaming and glowing. $Al_2(SO_4)_3$, NH_4Br, NH_4Cl, and H_3BO_3 are effective only at high concn. H_3BO_3 prevents glowing, but not flaming. Mixtures of H_3BO_3 and $Na_2B_4O_7$ at high concn. prevent both. CH. ABS.

CaO. $Na_2Cr_2O_7$.—See VII.

Aq. [tar] emulsions.—See II. **Decorating wood** etc. **Washable wallpaper.**—See XIII. **Plywood.**— See XV.

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

Electric smelting of iron ore. E. A. MILYAEV (Domez, 1932, No. 10, 21—27).—An arc is formed between suspended tubular C electrodes and the molten bath. Finely-divided ore, ore flux, and coal are blown through the electrodes into the furnace.   CH. ABS.

Strength and behaviour of steels at high temperatures. W. H. HATFIELD (Proc. Inst. Mech. Eng., 1932, **123**, 773—791).—The author's " time-yield " test was devised to ascertain the beginning of the unstable (creep) stress range, and the presence or absence of slow creeping becomes the dominant factor for those temp. where creep can occur. Results of tests on special steels are given.   C. A. K.

Tensile properties of steel, cast steel, and cast iron in the cold. R. WALLE (Chem. Fabr., 1933, **6**, 207—211, 220—222).—A review of recent work on the effect of low temp. ($0°$ to $-200°$) on the tensile strength, hardness, ductility, and impact val. of various plain and alloyed steels, two specimens of cast steel, and five varieties of cast Fe; the results of the various investigators are shown graphically and briefly discussed.
     A. R. P.

Cutting Tools Research Committee. Heat conductivity and hardness of carbon and high-speed steels and durability of these steels when cutting brass. D. SMITH and A. NIELD (Proc. Inst. Mech. Eng., 1932, **123**, 709—725).—The relative thermal conductivity, hardness at varying temp., and the durability of C and high-speed tool steels were studied under the conditions of machining brass.   C. A. K.

Rusting of iron with excess of oxygen. G. SCHIKORR (Z. Elektrochem., 1933, **39**, 409—414).—The rusting of Fe immersed completely in unstirred H_2O at room temp. is determined mainly by the diffusion of O_2; the purity of the Fe and the presence of electrolytes in the H_2O are relatively unimportant. O_2 exerts a passivating influence when Fe rusts in the atm. by applying drops of H_2O, or when rusting occurs in moving H_2O saturated with air. In this case impurities in the Fe and electrolytes in solution (especially chlorides) increase the corrosion. The latter behaviour occurs also at $3°$.   E. S. H.

Creep and structural stability of nickel-chromium-iron alloys at 870°. W. A. TUCKER and S. E. SINCLAIR (Bur. Stand. J. Res., 1933, **10**, 851—862). —Investigations were made on 15 alloys with a range 1—75% Ni and 3—55% Cr. Those containing equal parts Ni and Cr and $\not>$ 30—40% Fe had the greatest resistance to creep. Similar structure was shown by these and by unstressed specimens annealed at $870°$ for 100—1000 hr. or quenched in iced brine from $870°$, indicating that these alloys are not readily heat treated. Carbide pptn. and agglomeration of the carbide at the grain boundaries were most pronounced in both the Fe–Cr alloys and the Fe–Cr–Ni alloys of higher Cr content. Prolonged heating produced no appreciable structure changes except for specimens containing $\not<$ 50% Ni.   N. M. B.

Determination of sulphur in steel and ferro-alloys. I. KASSLER (Chem.-Ztg., 1933, **57**, 573—574).

—The metal is heated in O_2 at 1250—1400° with the addition of Co_3O_4 if Mo is present and the gases are passed through an absorption flask containing H_2O just coloured blue with starch and I. As the blue colour disappears it is brought back again by addition of more I solution from a microburette; in this way the SO_2 can be titrated directly in 0.5 g. of metal in $<$ 5 min.
     A. R. P.

Sulphate roasting of copper ores and economic recovery of electrolytic copper from chloride solutions. E. A. ASHCROFT (Trans. Electrochem. Soc., 1933, **63**, 229—250).—In order to obtain the max. amount of Cu as $CuSO_4$ and Fe as Fe_2O_3, the mixed ore should contain $\not>$ 5% excess of S, there should be no movement of the charge while any unoxidised sulphide remains, and the temp. should be kept at 550—650° in suitable ovens without access of CO; since the reactions are exothermic, low-grade ores can be used, often without concn. or fine grinding, especially if O_2 is used wholly or partly in place of air. Selection of ores to form a balanced mixture, details of the roasting operation, and the advantages and economics of the use of O_2 are discussed in relation to various types of ores and local conditions. In experiments with Rhodesian ores 90—98% of the total Cu was rendered H_2O-sol. by controlled roasting of properly proportioned mixture in ovens supplied with O_2; the resulting solution was much purer than that obtained by acid leaching of the imperfectly roasted ores. For recovery of pure Cu from the resulting $CuSO_4$ solution it is proposed to ppt. Cu with high-grade sponge Fe (Zn and Ni can be recovered from the filtrate), dissolve the cement Cu in a solution of $CuCl_2$ and NaCl or $CaCl_2$ (spent electrolyte) to yield a solution containing 150 g. of Cu as Cu_2Cl_2 and 300 g. of total Cl' per litre, and to electrolyse this between graphite anodes and Cu cathodes at 1.5—2.5 amp. per sq. dm., yielding Cu at a current efficiency of 95—97·5% (reckoned on Cu').   H. J. T. E.

Electrolytic refining of copper using complex salt of cuprous chloride. XI. Behaviour of bismuth. N. KAMEYAMA and S. MAKISHIMA (J. Soc. Chem. Ind., Japan, 1933, **36**, 365—367 B; cf. B., 1932, 1037).— Deposition of Bi is minimised by increasing the content of Cu (to 5%) and of gelatin in the bath.   A. G.

Cyanide zinc-plating baths using the aluminium-mercury-zinc anode. A. K. GRAHAM (Trans. Electrochem. Soc., 1933, **63**, 135—146).—Smooth, white Zn deposits of good texture are obtained at cathodic (I) and anodic (II) efficiencies approaching 100% and with low anode polarisation (III) and bath voltage, by using anodes containing 0.5% Al and 0.3% Hg in N-$Zn(CN)_2$ baths at $49°$ with a c.d. of 2.2 amp. per sq. dm., when the NaCN and NaOH concns. are respectively 5—8·5 and 4·5—10 oz. per gal., the ratio of the sum of the normalities of NaCN and NaOH to that of $Zn(CN)_2$ being about 2. A N-$Zn(CN)_2$ bath containing 7 oz. of NaCN and NaOH per gal. (52·5 g. per litre) has all these advantages when the Al–Hg–Zn anode is used, but with a pure Zn anode gives too high a (I) and considerable sludge. Addition of Na_2CO_3 up to 30 g. per litre produces no noticeable effect, but reducing the Zn concn. to $0.75N$-$Zn(CN)_2$ lowers (I) and (II) and raises (III) and bath voltage.   H. J. T. E.

Electrolytic analysis of bismuth, tin, lead, and antimony without mechanical agitation of the electrolyte. T. Grosset (Bull. Soc. chim. Belg., 1933, 42, 269—280).—Bi is deposited cathodically from solutions in HNO_3. Addition of tartaric acid prevents anodic deposition of oxide. Sb is deposited from solution in HCl in presence of NH_2OH,HCl. Pb is determined by anodic deposition as PbO_2, using a solution in HNO_3. Sn is deposited on a Ni-plated cathode from a solution in HCl containing NaCl, KCl, NH_2OH,HCl, and $(NH_4)_2S_2O_8$. Electrolysis is conducted at or very near the b.p. and stirring is unnecessary when the c.d. is controlled according to the directions given. E. S. H.

Electrolysis of zinc sulphate solutions. P. Guareschi (L'Ind. Chimica, 1933, 8, 704—708, 822—826).—Additions of various substances to $ZnSO_4$ solutions to prevent disturbance of the electrolytic deposition of Zn by Fe, As, Sb, Co, and Ni have been investigated. Rochelle salt results in a good compact deposit, but, if much Co is present, is expensive; ordinary glue gives poor results; gum arabic results in a good deposit, but a poor current yield; tannic acid, in quantity about 4 times that of the Co or other metallic impurities, is efficacious, except when much Cu is present, but it is cheaper to use an infusion of quebracho or other wood containing tannic acid and carbohydrates; $KMnO_4$, Na_2O_2, and $CaCN_2$ (1 g. per litre) give good results. An outline of all the operations is given. T. H. P.

Electrolytic zinc: determination of small amounts of germanium. H. Lundin (Trans. Electrochem. Soc., 1933, 63, 191—195).—Owing to deleterious effect of traces of Ge in the electrolytic extraction of Zn (B., 1930, 718), a method has been worked out for the detection and determination of traces of Ge in materials containing SiO_2. The method involves treatment with HNO_3 (to oxidise sulphides) and H_2SO_4, volatilisation of Si as SiF_4, distillation with HCl in a current of Cl_2, pptn. of Ge from the distillate with H_2S after removal of excess Cl_2, and igniting the ppt. to GeO_2, which is weighed. The results are accurate to about 0.001% Ge. H. J. T. E.

Influence of composition and acidity of the electrolyte on the characteristics of nickel deposits. D. J. Macnaughtan, G. E. Gardam, and R. A. F. Hammond (Trans. Faraday Soc., 1933, 29, 729—754; cf. B., 1931, 1100).—The influence of p_H and added H_3BO_3, K_2SO_4, KCl, and $NiCl_2$ on the cathode efficiency and on pitting, microstructure, Brinell hardness, etc. of Ni electrodeposited from aq. $NiSO_4$ has been investigated. Hardness falls with increasing acidity until a crit. p_H is reached, below which, in presence of Cl', there is little further change, the presence of K' favouring a hard deposit. In absence of Cl', K' has the reverse effect, whilst the hardness first falls with decreasing p_H and then rises to pass through a max. Pitting occurs only at $p_H > 2.6$; it is suppressed by K' and to a smaller extent by Na' and Li', is uninfluenced by Mg'' and NH_4', and is increased by Cl'. H_3BO_3 tends to prevent the formation of a bright deposit. The effects produced are related to the influence of the various ions on the pptn. of basic salts, the co-pptn. of the latter causing increased hardness. D. R. D.

Effect of annealing on the microstructure and mechanical properties of electrodeposited nickel. G. E. Gardam and D. J. Macnaughtan (Trans. Faraday Soc., 1933, 29, 755—764).—Annealing causes loss of tensile strength of hard deposits, due to segregation of non-metallic material, probably co-deposited basic salts (cf. preceding abstract). D. R. D.

Nickel-plating of fabricated zinc in a barrel. A. Hirsch (Trans. Electrochem. Soc., 1933, 63, 129—133).—Small Zn articles are submitted successively to "dry grinding" in a barrel charged with sawdust and powdered pumice; cleaning in a dil. alkaline solution; Cu-plating from a cyanide bath; ball-burnishing, and further cleaning in dil. alkali; they are then Ni-plated in a barrel at a c.d. up to 4 amp. per sq. ft. from a $NiSO_4$ solution containing $NiCl_2$, H_3BO_3, and Na_3BO_3, with addition of aq. NH_3 to produce p_H 7.6—8.0, at 32—$60°$. H. J. T. E.

Rhodium-plating. C. G. Fink and G. C. Lambros (Trans. Electrochem. Soc., 1933, 63, 107—112).—Good deposits of Rh can be obtained from sulphate, phosphate, sulphate–phosphate, –citrate, and –nitrate baths. An acid sulphate bath containing $(NH_4)_2SO_4$ operated at $50°$ gives dense, brilliant deposits at c.d. < 9 amp. per sq. dm. H. J. T. E.

Metals in textiles.—See V. **Pickling solutions.**—See VII. **Glass-forming moulds.**—See VIII.

PATENTS.

Roasting of minerals containing the sulphides of zinc, iron, lead, and copper, for recovery of the metal and sulphur dioxide gas therefrom. B. A. Stimmel, K. D. McBean, and G. Cruickshank, Assrs. to Consolidated Mining & Smelting Co. of Canada, Ltd. (U.S.P. 1,884,348, 25.10.32. Appl., 10.2.30).—The dry, finely-divided minerals are blown into a roasting chamber of considerable vol., enough motive air being used almost to prevent touching of particles. The temp. is maintained solely by the heat of the reactions and the formation of ferrites is inhibited by controlling the time the roasted material lies on the bottom of the furnace, rabbling and discharge rakes being situated there. B. M. V.

Inhibiting [internal] corrosion [of food cans]. J. E. McConkie and R. H. Lueck, Assrs. to Amer. Can Co. (U.S.P. 1,884,790, 25.10.32. Appl., 2.8.29).—Minute quantities of gelatin are added to the foodstuff, or the can is coated with it. B. M. V.

Decomposing monazite sand and similar ores bearing rare-earth metal compounds. I. G. Farbenind. A.-G. (B.P. 395,657, 17.3.33. Ger., 25.4.32).—The (phosphate) ore is melted in a rotary drum furnace at 1400—$1750°$, with oxides or carbonates of alkaline-earth metals or Mg ($\not> 3$ mols. per mol. of rare-earth metal oxide), and C just sufficient to yield all the P. The melt is granulated and ground, and worked up by known methods. H. R.-D.

Cooling sintered material.—See I. **Metallising vitreous materials.**—See VIII. **Purifying blast-furnace gases.**—See XI. **Decorating metal etc.**—See XIII.

XI.—ELECTROTECHNICS.

