

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

JULY 21 and 28, 1933.*

I.—GENERAL; PLANT; MACHINERY.

Modern chemical plant. J. A. REAVELL (J.S.C.I., 1933, 52, 133—139 r).—Recently developed plant using direct electric heating is described with special reference to the bodying of linseed oil and prep. of synthetic materials used in the paint and varnish industry. An electrically operated fluid heat-transmission plant for high-pressure reaction vessels at 300°/20 atm. (700,000 B.Th.U./hr.) is illustrated. A layout and description of modern plant for classifying and drying suspensions are given. Raw material such as whitening at 5—15% solids is refined, pptd., and dewatered by the Andrew patent process in one continuous plant, and the classified and partly dewatered suspension is dried in a film dryer.

Graphical computation of logarithmic mean temperature difference. A. J. V. UNDERWOOD (Ind. Chem., 1933, 9, 167—170).—Charts and the mathematics on which they are constructed are given.

D. K. M.

Granular composition as a characteristic of finely-divided technical materials. H. W. GONELL (Chem. Fabr., 1933, 6, 227—233).—Existing methods for determining the size and distribution of particles in powders are reviewed. Sieving is applicable only to particles $> 60 \mu$. Separation by an air current is applicable to all materials. Elutriation and sedimentation are used particularly in ceramics and soil studies; sedimentation is particularly applicable in industrial work. X-Ray methods are applicable to highly-dispersed substances. (Cf. B., 1931, 950.)

E. S. H.

Rapid determination of the specific gravity of pigments and powders. E. J. DUNN, JUN. (India-Rubber J., 1933, 85, 662—663).—The pigment (etc.) to which 1 g. of gum arabic is added is ground with H_2O in a mortar and the suspension transferred to a wide-necked sp.-gr. bottle. The last H_2O is added to the latter without shaking, whereupon entrained air bubbles come to the surface and are removed. The bottle is standardised with a similar gum arabic solution. Results are accurate to 0.02.

C. I.

Influence of roughness of surface and variation of speed on boundary lubrication. P. S. CALDWELL and A. S. T. THOMSON (J. Roy. Tech. Coll., 1933, 3, 106—115; cf. B., 1931, 469).—Scraping, burnishing, and running-in of the surfaces results in a considerable reduction in the val. of the coeff. of static friction, by 45% with white metal on Ni-Cr steel, by 25% with P-bronze on Ni-Cr steel, and by 8% with cast Fe on Ni-Cr steel. A further reduction is produced by grinding or lapping the surfaces; of the above com-

binations the last-named gives the lowest coeff. of static friction (0.130). With increase in rubbing speed under relatively low loads μ decreases to a min., then rises; this min. occurs at higher speeds the greater is the load and the lower the viscosity of the lubricating oil, and is lower the lower is the static friction. Friction-rubbing speed curves are given for 6 oils under boundary, film, and greasy conditions of lubrication. A. R. P.

Applications of MeBr.—See III. Use of Cerin dialysers.—See VII. Anthracite coal as filter-medium.—See XXIII.

See also A., June, 561, Universal fractional distillation apparatus.

PATENTS.

Rotary drying apparatus. H. L. CORWIN (U.S.P. 1,873,995, 30.8.32. Appl., 12.3.30).—The material is drawn into a rotary drum from the circumference of the shell at one end by means of a device like a Frenier spiral pump having, preferably, > 1 worm, each extending only a little $> 360^\circ$.

B. M. V.

Spray-drying apparatus. G. B. VOORHIES, ASSR. to FEDERAL MILK Co. (U.S.P. 1,874,665, 30.8.32. Appl., 7.3.30).—In the drying of sticky materials, e.g., the constituents of ice cream, the air-borne powder is caused to pass through coarse screens and to turn over a partition before passing through bag filters; the screens are mechanically jarred to detach half-dried material that has stuck to them.

B. M. V.

Process retort. A. L. TAYLOR (U.S.P. 1,874,833, 30.8.32. Appl., 29.5.30).—The claims relate to gastight doors for vac. ovens and the like.

B. M. V.

Apparatus for controlling temperatures in chemical reactions. C. R. DOWNS, ASSR. to BARRETT CO. (U.S.P. 1,873,876, 23.8.32. Appl. 26.2.23. Renewed 19.4.29).—Tubes containing a volatile liquid have their lower ends in the reaction chamber, which may be provided with a catalyst if desired. The b.p. of the liquid is held at the desired temp. of reaction by a pressure device, and the upper ends of the tubes are cooled by external liquid which may, in some cases, be the gases going to the reaction chamber.

B. M. V.

(A) Catalytic core and (B) its method of production [for use in tubular oil heaters]. A. E. HARNSEBERGER and C. L. SMITH, ASSRS. to GYRO PROCESS Co. (U.S.P. 1,873,707 and 1,874,743, [A] 23.8.32, [B] 30.8.32. Appl., [A] 21.8.28, [B] 14.12.29).—FeO and cement are cast around a wooden rod which is burnt away to form an internal passage; the texture may be made more open by incorporating carbonaceous material, e.g., 10% of sawdust.

B. M. V.

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

Electrolytic means for protection of boilers. A. KIRKALDY, Assr. to ELECTRO ANTI-CORROSION CORP. (U.S.P. 1,874,759, 30.8.32. Appl., 3.5.30).—Cradles, insulators, and flexible leads permitting rod-like anodes to expand and contract are described. B. M. V.

Stabilised heating fluid. H. H. DOW, Assr. to DOW CHEM. CO. (U.S.P. 1,874,258, 30.8.32. Appl., 13.7.29).—A fluid which may be vaporised many times without decomp. comprises Ph_2O 70 and diphenylene oxide ≥ 30 pts., with, if desired, a little Ph_2 or C_{10}H_8 . B. M. V.

Jaw crusher. E. B. SYMONS, Assr. to NORDBERG MANUFG. CO. (U.S.P. 1,874,830, 30.8.32. Appl., 24.7.30).—A crusher in which the swing jaw is pivoted at the upper end and directly driven by an eccentric is described, the claims relating mainly to lubrication. B. M. V.

Rock crusher. H. J. McELVAIN, Assr. to H. C. McELVAIN (U.S.P. 1,874,329, 30.8.32. Appl., 24.4.30).—An inverted conical head is reciprocated vertically within an inverted conical body part. B. M. V.

Mixer. I. W. LITCHFIELD, Assr. to BEMIS INDUSTRIES, INC. (U.S.P. 1,873,438, 23.8.32. Appl., 3.11.30).—The material is kneaded by rollers while contained in an annular bag. B. M. V.

Means for classifying materials in jet impact pulverisers. P. ANGER (U.S.P. 1,874,150, 30.8.32. Appl., 5.2.31. Ger., 27.11.28).—After impact the fluid-borne materials are made to rotate by vanes and passed through classifying devices, several forms of the latter being described. B. M. V.

Making a filtering, bleaching, and insulating material. H. T. WOODWARD, Assr. to CALIFORNIA CHEM. CORP. (U.S.P. 1,873,520, 23.8.32. Appl., 25.5.31).—The material is MgSiO_3 produced from an aq. solution of Mg borate and SiO_2 by pressure-digestion. B. M. V.

Fractional distillation. I. H. LEVIN, Assr. to GAS INDUSTRIES CO. (U.S.P. 1,873,771, 23.8.32. Appl., 1.6.25).—In a bubbling tower, a moisture eliminator, e.g., a diaphragm of gauze, is placed in the free space between each pair of plates and the collected spray led to the plate below. B. M. V.

Process of evaporative cooling. C. F. RITCHIE and W. A. GALE, Assrs. to AMER. POTASH & CHEM. CORP. (U.S.P. 1,873,329, 23.8.32. Appl., 12.7.29).—Hot aq. liquor is cooled by evaporation, the vac. being produced by a barometric condenser operated with freshly prepared (or freshly strengthened) saturated brine, the dissolution of the salt lowering both the temp. and the v.p. to those for H_2O . The process is useful where Na_2SO_4 and/or NaCl are waste products. B. M. V.

Cataract condensation apparatus. R. S. DANFORTH (U.S.P. 1,874,849, 30.8.32. Appl., 21.3.30).—A no. of cascades are arranged in a tower, giving the effect of a bubble column without back-pressure. Each cascade is provided with a pump for returning liquor to the top of the same cascade, only excess liquid equal to that acquired from the gas overflowing downwards. B. M. V.

Apparatus for separation of liquids having different b.p. B. TORREY, JUN., and G. R. SANFORD,

Assrs. to SEMET-SOLVAY CO. (U.S.P. 1,874,387, 30.8.32. Appl., 18.1.29).—The apparatus is composed of known parts arranged for the process described in U.S.P. 1,701,988 (B., 1929, 744). B. M. V.

Separation of (A) oil from mixtures thereof with water, (B) mixtures of substances. L. D. JONES, Assr. to SHARPLES SPECIALTY CO. (U.S.P. 1,873,597—8, 23.8.32. Appl., [A] 18.5.28, [B] 19.5.28).—(A) A settling apparatus of the type in which the mixture flows through a no. of narrow passages is described. (B) In the separation from a liquid of solids which are of higher d but difficult to centrifuge or filter, a proportion of clear liquid is obtained by sedimentation only; the sludge is centrifuged and, if desired, filter-pressed to provide reasonably dry solids and cloudy liquid, which is treated with feed liquid. B. M. V.

Erratum.—On p. 495, col. 2, line 22 from bottom, for U.S.P. 1,689,703 read U.S.P. 1,869,703.

Gas-washing apparatus. S. C. CUTLER (U.S.P. 1,875,300, 30.8.32. Appl., 22.10.26).—A tower provided with a no. of superposed, inverted, conical, lifting centrifugal sprayers is arranged so that any sprayer can be removed without disturbing the others. B. M. V.

[Thermal-conductivity] gas-analysis apparatus. (A) W. O. HEBLER, (B) R. H. KRUGER, and W. F. HAMILTON, Assrs. to C. ENGELHARD, INC. (U.S.P. 1,874,520 and 1,874,549, 30.8.32. Appl., [A] 8.11.29, [B] 14.1.31).—(A) The bulb of a Hg thermometer is surrounded by an electrical resistance which is heated by a current at const. potential, the whole being surrounded by a block of good-conducting metal through which currents of air (standard) and the gas are passed alternately, or simultaneously through a twin apparatus. The reading of the thermometer is a measure of the conductivity and hence the composition of the gas. (B) The gas in the presence of the electrical resistance is changed partly by convection and partly by diffusion, the former being the more useful when the sample is becoming lighter, and *vice versa*. B. M. V.

Products from coal ashes. Gas purifiers.—See II. **Tunnel kilns.**—See VIII.

II.—FUEL; GAS; TAR; MINERAL OILS.

Determination of moisture in coal. B. G. ŠIMEK, J. LUDMILA, and B. ŠTANČLOVÁ (Mitt. Kohlenforschungsinst. Prag, 1932, 242—253).—Determination of the loss on air-drying by the use of an air oven at about 35° may cause an alteration in the composition of lignites and easily oxidisable coals. The total moisture content and the gross calorific val. are then found to be high. Determination of total moisture by the xylene method gave higher results than drying at 105°, and is preferable for lignites and many coals. Determinations by the loss of wt. of coal at 110—120° in streams of air, H_2 , and N_2 gave low results, due to gas adsorption. If this method is used, H_2O must be determined directly by means of CaCl_2 . T. H. B.

Relative fuel economy of electricity, gas, oil, and solid fuel as heating agents. A. H. BARKER (J. Inst. Electrical Eng., 1933, 72, 269—312).—The

economic advantages of the more expensive "fuels," particularly electricity, for heating buildings, both continuously and intermittently, as compared with the cheaper solid fuel are examined and discussed. G. E. F.

Calculating the radiation correction in the calorimetric investigation of fuels. B. G. ŠIMEK (Mitt. Kohlenforschungsinst. Prag, 1932, 266—270).—Tables and a nomogram are given for facilitating the calculation according to Mahler's formula for combustion times of 3 and 4 min. T. H. B.

Hydrogenation of American coals in anthracene. W. L. BEUSCHLEIN and C. C. WRIGHT (Ind. Eng. Chem., 1933, 25, 409—410; cf. B., 1933, 98).—A series of American coals were treated, using anthracene as dispersion agent, (1) with H_2 , and (2) with N_2 , at 350° for 8 hr. at an initial pressure of 114 kg. per sq. cm., followed by subsequent carbonisation of the insol. residue. The conversion by hydrogenation varied from 10.5% to 40%, sub- and low-grade-bituminous coals giving the highest conversions. No definite correlation was found between the degree of conversion and the classification of the coal. D. K. M.

Reactivity of cokes at low temperatures to oxygen and carbon dioxide. C. B. BOLLAND and J. W. COBB (J.S.C.I., 1933, 52, 153—159 T).—The method previously described (Key and Cobb, *ibid.*, 1930, 46, 439 T; Branson and Cobb, Trans. Inst. Gas Eng., 1926, 27, 357) for the determination of the reactivity of a coke to CO_2 is not suitable for cokes prepared at low temp., because of changes they may undergo during preheating and testing. A modified procedure has been adopted involving a preliminary evacuation at, e.g., 600° over 6 hr. and the collection of a test sample over 1 hr. Even then the amounts of CO formed were very small, and it is more practicable to determine the reactivity of a coke at low temp. with reference to O_2 rather than CO_2 . For this purpose the disturbing exothermic effect is eliminated by the use of a Pb bath. The reactivities to O_2 of a series of carbonised fuels of gradually diminishing O content and carbonised at different temp. were determined and tabulated. In this series (including lignite, bituminous coal, and anthracite) the fuel containing more O, or carbonised at the lower temp., gave the more reactive coke. Comparisons were also made between the reactivities and ignition points of the different cokes, indicating a close correspondence when the "second" ignition points were used. The process of slow gasification at 380° in O_2 of a 600° coke from a bituminous coal was followed for 9 hr.; the % O_2 in CO and CO_2 soon attained and maintained a fairly steady val., while the rates of H_2 consumption and of O fixation by the coke diminished rather quickly at first and slowly afterwards during the gasification.