Determination of maximum current-carrying capacity of furnace electrodes. B. L. BAILEY and R. R. RIDGWAY (Trans. Electrochem. Soc., 1933, **63**, 147—162).—Screw-jointed assemblies of C and graphite electrodes were examined as to their a.c. conductivities when supplied with various const. c.d. through water-cooled clamps. Both C and graphite showed notable oxidation at regions where the surface temp. reached 500°, and the quality of the electrode and its joints can be assessed by the max. c.d. which can be carried without reaching this temp. A joint is always a region of highest resistance and max. temp., and permissible loading is therefore largely determined by the construction of the joint and the details of assembly. C electrodes recommended for high c.d. were superior to standard products but not comparable with graphite. The considerable loss of power which generally occurs at the contacts with steel electrode clamps, even when these are kept in good condition by polishing, can be notably reduced by using bronze linings.   H. J. T. E.

Electric arc and arc-resistance furnaces and their power factor. A. WEJNARTH (Trans. Electrochem. Soc., 1933, **63**, 355—389).—The influence of various factors on the power factor of arc and arc-resistance furnaces is discussed in detail. Results obtained with commercial furnaces indicate the exactness of Lindström's formula. Bergeon's empirical formula may be used as a guide, but it is not accurate in general because it does not take account of the geometrical shape of the conductors.   H. J. T. E.

Seat of the electromotive force in voltaic cells. M. DE K. THOMPSON (Trans. Electrochem. Soc., 1933, **63**, 113—115).—Some of the evidence in favour of the " chemical " theory of the e.m.f. of voltaic cells is stated.   H. J. T. E.

Viscosity of sulphuric acid solutions used for battery electrolytes. G. W. VINAL and D. N. CRAIG (Bur. Stand. J. Res., 1933, **10**, 781—793).—Data for 10—50% solutions for the temp. range 30° to $-50°$ are given. Below 0° the viscosity increases rapidly with fall of temp.   N. M. B.

Electrolytes for hydrogen–oxygen cells. W. S. KIRKPATRICK, B. P. SUTHERLAND, and C. H. WRIGHT (Trans. Electrochem. Soc., 1933, **63**, 251—259).—Sp. conductances of KOH solutions determined at 50—80° are compared with corresponding data for NaOH solutions. At 60° 29% KOH solution has max. conductivity. The cell voltage of technical H_2–O_2 cells is analysed, and effects of impurities in the electrolyte or introduced in the feed-H_2O are discussed. Fe is troublesome since $Fe(OH)_3$ tends to clog diaphragms and Fe to form accretions on electrodes and bells. Methods of minimising loss of alkali as spray or through carbonation are indicated. At 60° carbonation of 21% NaOH leads to pptn. when the solution contains about 6% Na_2CO_3; with 25% KOH complete conversion into K_2CO_3 occurs without pptn.   H. J. T. E.

Artificial manganese dioxide for the production of dry cells of long shelf-life. Y. KATO and T. MATSUHASHI (J. Soc. Chem. Ind., Japan, 1933, **36**, 164—165 B).—Artificial MnO_2 is prepared by oxidising lower oxides (e.g., Mn_2O_3) with air at about 300° in presence of a small quantity of a strong base, which is subsequently removed by washing. Dry cells made with this material have longer shelf-life and greater capacity than cells containing natural MnO_2.   H. F. G.

Hardness values for electrochemical products. R. R. RIDGWAY, A. H. BALLARD, and B. L. BAILEY (Trans. Electrochem. Soc., 1933, **63**, 267—290).—Methods of hardness testing are described, and comparative tests made with a no. of natural and synthetic materials. With certain exceptions, which are discussed, the same sequence is found by the different methods, and Moh's scale is amplified by inclusion of substances (electric furnace products) between 6 and 7, 8 and 9, and 9 and 10 on that scale.   H. J. T. E.

Electrolytic plant at Temiskaming. Brine for electrolyses. CaC_2.—See VII. **Melting of glass. Tercod.**—See VIII. **Analysis of Bi, Sn, Pb, and Sb. Cu. Ni. Electrolysis of $ZnSO_4$. Zn. Rh.**—See X. **Drying oils.**—See XIII. **Soil analysis.**—See XVI.

PATENTS.

Induction electric furnace construction. F. EIBL, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,890,773, 13.12.32. Appl., 30.6.30. Ger., 31.12.29). —The portion of the inductor coil carrying the greater part of the current and the portion forming the walls of passages carrying H_2O are made integral with one another.   J. S. G. T.

Electric arc carbons. COMP. LORRAINE DE CHARBONS POUR L'ELECTRICITÉ (B.P. 395,580, 5.12.32. Fr., 4.12.31 and 25.11.32).—The tip of a cored C is impregnated with vaporisable metallic salts, e.g., K_2CO_3 or K borate.   J. S. G. T.

Production of porous or permeable coatings for use in galvanic cells. G. LÜDECKE, and GRAPHITWERK KROPFMÜHL A.-G. (B.P. 395,456, 22.3.32. Switz., 23.3.31).—Electrodes are coated with a solution containing fully acetylated cellulose and, if desired, cellulose and sol. alkali salts.   J. S. G. T.

Electrolytic condensers. STANDARD TELEPHONES & CABLES, LTD., G. W. CLARKE, and H. S. LEMAN (B.P. 395,416, 20.1.32).—Electrodes composed of film-forming wires, e.g., of Al or Mg, insulated by porous material, e.g., paper, are wound helically around a core and impregnated with electrolyte.   J. S. G. T.

Highly emissive cathodes for electric-discharge apparatus. S. LOEWE (B.P. 395,537, 12.9.32. Ger., 15.9.31).—A superficially-oxidised cathode core wire is heated in a vac. furnace in an atm. of a highly emissive metal, e.g., Ba, and then heated as cathode in the discharge vessel. Finally a light metal, e.g., Mg, is applied to the wire by atomisation.   J. S. G. T.

Copper iodide rectifier. W. KRAUSS, Assr. to GEN. ELECTRIC CO. (U.S.P. 1,891,097, 13.12.32. Appl., 8.9.30. Ger., 3.10.29).—A mixture of Cu iodide and I is arranged in contact with a surface layer of $PbSO_4$ coating a Pb electrode.   J. S. G. T.

(A) Conditioning gases for electrical precipitation. (B) Purification of blast-furnace gases. C. W. J. HEDBERG, Assr. to RESEARCH CORP. (U.S.P.

1,883,372—3, 18.10.32. Appl., [A] 7.1.28, [B] 1.5.29).—Hydrocarbon vapour or mist is added in amount sufficient substantially to alter the electrical characteristics of the gases, which are then subjected to a high electrical potential, preferably, in (A), accompanied by a corona discharge and causing the deposition of dust in friable form. The amount of hydrocarbon added may be: in (A), 0·05 grain/cu. ft. of gas; in (B), 25—90 lb. of finely-divided bituminous coal/ton of pig Fe, the gases being at a temp. sufficient to distil the coal. B. M. V.

Partly acetylated cellulose.—See V. Purifying air.—See XXIII.

XII.—FATS; OILS; WAXES.

Autoxidative breakdown of fats. V. Behaviour of epihydrinaldehyde and its acetals. K. TÄUFEL and F. K. RUSSOW (Z. Unters. Lebensm., 1933, 65, 540—551).—Interaction of acraldehyde with $[\cdot CH_2 \cdot OH]_2$ which has been saturated with Cl_2 gives β-*chloroprop-aldehyde ethylene acetal*, b.p. 71—72°/10 mm., converted by heating with KOH into *acraldehyde ethylene acetal*, b.p. 112—116°, which by Wohl and Schneider's method (A., 1907, i, 194) yields α-*chloro-β-hydroxypropaldehyde ethylene acetal*, b.p. 123—125°/12 mm., and this, by treatment with Na in Et_2O followed by KOH, affords *epihydrinaldehyde ethylene acetal*, $\begin{smallmatrix} CH_2 \\ O \end{smallmatrix} > CH \cdot CH < \begin{smallmatrix} O \cdot CH_2 \\ O \cdot CH_2 \end{smallmatrix}$, b.p. 165—175°/atm., 67—70°/15 mm. Epihydrinaldehyde (I) is liberated from this or the diethyl acetal by 50% H_2SO_4. (I) is unstable, very volatile, has m.p. $< 0°$, and gives an intensely strong Kreis reaction. Methyl-red and $KMnO_4$ are used as colorimetric standards for the Kreis test and for the determination of (I) and its acetals. The Kreis test is sensitive to $0·5 \times 10^{-6}$ g. of (I). The substance in autoxidised fats responsible for the Kreis test is rapidly destroyed by heating at 150° and by the action of alkalis. It is present in the soap fraction after saponification. (I) occurs in autoxidised fats in a non-volatile combination, which is unlikely to be the glycerol acetal. E. C. S.

Lard [refractometer and iodine values]. K. BRAUNSDORF (Z. Unters., Lebensm., 1933, 65, 580—582).—Lard from kidney and mesenteric fat gave refractometer vals. (at 40°) of 47·3—48·1 and I vals. of 46·2—50·9; dorsal fat gave vals. of 49·0—49·55 and 57·2—59·8 respectively. E. C. S.

Alcoholysis of fats. I. Ethanolysis of olive oil by sodium hydroxide in ethyl alcohol. II. Methanolysis of olive oil by alkali hydroxides in methyl alcohol. Y. TOYAMA, T. TSUCHIYA, and T. ISHIKAWA. III. Formation of di- and mono-glycerides by partial alcoholysis of olive oil. Y. TOYAMA and T. TSUCHIYA (J. Soc. Chem. Ind., Japan, 1933, 36, 230—231 B, 231—232 B, 232—233 B).—I. The rate of ethanolysis increases with the amount and concn. of the NaOH–EtOH and with the temp. Soap formation occurs to some extent in all cases, and is facilitated by higher temp. Ethanolysis proceeds when 80% EtOH is used, but soap formation increases with increasing H_2O content of the EtOH.

II. The results are similar except that soap formation is not greatly increased by using MeOH containing H_2O.

III. The formation of di- and mono-glycerides is followed under various conditions by means of the Ac val. Products with a max. Ac val. deposit cryst. mono- and di-stearin. A. A. L.

Re-esterification of fats with glycerol. T. TSUCHIYA and G. AKIYAMA (J. Soc. Chem. Ind., Japan, 1933, 36, 233—234 B).—The highest Ac val. is obtained with hardened fish oil by using 25—100% of its wt. of glycerol at 270—280° for 1—2 hr. The reaction is catalysed by alkali carbonates and hydroxides, MgO, CaO, and ZnO. Similar results are obtained with a no. of other oils. Sperm oil and hardened sperm oil require a higher temp., and free higher alcohols are formed. A. A. L.

Direct determination of calcium soaps in fats. BERGELL (Allgem. Oel- u. Fett-Ztg., 1933, 30, 301—302).—After refluxing 10 g. of fat for a few min. with 200 c.c. of $COMe_2$, the solution is cooled and decanted through a filter; the residue is re-extracted with 100 c.c. of $COMe_2$, collected, washed with $COMe_2$, and treated with acid to liberate the fatty acids, which are extracted with Et_2O and weighed as usual. Loss by dissolution of Ca soap is ≯ 6 mg. E. L.

Stability of fats and oils. Applications of the methylene-blue test. H. D. ROYCE (Ind. Eng. Chem. [Anal.], 1933, 5, 244—247).—The use of methylene-blue as an oxidation-reduction indicator is described. Secondary colour changes render photoelectric control of the end-point unsatisfactory. Stability curves for some shortening products and salad oils are given. The induction period in the accelerated peroxide test may be shortened by light. The relation of methylene-blue fading time to Kreis vals. and peroxide vals. has been determined for cottonseed oil aged to a peroxide val. of 250 millimol. E. S. H.

Improvement of soya-bean oil extraction. IV. Extraction with azeotropic mixtures adding lower alcohols before or after extraction. M. MASHINO (J. Soc. Chem. Ind., Japan, 1933, 36, 309—310 B; cf. B., 1930, 291; 1932, 30).—Azeotropic mixtures of aliphatic or aromatic hydrocarbons with MeOH or EtOH can be used for the extraction of soya-bean oil, if lower alcohols are added to the azeotropic mixture before or after the extraction, and the azeotropic mixture is evaporated off from the miscella, which separates into two layers after cooling, so that oil and alcohols can be recovered. The purest and palest oil is obtained by using MeOH in the mixtures. E. L.

Extraction of oil from soya beans. S. JUSCH-KEVITSCH, S. BRILLING, and F. ANTONEMKOV (Masloboino-Zhir. Delo, 1932, No. 4—5, 52—53).—C_2HCl_3 and $C_2H_2Cl_2$ give good yields, but impart an objectionable odour and taste. CH. ABS.

Tobacco-seed oil. N. BELIAEV (Masloboino-Zhir. Delo, 1932, No. 3, 47—50).—The oil had d 0·9234, n_D^{20} 76·8, acid val. 9·0, sap. val. 200·70, I val. 135·34. The oil with driers and pigments gave slow-drying films. CH. ABS.

Determination of the "foots" content in vegetable oils. J. JOLSON and V. IVANOVA (Masloboino-Zhir. Delo, 1932, No. 3, 31—35).—The amount of "foots"

depends on the temp. and time of keeping. Dilution with solvents accelerates the pptn. of the foots and affects its quantity. The oil is diluted with benzine (1 : 1) and the vol. of deposit is determined after 4 hr.
                                                   CH. ABS.

Quality of Japanese fish oils and the hardened oil industry. III. Quality of herring oils. 2. S. UENO, G. INAGAKI, and K. KOIZUMI (J. Soc. Chem. Ind., Japan, 1933, 36, 322—324 B; cf. B., 1928, 202).— The sap. vals. (181·5—190·6), Wijs I vals. (98·5—129 for herring oils from Hokkaido and Karafuto; 134— 167·8 for " small herring " oils from Hokkaido), and acid vals. (2·6—33·5) are listed for 40 samples. Reasonable figures are obtained for the Ac val. (4·4—10·5) by the Wizöff method if the acetylated oils are saponified soon after prep.
                                                   E. L.