Determination of the crushing strength of coke. F. COUFALÍK (Mitt. Kohlenforschungsinst. Prag, 1932, 237—241).—Crushing-strength tests were made on cokes in a hand-operated oil press giving a max. force of 500 kg.; 1-in. cubes were used as test-pieces. Coke was stronger in the longitudinal direction of the oven. Coke from the middle of the oven was stronger than that from the ends. The effect of test-piece shape was

studied, using cubes, cylinders, spheres, and prisms. Vals. under all conditions varied from 125 to > 500 kg./sq. cm. The crushing strength required in a blast furnace is about 3 kg./sq. cm. T. H. B.

Ash value of charcoal. L. W. WINKLER (Pharm. Zentr., 1933, 74, 291).—Commercial and laboratory-prepared charcoals have much lower ash vals. than medicinal charcoals. No explanation is offered.

V. P. P.

Removal of ammonia and hydrogen sulphide from gases by means of thionate solutions. J. HANSEN [with H. WERRES, G. HILLER, and K. VOITURET] (Chem.-Ztg., 1933, 57, 361—363, 382—383).—Various proposed modifications of the Feld process are reviewed. Thionate solutions remove NH_3 and H_2S in a 2:1 mol. ratio and in practice there is an excess of H_2S left. Thiosulphate (I) containing SO_2 removes this excess much more effectively than do thionates, but on account of the consumption of (I) could only be used as an auxiliary. Alkaline $Fe(OH)_3$ suspensions give a troublesome mixture of S and $Fe(OH)_3$, but can be used in conjunction with a metallic thionate process. The polythionate washing process has the disadvantage of working with an alkaline solution. With the Fe process 20—30% of the S is converted into Fe polythionate, so that in this case also there is loss of NH_3 . Proposed working methods are discussed. C. I.

Recovery of sulphur from [gas-purifier] spent oxide. ANON. (Gas J., 1933, 202, 219—220).—A process is sought to extract S (reasonably pure) from spent oxide and to revivify the oxide so that it can be re-used a no. of times and its concn. of Prussian Blue (I) increased until it can be profitably extracted from the spent oxide. Two German plants have used CS_2 to extract S of 95—99% purity (cf. B., 1931, 379, 527). The residual oxide, after activation, can be re-used 3 or 4 times and disposed of for extraction of (I). The extracted oxide efficiently absorbs S, but a low rate of gas flow is necessary. Attempts to remove S by the passage of steam and inert gases through the oxide are limited to temp. $< 250^\circ$, as above this the partly dehydrated Fe oxide loses activity. C. E. M.

Electrolytic corrosion in gas mains. W. BECK (Gas World, 1933, 98, 584—594).—Laboratory experiments are described in which measurements of current intensities on various points of the surface of a pipe embedded in moist soil or liquids are determined by means of metallic search electrodes. The results obtained agree with vals. derived from a formula of Michalke. All tests were made after a polarising current had been maintained for < 24 hr., as the electrode currents are not const. in the initial periods. The method has been applied to the testing of pipe coatings. A large electrode current indicates the presence of a defective spot directly opposite the electrode position. The initial fall in the current-intensity val. of protected pipes embedded in sand is due to the formation of a hard layer of Fe salts, which increases the electrical resistance. The results obtained with various commercial coatings are given. Measurements at low temp. and under vibrational stress show that the life of the protective coatings is lowered by these factors. R. N. B.

Bituminous coal bitumen and the conversion of bituminous coals into pseudo-bitumen by hydrogenation. II. μ -Coals. F. FISCHER, K. PETERS, and W. CREMER (*Brennstoff-Chem.*, 1933, 14, 181—184; cf. B., 1932, 1063).—Complete separation of coal bitumen into fractions sol. (A) and insol. (B), respectively, in light petroleum, which is difficult or impossible by the methods previously suggested, has been effected by impregnating kieselguhr with the bitumen, e.g., from solution in C_6H_6 , and, after removing the solvent by warming *in vacuo*, extracting the mass with light petroleum. A bitumen obtained by extracting a Ruhr coal ground to μ fineness with C_6H_6 was resolved into A 4.5% and B 3.0% (referred to the coal); extraction of the original coal with light petroleum yielded only 0.9% of bitumen. By heating the μ -coals with H_2 under pressure, e.g., 140—200 atm., at temp. below the normal decomp. temp., e.g., 200—285°, the amount of bitumen extractable by C_6H_6 was greatly increased. This production of "pseudo-bitumen" was accelerated by the presence of a MoO_3 catalyst. By repeated hydrogenation under these conditions and removal of the extract after each treatment, nearly 90% of a Ruhr coal has been converted into a product sol. in C_6H_6 . Hydrogenation under the above conditions of a coal from which the original bitumen has been extracted restored the caking properties of the coal. A lean coal which gave no appreciable amount of bitumen on extraction with C_6H_6 could similarly be partly converted into pseudo-bitumen (yield of C_6H_6 extract 23.5%); on low-temp. carbonisation the hydrogenated coal gave an increased yield of tar (9.5% as compared with 5.0%) and a strong coherent coke. The pseudo-bitumen can, like the original bitumen, be resolved into fractions sol. or insol. in light petroleum; by hydrogenation of the insol. fraction at 220—230°/180 atm. it is partly converted into the sol. form. A. B. M.

Formation of crystalline oxidation products on heating fuels in a current of air. III. μ -Coals. F. FISCHER, K. PETERS, and W. CREMER (*Brennstoff-Chem.*, 1933, 14, 184—187; cf. preceding abstract).— μ -Coals were heated in a current of air at successively higher temp. from 110° to 400°, the temp. being maintained const. at each stage until the rate of oxidation became inappreciable (4—9 days). In the range 225—350°, white, needle-shaped crystals, in one case amounting to 0.7% of the coal, condensed on the cool part of the tube. The crystals were sol. in aq. NH_3 , but difficultly sol. in H_2O and C_6H_6 , and consisted presumably of a mixture of benzenecarboxylic acids. Similar cryst. sublimates were obtained by the oxidation under like conditions of all types of coal, of wood, of coal-bitumen, pseudo-bitumen, and extracted coals, and of semi-cokes from coal, lignite, wood, and cellulose. The residual oxidised products were sol. in dil. aq. NH_3 and resembled humic acids. On heating *in vacuo*, the oxidised residues evolved CO_2 and CO and again lost their solubility in aq. NH_3 . No cryst. sublimate was obtained by the air-oxidation of lampblack or C obtained by the catalytic decomp. of CO. A. B. M.

Catalytic reduction of tar phenols to aromatic hydrocarbons. II. T. BAHR and A. J. PETRICK (*Brenn-*

stoff-Chem., 1933, 14, 187—193; cf. B., 1933, 532).—Catalysts for the reduction of phenols by H_2 under atm. pressure were prepared by the thermal decomp. of NH_4 molybdate in air, or by the oxidation of Mo by air or by HNO_3 ; the catalyst was used as powder or on a ceramic support ("Stuttgarter Masse"). Addition of alkalis or other metal oxides to the catalyst, in general, lowered its activity. The catalyst was not sensitive towards S compounds. Its activity gradually decreased during the reaction, but could be restored by heating in air at 400—450°. On heating the MoO_3 catalyst at 360—450° with H_2 only it was gradually reduced to MoO_2 and had then lost its activity; it is concluded that the active catalyst is MoO_3 or possibly an oxide intermediate between MoO_3 and MoO_2 , and that the loss of activity during the reaction is due to reduction to MoO_2 . On increasing the pressure under which the reaction was carried out some hydrogenation of the aromatic nucleus occurred; e.g., the neutral oil produced under 20 atm. contained 40% of saturated and unsaturated hydroaromatic hydrocarbons. A. B. M.

Determination of paraffins in lignite tar. B. G. SRMEK (*Mitt. Kohlenforschungsinst. Prag*, 1932, 225—235).—About 5 g. of tar are weighed in an Al vessel and sealed in an Fe retort with nicked-Cu side-arm. The retort is heated in a hollow Al block. Distillation is carried out at 0.5 atm. vac. The paraffins in the distillate are pptd. with butanone at -21° , and separated by filtration through Jena glass filters cooled with liquid air. Analysis of known mixtures by this method showed a max. paraffin loss of 2.62%. T. H. B.

Distribution of gum-forming constituents in cracked gasoline. S. M. MARTIN, JUN. [with W. A. GRUSE and A. LOWY] (*Ind. Eng. Chem.*, 1933, 25, 381—386).—A vapour-phase cracked gasoline was distilled into 32 fractions each with a boiling range of 5.6°. Fractions giving the greatest gum formation had b.p. corresponding with those of conjugated diolefines (I) and cycloolefines (II). Treatment of the fractions with maleic anhydride (III), partial hydrogenation of the fractions, treatment of the gasoline with H_2SO_4 , and then fractionation rendered the fractions stable to oxidation at 38° but gum-forming at 50° [at which temp. the fractions treated with (III) are the least, and the hydrogenated fractions the most, resistant]. The stability at 38° is thought to be due to removal of (I), which compounds readily peroxidise; then these products act as oxidation catalysts. Gummying at 50° is probably due to the presence of (II). D. K. M.

Cracking of Alaskan fur-seal oil. G. EGLOFF and E. F. NELSON (*Ind. Eng. Chem.*, 1933, 25, 386—387).—The chief products of the continuous cracking of seal oil at 481°/200 lb. per sq. in. are: gasoline (yield 59.9%, C_8H_{18} no. 66), containing unsaturates 40, aromatics 30.6, naphthenes 12.0, and paraffins 17.4%; a gas (yield 497 cu. m. per metric ton, calorific val. 1084 B.Th.U. per cu. ft.) which, after removal of CO_2 , contained CH_4 and lighter gases 60.1, C_2H_6 9.2, propylene 15.0, C_3H_8 8.4, $n-C_4H_{10}$ 4.2, *iso*- C_5H_{12} 3.1%; and a residuum which on steam-distillation gave an asphalt base equal to 12% of the original oil. D. K. M.

Production of lubricating oils by extraction with $[\beta\beta\text{-dichloroethyl ether}]$. J. M. PAGE, JUN., C. C. BOCHLER, and S. H. DIGGS (Ind. Eng. Chem., 1933, 25, 418—422).—Motor-lubricating oils of high quality are obtained on the large scale by the 3-stage countercurrent extraction of Salt Creek and mid-continent crudes with $\beta\beta\text{-(C}_2\text{H}_4\text{Cl)}_2\text{O}$, which dissolves the undesirable parts of the oil. The solvent is recovered by steam-distillation at 177° with a max. stripping temp. of 232° from both the raffinate and extract. The solvent is very stable and the loss 0.2% per cycle. D. K. M.

Boundary lubrication.—See I. **Decomp. of paraffins.** **Hydrogenation.**—See III. **Protecting Fe pipes.** **Sparking of tool steel in firedamp mixtures.** See X. **Determining moisture [in coal etc.].**—See XI. **Paints etc. containing tar oils.**—See XIII. **Oils used in tanning.**—See XV. **Anthracite coal as filter-medium.** **Coke-oven effluents.**—See XXIII.

See also A., June, 565, **Testing lubricating oils.** 570, **Water-gas equilibrium consts.** 586, **Fractionation column.** 587, **Apparatus for determination of paraffin.** 601, **Cancer-producing hydrocarbon from coal tar.**

PATENTS.

Production of solid fuel by briquetting and heat-treating. G. MERKEL (B.P. 391,975, 30.4.32. Ger., 1.5.31).—A non-caking or poorly caking fuel, *e.g.*, anthracite or semi-coke, is mixed intimately with 10—25% of a finely-ground caking coal and with a small amount, *e.g.*, 1—2%, of a binder such as pitch, the mixture is briquetted, and the briquettes are embedded in a neutral refractory material, *e.g.*, small coke, and carbonised. For household fuel carbonisation is effected at $600\text{--}650^\circ$, whilst briquettes for industrial purposes are produced by carbonisation at $900\text{--}1000^\circ$. A. B. M.

Chamber ovens. F. GOLDSCHMIDT (B.P. 391,726, 16.12.32).—A horizontal passage (*A*) connected to the vertical gas outlet (*B*) is arranged in the arch of the oven and is connected to the chamber by a no. of openings which increase in size the farther they are from *B*. The suction is thereby so distributed that the gases pass by the shortest path, *i.e.*, vertically, into *A* and thence to *B*, and are so protected from overheating. A. B. M.

Ovens for producing coke and coal gas. H. STÖTER-TILLMANN (B.P. 392,496, 11.2.33. Ger., 29.2.32).—The oven (*A*) has a horizontal gas flue (*B*) in the roof (*C*) with an uptake (*D*) at one end. *C* is constructed in part of a series of bricks which stand in *B*, with clearance around them, and have charging holes for the introduction of coal into *A*; they also have gas-outlet passages connecting the charging holes with *B*, through which gas can pass from *A* to *B* and thence to *D*. A. B. M.