High-pressure hydrogenation of fatty oils. IV. Production of solid unsaponifiable matters by means of pyrogenic hydrogenation of fatty acids. V. Production of solid unsaponifiable matters by high-temperature hydrogenation of fatty oils. Y. TANAKA, R. KOBAYASHI, and Y. FUKUSHIMA (J. Soc. Chem. Ind., Japan, 1933, 36, 311—312 B, 312—313 B; cf. B., 1932, 434; 1933, 274, 435).—IV. Working under pressure and using a $Ni(OH_2)_2$-$Cu(OH)_2$ catalyst with Japanese acid clay, normal hydrogenation is diminished at temp. $>$ 200°, owing to decomp. and secondary reactions. Thus palmitic acid treated at 300—400° yielded a product rich in unsaponifiable matter [mainly palmitone with hentriacontane (?)]; similarly, stearone and pentatriacontane were obtained from stearic acid.

V. The product obtained by such hydrogenation at 180—400° from soya-bean oil contained stearin, stearic acid, stearone (m.p. 84°), and pentatriacontane (m.p. 74·1°) in proportions depending on the temp. employed. The last two named appear at temp. $>$ 300° and are apparently derived by reduction of stearic acid, which is liberated together with glycerol at about 300°.
                                                   E. L.

Soap boiling. VI. Separation of nigre from neat soap. VII. Detection of the end-point. Y. KAWAKAMI (J. Soc. Chem. Ind., Japan, 1933, 36, 181—184 B, 184—187 B).—VI. The separation coeff. N of nigre is defined as $V/100a$, where V is the vol.-% of nigre after t hr. settling; by experiment, $(a-V)t = b$, where a and b are consts. which depend on the concn. of soap and electrolyte. For a const. degree of partial salting out, N increases (from 10—15% to about 50%) as the soap concn. is reduced from 60% to 45%; for const. soap concn. N increases with increase of the duration of salting out. Measurements of the viscosity of neat soap indicate that the separation of nigre practically stops below 70°; for effective separation the temp. of the neat soap should be $\not<$ 80°.

VII. By centrifugal separation very small changes of equilibrium can be detected; the vol. of neat soap determined by this means accords closely with the true vol. as measured after settling for 48 hr.   H. F. G.

Power laundry comparison of detergent efficiencies of alkaline soap builders. O. M. MORGAN (Canad. J. Res., 1933, 8, 583—591; cf. B., 1932, 418; 1933, 718).—The detergent efficiency of the following decreases in the order $NaOH > Na_2CO_3 >$ " modified " soda $> Na_2SiO_3 > Na_3PO_4$. Optimum p_H and quantity of soap vary with the soap builder. The above are easily washed out and do not weaken the fabric under the specified conditions.   D. R. D.

Properties of soap solutions. V. Power of soap solutions to remove oily dirt. B. TIUTIUNNIKOV, S. PLESCHKOVA, and A. TSCHERNITSCHKINA (Allgem. Oel- u. Fett-Ztg., 1933, 30, 294—296; cf. B., 1933, 274). —The detergent (oil-removing) power of soap solutions of 0·25—1% concn. has been measured; within this range: (1) soaps of rosin and naphthenic acids have no detergent power (although the solutions can suspend powders in the McBain C test), and reduce the washing action if added to solutions of ordinary (fatty) soaps; (2) the detergent action of soaps increases with the concn. of the solution; raised temp. improves the detergency of Na palmitate and stearate, but reduces that of soaps of rosin and the higher liquid fatty acids; (3) addition of Na_2CO_3 improves the washing power in the case of solutions of soaps of rosin and naphthenic acids and mixtures containing them, but reduces that of ordinary soap solutions (addition of Na_2CO_3 has a similar qual. effect on interfacial tension in all cases). Experiments indicate that the peptising action of oleic soap is an important, although not the only, factor in determining detergent power.   E. L.

Ageing of oil films.—See XIII.

Emulsion breakers.—See II. **Margarine emulsions.**—See XIX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Artificial drying oils, and the part played in them of cracking by-products. G. M. ZILBERMAN, S. V. JAKUBOVITSCH, A. A. BOLOTIN, and M. I. MICHEEVA (J. Chem. Ind. Russ., 1933, No. 4, 16—20).—Linseed oil (I) for paints can be replaced by a mixture containing 72·25% of the residue (chiefly highly unsaturated, polymerised hydrocarbons) from the distillation of cracking oil, 8·5% of slightly polymerised (I), 4·25% of fatty acids obtained by hydrolysis of (I), and 15% of driers. The films obtained using pigments based on this mixture are as resistant to heat, steam, H_2O, and light as are those obtained using (I) alone.   R. T.

Influence of driers on ageing of oil films. V. S. KISELEV and L. I. NORINA (J. Chem. Ind. Russ., 1933, No. 4, 22—27).—The induction period is shortened by salts of metals, the activity of which increases in the order Pb $<$ Ca $<$ Mn $<$ Co linoleate or resinate. The action of mixtures of these salts is considerably $>$ the sum of that of the individual constituents. The hardness, cohesion, and acid val. of the film of dried oil increases with its content of $COMe_2$-insol. substances (I), which attains a max. val. using Co drier; at the same time the elasticity and I val. fall to a min. In the case of baked films, the I val. and wt. fall rapidly, the elasticity, acid val., and O val. are low, and the hardness and content of (I) rise rapidly.   R. T.

Influence of anti-oxidants on ageing of oil films. V. S. KISELEV and V. E. CHATZET (J. Chem. Ind. Russ.,

1933, No. 3, 31—43).—A no. of org. compounds, when present in < certain min. concn. in drying oils, accelerate drying, and at higher concn. retard it to an extent depending on the concn. of the substance, and on its nature; the most active retardants (I) are pyrogallol (II) and quinol (III). The action of (I) is due to prolongation of the induction period, the chemical and physical properties of the film obtained after the expiration of this period being practically identical in the presence or absence of (I). The acid val., I val., and n of linseed oil remain unchanged after heating with various antioxidants, whilst viscosity is increased with (II) and α-$C_{10}H_7 \cdot NH_2$, and decreased by (III), m-$C_6H_4(NH_2)_2$, and $[CH_2 \cdot OH]_2$. R. T.

Evaporation and oxidation of coal-tar coatings. A. LÉAUTÉ (Compt. rend., 1933, **196**, 1729—1731).— When tar freed from H_2O and light oils was spread on metal plates and kept at 65—70° for 8 hr. and at 50° for a further 16 hr. during each day for 25 days the limiting losses were 34·5%, when a material as hard as that resulting from heating at 320° remained, whence it is concluded that this change is not due to oxidation. With 40% of coal dust as filler the loss was 27% (on wt. of tar only); with 40% of chalk it was intermediate. C. A. S.

Influence of moisture content on oil absorption of pigments. S. JAKUBOVITSCH and M. GOLDBERG (Farben-Ztg., 1933, **38**, 1160—1161).—As an arbitrary measure of oil absorption (I), a method involving gradual addition of pigment to oil is preferred to the normal reverse process. Pigments show a decrease in (I) with H_2O content, gradual in the case of ZnO and white lead, whilst with red oxides and ochres the decrease is negligible until a limiting H_2O content is reached (approx. 5% and 8% respectively), after which (I) decreases steadily. (I) was lower for raw than for boiled linseed oil. More thorough grinding is necessary in practice for damp pigments than for the same pigments subjected to air-drying, and further addition of grinding vehicle is useless in this connexion. S. S. W.

Non-metallic constituents of bright-gold [lustre]. I. A. NAKATSUCHI (J. Soc. Chem. Ind., Japan, 1933, **36**, 171 B; cf. B., 1931, 720).—A film of bright-gold lustre containing colophony exhibits grain growth and pin-holes when heated at 200°, whereas a copal lustre yields a flat film under these conditions. Damage to the film by H_2O may be obviated by using a suitable resin. A moderate quantity of C liberated by thermal decomp. of the resin improves the surface, but an excess causes darkening and graining. H. F. G.

Synthetic resinous products. A. E. WILLIAMS (Engineering, 1933, **136**, 131—133).—A brief review, particularly with regard to machinery.

Plastics: their use in dentistry. C. S. GIBSON. **Plastics: the phenolic type and their uses.** G. DRING. **Plastics and their genesis.** G. T. MORGAN (Chem. & Ind., 1933, 669—671, 671—675, 675—680).— Lectures delivered at the Plastics Exhibition, London.

Shellac. VII. Determination of acid value. H. WEINBERGER and W. H. GARDNER (Ind. Eng. Chem. [Anal.], 1933, **5**, 267—270; cf. B., 1933, 638).—The Albert method for determining the acid val. of resins is not applicable to shellac. The acid val. may be determined by titrating with 0·5N-KOH in EtOH, using thymol-blue as outside indicator. E. S. H.

Casein. Paper-coating pigments.—See V. **Lithopone.**—See VII. **Chlorinated rubber.**—See XIV.

PATENTS.

Planographic printing process. V. DIETZ, Assr. to MULTIGRAPH Co. (U.S.P. 1,892,875, 3.1.33. Appl., 1.8.30).—The image-bearing plate is wetted with a dil. aq. solution of NH_4NO_3 (1 pt.), $(NH_4)_3PO_4$ (4 pts.), and glycerin (I) (20 pts.), and dried; these compounds are also added to the printing ink. The inorg. salts attract (I) from the ink to the plate and also break down any (I)-oil emulsion in the ink. As the (I) is ink-resisting, adherence of ink to non-printing areas is prevented. S. M.

Modifying the characteristics of pigments. H. A. GARDNER (U.S.P. 1,894,168, 10.1.33. Appl., 22.1.31).— The surface of pigment particles (particularly Ti pigments) is coated with β-elæostearin, e.g., by admixture of a solution of the latter in a suitable volatile org. solvent, e.g., $COMe_2$, and removing the solvent from the thoroughly wetted pigment. Reduced "chalking," settling, and susceptibility to H_2O are claimed. S. S. W.

Varnish and paint oil manufacture. M. B. CHITTICK, Assr. to PURE OIL Co. (U.S.P. 1,891,079, 13.12.32. Appl., 2.7.30).—4 pts. by wt. of drying or semi-drying oil, e.g., linseed, tung, are heated for 1 hr. at 150—260° with 6 pts. by wt. of "reduced hydrocarbon polymerides" (obtained by catalytic action from the unsaturated hydrocarbon residues from petrol etc. obtained by high-temp. operations), the mixture is cooled to 95°, and 1 pt. of japan drier and 0·5 pt. of turpentine or naphtha are added. Natural and/or synthetic resins may also be incorporated. S. S. W.

Coating composition. C. E. BURKE, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,890,769, 13.12.32. Appl., 28.1.30).—Compositions of cellulose nitrate and alkyl ethers of pentaerythritol are claimed. S. S. W.

Wrinkled-finish coating. T. F. BRADLEY, Assr. to AMER. CYANAMID Co. (U.S.P. 1,893,611, 10.1.33. Appl., 20.2.31).—Synthetic resins of the phthalic anhydride-glycerol–linseed oil fatty acids type, dissolved in substantial proportions of highly volatile solvents, e.g., C_6H_6, PhMe, and mixtures thereof with volatile petroleum hydrocarbons, to which driers may be added, are claimed as "wrinkle finishes." S. S. W.

Coating composition [for leather]. F. B. MORTON, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,894,050, 10.1.33. Appl., 27.6.28).—HCO_2H, lactic or other org. acid is added to a nitrocellulose lacquer which contains neatsfoot or other adherent oil. S. M.

(A) **Finish-removing composition adapted to remove nitrocellulose coatings.** (B) **Paint, varnish, and lacquer remover.** C. ELLIS, Assr. to CHADELOID CHEM. Co. (U.S.P. 1,884,632—3, 25.10.32. Appl., [A] 1.9.27, [B] 12.10.28).—(A) The composition comprises a lacquer solvent and wax precipitant (e.g., org. acetates, ketones, alcohols) in major proportion,

✢ 1·5% of wax and an alkali compound of higher fatty acids as protective colloid, and > 20% of wax solvent (e.g., benzol or petroleum hydrocarbon), all the solvents boiling at ✢ 60°. In (b) PhCl is used as the wax solvent and nitrocellulose as the protective colloid.   B. M. V.

Composition for removing surface finishes. D. F. Othmer, Assr. to Eastman Kodak Co. (U.S.P. 1,884,164, 25.10.32. Appl., 10.6.30).—The solvent comprises $\beta\beta'$-$(C_2H_4Cl)_2O$ 4, $COMe_2$ 5, MeOH 5, benzol 2 pts.   B. M. V.

Refining of rosin. I. W. Humphrey, Assr. to Hercules Powder Co. (U.S.P. 1,890,086, 6.12.32. Appl., 28.2.30. Renewed 26.5.31).—Visible and latent colour bodies (I) are removed by agitating a solution of the rosin in gasoline or pinene with a liquid, e.g., an alcohol, aliphatic ester, glycol, etc., which is immiscible with the rosin solvent and in which (I) are selectively sol. Separation of the 2 layers is usually promoted by cooling the mixture.   S. M.

Rosin size. W. H. Harding and S. V. Burrows, Assrs. to Kalbfleisch Corp. (U.S.P. 1,890,462, 13.12.32. Appl., 17.3.31).—A rosin size of free rosin content > 22% (determined by titration) is emulsified hot with a caustic alkali solution, giving a size of low free rosin content, for which advantages in cheapness and hardness of finished paper are claimed.   S. S. W.

Manganese resinate. P. S. Miller, Assr. to Gen- Electric Co. (U.S.P. 1,894,113, 10.1.33. Appl., 20.6.29). —148 lb. of rosin (preferably F grade) are melted and raised to 250° during 40 min., 9 lb. of dry MnO_2 are sifted in during ½ hr., and the temp. is slowly raised to 300°. The melt is stirred for 5 min. and the temp. then held at 310—315° until reaction is complete (40—60 min.), when the melt is rapidly cooled, e.g., by pouring into a shallow pan. A rosinate, sol. in mineral oil and containing 4·5—5% Mn, is obtained.   S. S. W.