Distillation of combustible carbonaceous materials. G. F. M. DUPONT, and PHYSICAL CHEMISTRY RESEARCH CO. (B.P. 391,545, 11.1.32).—Distillation is effected in the presence of alkali or alkaline-earth salts of fatty acids which give or form Me groups, *e.g.*, Ca(OAc)_2 , and of catalysts which facilitate substitution of the OH groups in phenols by Me, *e.g.*, Fe. Basic

materials, *e.g.*, Na_2CO_3 , may also be added to remove S. When the process is applied to oils, *e.g.*, petroleum, these are preferably made into a paste by admixture with a porous material, *e.g.*, coke or charcoal. If it is desired to keep the lubricating oils and asphalts intact, distillation is effected under pressure, *e.g.*, 10 kg./sq. cm. A. B. M.

Cleansing of carbonaceous matter. BRIT. COAL DISTILLATION, LTD., and C. MACHEN (B.P. 391,840, 7.8.31).—The material is carbonised and the product while still hot is conveyed across the surface of a tank (*A*) of H_2O under such conditions that the heavier shale or dirt is allowed to sink, whilst the porous carbonaceous residue remains at the surface and is removed therefrom out of the apparatus. The surface of the H_2O is maintained at the b.p. so that the steam evolved assists in giving buoyancy to the carbonised material; this effect may be enhanced by passing currents of air up through the H_2O in *A*. The shale and dirt are removed continuously from the bottom of *A* by suitable mechanical means. A. B. M.

(A) **Recovering alumina from coal and its ashes.** (B) **Making Portland cement from coal ashes.** W. M. GUERTLER, ASSR. to ELECTRIC SMELTING & ALUMINUM CO. (U.S.P. 1,873,642 and 1,874,186, [A] 23.8.32, [B] 30.8.32. Appl., [A, B] 21.3.30).—In the Cottrell dust from power plants the Al_2O_3 may reach 30% and the material has negative val. If, however, the coal be burned at $< 900^\circ$ the Fe becomes magnetic; a slurry of the dust can then be magnetically separated and afterwards treated with mineral acid, with, in (A), extraction of, *e.g.*, AlCl_3 from which Al_2O_3 is pptd. In (B), the hydrated silicious residue is suitable for the manufacture of Portland cement. B. M. V.

Producing a sooty atmosphere in gas-fired furnaces. E. G. DE CORIOLIS and H. B. BARBER, ASSRS. to SURFACE COMBUSTION CORP. (U.S.P. 1,873,999, 30.8.32. Appl., 20.5.31).—Hydrocarbon fuel and air are introduced in separate layers at such a low velocity that the flow remains non-turbulent, with deposition of C in the undiffused part of the gas. B. M. V.

Revivification of spent carbon. R. G. DAVIS, ASSR. to DARCO CORP. (U.S.P. 1,873,998 and 1,875,223, 30.8.32. Appl., [A] 19.8.30, [B] 4.12.31).—(A) C which has been used to absorb carbonaceous material is mixed with a limited quantity of air (100—150 cu. ft./lb. of adsorbed material), is heated quickly to above the ignition point ($800\text{--}1000^\circ$), and quickly cooled. The adsorbed material is completely burnt, and it can be arranged that $> 10\%$ of the active C is lost. In (B) a rotary tubular kiln with external stationary combustion jacket is described. B. M. V.

Gas producer for vegetable waste. HUMBOLDT-DEUTZMOTOREN A.-G. (B.P. 392,498, 13.2.33. Ger., 13.2.32).—The gasifying air is supplied through a central supply pipe (*A*) to a wide, *e.g.*, conical, nozzle (*B*), and through openings in the walls of the producer at about the level of *B*. The gas is withdrawn from the bottom of the producer. The upper surface of *B* may be fitted with vanes, so that by rotating *A* and *B* to-and-fro the charge is efficiently stirred. The bottom of the producer is closed by a basket and a plate grate, and a stirring

device is provided for loosening the ash above the grate.

A. B. M.

Manufacture of water-gas. HUMPHREYS & GLASGOW, LTD., and A. G. GLASGOW (B.P. 391,603, 20.4.32).—A water-gas plant consisting of a generator (*A*), carburettor, superheater, and waste-heat boiler is provided with steam connexions so arranged that a normal down-run or a back-run can be carried out, or these two methods of running can be so combined as to cause the steam to pick up and return to *A* none or any desired amount of the stored heat.

A. B. M.

Manufacture of a gas low in hydrocarbons, and approximating in composition to blue water-gas, from bituminous coal, lignite, peat, and the like. POWER-GAS CORP., LTD., and N. E. RAMBUSH (B.P. 391,682, 28.9.32).—The apparatus comprises a generator, a cracking chamber (*A*), a waste-heat boiler, etc. The blow gases are burned in *A* until its temp. is $> 900^\circ$, and preferably $> 1000^\circ$. The blow is followed by an up-run, the gases from which are passed through *A*, wherein the bulk of the tar etc. is cracked to H_2 and other permanent gases. A down-run follows, with steam which is highly superheated by being passed through *A*, and the cycle is then repeated.

A. B. M.

Gas-purification processes and apparatus therefor. KOPPERS CO. OF DELAWARE, ASSEES. OF J. BECKER (B.P. 391,833, 5.11.31. U.S., 5.11.30).—Coke-oven gas is purified in known manner by washing with a suitable liquid, e.g., aq. Na_2CO_3 , and the air fouled during activation of the washing liquid is supplied to the combustion chamber of the coke oven. The fouled air is first scrubbed to remove entrained liquid and is heated to avoid condensation of H_2O therefrom in the mains or passageways of the battery. Means are provided for automatically stopping the fuel-gas supply to the battery on failure of the air supply.

A. B. M.

Gas purifiers. W. BLAKELEY (B.P. 391,928, 5.2.32).—The purifiers contain a no. of tiers of grids for supporting the purifying material. Each tier is provided with inlet and outlet valves communicating with main inlet and outlet conduits, the arrangement permitting any tier to be used or put out of action independently of the others. The purifiers are provided with hinged doors through which the fouled material can be discharged into a telescopic shoot and thence on to a conveyor.

A. B. M.

Removal of tar from pyrolygneous liquids. D. F. OTHER, ASSR. to EASTMAN KODAK CO. (U.S.P. 1,866,719, 12.7.32. Appl., 19.1.31).—The tar is extracted by treating the liquids with a dihalogeno-alkyl ether, e.g., $\beta\beta'$ -dichloroethyl ether.

A. B. M.

Manufacture of bituminous emulsions. P. LECHLER (B.P. 392,365, 9.6.32. Ger., 17.8.31).—The molten bituminous material is treated with up to about 5% of alkali hydroxide or carbonate and is then emulsified in known manner. An emulsion of thicker consistency and increased stability is formed.

A. B. M.

Apparatus for separating a plurality of condensates of the hydrocarbon constituents of natural gas. W. M. PARKMAN, ASSR. to J. S. WATSON (U.S.P. 1,875,199, 30.8.32. Appl., 10.11.31).—A tower is provided with honeycomb baffles at the top and bottom, and

intermediately with absorbents (of, e.g., red-cedar charcoal) with free spaces between into which steam may be injected. Absorption of oils is effected at room temp. and distillation from the absorbents at successively raised temp.

B. M. V.

Continuous filtration [for dewaxing of hydrocarbon oils]. F. W. HALL, ASSR. to TEXAS CO. (U.S.P. 1,874,972, 30.8.32. Appl., 4.11.29).—A cycle for a vac. filter used in the dewaxing of oil comprises: (a) cake formation of wax and filter aid, (b) cake washing, (c) cake removal by reverse current of gas, (d) cleaning pores of filter by reverse current of gas with mist of filtrate incorporated.

B. M. V.

Preventing corrosion by sulphur compounds during conversion of hydrocarbons. A. P. SACHS, ASSR. to PETROLEUM CONVERSION CORP. (U.S.P. 1,873,851, 23.8.32. Appl., 24.6.29).—S is reduced to $< 1\%$ by the method described in B.P. 336,380 (B., 1931, 10), the proportion of carrier gas (e.g., CH_4 and H_2 with 0.1% S) being varied with the initial proportion of S, and the temp. inversely to the quantity.

B. M. V.

Treating [refining] oil. R. C. OSTERSTROM and R. T. TUCKER, ASSRS. to PURE OIL CO. (U.S.P. 1,873,783, 23.8.32. Appl., 17.4.28).—Petroleum is purified by redistillation and absorption of impurities from the vapours by, e.g., clay. The treatment conduit is sufficiently long to give the necessary time of contact, and small enough for the powdered absorbent to remain in suspension; the vapours are then passed upwards through a tower of larger cross-section in which they meet a reflux, which may be produced by partial condensation, and washes out the clay as well as the high-boiling constituents.

B. M. V.

Cutting oil. B. GALLSWORTHY, ASSR. to TEXAS CO. (U.S.P. 1,874,956, 30.8.32. Appl., 30.9.30).—A mineral lubricating oil, preferably of low viscosity, is mixed with 15–30% of oxidised paraffin wax, preferably of m.p. $< 35^\circ$.

B. M. V.

[Production of] combustible briquettes [having curved lateral surfaces]. N. V. MAATS. TOT EXPLOIT. VAN LIMBURGSCH STEENKOLENMIJNEN, GENAAMD ORANJE-NASSAU MIJNEN (B.P. 392,015, 21.7.32. Holl., 28.7.31).

Core for oil heaters. Separating oil- H_2O mixtures.—See I. Separating weak acids from gases.—See VII. Pptn. of resins from oils.—See XIII.

III.—ORGANIC INTERMEDIATES.

Application of halogen derivatives of hydrocarbons with particular reference to methyl bromide. A. HENNING (Chem. and Ind., 1933, 462–464).—The advantages of MeBr as a fire-extinguisher, refrigerant, and solvent for fats are stressed. Neither MeBr vapour nor the fumes evolved when it is used as a fire-extinguisher are appreciably toxic.

D. R. D.

Stability of trichloroethylene. ANON. (Synth. and Appl. Finishes, 1933, 4, 58–59, 61).— C_2HCl_3 is very stable in dry conditions, but in presence of H_2O and light HCl is liberated. In the degreasing of Cu for electrical purposes, H_2O also promotes attack by the solvent, leading to faulty appearance and electrical

leakage. Supplies of this solvent occasionally show an alkaline reaction due to NH_3 (arising from impurities).

S. S. W.

Effect of gamma radiations on chloroform.

W. B. S. BISHOP (J. Proc. Sydney Tech. Coll. Chem. Soc., 1933, 5, 66—69).— γ -Rays (and X-rays) liberate Cl_2 from CHCl_3 . After prolonged irradiation HCl and C_2Cl_6 are formed with disappearance of Cl_2 .

A. A. L.

Analysis of sulphonates of the aliphatic alcohols.

H. JAHN (Chem.-Ztg., 1933, 57, 383—384).—The majority of the commercial sulphonates are esters capable of hydrolysis by HCl and it is to this class that the method applies. 3—4 g. of the paste are warmed with 100 c.c. of a mixture (I) of EtOH and C_2HCl_3 with dissolution of the org. compound and separation of Na_2SO_4 . After filtering, the residue is washed with (I) and the filtrate evaporated and heated with HCl until the fatty compound separates in the surface of a piece of pumice. It is diluted with H_2O , extracted with Et_2O , and SO_4^{2-} determined in the aq. solution.

C. I.

Thermal decomposition of simple paraffins.

F. E. FREY and H. J. HEPP (Ind. Eng. Chem., 1933, 25, 441—449).— C_3H_8 , *n*- and *iso*- C_4H_{10} , *n*- and *iso*- C_5H_{12} (I, II), *n*- C_6H_{14} (III), CMe_4 , and $\beta\gamma$ -dimethylbutane have each been decomposed by passage through a SiO_2 tube at 575° [(I), (II), and (III) also at 400 — 425°]. The breaking of the C chain resulted in the formation of a mol. of paraffin and a mol. of the complementary olefine; if the paraffin was higher than CH_4 part of it was converted into the corresponding olefine and H_2 . (I) and (III), however, did not yield equal mols. of complementary products and their behaviour is in accordance with the theory postulating the formation and subsequent decomp. of free alkyl radicals. When olefines were produced by the scission of a side-chain the ethylenic linking in the product was in the inner and not the ω -position.

D. K. M.

Use of catalysts for the high-pressure hydrogenation of phenols and hydrocarbons. H. TROPSCHE and O. WEINSTEIN (Mitt. Kohlenforschungsinstit. Prag, 1932, 171—195; cf. B., 1931, 194).—A commercial tricresol was hydrogenated, using WO_3 , WS_3 , FeS , MoO_3 , MoS_3 , and CoS as catalysts. In some cases salts such as $(\text{NH}_4)_2\text{WS}_4$ were used, giving a good physical condition on loss of NH_3 . WS_3 , MoS_3 , and CoS are more active than the oxides; WS_3 left 13.6% of phenols in the product after 1 hr. at 465° and 188 kg./sq. cm., compared with 92.7% with WO_3 under similar conditions. At 370 — 380° CoS showed the highest hydrogenating power, followed by MoS_3 [as $(\text{NH}_4)_2\text{MoS}_4$]. The temp. of initial reaction varied with the catalyst between 330° and 400° . The degree of hydrogenation rises as the reaction temp. falls. At lower temp. no compounds like cyclohexanols were formed. WS_3 and MoS_3 applied to gas oils at 80 kg./sq. cm. and 440° for 1 hr. gave a higher and more saturated light-hydrocarbon yield. NiS was of only moderate catalytic val., whilst MoO_3 and ZnS were very poor. With paraffin wax, MoS_3 gave increased yields of light saturated hydrocarbons.