Manufacture of phenol–aldehyde condensation products. J. J. Kessler, Assr. to Apple Electrical Manufg. Co. (U.S.P. 1,889,751, 6.12.32. Appl., 24.9.28). —Substitution of a portion of the usual mono- by a poly-hydric phenol, e.g., resorcinol, reduces the time of the moulding reaction, the evolution of gases, excess of aldehyde in, and sticking and staining of, the aldehyde condensation product.   S. M.

Manufacture of phenolic condensation products. H. M. Dent, Assr. to Gen. Plastics, Inc. (U.S.P. 1,894,088, 10.1.33. Appl., 15.2.29).—Crude phenolic material is caused to react with excess of CH_2O in the presence of a non-volatile alkaline catalyst, e.g., CaO, and the reaction is stopped by neutralising the alkali, e.g., with H_2SO_4, forming an insol. compound that disperses through the mass as a filler; aq. NH_3 is subsequently added to combine with free CH_2O, or, alternatively, neutralisation is brought about by means of an NH_4 salt, e.g., the sulphate.   S. S. W.

Purifying phenol–aldehyde condensation products. F. Seebach, Assr. to Bakelite Ges.m.b.H. (U.S.P. 1,891,455, 20.12.32. Appl., 3.5.29. Ger., 5.5.28).—Free phenol and by-products are removed by distilling the resin in vac., or with a current of gas, above 140° in the presence of a high-boiling org. substance

which is miscible with the resin at high temp., e.g., glycerol, ethylene glycol, etc.   S. M.

Moulding of phenol–formaldehyde condensation products. Imperial Chem. Industries, Ltd., and W. J. S. Naunton (B.P. 395,023, 8.1.32).—The resin, filler, and pigment are heated until the "resole" constituent becomes fluid (about 100°), extruded under pressure, crushed if desired, heated to a higher temp., and then moulded. By arranging the extruding powder in differently coloured layers, variegated surface effects are obtained.   S. M.

Manufacture of urea–formaldehyde condensation product. L. Smidth (U.S.P. 1,893,911, 10.1.33. Appl., 24.12.27).—1 mol. wt. of urea (I) is boiled in formalin containing 2 mol. wts. of CH_2O and having $p_H > 4$; the dimethylolurea thus formed condenses after further boiling and liberates CH_2O, for every 2 mols. of which ✢ 1 more mol. of (I) is added and the boiling continued. As much as 1·3 mols. of (I) can thus be made to react with 2 mols. of CH_2O. The H_2O is distilled off and hardening accelerated by addition of acid.   S. M.

Polyhydric alcohol–polybasic acid resin. T. F. Bradley, Assr. to Amer. Cyanamid Co. (U.S.P. 1,890,668, 13.12.32. Appl., 16.12.29).—The reaction product of a polybasic acid, e.g., phthalic anhydride, and a simple dihydric alcohol, e.g., propylene glycol, devoid of monobasic acid, is sol. in PhMe and lacquer solvent mixtures of high PhMe content, and is compatible with nitrocellulose.   S. S. W.

Rapid-drying [glyptal] synthetic resins. C. Ellis, Assr. to Ellis–Foster Co. (U.S.P. 1,892,425, 27.12.32. Appl., 12.3.30).—A glyptal resin which has been modified with stearic or other saturated or unsaturated acid is extracted with a solvent which will remove the slow-drying constituents, e.g., petroleum naphtha.   S. M.

Manufacture of [modified glyptal] resinous condensation products. (a, b) R. H. Kienle, (c) L. V. Adams, Assrs. to Gen. Electric Co. (U.S.P. 1,889,923 and 1,893,873—4, [a] 6.12.32, [b, c] 10.1.33. Appl., [a] 27.7.28. Renewed 4.11.30, [b] 29.1.27, [c] 25.6.26). —A glycerol–phthalic anhydride resin is heated to 200° with (c) a drying or non-drying oil in a solvent or dispersing agent which is subsequently distilled off, or (b) an oxidising, unsaturated acid. (a) The glycerol may be heated with all or part of the oil before being made to react with the phthalic anhydride. The products are heat-convertible.   S. M.

Manufacture of ester resin product. T. F. Bradley, Assr. to Ellis–Foster Co. (U.S.P. 1,893,982, 10.1.33. Appl., 18.8.27).—A light-coloured, esterified rosin having low acid val. is pulverised and heated in thin layers for several days in air at 50—80°. The softening point and solubility in some solvents gradually increase.   S. M.

Manufacture of (a) non-crystalline, highly chlorinated, (b) clear, transparent, chlorinated diaryl resins, (c) diphenyl resin. R. L. Jenkins and (b, c) J. A. Sikarski, Assrs. to Swann Research, Inc. (U.S.P. 1,892,398—1,892,400, 27.12.32. Appl., [a] 28.9.29, [b] 27.9.29, [c] 23.4.30).—(a) Cl_2 is passed into a molten

mixture, contained in an Fe vessel, of Ph_2 and varying proportions of the high-boiling (270—400°) by-product (I) which is produced during the formation of Ph_2 from C_6H_6 or benzol. The softening point of the product (50—125°) increases with its Cl content (60—69%) and with the proportion of (I). (B) 0·04% of I is added as catalyst and a glass vessel is used. (c) The dark, chlorinated product obtained with Fe as catalyst is distilled to give colourless or light yellow, clear resins. With large Cl absorptions cryst. substances are formed. S. M.

Manufacture of [mouldable] artificial masses. Röhm & Haas A.-G. (B.P. 395,291, 20.2.33. Ger., 24.2.32).—Solutions or films of polymerides of acrylic acid, its esters or homologues are treated with Cl_2 in the presence of light or a catalyst; the softening point and resistance to solvents are thereby gradually increased and the mechanical properties improved. S. M.

Cellulose derivative compositions. E. F. Hitch and M. A. Dahlen, Assrs. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,893,283—4, 3.1.33. Appl., 28.11.31).—The use of o- and p-alkoxydiphenyls and alkyl ethers of o- and p-cyclohexylphenol is claimed as plasticisers for cellulose nitrate, acetate, etc. Methods of prep. are described. S. M.

Colouring of cellulose plastics. E. J. Bowley, Assr. to Rubber & Celluloid Products Co. (U.S.P. 1,891,520, 20.12.32. Appl., 12.3.30).—Articles consisting of celluloid, cellulose acetate, benzylcellulose, etc. plastics are coloured in shades resistant to abrasion and without loss of lustre by steeping for 5—15 sec. in a solution of an oil-sol. (anthraquinone) dye in an org. ester solvent, e.g., BuOAc or the (mono) Me, Et, or Bu ether of $[\cdot CH_2\cdot OH]_2$. A. J. H.

[Nitrocellulose] floor covering. J. H. Rile, Assr. to Hercules Powder Co. (U.S.P. 1,890,128, 6.12.32. Appl., 3.4.28).—30—70% of Et (or other alkyl) abietate (calc. on wt. of nitrocellulose) is used as plasticiser instead of castor and linseed oils, which rancidify slowly. S. M.

Manufacture of heat-plastic composition. H. L. Fisher, Assr. to B. F. Goodrich Co. (U.S.P. 1,890,903, 13.12.32. Appl., 28.12.26).—Rubber derivatives containing Cl are caused to react with compounds of the type RX (where R = aryl, X = NH_2 or OH), e.g., phenols, NH_2Ph, etc., in the presence of catalysts, e.g., $AlCl_3$, $ZnCl_2$, $FeCl_3$, $SnCl_4$, until a substantial part of the Cl is displaced. S. S. W.

Manufacture of [rubber] plastic composition. W. L. Semon, Assr. to B. F. Goodrich Co. (U.S.P. 1,892,167, 27.12.32. Appl., 12.4.28. Renewed 19.5.32). —Ester gum (10 pts.) is heated with vulcanised rubber (4—15 pts.) for 6 hr. in an autoclave at 175°. The product is sol. in mixed common solvents, and fillers may be incorporated. S. M.

Manufacture of plastic [caoutchouc-like] substances. J. C. Patrick (U.S.P. 1,890,191, 6.12.32. Appl., 18.5.31. Can., 28.5.28).—Ethylene and propylene dichlorides (and other compounds in which a C_nH_{2n} group is attached to negative radicals) react with aq. solutions of alkaline polysulphides (I) to yield plastic materials the hardness of which increases with decreasing S content of (I). The product contains 70—84% S. S. M.

Manufacture of [rubber–resin] plastic compositions. Brit. Thomson-Houston Co., Ltd., Assees. of H. L. Grupe and R. H. Kienle (B.P. 395,217, 26.10.32. U.S., 27.10.31).—In order to render rubber available for plastic compositions which are resistant to hydrocarbons etc., the latex is thoroughly mixed with a solution of a glyptal resin in 5% aq. NH_3, AcOH is added, the ppt. washed with H_2O, dried, and finally vulcanised. Rubber dispersions and glyptal resins which have been modified with drying oils or org. acids may also be employed. S. M.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Dispersion of rubber in gasoline. T. Fujiwara and T. Noguchi (J. Soc. Chem. Ind., Japan, 1933, 36, 237—240 B).—Fractions rich in aromatic or naphthene hydrocarbons have greater dispersing power than paraffins. Structure viscosities in various gasoline fractions were measured and the degree of aggregation and relative vols. of the disperse phases were calc. A. A. L.

Chlorinated rubber and its [use for] varnish. K. Kojima and Y. Toyabe (J. Soc. Chem. Ind., Japan, 1933, 36, 236—237 B).—Chlorinated rubber is resistant to various corrosive substances. The solubility boundaries in mixed solvents are recorded. It is recommended as a basis for an anticorrosive varnish. A. A. L.

T-50 test for state of cure [of rubber]. W. A. Gibbons, R. H. Gerke, and H. C. Tingey (Ind. Eng. Chem. [Anal.], 1933, 5, 279—283).—The test is based on the fact that the greater is the state of cure of rubber, the lower is the temp. at which chilled, stretched rubber spontaneously retracts. E. S. H.

Microscopical examination of rubber and other solid technical products. F. H. Roninger, jun. (Ind. Eng. Chem. [Anal.], 1933, 5, 251—253).—The prep. of sections is described. The determination of degree of dispersion of pigments in rubber by the microscopical method is illustrated. E. S. H.

PATENTS.

Production of compositions containing derivatives of balata resins or gutta or similar resins. Dunlop Rubber Co., Ltd., D. F. Twiss, F. A. Jones, and J. H. Anderson (B.P. 395,430, 3.2.32).—Resins from natural balata, gutta-percha, etc. are converted into adhesive compositions suitable for bonding rubber to surfaces such as metals by the action of condensing agents, e.g., H_2SO_4, sulphonic acids, $SnCl_4$, or H_3PO_4, in the presence of a reactive polymerised or polymerisable unsaturated hydrocarbon such as rubber. A temp. 100—150° is suitable as also are 5—30% of hydrocarbon and $3\frac{1}{2}$% of condensing agent on the mixture. D. F. T.

Plastic compositions. Caoutchouc-like substances.—See XIII.

British Chemical Abstracts—B.

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XV.—LEATHER ; GLUE.

Boric acid and borax in the leather industry. E. Vigezzi (Boll. Uff. Staz. Sperim. Ind. Pelli, 1933, **11**, 371—381).—The use of H_3BO_3 and borax in many of the stages of leather manufacture is advocated. H_3BO_3 is antiseptic, and has no corrosive action on hides or leather. Borax can be used both for neutralising tan liquors and for H_2O-softening. As a denaturant in salting hides, borax is free from the tendency shown by $K_2Cr_2O_7$ or $CuSO_4$ to spot or damage the fibres. In the softening bath preparatory to depilation, $0·05$—$0·1\%$ borax effectually prevents bacterial action, and renders the epidermis readily susceptible to the depilatory. For deliming, H_3BO_3, on account of its sol. Ca salt, is both the safest and cheapest acid to employ, 3% H_3BO_3 on wt. of hide removing 90% of total Ca, and, unlike other acids, produces a soft grain without undue swelling. Borax has also distinct advantage over other salts for neutralising vegetable tannin baths and chrome tan liquors, prep. of tanned leather for currying, and washing leather preparatory to semi-chrome tanning ; when used in the last-named process it renders the leather almost white. It is used as a mordant in leather dyeing. In leather finishing, H_3BO_3 has the advantage over lactic acid in being free from Fe and other undesirable impurities, whilst borax facilitates the lixiviation of tannins from tan barks, inhibits their fermentation in tan liquors, and reduces their astringent action on hides. Finally, H_3BO_3 acts as a preservative for egg-yolk in tawing preps.　　　　　　　　　　　　R. N. C.

Patents.

Tawing, dehydrating, and astringent product. H. O. Nolan, Assr. to C. Ellis (U.S.P. 1,891,440, 20.12.32. Appl., 24.2.26).—A mixture of $AlCl_3$, $Al(OAc)_3$, H_2O, and EtOH is claimed.　　　　　　D. W.

Tanning leather. C. Kannel (U.S.P. 1,893,706, 10.1.33. Appl., 17.4.30).—Hides are tanned in a drum provided with a large no. of wooden pegs 8—12 in. long mounted in the shelves therein. The drum is rotated at 6 r.p.m. and partly evacuated through the hollow axle.　　　　　　　　　　D. W.

Tanning of hides. G. V. Wrange, Assr. to Aktieb. Friberg's Hogvacuumpump (U.S.P. 1,887,972, 15.11.32. Appl., 4.3.31. Swed., 11.3.30).—The hides are placed in a heated tank which is subsequently evacuated. Tan liquors are circulated through the tank and the vapours withdrawn by the evacuation are condensed and returned to the liquor.　　　D. W.

Shoe-stiffener material. F. O. Woodruff, Assr. to H. H. Beckwith (U.S.P. 1,893,923, 10.1.33. Appl., 12.8.31).—Chrome-tanned leather scrap or other material consisting of animal fibres is reduced to pulp, formed into a continuous sheet, treated with dil. aq. NH_3, and dried.　　　　　　　　　D. W.