T. H. B.

Industrial catalytic preparation of aniline from nitrobenzene. A. L. IRLIN (Anilinokras. Prom., 1933,

3, 68—76).— $\text{Cu} + 10\%$ CaO at 240 — 250° is the best catalyst for the reduction of PhNO_2 to NH_2Ph and retains its activity for 80 hr.; electrical heating is recommended, and yields up to 96.5% are obtainable.

G. A. R. K.

Separation of *m*-xylylidine from a mixture of isomerides by means of formic acid. B. I. KISSIN (Anilinokras. Prom., 1933, 3, 80—84).— HCO_2H can be used in place of AcOH for the pptn. of *m*-xylylidine, but a rise of temp. above 20° must be avoided, otherwise formylation takes place. *p*-Xylylidine is also readily formylated, and formylation cannot be used to separate the *m*- and *p*-isomerides; the *o*-compound is formylated with difficulty.

G. A. R. K.

Wetting agents. V. V. KOSLOV and T. D. NEFEDOVA (Anilinokras. Prom., 1933, 3, 84—87).—A mixture of C_{10}H_8 and fusel oil (I) is sulphonated with oleum (68% SO_3), giving a satisfactory solid wetting and emulsifying agent; similar but liquid products result when (I) is replaced by Pr^nOH , Bu^nOH , or *iso*amyl alcohol. Naphthalenedisulphonic acids could not be condensed with (I) to give wetting agents. The application of the new product to dyeing is discussed.

G. A. R. K.

Colorimetric determination of α -naphthylamine in technical naphthionate. V. LENHOLD (Anilinokras. Prom., 1933, 3, 87—88).—A diazotised solution of sulphanilic acid (I) is added to the naphthionate to be tested and to a standard naphthionate solution, previously acidified with AcOH , and the colours are compared, an accuracy of 0.1—0.15% being attained. A greater accuracy (0.03%) can be attained using benzidine in place of (I), especially if 33% HCO_2H is used instead of AcOH ; the solution must then be kept for 1—1.5 min. for the colour to develop.

G. A. R. K.

Preparation of 1-nitroso- β -naphthol-3-carboxylic acid. V. G. GULINOV (Ukrain. Chem. J., 1932, 7, [Tech.], 197—198).— β -Naphtholcarboxylic acid cannot be satisfactorily nitrosated by the usual method owing to its insolubility in H_2O , but in presence of AcOH a 90—92% yield of the NO -compound is obtained.

G. A. R. K.

Detecting diamines in hair dyes.—See IV.

See also A., June, 561, Fractionation of azeotropic mixtures. 590, C_2H_2 polymerides and their derivatives. 591, Reactions of substituted divinylacetylenes. 592, Nitrates of glycols. 595, Prep. of dihydroxyacetone. 601, Synthesis of homologous naphthalenes. Dichloronaphthalenes and related intermediates. Synthesis of phenanthrene and its derivatives. 604, Catalytic hydrogenation of esters to alcohols. 608, Prep. of nitrophthalic anhydrides. 613, Preps. of 5-methylfurfuraldehyde and 5-bromofuroic acid. 617, Synthesis of acenaphthenep er i-*m*-thiazines. 621, Determination of volatile acids, and of org. acids. Volumetric analysis of anthranilic acid and its salts. 637, Production of acids and EtOH by *Aspergillus*, and of citric acid by moulds. 639, PrCO_2H bacteria. COMe_2 -butanol and gluconic acid fermentations. 640, Trimethylene glycol fermentation. 654, Folin-Denis colorimetric tests.

PATENTS.

Manufacture of aliphatic [acetic] anhydrides. H. DREYFUS (B.P. 389,835, 24.9.31).—In the conversion of (acetic) acid into anhydride, a catalyst comprising a stable sulphate of a metal at least as electronegative as Al (Al, Cr^{III}, Mn^{II}, or Mn^{III}) is used, preferably on pumice, kieselsguhr, or asbestos, with or without alkali or alkaline-earth sulphates, at 550—650°. C. H.

Manufacture of sulphuric esters of aliphatic alcohols. SOC. CHEM. IND. IN BASLE (B.P. 390,023, 30.5.32. Switz., 29.5.31. Addn. to B.P. 365,468; B., 1932, 495).—Monohydric aliphatic alcohols above C₈, e.g., oleyl or stearyl alcohol, are sulphated with additive compounds of *tert.* bases and SO₃ in presence of excess of the base, e.g., with C₅H₅N, SO₃ in C₅H₅N. C. H.

Manufacture of vinyl ketones. J. Y. JOHNSON. From I. G. FARBEIND. A.-G. (B.P. 389,884, 3.10.31).— α -Di(hydroxymethyl) derivatives of ketones (cf. B.P. 361,597 and 381,686; B., 1932, 301; 1933, 101) are dehydrated by distillation, preferably in vac., and, if desired, in presence of non-alkaline, non-polymerising dehydrating agents, e.g., Al₂O₃, ZnO, Cr₂O₃, H₃PO₄, etc. Me $\beta\beta'$ -dihydroxyisopropyl ketone ("dimethylol-acetone") gives α -hydroxymethylvinyl Me ketone; α -methylvinyl Me ketone is obtained from Me $\alpha\alpha$ -di(hydroxymethyl)ethyl ketone. C. H.

Manufacture of 4-amino-2:5-dialkoxydiphenyls and azo dyes [pigments and ice colours] therefrom. I. G. FARBEIND. A.-G. (B.P. 390,029, 24.6.32. Ger., 24.6.31).—A 2:5-dialkoxydiaryl is nitrated in position 4 and reduced (e.g., with H₂ and Ni) to the amine, which may be diazotised and coupled in substance or on the fibre with a 2:3-hydroxynaphthoic arylamide, e.g., the 4-chloro-2:5-dimethoxyanilide, to give light-fast violets and blues. The following diaryls are suitable starting materials (m.p. of 4-NO₂- and 4-NH₂-derivatives in parentheses): 2:5-(OMe)₂, m.p. 42°, b.p. 180°/10 mm. (102—103°, 89°); 2:5-(OEt)₂, b.p. 175—190°/8 mm. (92°, 72—73°); 2:5:4'-(OMe)₃, m.p. 62—64° (106°, 125—126°); 2:5-(OMe)₂:4'-Ph, m.p. 190—191° (159—161°, 213—214°), from 2:5-dihydroxyterphenyl, m.p. 171—172°; 2:5-(OBuⁿ)₂, b.p. 200°/10 mm. (41—42°, 52—53°); 3'-Cl-2:5-(OMe)₂, m.p. 43—44° (127°, 68—69°); 3':5'-Cl₂-2:5-(OMe)₂, m.p. 104—107° (149—150°, 161—163°); 2:5-(OMe)₂:4'-Me, m.p. 66—67° (167°, 103—104°); 2:5-(OMe)₂:2'-Me, m.p. 74—75° (86—87°, 116—117°); 2'-Cl-2:5-(OMe)₂, b.p. 180°/8 mm. (132—134°, 131—132°); 4'-Cl-2:5-(OMe)₂, m.p. 63—64° (152—153°, 101—102°); 4'-NHBz-2:5-(OMe)₂, m.p. 148—149° (187°, 150°); 3':4'-Cl₂-2:5-(OMe)₂, m.p. 58—59° (137°, 113°); 2':4'-Cl₂-2:5-(OMe)₂, b.p. 195°/8 mm. (125—127°, 100°); 2:5-(OMe)₂, 3'-CF₃, b.p. 167°/8 mm. (139—140°, 67—68°); 2:5-(OMe)₂:2':4'-Me₂, b.p. 178°/8 mm. (126—127°, 99—100°); 2'-Cl-2:5:4'-(OMe)₃, b.p. 205°/8 mm. (132—133°, 112—113°); 3'-Cl-2:5:4'-(OMe)₃, b.p. 220°/8 mm. (127—128°, 101—103°); 4'-Cl-2:5-(OMe)₂:2'-Me, b.p. 190°/8 mm. (150—151°, 106°); 2:5:2'-(OMe)₃:5'-Me, m.p. 98—100° (112—113°, 107—108°); 2':4':5'-Cl₃-2:5-(OMe)₂, b.p. 205°/8 mm. (156—157°, 126—127°); 3':4':5'-Cl₃:2:5-(OMe)₂, m.p. 104—106° (190—191°, 175—176°);

4'-Cl-2:2':5:5'-(OMe)₄, m.p. 126—127° (187—190°, 175—179°); 5'-Cl-2:2':5:4'-(OMe)₄, m.p. 114—115° (192—193°, 148—149°); 3'-Cl-2:5-(OBuⁿ)₂, b.p. 220°/8 mm. (60°, liquid); 2:5-(OMe)₂:3'-Me, b.p. 170°/8 mm. (114°, liquid); 2:5-(OEt)₂:3'-Me, b.p. 178°/8 mm. (75—76°, liquid); 2:2':5-(OMe)₃, b.p. 192—193°/8 mm. (114—116°, liquid); 2:5-(OMe)₂:3'-SO₂Me, b.p. 260°/8 mm. (192°, liquid); 2':5'-Cl₂-2:5-(OMe)₂, b.p. 195°/8 mm. (147—148°, liquid); 5'-Cl-2:5-(OMe)₂:2'-Me, b.p. 185°/8 mm. (110—111°, liquid). Numerous couplings are described. C. H.

Stabilised heating fluid.—See I. **Products from cellulosic material.**—See V. **Xanthates.**—See VII. **Aldehyde-free alcoholic liquids.**—See XVIII.

IV.—DYESTUFFS.

Detection of *p*-phenylenediamine and other diamines [*p*-tolylenediamine] in hair dyes. C. GRIEBEL and F. WEISS (Z. Unters. Lebensm., 1933, 65, 419—428).—*p*-Phenylene- (I) and *p*-tolylene-diamine (II) can be distinguished, and the former detected in the presence of an excess of the latter, by the vanillin-HCl reaction of Griebel (B., 1931, 195). If possible, the chloroimide should be isolated by means of Ca(OCl)₂ and characterised by its m.p. The brick-red colour produced by vanillin-HCl in the presence of (I) is changed to purple-violet by excess of H₂O (distinction from *p*-aminodiphenylamine). The presence of the latter and of *m*-C₆H₄(NH₂)₂ renders difficult the detection of (I) and (II). For these cases a distinct procedure is recommended. E. G. S.

Preparation of olive and green sulphur dyes related to Italian Green from copper and aluminium nitrosophenoxides. V. G. GULINOV (Ukrain. Chem. J., 1932, 7, [Tech.], 198—204).—Samples of Italian Green often vary in colour owing to the uneven distribution of Cu salts in the mass. This can be avoided by mixing a paste of C₆H₄(NO₂)₂·OH with Cu(OH)₂; the mixture on treatment with Na polysulphides give a homogeneous dye of bluish-green colour. Cu nitrosophenoxide on similar treatment gives a pure olive dye; a mixture (85:105) of Cu and Al nitrosophenoxides gives a pure bluish-green dye fast to light, washing, and alkali. G. A. R. K.

Nitro-dye from benzidine and chlorodinitrobenzene. V. G. GULINOV (Ukrain. Chem. J., 1932, 7, [Tech.], 183).—Benzidine condenses with C₆H₃Cl(NO₂)₂ in EtOH in presence of NaOAc to a H₂O-insol. dye; this is converted into the sol. sulphonic acid which dyes wool a bright yellow shade of satisfactory fastness. G. A. R. K.

Nitro-dye from 2-amino-8-naphthol-6-sulphonic acid and chlorodinitrobenzene. V. G. GULINOV (Ukrain. Chem. J., 1932, 7, [Tech.], 184).—A solution of γ -acid in aq. Na₂CO₃ condenses with C₆H₃Cl(NO₂)₂ in presence of NaOAc to a yellow wool dye of satisfactory fastness; the corresponding 2:4-disulphonic acid does not yield a condensation product. G. A. R. K.

Nitro-dye from naphthionic acid and chlorodinitrobenzene. V. G. GULINOV and L. V. DANILEVSKAJA (Ukrain. Chem. J., 1932, 7, [Tech.], 189—192).—Na naphthionate is condensed with C₆H₃Cl(NO₂)₂

(I) (cf. preceding abstract), the product reduced with Fe and AcOH, and this again condensed with (I), giving a brown-violet acid wool dye of good fastness.

G. A. R. K.

Nitro-dyes from diaminophenyl- β -naphthyl-aminesulphonic acids. V. G. GULINOV and L. V. DANILEVSKAJA (Ukrain. Chem. J., 1932, 7, [Tech.], 192—195).—Brenner's acid and amino-G-acid are condensed with $C_6H_3Cl(NO_2)_2$ (I) (cf. preceding abstract), the products are reduced with Fe and dil. AcOH, and the resulting amines again condensed with (I), giving acid wool dyes, bright cinnamon brown and dark brown, respectively.