Glue and method for making plywood. H. V. Dunham (U.S.P. 1,892,486, 27.12.32. Appl., 24.9.29). —Dried blood albumin, casein, a highly proteinous seed meal, e.g., soya-bean meal, an alkali, an alkaline earth, and H_2O are mixed together with or without the addition of sawdust and used in making plywood.　　　　　　　　　　　　　D. W.

Adhesive. I. F. Laucks and G. Davidson, Assrs. to I. F. Laucks, Inc. (U.S.P. 1,883,989, 25.10.32. Appl., 10.9.28. Cf. U.S.P. 1,689,732 ; B., 1929, 141). —Vegetable protein-containing material, e.g., soya-bean flour, is treated with an alkaline medium and $Na_2Cr_2O_7$.　　　　　　　　　　　　　D. W.

Colloid sheets.—See V. **Coating leather.**— See XIII.

XVI.—AGRICULTURE.

Chemical nature and origin of humus. III. Base-exchange capacity of " synthesised humus " (ligno-protein) and of ." natural humus " complexes. IV. Fixation of proteins by lignins and formation of complexes resistant to microbial decomposition. S. A. Waksman and K. R. N. Iyer (Soil Sci., 1933, **36**, 57—67, 69—82 ; cf. B., 1932, 853). —III. The base exchange capacity (I) of artificial ligno-proteins is $>$ that of free lignin (II), and increases with the protein (III) content. It is influenced by the base used in preparing the complex, the Ca'' complex having the highest and the Al''' complex the lowest (I). Natural humus preps. from soil or peat show distinctive differences in (I). The (I) of a (II)–gliadin complex is approx. 7 times that of the constituents. The loss of (I) following drying of (II)–(III) complexes is relatively small.

IV. The formation of (II)–(III) complexes is not an instantaneous reaction but is a gradual process and is influenced by drying, temp., reaction, and the presence of bases. The products contain (II) and (III) in varying proportions and their resistance to microbiological decomp. is inversely related to the content of (III). In soil humus the complexes are intimately associated with org. and inorg. substances, notably hemicelluloses and Al silicates, and contain P and S as integral parts of the complex. Certain elements, e.g., Ca, Mg, K, and, in part, Al and Fe, form definite compounds, and others, e.g., Si, form absorption compounds with the complex. Factors influencing the decomp. of (III) complexes of humus in soil are examined.　　　　　　　　A. G. P.

Volumetric determination of humus in soils. N. A. Komarova (Proc. Leningrad Dept. Inst. Fert., 1933, **17**, 29—44).—Humus is oxidised by $0·4N$-CrO_3 in dil. H_2SO_4 $(1:1)$ using $HgSO_4$ as catalyst, the mixture being kept at 140—180° for 5 min. After cooling, dilution, and addition of H_3PO_4, the solution is titrated with standard $Fe(NH_4)_2(SO_4)_2$ containing H_2SO_4, $NHPh_2$ being used as indicator. Modifications of the method for the determination of humus in aq., aq.-NH_3, and alkali extracts are given. The results agree well with those obtained by Knop's method.　　A. M.

Gas-volumetric determination of potassium in soils. V. M. Gortikov and L. A. Znamenskaya (Proc. Leningrad Dept. Inst. Fert., 1933, **17**, 57—68). —If the conditions of pptn. (temp., vol., and concn.) are similar for both unknown and standard KCl, the method of Jander and Faber (A., 1928, 980 ; 1929, 1030) is rapid and sufficiently accurate for the determination of K in most soil extracts.　　　　A. M.

Kappen's method for determination of the sum of adsorbed bases (S) [in soils]. G. A. Weiss (Proc.

Leningrad Dept. Inst. Fert., 1933, **17**, 89—100).—The accuracy of the method could not be increased. The soil-acid mixture is better set side for 2—3 days. The original method gives good agreement between the S val. and the sum of bases determined by the acetate or the NH_4Cl methods on account of compensating errors. A. M.

Application of electrofiltration, electrodialysis, and electrolysis to soil analysis. I. I. N. ANTIPOV-KARATAIEV and K. N. KRASIKOV (Trans. Dokuchaiev Soil Inst., 1933, **8**, No. 8, 5—22).—Adsorbed Ca and Mg are removed completely by electrofiltration (I), Mg being removed to a greater extent than by the acetate method (II). The amounts of K and Na were 2—3 times those of (II). This is due to the destruction of part of the soil mass. Electrodialysis gives results similar to those obtained by (I) whereas electrolysis gives results for Ca + Mg which are generally $<$ those obtained by (II). A. M.

Titanometric determination of ferric iron in presence of humic matter. P. A. KRIUKOV (Proc. Leningrad Dept. Inst. Fert., 1933, **17**, 9—19).—Titration with $Ti_2(SO_4)_3$ may be carried out electrometrically, or with NH_4CNS as indicator, in a current of CO_2. Even significant quantities of humus have no serious effect on results. The presence of NH_4CNS is necessary in H_2SO_4 extracts and is desirable in other cases. An electrolytic method of preparing $Ti_2(SO_4)_3$ from $Ti(SO_4)_2$ is described. A. M.

Alkalinity and dispersion in solonchak soils. S. Y. SUSHKO and E. F. DIMITRIEVA (Proc. Leningrad Dept. Inst. Fert., 1933, **17**, 191—208).—These soils are divided into three groups : (1) sulphate, (2) sulphate-chloride, and (3) chloride. In (1) leaching is rapid because of the presence of $CaSO_4$ which prevents the entry of Na into the adsorption complex. In (3) $CaSO_4$ is present in very small amounts, or is absent, and Na enters the adsorption complex, thus increasing the dispersion and retarding leaching. In (2) increase in dispersion depends on whether SO_4'' or Cl' predominates, and on the amount of $CaSO_4$ present. The presence of $MgSO_4$ or $MgCO_3$ in saline soils increases their alkalinity. The determination of alkalinity should be made only after all the easily sol. salts have been removed by leaching. A. M.

Phosphate availability in alkaline calcareous soils. W. T. McGEORGE (J. Amer. Soc. Agron., 1933, **25**, 351—360).—Results obtained by Spurway's (H_2O-sol.) and Truog's methods agreed fairly well with results of fertiliser trials. The Illinois test failed to differentiate P-deficient soils of this type. Closer attention to methods of extraction is recommended. A. G. P.

Influence of various applications of lime on the solubility of the phosphates of acid soils. O. ENGELS (Z. Pflanz. Düng., 1933, **30**, A, 312—319).—The significance of soil reaction in the determination of root-sol. PO_4''' (Neubauer) in soils is discussed. Experimental data confirm the larger intake of P by seedlings from acid soils as a result of liming. A. G. P.

Effect of depth of placement on the availability of superphosphate in calcareous soils. R. D. HOCKENSMITH, R. GARDNER, and A. KEZER (Soil Sci., 1933, **36**, 35—39).—The amount of PO_4''' leached from calcareous soils treated with superphosphate was very small. Yields of lucerne were sufficiently affected by depth of placement of the fertiliser to explain cases of failure to secure economic returns in these soils. A. G. P.

Effect of inorganic constituents of soil solution on the growth of *Azotobacter*. K. KONISHI and T. TSUGE (J. Agric. Chem. Soc., Japan, 1933, **9**, 129—144).—Soil solution, particularly of rich soil, increased N fixation. The soil solutions contained Fe, Mg, Ca, Al, Mn, Si, Na, Ti, Ba, Sr, Li, Cr, V, Zn, and Ni. Rich soils are usually rich in V, and V salts, when added to *Azotobacter*, gave good results. CH. ABS.

Use of less common elements as soil amendments for sugar-cane production in southern Florida. R. V. ALLISON (Proc. IV Cong. Int. Soc. Sugar Cane Tech., 1932, Bull. No. 112).—Cu is necessary on the raw fibrous saw-grass soils ; Mn is necessary on Everglades soil only when these org. soils contain excessive amounts of CaO. CH. ABS.

Experiments with commercial nitrogenous fertilisers on apple orchards. J. D. HARLAN and R. C. COLLISON (New York [Geneva] Agric. Exp. Sta. Bull., 1933, No. 623, 36 pp.).—Spring applications of N to grass orchards produced larger yields than summer applications. Excessive applications produced correspondingly increased yields but the colour of the fruit was poor. On light soils readily available N is preferable. On heavier or highly org. soils $CaCN_2$ and urea were satisfactory. A. G. P.

Action of certain substances on the growth of bast fibres. F. TOBLER (Jahrb. wiss. Bot., 1933, **78**, 295—317).—Cell wall formation in bast fibres of a no. of plants is favoured by the presence of K. K Mg sulphate produces thickened walls but cells of smaller circumference. With K fertilisers containing Cl' there is a tendency to increase the size of the cells, the Cl' effect exceeding or supplementing that of K. A. G. P.

Magnesium ammonium phosphate as fertiliser. A. SOKOLOV (J. Chem. Ind. Russ., 1933, No. 4, 62—64).—Better growth of various plants is obtained by manuring with a mixture of $MgNH_4PO_4,6H_2O$ and $(NH_4)_2SO_4$ than using the ordinary artificial fertilisers. R. T.

German oil [soya] beans. B. HEINZE (Ernähr. Pflanze, 1933, **29**, 225—230).—Fertiliser trials with acclimatised brown, yellow, and black varieties are recorded. In general, K facilitates seed production and improves the size of the beans, whereas P promotes leaf formation and increases the growth of the whole plant. A. G. P.

Influence of colloidal substances on the growth of some cultivated plants. B. NIKLEWSKI (Jahrb. wiss. Bot., 1933, **78**, 431—482).—Addition of colloidal sols or fine suspensions (clay, humus, and manure extracts) to culture media induces more luxuriant growth of, and greater nutrient intake by, a no. of plants. Relationships between this stimulatory effect and changes in the reaction of the medium and in the permeability of root cells are examined. A. G. P.

Employment of a mixture of sand and calcium bentonite as the growth medium in pot culture and the establishment therein of a sward of perennial rye grass. A. W. GREENHILL and H. J. PAGE (J. Agric. Sci., 1933, 23, 329—334).—A mixture containing 6% of bentonite (subsequently converted into the Ca salt) has an appropriate H_2O-retaining capacity and buffer action for a culture medium, is almost entirely deficient in N and P, and markedly deficient in K.   A. G. P.

Effect of potash on starch in potatoes. G. V. C. HOUGHLAND and J. A. SCHRICKER (J. Amer. Soc. Agron., 1933, 25, 334—340).—Applications of K fertilisers did not increase the % of starch in potatoes and in many cases produced a depression which was more evident with KCl than with K_2SO_4. The % of dry matter was also reduced by K treatment, with a resulting increase in the starch : H_2O ratio in most instances. This ratio was increased when KCl was substituted for K_2SO_4.   A. G. P.

Composition and distribution of phosphate rock with special reference to the United States. K. D. JACOB, W. L. HILL, H. L. MARSHALL, and D. S. REYNOLDS (U.S. Dept. Agric. Tech. Bull., 1933, No. 364, 89 pp.).—Analytical data for numerous samples are given. Continental deposits usually contain 3—4% more F than insular deposits. The $F : H_3PO_4$ ratio is approx. const. for a definite type of deposit. The F in fossil bones and phosphate rock is probably derived from contact with F-bearing H_2O and a general relationship between F content and geological age is indicated. Org. matter present in rock deposits contains much N and S and the ash is rich in Fe. Characteristic proportions of the minor constituents of various deposits are recorded. Mechanical analysis of ground rock samples shows a concn. of P, F, and Ca in the " sand " and " silt " fractions and of Al and Si in the " clay." Phosphate rock contains insignificant proportions of P sol. in neutral NH_4 citrate. < 30% of the total P is sol. in 2% citric acid solution. The solubility in both cases increases with the fineness of subdivision of the sample. Fluorapatite in submicrocryst. condition is the principal constituent of continental deposits, and hydroxyfluorapatite occurs in insular deposits.   A. G. P.

Organo-mineral manures from peat. S. S. DRAGUNOV (Z. Pflanz. Düng., 1933, 30, A, 199—208).— The nature of, and N distribution in, a no. of peat preps. are discussed.   A. G. P.

Determination of equivalent acidity and basicity of fertilisers. W. H. PIERRE (Ind. Eng. Chem. [Anal.], 1933, 5, 229—234).—The fertiliser is ignited with Na_2CO_3 to destroy org. matter and volatilise N compounds, whilst sulphates, chlorides, and phosphates are retained. A measured amount of dil. HCl is added to the residue and the solution boiled for 10 min. Excess of acid is then titrated with N-NaOH and Me-red. Results for several fertilisers are given. The acidity of many mixed fertilisers can be neutralised by using $CaCO_3$ as a filler in place of sand.   E. S. H.

Fire hazards in the use of oxidising agents as herbicides. W. H. COOK (Canad. J. Res., 1933, 8,

509—544).—The inflammability of filter-paper and duck cloth treated with various oxidising agents which are used as weed killers has been examined with a view of obtaining mixtures of herbicidal val. without incurring the risk of fire. Material containing > 10% $NaClO_3$ (I) is inflammable when the humidity is < 75%. Admixture of a sufficient amount of a deliquescent compound, such as 2 parts of $CaCl_2$ or 1 part of $MgCl_2$ to 2 parts of (I), renders the material safe but reduces the herbicidal power. Na_2CO_3, NaOH, K Al alum, NH_4 Cr alum, $Cr(NO_3)_3$, $CuSO_4$, $FeCl_3$, $AlCl_3$, $Na_2B_4O_7$, Na_2SnO_3, Na_2HPO_4, $(NH_4)_2HPO_4$, $ZnCl_2$, $ZnSO_4$, As_2O_3, Na_2HAsO_3, Na_2HAsO_4, and NH_4CNS either do not reduce inflammability, or cause decomp. of (I). $Ba(ClO_3)_2,H_2O$ (II) and $Ca(ClO_3)_2,2H_2O$ are safer than (I), but there is still some risk of fire. Addition of 1 part of $MgCl_2$ or $CaCl_2$ to 2 parts of (II) renders it safe. $Na_2Cr_2O_7$ (III) is safer than chlorates, and addition of 10% of $MgCl_2$ or $CaCl_2$ renders it safe under all ordinary conditions. Mixtures of (I) and (III) with org. material are extremely combustible.   D. R. D.