G. A. R. K.

Nitro-dye from diaminophenylhydroxynaphthyl-aminesulphonic acid and dinitrochlorobenzene. V. G. GULINOV and L. V. DANILEVSKAJA (Ukrain. Chem. J., 1932, 7, [Tech.], 195—196).—The condensation product of 2-amino-8-naphthol-5-sulphonic acid with $C_6H_3Cl(NO_2)_2$ (I) (cf. preceding abstract) is reduced with Fe and AcOH and again treated with (I), affording an acid wool dye giving fast brown shades with a slight violet tinge.

G. A. R. K.

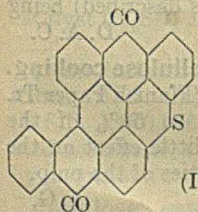
Colouring matter of butter. Paprika pigment in sausages.—See XIX.

See also A., June, 555, Coal-tar dyes in the ultraviolet. 594, Plant dyes. 614, Colouring matter of "Awobana." 615, Cryst. compounds in redwood extract. 617, Dyes from acenaphthenep θ -m θ -thiazines. 625, Histological applications of $CHPh_3$ and $CHPh_2 \cdot C_{10}H_7$ dyes.

PATENTS.

Manufacture of esters of the leuco-compounds of vat dyes. I. G. FARBENIND. A.-G. (B.P. 390,081, 6.10.32. Ger., 7.10.31. Addn. to B.P. 360,907; B., 1932, 254).—Anhyd. leuco-compounds are obtained by reducing vat dyes with alkali sulphide or polysulphide, preferably in org. diluent, e.g., C_5H_5N , in substantial absence of H_2O and O_2 . The leuco-compound may be esterified, e.g., with $C_5H_5N \cdot SO_3$, without isolation.

C. H.



Manufacture of vat dyes of the anthraquinone series. J. Y. JOHNSON. From I. G. FARBENIND.

A.-G. (B.P. 389,961, 5.2.32).—1:2'-Dianthraquinonyl sulphide or its halogen derivatives or corresponding sulphoxides are heated with $ZnCl_2$ above 200° , e.g., at

305 — 310° to give blue-green vat dyes of the type (I).
C. H.

Manufacture of dye preparations [containing stable reduction products of thioindigoid vat dyes].

I. G. FARBENIND. A.-G. (B.P. 389,915, 2.12.31. Ger., 2.12.30).—The products of B.P. 334,878, 334,919, or 338,104 (B., 1930, 1144; 1931, 14, 239) are intimately ground with a derivative of benzyl- or dimethylsulphanilic acid or $1-C_{10}H_7 \cdot SO_3H$, e.g., the benzidine or Sn salt, which becomes H_2O -sol. under printing conditions, and made into a printing paste.
C. H.

Manufacture of water-insoluble azo dyes [pigments and ice colours]. I. G. FARBENIND. A.-G. (B.P.

390,079, 4.10.32. Ger., 5.10.31).—A diazotised arylamine, free from solubilising groups, is coupled in substance or on the fibre with an α -naphthindole carrying in positions 7:8 or 8:7 $\cdot OH$ and $\cdot CONHAr$ groups, in position 2 a hydrocarbon group, and in position 3 H or a hydrocarbon group (or in positions 2:3 a tetramethylene group). The shades obtained are blue, violet-blue to blue-black. Examples are: 5-nitro- α -anisidine or 3-aminocarbazole \rightarrow 8-hydroxy-2-phenyl- α -naphthindole-7-carboxylic *p*-anisidide; 5-nitro- α -anisidine \rightarrow 8-hydroxy-2-methyl- or -2:3-dimethyl- α -naphthindole-7-carboxylic *p*-anisidide or α -naphthylamide, or 7-hydroxy-1:2:3:4-tetrahydro- α -naphthacarbazole-8-carboxylic *p*-chloroanilide.
C. H.

[Manufacture of] disazo [acid] dyes. IMPERIAL CHEM. INDUSTRIES, LTD., and M. MENDOZA (B.P. 389,818, 21.9.31).—2:2'-Tolidine is tetrazotised and coupled with 1 mol. each of 2 different naphthol-mono-, -di-, or -tri-sulphonic acids, the total SO_3H groups being < 5 , ≥ 1 being in position 8 relative to a 1- or 2-OH group. The dyes give on wool red shades fast to milling. Examples of coupling components are: G- and R-acids; G- and N.W.-acids; 2:7- and 1:4-, 1:4- and 1:8-, 2:8- and 1:4-naphtholsulphonic acids.
C. H.

Azo dyes.—See IV.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Effect of atmospheric humidity and temperature on relation between moisture content and electrical conductivity of cotton. A. C. WALKER (J. Text. Inst., 1933, 24, T 145—160; cf. B., 1929, 201).—The relation between the insulation resistance (I.R.) of cotton and its moisture content (M.C.) can be represented over the whole range by the three equations: $\log I.R. = -A \times \% M.C. + B$ (M.C. $< 3\%$); and $= -A \log \% M.C. + B$ (M.C. 3—10%); and $= -A \% R.H. + B$ (M.C. $> 10\%$), where R.H. is the relative humidity of the atm. with which the cotton is in equilibrium. The vals. of the consts. *A* and *B* in each equation depend on the previous moisture history of the cotton, and on whether it is raw or H_2O -boiled. The higher is the temp. at which wet cotton is dried the higher is its I.R. Neither the pore theory nor that of orientation of OH groups completely accounts for the hysteresis effect in the relation between I.R. and M.C.
A. G.

Effect of salt on boil-off in silk-soaking. R. HART (Melliand Text. Month., 1933, 5, 68—69).—The addition of a small amount (e.g., 0.5% of the silk) of Na_2SO_4 increases the boil-off and the oil efficiency in silk-soaking.
A. G.

Flax fibre in relation to quality. R. M. SNYDER and B. B. ROBINSON (Melliand Text. Month., 1933, 5, 55—57).—The quality of flax samples is correlated with the tensile strength but not with the microscopical appearance, though the latter may aid in determining the degree of retting.
A. G.

Measurement of hydrogen-ion concentration in the textile industry. K. SCHULZE (Mitt. Textilforschungsanst. Krefeld, 1932, 8, 12—16).—An account of current methods.
A. G.

Determination of the acetyl content of carbohydrate acetates. H. L. PARSONS (*J. Text. Inst.*, 1933, **24**, T 167—173).—0.5 g. of a carbohydrate acetate of known moisture content is dissolved in 5 c.c. of 65% H_2SO_4 by keeping for 5 hr. at 30° with occasional stirring; the solution is diluted with 30 c.c. of H_2O and is refluxed for 15 min. or set aside overnight. After making up to 50 c.c., 10 c.c. are extracted with 20 c.c. of Et_2O and 10 c.c. of the extract run into 20 c.c. of 75% $EtOH$ and titrated with 0.01N-NaOH (phenolphthalein). Since extraction of $AcOH$ from H_2O by Et_2O is not quant. an analytical factor must be determined experimentally for each type of acetate to be analysed. Any dye is first removed from cellulose acetate with $CH_2Cl_2-C_6H_6$ mixture. A. G.

Fabric investigations. VII. Weft cracks in rayon crêpe. VIII. Warp stripes in acetate-rayon cloths. W. WELTZIEN and W. COORDT [with H. SKAMKIEWICZ] (*Mitt. Textilforschungsanst. Krefeld*, 1932, **8**, 17—23, 25—32).—VII. Weft cracks occur more frequently in rayon crêpe fabrics when bleached yarn has been used, and are then generally due to local oxidation caused by residues of linseed oil size or of spinning oil containing traces of metals. Over-twisting of yarn causes a small loss of strength, but is not a probable cause of serious weakness; such weakness can be detected by an increased strength of the yarn when untwisted. Spinning faults and too heavy calendering are other possible causes of weft cracks.

VIII. Warp stripes in acetate-rayon fabrics may be due to variations in the quality of the rayon, in the tension or arrangement of the warp ends, in the lustre of partly hydrolysed acetate or of acetate delustrated without hydrolysis, or to faulty desizing. A. G.

Determination of oil in acetate rayon. W. WELTZIEN and W. KÖNIGS (*Mitt. Textilforschungsanst. Krefeld*, 1932, **8**, 40—42).—Oil cannot be removed completely from acetate rayon by extraction with light petroleum (b.p. 40—65°). It is determined by steeping the dried rayon overnight at 45° in a solution containing 10 g. of Marseilles soap, 10 g. of Laventin KB, and 1 g. of Na_2CO_3 per litre, heating at 50—60° for 1 hr., and washing, drying, and reweighing. The oil content is very variable. A. G.

Linseed oil sizes. I. General methods for the investigation of difficulties and faults. W. WELTZIEN. II. Effect of linseed oil sizes on the extensibility and strength of viscose rayon. W. COORDT (*Mitt. Textilforschungsanst. Krefeld*, 1932, **8**, 1—5, 7—12).—I. In removing linseed oil size from rayon it is better to soap at 80° than at 95—100°. Residues of size can often be detected by fluorescence in ultra-violet light, by treatment with aq. Na_2S , or by dyeing with Me-violet (acetate rayon), but none of these methods is certain and they should be applied to the material both before and after a desizing treatment. The best method is microscopical examination of the filaments. Damage by linseed oil size most often occurs in bleached material, it is found in places where the size is abnormally acid, and it is often due to traces of metals. Size can be tested by heating sized material at 105° for 2 hr., when little loss of strength should occur.

II. Normal and fine filament viscoses were heated for 3 hr. at 105° alone and with 6 linseed oil sizes. The breaking load of the unsized rayon was unaffected, whilst the vals. for the sized rayons were lowered and the p_H of the aq. extracts was raised. Generally, the more acid sizes had the greater effect, but acidity was not the only controlling factor. A. G.

Pectin as a source of lignin and humus. O. ASCHAN (*Finnish Paper Tr. J.*, 1932, 366—367).—If humus is dried at >110° volatile constituents are lost. When dried at lower temp. the composition agrees with that of Ehrlich's galacturonic acid obtained by the hydrolysis of pectin. A. G.

Circulation of liquor in the sulphite[pulp] cooking process. T. SAMSON (*Zellstoff u. Papier*, 1933, **13**, 207—213, 265—268).—A no. of systems of external circulation and heating of liquor are described, including a detailed examination of the Schaufelberger method, where a const. circulation of liquor, with a max. variation of 2%, maintains even heat distribution and concn. of liquor throughout the digester. Calculations are given comparing conditions with indirect and direct cooks. Spent liquor from an indirect cook, which has a higher steam consumption of 9.4%, contains 1.15% CaO , as compared with 0.776% CaO from a direct cook. D. A. C.

Lignosulphonic acid and the chemical mechanism of the sulphite[pulp] cooking process. E. HÄGGLUND (*Zellstoff u. Papier*, 1933, **13**, 261—265).—The sulphonation of lignin proceeds in two stages, viz., the formation of lignosulphonic acid (I) in the solid phase, and its dispersion by hydrolysis, the severity of the cook and composition of the liquor governing both the S and OMe contents of the (I) and its degree of dispersion, on which depends its ability to be pptd. by NaCl, aromatic amines, alkaloids, etc. Liquors with a high base content and low $[H^+]$ give sulphonic acids rich in S both in the solid and dispersed phase, and the rate of dispersion of the solid phase depends on its $[H^+]$. α - and β -Lignosulphonic acids are separated, the latter only (a method for the isolation of which is described) being dispersed in $C_{10}H_7 \cdot NH_2$. D. A. C.

Use of black liquor in sulphate-cellulose cooking. E. HÄGGLUND and G. SCHOLLEN-BORG (*Finnish Paper Tr. J.*, 1932, 368—372).—Replacing up to 50% of the cooking liquor with black liquor has little effect on the cooking time or on the yield or properties of the pulp. A. G.

Chlorination of wood. H. R. HIRST and A. T. KING (*J. Text. Inst.*, 1933, **24**, T 174—184).—Flannel was chlorinated with bleaching powder or with aq. Cl_2 and with additions of salts and/or acids, and the samples were compared for unshrinkability, strength, colour, handle, and level dyeing. Addition of salt produces greater levelness by retarding chlorination, but excessive amounts diminish the unshrinkability. A. G.

Rosin sizing of paper. F. SCHÜTZ and W. KLAUDITZ (*Papier-Fabr.*, 1933, **31**, 281—286, 295—300, 307—311).—Al rosinate (I) and Al abietate are sol. in C_6H_6 , Et_2O , $EtOAc$, etc., but if the solvents are wet hydrolysis occurs and basic salts, $Al(OH)R_2$ and $Al(OH)_2R$, can be

obtained. Interaction of Na rosinate (II) and $Al_2(SO_4)_3$ yields the normal salt, the absence of hydrolysis being ascribed to the insolubility of this salt. (II) is not greatly hydrolysed in solution; abietic acid is not very weak, the dissociation const. being about 10^{-5} . The colloid particles in technical free rosin size are salts of the type NaR_4 . (I) can be extracted from sized paper with $Et_2O + C_6H_6$, and the yield is nearly equiv. to the (II) added to the hollander. A. G.

Fastness to light of coloured papers. K. BERNDT (Zellstoff u. Papier, 1933, 13, 271—273).—The properties and uses in the industry of the various classes of dyes are discussed, together with the effect of light on the physical properties, and causes of discoloration, of papers. A method of testing the light-fastness of papers by comparison under a Hg lamp is described. D. A. C.

Recovering aq. NaOH containing hemicellulose.—See VII. **Determining moisture [in wool, paper, etc.]**.—See XI. **Sulphite-cellulose liquor in tanning.**—See XV. **Nitrocellulose.**—See XXII.

See also A., June, 567, Rosin sizing.

PATENTS.

Degreasing of wool with [volatile] solvents. E. J. R. DRAKE (B.P. 391,929, 8.2.32).—Apparatus particularly suitable for the treatment of baled wool is described. D. J. N.

Treatment [changing the solubility] of cellulose acetate. C. J. MALM, Assr. to EASTMAN KODAK CO. (U.S.P. 1,870,635, 9.8.32. Appl., 3.5.30).—Hydrolysis is carried out first above the normal hydrolysis temp. (27—66°) and, prior to stopping the hydrolysis, at a lower temp. (< 27°). F. R. E.

Manufacture of chloroform-insoluble [fibrous] cellulose acetate. C. J. STAUD and H. LE B. GRAY, Assrs. to EASTMAN KODAK CO. (U.S.P. 1,870,594, 9.8.32. Appl., 1.2.29).—After pretreating undegraded cellulose with AcOH and H_2SO_4 and washing free from acid, acetylation is carried out in a bath of conc. Ac_2O and a catalyst (H_2SO_4 and H_3PO_4) initially free from AcOH. F. R. E.

[Non-inflammable] cellulose acetate composition. S. J. CARROLL, Assr. to EASTMAN KODAK CO. (U.S.P. 1,870,556, 9.8.32. Appl., 9.3.29).—A halogenated acetamide, e.g., $CCl_3 \cdot CO \cdot NH_2$, is added to the ester by means of a common solvent (COMe₂). F. R. E.

Cellulose ester composition. G. ROCKER and E. B. MIDDLETON, Assrs. to DU PONT VISCOLOID CO., INC. (U.S.P. 1,868,851, 26.7.32. Appl., 8.10.31).—Glycerol Me ethers are used as softeners for cellulose esters, particularly the acetate. 1—25% on the wt. of cellulose ester is suitable. D. J. N.

Manufacture of viscose. R. THURM, Assr. to BAKER PERKINS CO., INC. (U.S.P. 1,871,245, 9.8.32. Appl., 26.10.31).—Cellulose sheets are soaked in NaOH, pressed from excess NaOH, aged, and kneaded *in vacuo* while gradually adding CS_2 to form a stiff xanthate dough; after removal of excess CS_2 *in vacuo*, dil. aq. NaOH is gradually added to the dough while stirring and kneading. F. R. E.

Preparation of cellulose [cuprammonium] solutions. H. P. BASSETT (U.S.P. 1,869,040, 26.7.32. Appl., 13.2.30).—An intimate mixture of cellulose and $Cu(OH)_2$ is obtained by beating the cellulosic material for 0.5—5 hr. in an ordinary beater and then pptg. $Cu(OH)_2$ on the pulp by double decomp. of NaOH and $CuSO_4$. The aq. NaOH is preferably circulated first, the aq. $CuSO_4$ (sufficient to give, e.g., 39% of Cu on the wt. of cellulose) being subsequently introduced in a thin stream under the beater roll. The impregnated pulp is separated, washed, and dissolved in aq. NH_3 . D. J. N.

Separation of cellulosic materials [esters by gravity]. L. E. CLEMENT, Assr. to EASTMAN KODAK CO. (U.S.P. 1,866,965, 12.7.32. Appl., 29.6.29).—A mixture containing two colloidalised cellulose derivatives differing in *d* by < 0.3, e.g., cellulose acetate (*d* 1.24) and nitrate (*d* 1.45), are separated by immersing them in an inert liquid of intermediate *d*, e.g., aq. $NaNO_3$ of *d* 1.35. Scrap film may be so treated. D. J. N.

Treating (A) fibres for papermaking and other uses, (B) woody materials to obtain fibres therefrom. L. A. DILS, Assr. to KELLOGG DILS, INC. (U.S.P. 1,868,569—70, 26.7.32. Appl., [A] 24.7.30, [B] 26.7.30. Renewed [A, B] 12.12.31).—(A) The material (hemp, flax straw, etc.) is cooked for 10—20 min. at about 104°/1 atm. in a liquor having the following approx. composition (wt.-%): H_2O 50, $Na_2B_4O_7$ 39, NaOH 10, Na_3PO_4 1. It is then beaten for 1—3 hr. and used for the manufacture of, e.g., cover papers. (B) The material is cooked for 15—45 min. at 127°/1 atm. with a liquor containing approx. 50 wt.-% of NaOH and small quantities of $Na_2S_2O_3$ (1.25%), $Na_2B_4O_7$ (2.25%), and Na_3PO_4 (2.5%). Suitable cooking times are 18 min. for spruce chips and 12 min. for flax straw. D. J. N.

Manufacture of cellulose material [α -cellulose] from hemp fibres. E. C. WORDEN, 1st, Assr. to HANSON & ORTH (U.S.P. 1,866,917, 12.7.32. Appl., 16.3.29).—Hemp is opened up mechanically and digested at about 110° for 3—8 hr. with a liquor containing 3—7% of NaOH, 0.5—3% of Na silicate, and 0.5—4% of cottonseed (or other saponifiable) oil. The washed fibre is then carefully bleached in absence of air, and, after further washing to neutrality, is dried at a moderate temp. The product contains < 1% of hemicelluloses and is particularly suitable for use in the manufacture of artificial silk. D. J. N.

Manufacture of artificial filaments or the like. BRIT. CELANESE, LTD., W. I. TAYLOR, R. P. ROBERTS, and J. F. BRIGGS (B.P. 392,218, 13.11.31. Addn. to B.P. 325,233; B., 1930, 413).—The additional evaporative medium is introduced by means of a conduit having a no. of apertures which may be opened or closed as desired. F. R. E.

Manufacture and treatment of artificial filaments, threads, yarns, ribbons, fabrics, etc. containing cellulose derivatives. H. DREYFUS (B.P. 392,191, 5.11.31).—Materials composed of org. derivatives of cellulose are treated, by addition to the spinning solution, or to the coagulation or after-treatment baths, with swelling agents or plasticisers consisting of cyclic ethers, or ethers or esters thereof, obtained by

condensation of aliphatic compounds with ≤ 4 OH groups, e.g., erythritol, with glycols, aldehydes, or ketones.

F. R. E.

Manufacture of artificial silk and like products.

H. DREYFUS (B.P. 392,185, 5.11.31).—Filaments etc. of org. derivatives of cellulose are subjected to a no. of softening treatments of progressively increasing strength, e.g., by altering the nature, quantity, concn., temp., or duration of action of the softening agent, and are then stretched.

F. R. E.

Manufacture of artificial sponges and other porous structures. I. G. FARBENIND. A.-G., Asses. of H. MOSTNY (B.P. 392,483, 22.12.32. Ger., 28.12.31. Addn. to B.P. 369,082; B., 1932, 461).—A mixture of viscose and a pore-forming filler (grains of cryst. Na_2SO_4), with fibrous material, dyes, scent, etc. if desired, after dehydrating by heat under reduced pressure to undecomposed cellulose xanthate, is treated with a hot, slightly alkaline regenerating liquid (saturated aq. Na_2SO_4) under pressure and is finally washed.

F. R. E.

Manufacture of cellulose articles. H. H. WRIGHT, Assr. to DU PONT CELLOPHANE CO., INC. (U.S.P. 1,870,307, 9.8.32. Appl., 25.7.25. Renewed 20.5.30).—A sheet of cellulose xanthate is shaped as desired and then converted into cellulose hydrate by treatment with a mineral acid.

F. R. E.

(A) Artificial cellulose yarns produced by the stretch spinning process. (B) Artificial yarn, particularly artificial silk yarn. A. ZART, A. HARTMANN, and F. HOELKESKAMP, Assrs. to AMER. BEMBERG CORP. (U.S.P. 1,867,297—8, 12.7.32. Appl., 18.12.28. Ger., [A] 22.12.27, [B] 5.5.28).—(A) Yarns of high dry and wet strength (2.2—2.68 and 1.4—1.83 g. per denier, respectively) the individual filaments of which are ≥ 1.5 denier are obtained by subjecting stretch-spun cuprammonium silk, while still in a plastic condition, to a further stretching operation (e.g., of 60%) either between the spinning funnel and the reeling device or subsequently in the skein. (B) Yarns may be thus produced composed of filaments of < 1 (0.71) denier having dry and wet strengths of, e.g., 2.64 and 1.85 g. per denier, respectively.

D. J. N.

Manufacture of artificial leather. R. B. HILL, Assr. to BROWN CO. (U.S.P. 1,870,567, 9.8.32. Appl., 12.12.29).—A web of fibres is impregnated with rubber latex, dried, impregnated with hot H_2O containing a vegetable tanning agent, and again dried.

F. R. E.

Separation and recovery of products produced by alkaline fusion of cellulosic material. L. C. SWALLEN, Assr. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,869,948, 2.8.32. Appl., 24.11.28).—The melt is pulverised and extracted with 75 wt.-% aq. MeOH to give a solution of salts of volatile acids and a residue (approx. 60% of the whole) of Na_2CO_3 and $\text{Na}_2\text{C}_2\text{O}_4$. The solute, after removal of MeOH, is treated first with aq. $\text{Ca}(\text{OAc})_2$ to ppt. succinic acid and H_2O -insol. acids as Ca salts, and then, after filtration, with a slight excess of $\text{H}_2\text{C}_2\text{O}_4$ to ppt. CaC_2O_4 and $\text{Na}_2\text{C}_2\text{O}_4$. The filtrate from this operation consists mainly of HCO_2H and AcOH , which are conveniently recovered by

conversion into their Et, Pr, or Bu esters. The Na_2CO_3 - $\text{Na}_2\text{C}_2\text{O}_4$ residues are washed with H_2O at 35° to remove Na_2CO_3 . The $\text{Na}_2\text{C}_2\text{O}_4$ is boiled with $\text{Ca}(\text{OH})_2$ and the pptd. CaC_2O_4 treated with hot aq. 50% H_2SO_4 .

D. J. N.

Manufacture of moistureproof opaque or transparent paper. E. SONNENFELD (B.P. 392,023, 27.7.32. Ger., 30.7.31).—A mixture of a cellulose ester or ether, a plasticiser, and a H_2O -repellent agent (rubber, oils, waxes) is wetted with a volatile solvent or solvent mixture and kneaded until a homogeneous paste is obtained. This is gently heated to volatilise the solvent and replace it by a precipitant (H_2O) which is in turn removed by further heating. The mass is then cooled to $< 25^\circ$ with const. kneading until it falls to a powder, of which 5—15% (on the wt. of furnish) is incorporated with pulp in the beater and the resulting sheet hot-calendered. Alternatively, the powder may be melted, optionally with addition of small quantities of high-boiling solvents, and used as an impregnating solution.

D. J. N.

Making artificial silk by the bobbin system. ALGEM. KUNSTZIJDE UNIE N.V. (B.P. 392,083, 31.10.32. Ger., 14.11.31).—A method for moderating the winding tension on the individual spinning bobbins is claimed.

D. J. N.

Fireproof cellulose. Solvent treatments of cellulose derivatives. Dissolving nitrocellulose. Resin sheets.—See XIII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Influence of certain vat dyestuffs on the tendering of cotton when exposed. C. M. WHITTAKER (J.S.C.I., 1933, 52, 140 r).—Further exposure tests are recorded (cf. B., 1933, 187).

Dyeing of furs with substantive and acid dyes. L. I. GILMAN (Anilinokras. Prom., 1933, 3, 77—79).—A no. of substantive and acid dyes can be used both direct and with Cr, Cu, or Fe mordants to replace "Ursol" dyes or in conjunction with the latter.

G. A. R. K.

Determination of optimum temperature for dyeing with substantive and acid dyes. N. I. PLANOVSKI and E. K. RYTSCHKOVA (Anilinokras. Prom., 1933, 3, 88—97).—A cotton fabric was dyed at temp. from 30° to the b.p. and a wool fabric at 70° to the b.p. under standard conditions; both the amount of dye fixed by the fabric and the quality of the colour were taken into account. Some substantive dyes (Anil Orange G, Anil Green 2B, etc.) give approx. the same shade at all temp., whilst others give varying shades (Anil Red F, Anil Violet B, etc.); others again, though giving equal intensity of colouring, give purer shades at higher temp. (Congo Red AT, Anil Fast Scarlet 4BS, etc.) or *vice versa* (Anil Orange R). These differences could not be connected with the purity of the dye. On wool a few dyes (Benzopurpurin AT4B, Anil Orange C and G, Anil Green B, etc.) give the best result at 90° , the rest at the b.p.; the shades obtained with some (e.g., Anil Black FF etc.) vary considerably with the temp. Acid dyes invariably give better results at the b.p. both as regards intensity and purity of colour.

G. A. R. K.

New uses for Indigosols [in printing]. A. WOLFF (Textilber., 1933, 14, 312).—Indigosols, unlike the vat dyes from which they are prepared, are not discharged by a mixture of $\text{Na}_2\text{S}_2\text{O}_4$ and Leucotrope W (I), so that fast multicoloured effects are obtained by printing on cotton fabric having a vat ground shade (produced with easily dischargeable vat or Indigosol dyes) a discharge paste containing an Indigosol, Hydrosulphite NF conc. and (I), steaming, and then developing the Indigosol by treatment with $\text{Na}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4$ at 70° .