Weed destruction by chemicals. ANON. (Nature, 1933, 132, 122—123).—The elimination of weeds by dil. H_2SO_4 in the cultivation of cereals is described.   L. S. T.

Chloropicrin injurious to greenhouse plants. G. H. GODFREY (Science, 1933, 77, 583).—Small amounts of chloropicrin (approx. 20 p.p.m.) cause severe injury to tobacco, strawberry, and other plants.   L. S. T.

Contact sprays for the Japanese beetle. W. E. FLEMING (U.S. Dept. Agric. Circ., 1933, No. 280, 4 pp.). —Contact sprays (I), e.g., pyrethrum–soap, are of limited application only. Beetles may be conc. on unimportant foliage by spraying with geraniol emulsions as attractants prior to the application of (I).   A. G. P.

Codling moth control. Sugar-beet leaves. Hay. —See XIX.

PATENTS.

Insecticides. STANDARD OIL DEVELOPMENT Co, Assees. of N. A. SANKOWSKY and S. C. FULTON (B.P. 394,977, 4.1.32. U.S., 5.1.31).—The products comprise solutions of pyrethrum, derris, or cubé extract in oil mixtures (A) boiling within the range 177—316° and containing > 15% of aromatic hydrocarbons together with naphthenic and unsaturated hydrocarbons ; A may be prepared, e.g., by extracting kerosene with liquid SO_2.   L. A. C.

Making arsenical insecticides. J. F. BLYTH and C. ELLIS, Assrs. to CHADELOID CHEM. Co. (U.S.P. 1,884,542, 25.10.32. Appl., 24.10.27).—CaO or other calcareous material, H_2O, and As_2O_3 are mixed to a pasty condition, and then more CaO is added to dryness. The total CaO should be > sufficient to form $Ca_3As_2O_6$; the cheap, finely-divided form of As_2O_3 may be used. Sol. As should be < 1%, preferably < 0.5%.   B. M. V.

XVII.—SUGARS ; STARCHES ; GUMS.

Dry cossettes stored for a long period. V. STRUTUINSKI (Nauk. Zapiski Tzuk. Prom., 1932, 24, 123—140).—During the first period the H_2O content

increased from $3 \cdot 2$ to 6% in spite of rising temp. and const. R.H. ; by the end of December it reached $8 \cdot 2\%$. During 13 months the sucrose decreased by 1% and reducing substances increased by $0 \cdot 5\%$. For cossettes containing 14% H_2O variations were $>$ for those containing 6% H_2O. Greatest deterioration occurs in the surface layer. Ch. Abs.

Storing sugar beets in field piles. K. M. Fridman and L. Tverdokhlebov (Nauk. Zapiski Tzuk. Prom., 1932, **24**, 65—83).—Unripe sugar beets from early digging should not remain in field piles for > 2—3 days ; they should be covered with 5—10 cm. of earth. The loss of sugar in 70 days is $\not>$ in silos. Ch. Abs.

Biochemical processes in the sugar beet during storage. A. I. Oparin, N. N. Dyachkov, I. V. Glazunov, and T. M. Ivanova (J. Sugar Ind., Russia, 1931, **5**, 393—401).—At const. temp., humidity, and aëration the rate of evolution of CO_2 is const., but the quantity of sucrose (I) which disappears increases with the time of storage. In absence of O_2, CO_2 is evolved regularly during the entire period of storage ; the amount of gas evolved is reduced to 33%, but there is a marked decrease in (I). Gradual wilting has no influence on respiration. The drier is the air, the smaller is the loss of (I) due to respiration of sterile beets. Storage in an atm. containing 1% C_2H_4 resulted in increased loss of (I) ; this was greatly increased by Et_2O vapour. Ch. Abs.

Beet marc. E. Valle (Ind. Sacc. Ital., 1933, No. 11 ; Bull. Assoc. Chim. Sucr., 1933, **50**, 180—189).—A summary of Kopecky's recent paper (B., 1932, 125) with some criticisms. J. H. L.

Recommendations for use of a 26·026-gram normal weight for Ventzke scale saccharimeters. C. A. Browne and R. T. Balch (Ind. Eng. Chem. [Anal.], 1933, **5**, 283).—Brass weights are described, the stems of which can be unscrewed, so that by inserting a small thread of wire in the interior cavity any slight loss due to abrasion can be corr. E. S. H.

Analysis of sugar mixtures. W. Braun and B. Bleyer (Woch. Brau., 1933, **50**, 142—143).—The method of calculation recommended by Laster (B., 1933, 279) is due to Kjeldahl and, like Kjeldahl's tables for individual sugars, needs re-study. The authors (A., 1929, 125) obtained maltose/Cu ratios different from those of Kjeldahl, whose maltose prep. probably contained some glucose. J. H. L.

Confectionery dehydration with starch. O. H. Windt (Food Ind., 1933, **5**, 213—215).—Conditions are described for obtaining and maintaining best results from moulding starch, e.g., control of H_2O content and periodical sterilisation. The economical use and control of drying rooms is also discussed. E. B. H.

Hyposulphites in sugar manufacture. J. Dutilloy (Bull. Assoc. Chim. Sucr., 1933, **50**, 153—169).—Following a historical résumé, the case for hyposulphite treatment of raw juices and syrup products is presented fully. Zn and Al hyposulphites or sulphoxylates are recommended for raw juices and the alkali or Ca salts for syrups. Improvement in colour and viscosity of syrups is claimed. The method of use at Verberie beet-sugar factory is described. J. H. L.

Liquid sulphur dioxide in sugar manufacture. Economies in its use. A. Carpentier (Bull. Assoc. Chim. Sucr., 1933, **50**, 145—153).—Means for storing, measuring, and applying liquid SO_2 (I) are discussed. In the Teatini process consumption of SO_2 60—70% in excess of the required amount was traced to volatilisation of part of the (I) in the filling of the sulphitometers, the gas formed passing into the juice in addition to the measured quantity of (I). A scheme of plant is described in which this volatilised SO_2 passes into a special receptacle and is re-liquefied. J. H. L.

Direct production of raffinade without recrystallising. I. F. Zelikman and L. O. Shnaidman (Nauk. Zapiski Tzuk. Prom., 1932, 9, No. 15, 1—44).—Conditions for the production of loaf and " hat " sugar by direct pressing of beet " sand sugar " without affination and recrystallisation are specified. Ch. Abs.

Optimum reaction for refinery syrups. B. O. Lyubin and A. V. Velichkovski (Nauk. Zapiski Tzuk. Prom., 1932, 9, No. 15, 133—148).—Clarification of second sugar syrups at 75—80° is practicable at p_H 6·2—8·0. If the temp. is 85° the p_H should be approx. 7·0. Ch. Abs.

Affination of massecuites with use of vacuum. I. F. Zelikman and A. I. Sichkarenko (Nauk. Zapiski Tzuk. Prom., 1932, 9, No. 15, 45—69).—Large Buchner filters are employed. Ch. Abs.

Sugar-cane soils.—See XVI. **Lactose from milk. Sugar as feeding-stuff.**—See XIX.

Patent.

Composition for baking.—See XIX.

XVIII.—FERMENTATION INDUSTRIES.

Diastatic power of malts by Pollak's method. G. Issoglio (L'Ind. Chimica, 1933, **8**, 702—703).—In Italy, malt (malt extract) used in making bread must have a diastatic power (I) $\not<$ 6500 (4500) Pollak units on the dry matter. Various modifications are suggested to facilitate the determination of (I). T. H. P.

Protein [in malt and wort]. W. Rokita and E. Gfundner (Woch. Brau., 1933, **50**, 225—229).—The N distribution in 12 malts and the corresponding " congress-worts " determined by the method of Lundin (A., 1931, 1317) showed close agreement with that determined by the method of Bishop (B., 1929, 696). Formol N bears a close relation to the fraction C (not pptd. by tannin or phosphomolybdic acid) of Lundin and gives an indication of the friability of the malt. A rapid evaluation of the malt may be obtained by the determination of total protein of the malt and the total N and formol N of the corresponding " congress-wort." R. H. H.

Detection of sweetening of completely fermented wine by sterilised must or must in which fermentation has been stopped. J. Alfa (Z. Unters. Lebensm., 1933, **65**, 571—577).—Wine containing $\not< 1 \cdot 0\%$ of reducing sugar, and in which the proportion of fructose is approx. 50% and $\not> 60\%$, has been sweetened after fermentation has ceased with must sterilised by filtration or by SO_2. E. C. S.

Rumanian wines. D. M. Popescu and D. Motoc (Z. Unters. Lebensm., 1933, **65**, 577—580).—Analytical data for still and sparkling Rumanian wines are presented.
　　　　　　　　　　　　　　　　　　E. C. S.

Production of βγ-butylene glycol by fermentation. Effect of sucrose concentration. E. I. Fulmer, L. M. Christensen, and A. R. Kendall (Ind. Eng. Chem., 1933, **25**, 798—800).—In a medium containing NH_4Cl 0·25, KH_2PO_4 0·1 $CaCl_2$ 5, 0·15, $MgSO_4$ 0·20%, and sucrose (I), *Aërobacter pectinovorum* ferments completely up to 8% of (I), but as (I) increases to 12% the amount fermented decreases to 85%. The rate of fermentation and the amount of βγ-butylene glycol (II) produced % of (I) fermented are at a max. in the presence of 8% of (I). The amount of acid produced % of (I) fermented decreases at first rapidly and then slowly with increase in concn. of (I). The ratio of acid to (II) falls from 1·88 in the presence of 1% of (I) to 1·0 in the presence of 8% or more of (I).　　E. C. S.

Patents.

Manufacture of yeast. A. Schultz and C. N. Frey, Assrs. to Standard Brands, Inc. (U.S.P. 1,893,152, 3.1.33. Appl., 3.3.31).—Yeast grown in the presence of 0·01—0·03% of $OH·CH_2·CH_2Cl$ has no zymatic activity but is normal in all other respects, and may be used as nutrient in food products, *e.g.*, malted milk, syrups, and as seed yeast in normal manufacture, when a higher yield of full-zymatic yeast on the sugar material is obtained.　　　　　　　　　　　　　　R. H. H.

Production of gluconic acid by fungi. J. N. Currie, J. H. Kane, and A. Finlay, Assrs. to C. Pfizer & Co. (U.S.P. 1,893,819, 10.1.33. Appl., 9.2.31).—The fermentation liquor consisting of small amounts of nutrient salts and 5—35% of glucose, maltose, or sucrose is inoculated with *Aspergillus niger* or *Penicillium luteum*, stirred at high speed, and efficiently aërated. A 90% yield of gluconic acid is obtained if a suitable neutralising agent, *e.g.*, $CaCO_3$, is added during fermentation.
　　　　　　　　　　　　　　　　　　R. H. H.

XIX.—FOODS.

Air conditioning in bakery products. W. W. Reece (Food Ind., 1933, **5**, 209—211).—The average loss of 0·62 oz. in wt. per 1-lb. loaf cooling to 32° in open-rack or conveyor cooling is said to be reduced to 0·37 oz., independent of location or climate, by using cooling tunnels passing conditioned and filtered air in counter-current. Further, bread-slicing under similar conditions reduces susceptibility to mould development. E. B. H.

Effect of feeding of distillery residues on some properties and constituents of milk. G. Goldmann (Milch. Forsch., 1933, **15**, 169—182).—The residue from the distillation of alcoholic liquors is shown to be a valuable feed for cows. In the milk obtained, a slight increase in fat content and no noticeable change in mineral salts were observed ; the odour and flavour were unaffected.　　　　　　　　　　　E. B. H.

Effect of silage on the vitamin-*B* content of milk. L. A. Tsherkes and P. Jurist (Milch. Forsch., 1933, **15**, 228—230).—Feeding of silage increased the vitamin-*B* content of winter milk.　　　　　　E. B. H.

Preservation of milk samples for analysis. Effect of preservatives on the determination of fat. G. Keymeulen (Bull. Inst. agron. Gembloux, 1932, **1**, 107—122).—Tests of a no. of preservatives show that the best results are obtained with CH_2O or $K_2Cr_2O_7$. The former added at the rate of 0·5 g. per litre of milk and the latter at the rate of 2·0 g. per litre will preserve the sample at 9—22° for 30 days without affecting the results of the analysis.　　　　　Nutr. Abs. (*b*)

Manufacture of casein and lactose from milk by electrodialysis. J. Katō (J. Soc. Chem. Ind., Japan, 1933, **36**, 158—159 b).—An apparatus is described in which casein of low ash content is obtained by coagulation at the isoelectric point, whilst pure lactose is obtained from the mother-liquors.　　　　A. A. L.

How science can help to improve the nation's food supply. Milk and dairy products. H. D. Kay. **Wheat.** E. A. Fisher. **Meat.** J. Hammond. **Fertilisers.** H. J. Page (Chem. & Ind., 1933, 624—630, 630—637, 637—640, 640—645).—A series of lectures.

Sterilisation of ice cream freezers. A. C. Dahlberg and J. C. Marquardt (New York [Geneva] Agric. Exp. Sta. Bull., 1933, No. 628, 20 pp.).—Hot-H_2O and steam treatment followed by rinsing with Cl_2 solution (I) is recommended. (I) alone (100 p.p.m.) does not penetrate and sterilise the bearings.　　　A. G. P.

Stability of margarine emulsions. A. Lesokhin (Masloboino-Zhir. Delo, 1932, No. 2, 40—50).—Margarine emulsions of the H_2O : oil type are unstable and retain their structure only in the solid state. Temp. has only a slight effect on the stability of oil–H_2O emulsions. Gelatin, starch, sugar, and fatty acids are emulsifiers for the oil–H_2O type. The proteins and fat of milk markedly increase the stability of margarine emulsions. p_H appears to have no effect on the emulsifying properties of the curd.　　　　　　Ch. Abs.