A. J. H.

Use of aqueous solutions of chlorine and bromine for production of the unshrinkable finish on knitted woollen goods. S. R. TROTMAN (J.S.C.I., 1933, 52, 159—164 T).—In commercial chlorination with NaOCl and HCl the bath contains Cl_2 , HCl , and NaCl . It has been shown (B., 1926, 280) that the concn. of HCl affects the damage produced. The action of HCl and NaCl has been examined separately under controlled conditions. Neutral Cl_2 - H_2O produces practically no damage. Addition of HCl causes a rapid increase in damage, reaching a max. at a concn. of 0.6 g. per litre. Addition of NaCl tends to diminish the damage, especially when a high percentage of Cl (e.g., 5%) is necessary to produce sufficient reduction of shrinkage. When HCl and NaCl are increased simultaneously each exercises its separate effect. Metallic catalysts with the exception of Mn do not affect the damage. The dechlorinating agent used affects the results. Aq. SO_2 *d* 1.01 gave 18% of damaged fibres, *d* 1.09 23%, and Na_2SO_3 -soap and NH_3 25%. Cl_2 - H_2O contains about 0.1% of HCl . When this is replaced by AcOH by addition of NaOAc the mixture produces commercial unshrinkability without > 10% of damaged fibres. If chlorination be carried out at 37° only half as much Cl is required as at atm. temp. and the damage is small. NaOCl may be used in the same way by neutralising it with dil. AcOH . Br - H_2O acts in the same way as Cl_2 - H_2O except that it produces less damage than its equiv. of Cl .

Wetting agents.—See III. **Chlorination of wool. Boiling etc. of rayon fabrics. Linseed oil sizes. Coloured papers.**—See V. **Bleaching of cotton.**—See VII.

See also A., June, 567, Rosin sizing.

PATENTS.

Dyeing with azoic [ice] colours. BLEACHER'S ASSOC., LTD., C. S. PARKER, C. L. WALL, and F. FARRINGTON (B.P. 389,853, 25.9.31).—More complete couplings on the fibre are obtained by rapidly warming the material after impregnation with coupling component and padding with diazo compound, e.g., to 50 – 100° , by passing it over steam-heated drying-tins. C. H.

Moth-proofing [compositions]. HARPIC MANUFG. CO., LTD., and H. PICKUP (B.P. 389,860, 25.9.31).—A mixture of chloroxylenols ("Chlorax") and artificial musk (trinitroisobutylxylene), preferably 3–5% of each with 94–90% of inert filler (MgCO_3), kills clothes-moths, their larvæ and eggs. C. H.

Varnishing fabrics. Solvent treatments of cellulose derivatives.—See XIII.

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

Recovery of caustic soda solutions containing hemicellulose using Cerini dialysers. D. J. EYNON (J.S.C.I., 1933, 52, 173—175 T).—A brief description of the apparatus is given, with a mathematical analysis involving the log. mean concn. difference. Relative flows of impure and dialysed NaOH are calc. for recovery at different concns. and efficiencies. The optimum capacity is determined by an economic balance of the cost of NaOH and cost of dialysers.

Analysis of alkali bisulphites. F. BALDRACCO (Boll. Uff. Staz. sperim. Ind. Pelli, 1933, 11, 306—313).—Me-orange is not recommended as an indicator in the titration of alkali bisulphites, as its colour indications vary comparatively rapidly with lapse of time. Bromocresol-green is more satisfactory in this respect.

T. H. P.

Production of a new type of "chloride of lime." A. B. JAFET (Chimica, 1933, 1, 65—66).—The material described contains 38–40% of available Cl , is but slightly hygroscopic, and is stable even at 50 – 80° ; it is rapidly sol. and the odour of Cl_2 is not very pronounced. Its bulk density is > that of the ordinary material. Plant for producing 2500 kg. per day is described briefly; the process consists in passing Cl_2 through a suspension of Ca(OH)_2 in CCl_4 . H. F. G.

Determination of the hydrogen-ion concentration of hypochlorite solutions with the glass electrode. (A) Dissociation constant of hypochlorous acid. (B) p_{H} variations of hypochlorite solutions during the bleaching of cotton. G. F. DAVIDSON (J. Text. Inst., 1933, 24, T185—206).—The p_{H} of hypochlorite bleach liquors may be determined with the aid of a glass electrode. For Ca(OCl)_2 (I) it is only necessary to calibrate the electrode with two buffer solutions, but with NaOCl (II) the e.m.f.- p_{H} curve is not linear above p_{H} 10 and a no. of buffer solutions are therefore requisite if highly alkaline solutions are to be tested. The validity of the data obtained with hypochlorite solutions was confirmed by the equality of the calc. and found vals. of the p_{H} of buffer solutions to which relatively small amounts of (II) had been added. The dissociation const. of HOCl deduced from the titration curves of (I) and (II) with HCl is 3.7×10^{-8} at 18 – 20° . Experimental bleaches were made with (I), (II), and $\text{NaOCl} + \text{Na}_2\text{CO}_3$ (III), and fresh hypochlorite was added to each spent liquor to bleach further batches of cloth. The p_{H} always falls during bleaching, but the fall diminishes in the order given, typical vals. of the final p_{H} after > 1 successive bleach being: (I) 7.3, (II) 8.3, (III) 9.7. Atm. CO_2 played only a minor part in this p_{H} drop, but the spent liquors are buffered with H_2CO_3 produced during the bleaching. The HOCl content of spent liquors falls rapidly, probably owing to oxidisable org. substances derived from the cotton. A. G.

John Holker and the manufacture of sulphuric acid in France in the 18th century. P. BAUD (Compt. rend., 1933, 196, 1797—1800).

Removing NH_3 and H_2S from gases. S from spent oxide.—See II. **ZnS as pigment.**—See XIII.

Sterile NaHCO_3 solutions.—See XX. PbN_6 .—See XXII.

See also A., June, 573, Prep. of $(\text{NH}_4)_2\text{SO}_4$. 578, Isolation of halogen compounds of the rare gases. "Variegated" H_2 . 579, Prep. of phosphorescent ZnS , and of GeI_2 . 580, Reactions in the Pb chamber. "Blue acid." Prep. of telluric acid, and of at. Cl. 581, Prep. of NiCO_3 . 599, Prep. of Si triethyl halides.

PATENTS.

Preparation of hydrocyanic acid. R. R. FULTON, ASSR. to KOPPERS CO. OF DELAWARE (U.S.P. 1,872,923, 23.8.32. Appl., 28.6.29).— NH_3 is bubbled through C_6H_6 at 28° to give a 6 : 1 vol. mixture, or through PhMe at 50 – 55° to give a 7 : 1 vol. mixture, of NH_3 and hydrocarbon, and the gases are passed over kieselguhr impregnated with Al_2O_3 and heated at 1100 – 1150° , whereby a mixture of HCN and H_2 is obtained.

A. R. P.

Separation of weak acids from gaseous mixtures. J. Y. JOHNSON. From I. G. FARBENIND A.-G. (B.P. 391,780 and 391,786, [A, B] 30.10.31 and 16.7.32).—(A) Gases are freed from CO_2 , H_2S , and/or HCN by washing with a solution of one or more salts of org. (carboxylic or sulphonic) acids with an inorg. base, e.g., Na salts of glycine or alanine, the org. acid having an electrolytic dissociation, at room temp., about the same as, or $<$, that of the acid gases to be absorbed, and the solution being capable of expelling the acid gases on heating, so that after cooling it can be recirculated. (B) Gases containing high percentages, e.g., 20%, of CO_2 , but no S compounds, can be freed therefrom by this process, and the CO_2 recovered. A. B. M.

Production of hydrazine. G. B. ELLIS. From E. MERCK (B.P. 392,845, 3.12.32).—The Hofmann decomp. of urea with, e.g., NaOCl is effected in the presence of a colloid capable of swelling with H_2O , e.g., albumin, gelatin, or a decomp. product thereof; increased yields of N_2H_4 are obtained. L. A. C.

Manufacture of soda-lime. DEWEY & ALMY, LTD. (B.P. 392,613, 20.11.31. U.S., 22.12.30).—Finely-divided soda-lime, or material capable of producing it, is agitated, e.g., in a rotating drum, in the presence of a spray of H_2O or, e.g., dil. aq. NaOH; the product is subsequently dried, e.g., to 10–20% H_2O . L. A. C.

Manufacture of alkali carbonate or alkali hydroxide. A. MENTZEL (B.P. 392,765, 1.7.32. Ger., 15.7.31).—A mixture of an alkali sulphate, e.g., Na_2SO_4 , with C is heated at about 900° and the product is treated with steam and CO_2 at 400 – 500° to yield a mixture of Na_2CO_3 and C suitable for the production of NH_3 and Na_2CO_3 or NaOH by cyanidisation and subsequent hydrolysis of the product. L. A. C.

Analytical method [of testing hypochlorites] and apparatus therefor. F. J. NORTON, ASSR. to SOLVAY PROCESS Co. (U.S.P. 1,874,339, 30.8.32. Appl., 22.5.29).—Hypochlorites are tested by measuring the H_2O displaced by the evolution of gas according to the equation $\text{NaOCl} + \text{H}_2\text{O}_2 = \text{NaCl} + \text{H}_2\text{O} + \text{O}_2$.

B. M. V.

Manufacture of alkali xanthates. (A) W. HIRSCHKIND, and (B) L. ROSENSTEIN, ASSRS. to GREAT WESTERN

ELECTRO-CHEM. Co. (U.S.P. 1,872,452 and 1,872,821, [A] 16.8.32, [B] 23.8.32. Appl., [A] 19.3.25, [B] 12.11.24).—(A) The alcohol and alkali hydroxide in stoichiometrical proportions are heated under pressure to obtain a uniform solution which is cooled and treated with the theoretical amount of CS_2 . (B) In the first stage of the operation air is displaced from the vessel by the alcohol vapour and a pressure of 150 lb./sq. in. is used to dissolve the hydroxide. A. R. P.

Preparation of (A) oxide of beryllium, (B) beryllium fluoride from a double fluoride of beryllium and an alkali metal. COMP. DE PROD. CHIM. ET ELECTRO-MÉTALLURG. ALAIS, FROGES & CAMARGUE (B.P. 389,045 and 389,053, [A] 31.10.32, [B] 12.12.32. Fr., [A] 28.11.31, [B] 19.12.31, 2.8. and 18.10.32).—Beryl is decomposed by fusion with Na_2SiF_6 , the product leached with H_2O , and the Na_2BeF_4 purified by crystallisation. (A) The dry salt (1 mol.) is intimately mixed with Na_2CO_3 (1 mol.) and the mixture heated at 525 – 550° . On leaching the sintered product with hot H_2O a residue of BeO is obtained with a solution of NaF from which Na_2SiF_6 can be regenerated. (B) The Na_2BeF_4 is dissolved in H_2O and the solution treated with H_2SiF_6 , BeSiF_6 , SiF_4 , or a mixture of HF and SiO_2 , to ppt. the Na as Na_2SiF_6 for use again in the decomp. of beryl and leave a solution of BeF_2 . A. R. P.

Production of sodium aluminium fluorides. J. E. MORROW, ASSR. to ALUMINUM Co. OF AMERICA (U.S.P. 1,873,210, 23.8.32. Appl., 30.12.27).— $\text{Al}(\text{OH})_3$ is digested with a slight deficiency ($< 5\%$) of aq. NaF at 175° under pressure and CO_2 is passed into the mixture to convert the NaOH formed into Na_2CO_3 . A yield of about 93% of Na_3AlF_6 (based on the F used) is obtained as a cryst. powder. A. R. P.

Production of ferricyanides. W. GLUUD and K. KELLER (U.S.P. 1,872,929, 23.8.32. Appl., 5.6.28. Ger., 15.6.27).—An aq. solution of $\text{K}_4\text{Fe}(\text{CN})_6$ is treated with air containing 5% CO_2 at 80 – $100^\circ/80$ – 120 atm. A. R. P.

Calcination of gypsum. E. L. FRANCIS. From GYPSUM, LIME & ALABASTINE, CANADA, LTD. (B.P. 392,780, 13.8.32).—Finely-divided gypsum is conveyed by the alternate application to the chambers of an abrupt backward and a slow forward movement through a preheating chamber and a calcining chamber maintained at $< 93^\circ$ and at $> 177^\circ$, respectively. L. A. C.

Manufacture of colloidal [copper] metal products. F. WILCOXON (U.S.P. 1,866,069, 5.7.32. Appl., 17.12.26).— CuSO_4 or $\text{Cu}(\text{OH})_2$ is heated with aq. NaOH and waste molasses or waste sulphite-cellulose liquor at 80° until the Cu is pptd. as Cu_2O , aq. A. R. P.

Production of antimony oxides. J. J. LISTRAT (U.S.P. 1,873,774, 23.8.32. Appl., 9.12.27).— Sb_2S_3 ore is melted in the middle one of three cupolas in line having a common metal bath. Air being present, Sb_2O_3 of 96–98% quality and SO_2 are produced in the hood of the cupola; air is injected into the Sb metal under the outer two hoods, producing Sb_2O_3 of 99% quality and generating sufficient heat for the entire process, once it has been started. B. M. V.

[Electrolytic] production of manganese dioxide. O. W. STOREY, ASSR. to BURGESS BATTERY Co. (U.S.P.

1,874,827, 30.8.32. Appl., 12.5.31).— $MnSO_4$ solution, leached from ores by the min. of acid and freed from Fe, is electrolysed from 10—20% down to 3% $MnSO_4$ in the presence of < 2% $MgSO_4$, effecting production of MnO_2 , and acid which is re-used many times.