Solids content of egg white. H. J. Almquist and F. W. Lorenz (Poultry Sci., 1933, **12**, 83—89).—After a short period of storage the solids content of the different layers of white in any egg becomes the same. " Watery " whites do not contain more H_2O than other kinds of whites. The ash content of the layers of white is practically const. and independent of the variation in total solids. The solids concn. in the whites of fresh eggs is highly variable but the variation is much less in eggs from the same hen.　　　Nutr. Abs. (*b*)

Malvaceous plants as a cause of " pink white " in stored eggs. F. W. Lorenz, H. J. Almquist, and G. W. Hendry (Science, 1933, **77**, 606).—When eaten by hens members of the *Malvaceæ* are responsible for the white of stored eggs becoming pink and the yolk, large, salmon-coloured, and watery.　　　　L. S. T.

Micro-determination of iodine in eggs. H. J. Almquist and J. W. Givens (Ind. Eng. Chem. [Anal.], 1933, **5**, 254).—The egg liquid is boiled with KOH in 95% EtOH, evaporated, and ashed. The ash is extracted with H_2O, acidified slightly, and excess of aq. Br is added. After boiling off excess of Br, a crystal of KI is added and the I liberated is extracted with 5 1-c.c. portions of CCl_4. I is determined colorimetrically in the CCl_4.　　　　　　　E. S. H.

Caffeine content of ripening and drying coffee. E. HERNDLHOFER (Z. Unters. Lebensm., 1933, 65, 561—566).—Caffeine increases in the seeds and shells of coffee during drying by the usual Brazilian method, while total N remains const. E. C. S.

Iodometric determination of caffeine in vegetable products. A. JERMSTAD and O. ÖSTBY (Dansk Tidsskr. Farm., 1933, 7, 117—122).—The method described by Walrabe (A., 1932, 411) gives accurate results for the caffeine content of guarana, kola, and coffee, but not for maté and tea. Details are given. R. P. B.

Properties of soya-bean protein. I. Influence of the preceding treatments [solvent extraction] on the solubilities of protein. T. IINUMA and M. MASHINO (J. Soc. Chem. Ind., Japan, 1933, 36, 310—311 B; cf. B., 1933, 753).—Pretreatment of the bean with solvents, e.g., benzine, benzine–MeOH mixtures, has little effect on the solubility of the soya-bean protein in H_2O, 10% NaCl, 1% NaOH, 30% $CaCl_2$, or 30% $Ca(CNS)_2$ solutions (full figures detailed). Preheating of the bean (at 120°) has a more marked effect on the solubilities. E. L.

Conductivity of vegetables and fruit, their acid contents, and degree of ripening. R. TOMII and G. KITAJIMA (J. Soc. Chem. Ind., Japan, 1933, 36, 159—160 B).—The acidity of fruit and vegetables is conveniently determined by conductivity measurements, by which means the process of ripening may be followed. The "sweetening" effect of various treatments of the persimmon is indicated by breaks in the conductivity curves. Injection of 10% H_2O or EtOH–H_2O solutions of PhOH, $C_6H_4Me\cdot OH$, salicylic acid, BzOH and its salts, H_3BO_3, H_2SO_3, CH_2O, $ZrSO_4$, or $NaHCO_3$ accelerates the overripening of pears. $NaNO_2$ causes blackening of the skin and hardening. H_3PO_4, EtOH–H_2O, saturated NaCl, saturated $CaOCl_2$, and Cl_2 retard overripening. A. A. L.

Determination of pectin in dried apple pomace. D. W. STEUART (Analyst, 1933, 58, 397—398).—Pectocellulose in pomace is converted into pectin with min. breakdown to pectic acid by boiling thrice, with 0·013N-, 0·067N-, and 0·33N-HCl for 30, 20, and 10 min. respectively. Pectin is determined in the combined extracts by pptn. with EtOH and HCl. E. C. S.

Codling moth control. S. W. HARMAN (New York [Geneva] Agric. Exp. Sta. Bull., 1933, No. 627, 31 pp.).—Fruit effectively protected by spraying against codling moth invariably retained spray residue exceeding the legal tolerance. A. G. P.

Stability of vitamin-C in frozen orange juice during prolonged storage. H. H. BUSKIRK, W. E. BACON, D. TOURTELLOTTE, and M. S. FINE (Ind. Eng. Chem., 1933, 25, 808—810).—The vitamin-C potency of orange juice remained unchanged during 20 months' storage at —26°. E. C. S.

Effect of cooking on the vitamin-A and -C content of fresh and dried apricots. A. F. MORGAN, A. FIELD, and P. F. NICHOLS (J. Agric. Res., 1933, 46, 841—850).—Fresh apricots (I), preserved by freezing, lost 30—50% of their vitamin-C (II) on cooking. Dried apricots (III), sulphured, lost less. SO_2 exerts a protect-ive action on (II) during both drying and cooking. Commercially stored, processed, and resulphured (III) had only one half the (II) content of (I), but kept this on cooking. Sulphured (III) lost 60% of (II) and 31% of SO_2 when stored in closed cans for a year at room temp., and when subsequently cooked lost none of its (II) but one half of the SO_2. The vitamin-A (IV) of (I) (10,000 international units per lb.) increased on cooking, owing to better intestinal utilisation. Sulphured, unsulphured, and processed (I) lost 59—74, 76—82, and 71—82% of (IV) on drying, the product having 12,000—15,000 units of (IV) per lb. E. C. S.

Optical determination of water content of marmalades, jams, and fruit jellies. F. LÖWE (Z. Unters. Lebensm., 1933, 65, 583—585).—A film suitable for refractometry is obtained by spreading the jam or fruit jelly over wire gauze applied to the horizontal face of the refractometer prism, and removing the gauze. The H_2O content of the aq. phase of the jam is calc. from the refractometer val. assuming the solution to contain only sucrose. A correction is made for the solid matter when it is desired to know the H_2O content of the whole jam. E. C. S.

Influence of the method of "making" hay and of artificial drying on the yield and nutrient value of fodder plants and the possibilities of the use of artificially-dried green fodder. O. MEIER (Bied. Zentr. [Tierernähr.], 1933, B, 5, 162—190).—Hay dried on a "band" dryer (I) suffers no loss in crude nutrient content or in digestibility. Sun-drying in the field or on wooden frames results in loss of some part of the crude fat and of the N-free extract. The digestibility of crude protein and fat is < that of hay from (I). The use of drum dryers reduced the digestibility of the crude protein. A. G. P.

Value of fodder sugar and beet slices as fattening feeding-stuff for pigs in comparison with barley groats. F. HONCAMP (Z. Ver. deut. Zuckerind., 1933, 83, 443—504).—Feeding tests on 122 pigs for an average of 79 days show that 1·25 kg. of beet sugar chips (A) or 1·00 kg. of beet fodder sugar (B) per head per diem can be consumed without ill effects. (A) requires only to be mixed with H_2O sufficient to form a thick suspension; it need not be milled or soaked beforehand. Both (A) and (B) can replace barley in the diet to the extent of at least 50%, the mixture giving better results than either constituent separately. Feeding with (A) alone does not give such good results as barley alone. The loss in slaughtering and the quality of the carcase are unaffected, except for individual cases of harder flesh and fat in barley-fed beasts. In terms of starch equivs., the feeding-stuffs show almost identical utilisation. E. C. S.

Influence of washing fresh and ensiled sugar beet leaves on their composition and digestibility and on the loss of crude and digestible nutrient so caused. F. HONCAMP, O. MEIER, W. SCHRAMM, and W. WÖHLBIER (Bied. Zentr. [Tierernähr.], 1933, B, 5, 65—86).—Nutrient losses during ensilage (I) were greater for unwashed than for washed leaves. The total loss of nutrients involved when washing preceded ensiling was < when silage was prepared from soiled

leaves and the product was subsequently washed. The apparent high loss of crude fat (Et_2O extract) during (I) is accounted for by the removal of large amounts of org. acids from silage by Et_2O.   A. G. P.

Feeding trials with saponin as supplement to pig rations. W. LIEBSCHER (Arch. Tierernähr. Tierzucht, 1933, **9**, 156—177).—No favourable effects on digestion or live-wt. increase resulted from administration of pure saponin. In some cases toxic effects were produced.   A. G. P.

Mineral matter, a constituent of rations containing [distillery] spent wash. K. G. SCHULZ (Z. Spiritusind., 1933, **56**, 141—142).—The importance of minerals in feeding stuffs is discussed with special reference to the supplementation of typical spent-wash rations.   A. G. P.

Action of hexylresorcinol on bacteria in certain food products. C. F. POE and H. A. FEHLMANN (J. Bact., 1933, **25**, 521—525).—The bacterial content of certain acid foodstuffs (e.g., tomato) was markedly reduced by addition of hexylresorcinol (1 in 5000). The effect on protein foods (milk, meat, eggs) was very much smaller.   A. G. P.

Use of a selenium–mercuric oxide combination in determination of nitrogen in feed materials. L. V. TAYLOR, JUN. (Ind. Eng. Chem. [Anal.], 1933, **5**, 263).—In Kjeldahl determinations digestion occurs more rapidly with the use of a mixture containing $Na_2SO_4,7H_2O$ (100 pts.), HgO (7 pts.), and Se (1 pt.), than with either HgO or Se alone. Results are given for animal fodder.   E. S. H.

Determination of total sulphur and sulphate sulphur in feeding stuffs. H. E. WOODMAN and R. E. EVANS (J. Agric. Sci., 1933, **23**, 459—462).—Total S is determined by Evans' method (B., 1932, 39). In the determination of SO_4''-S the preliminary ignition may lead to reduction of SO_4'' to S'' or to the oxidation of org. S to SO_4''. The unignited sample is therefore extracted with dil. HCl (1 : 4) at 80° for 24 hr.; the SO_4'' is completely removed and is determined by direct pptn. with $BaCl_2$.   A. G. P.

Stability of fats and oils. Vegetable oils. Soyabean oil. Seed oil of Staphylea pinnata. Lard.—See XII. **Confectionery dehydration.**—See XVII.

PATENTS.

Composition for baking purposes. E. WOXVOLD, Assr. to AMER. MAIZE PRODUCTS CO. (U.S.P. 1,887,175, 8.11.32. Appl., 1.11.28).—Glucose (I), for baking purposes, is rendered less hygroscopic and easier to handle by preparing a solid solution of it in starch and acid Ca lactate (II). (I) and (II) are dissolved in a slurry of suspended starch and the whole is spray-dried.   E. B. H.

Removal of natural oils, wax, and spray residues from fruits. R. H. ROBINSON, Assr. to the PEOPLE OF THE UNITED STATES OF AMERICA (U.S.P. 1,884,966, 25.10.32. Appl., 19.2.30).—The fruit is washed in dil. HCl in which is disseminated liquid petroleum hydrocarbon or other wax solvent, and rinsed in H_2O.   B. M. V.

Extraction of pectin from pectic materials. P. B. MYERS and G. L. BAKER (U.S.P. 1,892,536, 27.12.32. Appl., 21.12.29).—The pectic material is heated with H_2O and acid at 60—110° for 5—60 min. The p_H after extraction should be 3·0—1·3.   E. B. H.

Corrosion of food cans.—See X.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Determination of chloroform. G. D. BEAL and C. R. SZALKOWSKI (J. Amer. Pharm. Assoc., 1933, **22**, 540—544).—The sample is hydrolysed by refluxing with 5N-EtOH–KOH for 4 hr., EtOH distilled off, and the Cl' formed determined. With $CHCl_3$ liniments, dilution with EtOH and aq. H_2SO_4 is followed by distillation, the $CHCl_3$ being found in the first fraction, which is then hydrolysed with alkali etc.   F. O. H.

Gluconic acid and gluconates, and their variable optical rotations. G. AURISICCHIO (L'Ind. Chimica, 1933, **8**, 836—843).—The different vals. of $[\alpha]_D$ shown by Ca gluconate (I) solutions sold for hypodermic use are due to the addition of traces of H_3BO_3 as stabiliser. The high rotation of (I) persists in the acid liberated by $H_2C_2O_4$ and may be due to the existence of various semi-acetal forms of (I) in equilibrium. The bacterial and chemical preps. of the acid are discussed, and a rapid, cheap method of obtaining the pure acid is described.   T. H. P.

Solution ferri albuminata. J. J. VERMET (Pharm. Weekblad, 1933, **70**, 753—758).—Notes are given on the prep. and testing of the above solution (Dutch Pharmacopœia).   H. F. G.

Fluid extracts of thyme. A. JERMSTAD and O. OSTBY (Pharm. Zentr., 1933, **74**, 441—443).—Comparison of the known methods of prep. of fluid extracts of thyme indicates that the D.A.B. method is superior to others, especially if the soaked material is percolated with a mixture of 95—96% EtOH and H_2O (7 : 3) instead of with one of 90—91% EtOH and H_2O (17 : 33).   F. O. H.

Alkaloids of Datura innoxia, Miller. E. E. HESTER and E. D. DAVY (J. Amer. Pharm. Assoc., 1933, **22**, 514—520).—Extraction of the leaves with $CHCl_3$ by the U.S.P. X method gives results varying with the final treatment of the extract. This is due to NH_4 soaps of resinous substances and not to the presence of volatile amines. The only alkaloid detectable is l-scopolamine.   F. O. H.

Determination of small amounts of pyridine in nicotine. N. STRAFFORD and R. T. PARRY-JONES (Analyst, 1933, **58**, 380—383).—Nicotine (I) is removed by oxidation with $KMnO_4$, the C_5H_5N (II) separated by distillation in steam, and determined colorimetrically by means of CNBr and NH_2Ph in $C_5H_{11}·OH$ (A., 1930, 429). 0·05% of (II) in 0·25 g. of (I) can be determined with an accuracy of 10% abs. The method is applicable only to (II), not to its homologues. Piperidine, $NHEt_2$, and NH_3 do not affect the determination.   E. C. S.

Nicotine in cigarette tobacco smoke. III. C. PYRIKI (Z. Unters. Lebensm., 1933, **65**, 566—571; cf. B., 1931, 27; 1932, 1136).—The nicotine (I) in the smoke of 40 varieties of oriental tobacco varied between

17·8 and 25·3% of that present in the tobacco. The smoke of cigarettes made from these tobaccos contained between 19·6 and 22·8% of the (I) in the tobacco. The lower vals. were obtained from the slower-burning tobaccos. (I) in tobaccos containing $< 0.3\%$ cannot be determined by Pfyl's method unless it is first separated from the absorbing solution by distillation in steam.

E. C. S.

F.p. of a mixture of pure o-cresol and pure cineole in molecular proportions. P. A. Berry and T. B. Swanson (Perf. Ess. Oil Rec., 1933, 24, 224).—This hygroscopic mixture has m.p. 56·3° (cf. B., 1933, 92). R. S. C.

Tobacco-seed oil.—See XII. **Caffeine.**—See XIX.

Patents.

Manufacture of therapeutic compounds of the heterocyclic series. A. Carpmael. From I. G. Farbenind. A.-G. (B.P. 390,831, 3.9.31).—Quaternary heterocyclic NH_4 salts carrying NH_2 are converted into carbamides, thiocarbamides, sulphuric or sulphurous amides, semicarbazides, thiosemicarbazides, etc. having one or two heterocyclic residues. 6-Aminoquinoline (I) is converted into its 2-nitro-p-toluoyl derivative, m.p. 214° [BMe_2SO_4, m.p. 203—204°; BMeCl, m.p. 260—265°; ethotoluenesulphonate, m.p. 229—230°; benzylochloride, m.p. 216—218°; CH_2AcCl compound, m.p. 238° (decomp.)], which is reduced to amine (II), m.p. 209° [BMeCl,HCl, m.p. 269—271°; Ac derivative, m.p. 235° (BMe_2SO_4, m.p. 233—234°, decomp.; BMeCl, m.p. 264—266°, decomp.); m-chlorobenzoyl derivative, m.p. 254°; phosgenated product, m.p. 254—256° ($B2Me_2SO_4$, m.p. 260°; B2MeCl, m.p. 250°, decomp.); quinoline-6-carboxyl derivative, m.p. 245°, from (II) and the 6-carboxylazide, ($B2Me_2SO_4$, m.p. 224°, decomp.)]. The 2-nitro-p-toluoyl derivatives of 2-, 5- (m.p. 191°), and 7-aminoquinoline and 3-aminoquinaldine, m.p. 162°, give methomethylsulphates and methochlorides of m.p. 215° and —, 228—229° and —, 210° and 234—235° (decomp.), and 178° and 145—147°, respectively. (I) is also converted into m-nitrobenzoyl, [m.p. 204° (BMeCl, m.p. 250—251°)], and 5-nitro-o-toluenesulphonyl [m.p. 230—231° (BMe_2SO_4, m.p. 201—202°; BMeCl, m.p. 239—241°)] derivatives. 9-Aminophenanthrolene, m.p. 240°, yields a 2-nitro-p-toluoyl derivative, m.p. 273—274° [$B2Me_2SO_4$, m.p. 227—228° decomp.]. The m.p. of the bismethomethylsulphates and bismethochlorides of the amides which follow are given in brackets: phosgenated (I), m.p. 260—262° [235—237° (decomp.); 260°] (monomethomethylosulphate, m.p. 168°; bismethiodide, m.p. 255—257°; $(NO_2)_2$-compound, m.p. 242°); phosgenated 5-aminoquinoline, m.p. 284—285° [217° (decomp.); —], 7-aminoquinoline, m.p. 282° [228° (decomp.); —], 3-aminoquinaldine, m.p. 276° [193° (decomp.); —], 5-amino-6-methoxyquinoline [192° (decomp.)], 3-aminocarbolidine, m.p. 276—277° [211°, —]; thiophosgenated (I), m.p. 190° [—; 237°], 7-aminoquinoline, m.p. 179—180° [160° (decomp.); —], 5-aminoquinoline, m.p. 178° [—; 150°], 3-aminoquinaldine, m.p. 208° [—; 205—206° (decomp.)], and 6-amino-8-methylquinoline, m.p. 196° [—; 100—105° (decomp.)]; quinaldine-4-carboxyl-6-quinolylamide, m.p. 205° [—; 232°

(decomp.)]; di-4-pyridylurea, m.p. 208° [191° (decomp.); —]. The hydrazide, m.p. 188°, of quinoline-6-carboxylic acid is converted into the azide, m.p. 88°, from which ureas are obtained by condensation with: 8-amino-6-methoxyquinoline (m.p. 229°) [239° (decomp.); —]; antipyrine (m.p. 242—243°) [217° (decomp.); —]; 6-amino-1-methyltetrahydroquinoline, b.p. 148—150°/3 mm. (m.p. 227°) [206—207° (decomp.); —]; m-aminophenyl β-diethylaminoethyl ether (m.p. 193°); 6-p-aminophenoxyquinoline, m.p. 126° (m.p. 209°) [242° (decomp.); —]; 0·5 mol. of 6-aminotetrahydroquinoline (m.p. 160°) [187° (decomp.); —]; p-aminophenyl m-5-xylyl ether, m.p. 62° (m.p. 198°) [234°; —]; 7-aminoquinoline (m.p. 229°) [238° (decomp.); —]; 5-aminoisoquinoline [221—222° (decomp.); —]; 5-chloro-8-aminoisoquinoline, m.p. 205° (m.p. 234°) [227° (decomp.); —]; quinoline-6-carboxylic hydrazide (semicarbazide, m.p. 230°) [—; 252° (decomp.)]. Ureas are also obtained from 2-nitro-p-toluic azide, m.p. 45—47°, and 2-aminoquinoline (m.p. 250—252°) [BMe_2SO_4, m.p. 226°, is reduced to amine (BMeCl,HCl, m.p. 268—270°, decomp.)], from p-dimethylaminobenzoic azide, m.p. 172°, and (I) (m.p. 220°) [—; 190°], and from (I) and KCNS (m.p. 218°; BMe_2SO_4, m.p. 208—209°; BMeCl, m.p. 234°). The methochloride of (I) gives with dicyanodiamide a diguanyl derivative (BMeCl,HCl, m.p. 245°), and thence a guanylurea (BMeCl,H_2SO_4, m.p. 150—152°) by treatment with H_2SO_4. The products are used against blood parasites.

C. H.

Production of denicotinised tobacco. L. Lippmann (B.P. 395,458, 23.3.32. Ger., 1.4.31).—The tobacco, moistened with H_2O, slightly alkaline H_2O, or an alkaline liquor containing tobacco bacteria, is fermented with access to air and the excess alkalinity is continuously or intermittently removed either by neutralisation or by the passage of air. The bases resulting from fermentation may be recovered and mixed with the denicotinised tobacco. E. H. S.

Production of a therapeutic compound [for anæmia]. G. B. Walden, Assr. to E. Lilly & Co. (U.S.P. 1,894,247, 10.1.33. Appl., 9.1.32).—A dehydrated mixture or liquid extract of a mixture of stomach or stomach-derived material and liver and kidney is specified. E. H. S.

Curative specifics containing sulphonated derivatives of santalene or caryophyllene. J. da V. Soares and N. B. G. da Silva (B.P. 395,007, 5.10.31. Brazil, 4.10.30).—The sesquiterpenes are sulphonated, e.g., with conc. H_2SO_4 in presence of Ac_2O, and injected as a 15% aq. solution. L. A. C.

Production of preparations for subcutaneous injections against septic illnesses in animals. J. Pekar (B.P. 395,264, 2.1.33. Czechoslov., 27.9.32).—A solution of 2·5—1·5 g. of parsley oil in 1000 c.c. of abs. EtOH diluted with 500—4000 c.c. of H_2O is used for subcutaneous injection. L. A. C.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Patent.

Paper.—See V.

XXIII.—SANITATION ; WATER PURIFICATION.

Chemical-mechanical treatment of sewage and sewage-sludge at Dearborn [Mich.]. E. C. Miller (Sewage Works' J., 1933, **5**, 447—457).—The sediment-ation tank sludge produced at a plant dealing with 18×10^6 gals. of sewage per day is treated at another plant which also has a daily sewage flow of $2 \cdot 85 \times 10^6$ gals. The mixed sludge and sewage are treated by the Laughlin process (cf. B.P. 392,017 ; B., 1933, 574). The finer particles of suspended matter are removed by an upward-flow magnetite filter 8 ft. wide and 3 in. deep around the periphery of the clarifier. The magnet-ite is cleaned at the rate of 4 ft. per min. by a mechanism consisting essentially of a solenoid which picks up and drops the material 18 times per min. The settled sewage rushes in from below, carries away the dirt, and is returned to the clarifier inlet. The sludge is dealt with on vac. filters at a rate of $7 \cdot 5$ lb. of dry solids per sq. ft. and the cake produced (average H_2O 62%) is dumped but may later be incinerated.   C. J.

Laughlin process of sewage treatment. S. I. Zack (Sewage Works' J., 1933, **5**, 458—481).—The application of this process at Dearborn, Mich., and Coney Island testing station is described. A well-clarified but unoxidised and unnitrified effluent is obtained. At Coney Island the final effluent required 62 lb. of Cl_2 per 10^6 gals. to produce a residual of $0 \cdot 4$ p.p.m. and a 25—40% reduction in the biochemical O_2 demand (I). At Dearborn an application of 25 lb. of Cl_2 per 10^6 gals. had no effect on (I). The cost of treat-ment (including capital charges) is estimated at $1·4 per head to obtain approx. 90% removal of suspended solids and 77% reduction in (I).   C. J.

Effects of sewage chlorination on the receiving stream. H. G. Baity, F. Merryfield, and A. B. Uzzle (Sewage Works' J., 1933, **5**, 429—446).—Chlorin-ation of settled sewage caused a high degree of bacterial destruction in the receiving stream during periods of dry weather, the residual Cl_2 in the effluent averaging $0 \cdot 12$ p.p.m. The appearance of the stream was much improved ; filamentous growths were sloughed off and washed away, the stones and sand were cleansed of slime, and obnoxious odours were eliminated. Retard-ation of bacterial activity and partial stabilisation of non-settleable org. materials reduced the immediate demand on the dissolved O_2 of the stream, which in-creased by 147% when the residual Cl_2 was $2 \cdot 0$ p.p.m. A 25—40% reduction in the biochemical O_2 demand (5 days) of the settled sewage was observed when the residual Cl_2 was $< 1 \cdot 4$ p.p.m.   C. J.

Design of grit chambers. H. Blunk (Sewage Works' J., 1933, **5**, 509—522).—The usual shallow types of grit chamber cannot easily be adjusted to varying rates of flow, so that putrescible matter is frequently present with the sand. The basic principles are de-scribed of an upward-flow type having a series of adjust-able concentric weirs and arrangements for washing the sludge *in situ*. The grit is finally evacuated by com-pressed air and contains < 2% of org. matter. C. J.

[Sewage] sludge disposal and future trends. W. Rudolfs and E. J. Cleary (Sewage Works' J., 1933, **5**, 409—428).—The various methods used are reviewed and discussed. Future treatment, except at small plants, may be by incineration either of the sludge resulting from sedimentation etc., dewatered with the aid of materials which change surface tension, cause rapid base exchange, and remove interfering substances, or of the whole of the sewage solids separated by some suitable form of mechanical filtration without pre-sedimentation or digestion.   C. J.

Germicidal efficiency of sodium hydroxide. E. C. McCulloch (J. Bact., 1933, **25**, 469—493).—A dil. solution of NaOH is a suitable disinfectant for barns, stables, etc., and is particularly effective against *B. abortus*. Velocity of disinfection by NaOH in the range 2—25° is independent of temp. changes. This phenom-enon is associated with the peculiar physico-chemical behaviour of NaOH whereby the ratio of OH' activity to H' activity increases with falling temp. The relative increase in OH' activity at lower temp. is counter-balanced by the greater germicidal efficiency of OH' at higher temp. At a fixed temp. the germicidal activity of a given [OH'] is independent of the amount of alkali used to produce this concn.   A. G. P.

Sludge gas for power.—See II. **Creoline.**—See III.

PATENTS.

Sewage disposal. R. S. Rankin, Assr. to Dorr Co., Inc. (U.S.P. 1,892,681, 3.1.33. Appl., 27.9.30).—Sludge is digested in a closed, continuously operated vessel with the aid of heat for a period not long enough to effect complete digestion, but sufficiently long to produce enough gas to provide the sole fuel for subse-quent incineration, the heating of the digester being effected by waste heat from the incinerator transmitted by thermo-siphon H_2O-coils. Intermediately the sludge is filtered, after incorporation of fine ashes and other filter aid.   B. M. V.

Sewage-treating apparatus. C. E. Keefer and F. C. Wachter, Assrs. to Dorr Co., Inc. (U.S.P. 1,892,688, 3.1.33. Appl., 9.6.31).—A digester with air-tight top (constructed in steel and concrete) is provided with a central pier forming the sole support for the stirring mechanism (a) and motor (b) and the support for the centre of the roof, although it is surrounded at roof level by the sleeve connecting a and b ; the means to overcome this obstacle are provided by an umbrella hut from the outer walls of which the inner part of the tank roof is suspended.   B. M. V.

Purifying air. M. Torrebadella (B.P. 395,199, 27.9.32. Fr., 20.10.31).—A disinfectant is slowly dis-charged from the inverted vessel, in which it was purchased, through an electromagnetically-operated valve to a centrifugal spraying device in the centre of an electric fan.   B. M. V.

Means for signalling the presence of an inflam-mable or non-inflammable noxious gas. A. Im-barrato (B.P. 395,149, 20.6.32. Italy, 23.6.31).—An apparatus embodying a flame is provided with a " thermostat " which signals any change in the con-ditions of combustion due to foul air. The thermal indicator may comprise a column of Hg moved by a fluid in a bulb and serving to make or break an electrical circuit.   B. M. V.

Fluosilicates.—See III.