B. M. V.

Manufacture of basic aluminium sulphate. E. D. SMITH, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,873,348, 23.8.32. Appl., 29.3.29).—The red mud obtained in the recovery of Al_2O_3 from bauxite is heated with the theoretical quantity of H_2SO_4 (d 1.45) at 125—150° under < 50 lb. (15—25 lb.) pressure, whereby a slightly basic solution of $Al_2(SO_4)_3$ is obtained free from TiO_2 but containing some $Fe_2(SO_4)_3$. A. R. P.

Preparation of metallic sulphides along with metals or massive silicon. E. WYDLER (B.P. 392,640, 16.12.31).—Silicious rocks are intimately mixed with Al powder, S, and a little $NaNO_3$ and the mixture is ignited. The products obtained are Al_2O_3 , Si or a Si alloy, and alkali and/or alkaline-earth sulphides, together with FeS if the rock contains Fe. The process is stated to give Cr or Ti when chromite or ilmenite is substituted for the rock. A. R. P.

Filtering etc. material. Evaporative cooling [or salts].—See I. Al_2O_3 from coal etc. Cement from coal ashes.—See II. Fertilisers. Fungicides.—See XVI.

VIII.—GLASS; CERAMICS.

Synthetic corundum for jewel bearings. E. G. SANDMEIER (J. Inst. Elect. Eng., 1933, 72, 505—514).

Granular composition of materials.—See I.

See also A., June, 579, Colorations in glasses due to Na vapour.

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[Tunnel] kiln. H. M. ROBERTSON (U.S.P. 1,874,064, 30.8.32. Appl., 7.9.29).—The walls of the kiln are V-shaped, the narrow bottom being occupied by vehicles for the goods, which are stacked so as to overhang and are heated from below by electric heaters adjacent the inclined walls. B. M. V.

Apparatus for treating ceramic ware. F. M. HARTFORD, Assr. to HARROP CERAMIC SERVICE CO. (U.S.P. 1,874,516, 30.8.32. Appl., 10.4.30).—In a tunnel kiln a portion of the cooling air is used for combustion, the remainder being exhausted. The tunnel walls (A) are generally very close to the goods on the trucks, but deep pockets are formed in A to form combustion chambers and shallow ones staggered on opposite sides to permit longitudinal zigzag flow of the gases. Blocks for the floors of the cars, which are free to expand, are described. B. M. V.

Refractory [silica] brick. R. P. HEUER (B.P. 391,858, 6.11.31. U.S., 5.12.30).—A dense brick (18—20% porosity) is produced by pressing (2000—10,000 lb./sq. in.) crushed quartzitic material which has been pre-fired at a temp. sufficient for vitrification and conversion into tridymite and/or cristobalite. The mixture should consist of > 35% of particles > 30-mesh, < 60% of finer particles, and 2—3% of CaO , Na_2SiO_3 , clay, etc. J. A. S.

Manufacture of cast refractory articles. R. HAD-DAN. From CORNING GLASS WORKS (B.P. 392,364, 4.6.32).—Strains and faults in (molten) cast blocks are eliminated by feeding into the mould pieces of solid material sufficient to cool the interior and bottom of the molten material at the same rate as the outer surfaces cool. J. A. S.

Decoration of pottery articles [in mottled or stippled effects]. V. G. H. ALCOCK, R. B. BLOORE, W. S. LINDLEY, and P. R. BURT (B.P. 392,767, 2.7.32).

IX.—BUILDING MATERIALS.

Manufacture and uses of high-alumina cement and ordinary Portland cement. A. J. MORRISON (J. Proc. Sydney Tech. Coll. Chem. Soc., 1933, 5, 26—34).—A lecture. A. A. L.

Determining the proportion of sand and cement present in cement linings of pipes. A. CRONIN (J. Proc. Sydney Tech. Coll. Chem. Soc., 1933, 5, 23—25).— SiO_2 is determined in the mixture by the usual method. The proportion of sand and cement is then calc. from similar determinations for each alone. A. A. L.

Weathering of building stones from the chemical viewpoint. R. GRÜN (Chem.-Ztg., 1933, 57, 401—404). The effects of temp. fluctuation, freezing, crystallisation, and the action of CO_2 and SO_3 (sulphates) are discussed. Laboratory tests show that the action of CO_2 is more harmful than has formerly been accepted, especially to stonework exposed to rain, whilst that protected from rain is attacked by SO_3 , particularly on the east side, owing to the local concn. of smoke. J. A. S.

Heating agents [for buildings].—See II. Determining moisture [in cement].—See XI.

PATENTS.

Bonding of cement and gypsum. C. M. CHAPMAN (U.S.P. 1,874,170, 30.8.32. Appl., 28.1.28).—0.25—10% of a sol. chloride is added to the plaster which is to be applied after the first, either Portland cement or $CaSO_4$, has set. B. M. V.

Cementitious surfacing material. J. LYONS & Co., LTD., and E. B. HUGHES (B.P. 392,246, 2.12.31).—Surfaces may be "cold-glazed" by applying a mixture of a cement, e.g., Portland, and 0.05 wt.-% of saponin. Addition of a Ca soap (to waterproof the coating), MgO , $CaCl_2$, or quartz may be made, and the glazed surface is rendered greaseproof by spraying it with a mixture of casein and CH_2O . C. A. K.

Manufacture of synthetic building blocks. C. H. and A. H. HARRISON (B.P. 392,340, 4.4.32).—A mass of $Ca(OH)_2$ is aerated, moulded, and treated with CO_2 in a heated chamber to dry and carbonate the block. The cellular $CaCO_3$ so formed may be granulated, mixed with a slurry of $Ca(OH)_2$, and the process repeated, or the blocks may be coated with $Ca(OH)_2$ and recarbonated to produce a hard smooth surface. C. A. K.

Manufacture of porous [structural] materials. H. W. SPENCER. From H. T. BELLAMY (B.P. 392,465, 1.12.32).—Porous masses are formed by drying and firing a mixture of clay, a solid non-volatile compound,

and a volatile compound. Such a mixture may consist of clay 43.5, sawdust 16, $C_{10}H_8$ 36, and kieselguhr 4.5%.

C. A. K.

Producing an artificial wood composition. L. VEZEKENYI (U.S.P. 1,875,187, 30.8.32. Appl., 12.10.27).—The composition is formed from alum, borax, ZnO , H_2O , carboic acid, H_2CrO_4 , glue, and sawdust in given proportions.

B. M. V.

Wood preservation. M. ENGELMANN and W. H. TISDALE, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,874,260, 30.8.32. Appl., 16.4.30).—A dry powder is formed of a Hg⁺ salt and an org. compound of Pb^{IV} ; the solution for use may be 1:5000 of H_2O .

B. M. V.

Bituminous emulsions.—See II.

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

Mechanical properties of some austenitic stainless steels at low temperatures. E. W. COLBECK, W. E. MACGILLIVRAY, and W. R. D. MANNING (Inst. Chem. Eng., May, 1933. Advance proof, 16 pp.).—The tensile strength of austenitic Ni-Cr steels increased progressively from room temp. to up to 110 tons per sq. in. at -180° and a normal yield point of 10–15 tons increased to > 30 tons in most of the steels. Elongation vals. showed a peak between -20° and -120° and the reduction in area decreased in the region -120° to -180° . Steels with complete austenitic structure showed good ductility at the low temp., but an increase in C, as free carbides, produced marked brittleness. Mn exerts a powerful stabilising action and the addition of 4% of Mn has been sufficient to maintain the ductility and resistance to impact down to -180° .

C. A. K.

Steels for the finishing industry. A. C. ROWE (Synth. and Appl. Finishes, 1933, 4, 53–54).—The characteristics of various heat-resisting, rustless, and high-speed steels are discussed, and their applications to the finishing industry are indicated, e.g., stoving racks, mill parts, balls for ball-milling, etc.

S. S. W.

Sparking of coal-cutter pick tool steel in explosive firedamp mixtures. J. M'COMBE (J. Roy. Tech. Coll., 1933, 3, 173–190).—Speed of the cutter is of great importance in determining the production of sparks which will ignite firedamp-air mixtures, no ignition occurring at 300–360 ft. per min. and frequent ignition at 500 ft. per min. Quartzitic sandstone with little or no binder is most liable to cause ignition since it is of approx. the same hardness (Moh's scale) as steel and produces a flame-like flash consisting of a cloud of incandescent particles of steel and quartz. Binding material in the sandstone has a cushioning effect and in its presence sparking is rare, however hard is the rock. Pyrites does not ignite explosive mixtures of the gases as readily as does sandstone, since the sparks are produced by impact rather than by abrasion. The temp. of steel sparks from sandstone appears to be about 1450 – 1500° , i.e., sufficient to melt the Fe and much higher than the ignition temp. of the gas-air mixtures found in coal mines; ignition, however, occurs only when a bunched shower of sparks is produced.

The C content of the pick has little effect on ignition of the gas.

A. R. P.

Hot-pressing [extrusion] of hard 58:42 brass. R. HINZMANN (Z. Metallk., 1933, 25, 67–70).—To avoid the formation of a granular ($\alpha + \beta$)-structure in the last portion of extruded rods of 58% Cu-brass, which produces fractures on subsequent hot-pressing, it is recommended that relatively short ingots be used in the extrusion press and that they be preheated at 780 – 800° and extruded at a relatively high speed. Thus, to obtain rod 40 mm. in diam. an ingot 400×180 mm. should be heated to 800° in 15 min. and extruded at 50 mm. per sec.

A. R. P.

Corrosion of lead. A. H. LOVELESS, T. A. S. DAVIE, and W. WRIGHT (J. Roy. Tech. Coll., 1933, 3, 57–64).—The rate of corrosion of Pb (0.0004% Cu, 0.0006% Sb, 0.0020% Zn, and 0.0025% Fe) in H_2SO_4 free from N and As compounds has been studied at various temp. At 50° corrosion is very slight with unstressed Pb in acid of $> 60\%$ concn.; at higher concns. the rate of corrosion increases rapidly with the concn. of the acid, reaching 0.0741 kg. per sq. m. per day in 96.5% acid. Continuous removal of the $PbSO_4$ film accelerates corrosion, hence the film acts as a protector under normal conditions. The rate of attack/temp. curve rises convex to the temp. axis when the concn. of the acid is $< 93\%$, and concave for concns. $> 93\%$. At high temp. part of the $PbSO_4$ film is reduced to PbS by the H_2 liberated and the metal assumes a black frosted appearance. The rate of corrosion is accelerated by stressing the Pb during immersion in the acid, owing to the formation of minute fissures along the crystal grains through which the acid penetrates into the interior of the metal. In HCl corrosion is marked during the early period of immersion, but rapidly decreases to a const. val. after a few days, owing to the formation of a protective film of $PbCl_2$. In conc. HCl intercryst. corrosion is severe since the $PbCl_2$ formed is more sol. in this acid.

A. R. P.

Protective treatment of ferrous pipe. T. B. DOWNER (J. Amer. Water Works' Assoc., 1933, 25, 605–632).—The causes and methods of prevention of corrosion are described and discussed with special reference to H_2O -mains in soil. The outside of Fe pipes is best protected by alternate layers of bituminous material and saturated fabric, care being taken to secure the best possible adhesion to the metal. For interior use, a substantial bitumen lining is recommended as it resists corrosion and tuberculation and so maintains the max. carrying capacity. The earthing of electric light (etc.) wires to H_2O -pipe should be prohibited and pipe-lines laid near high-tension transmission lines (etc.) should have frequent insulating joints.

C. J.

Cleaning of iron and steel. S. WERNICK (J. Electrodep. Tech. Soc., 1931–2, 7, 163–165).—The prep. of Fe and steel before applying a coating by electrodeposition is discussed under the headings (a) soaps, (b) electro-cleaning, (c) acid-cleaning.

E. S. H.

Modern practice in metal cleaning. A. D. WEILL (J. Electrodep. Tech. Soc., 1931–2, 7, 157–160).—A summary of existing practice, with special reference to the prep. of metals prior to electrodeposition.

E. S. H.

Theory of metal cleaning. E. J. DOBBS (J. Electrodep. Tech. Soc., 1931—2, 7, 161—162).—The following factors are considered: (a) wetting power, (b) emulsification, (c) peptisation. E. S. H.

Selection of electroplate coatings for iron and steel components. E. E. HALLS (Synth. and Appl. Finishes, 1933, 4, 45—50).—Electrodeposited coatings of the "sacrificial protection" and the "blanket" types are discussed with special reference to the electro-motive series of the metals. Metals prone to passivity cannot be used as "sacrificial" coverings. The relative behaviour of metals under mild corrosive conditions is often reversed under more rigorous attack. The outstanding features of Zn, Cd, Ni, Cu, and Cr electrodeposits are summarised. S. S. W.

Protective coatings on metals. H. SUTTON (J. Electrodep. Tech. Soc., 1931—2, 7, 91—102).—A survey of recent work, especially on electrodeposits of Cd and Zn on Fe and steel, the protection of Al and its alloys by electrodeposits, and the production of oxide and other films by chemical reaction and by anodic oxidation. E. S. H.

American and Continental practice in nickel deposition. W. T. GRIFFITHS (J. Electrodep. Tech. Soc., 1931—2, 7, 51—70).—A summary of contemporary practice, with special reference to cleaning the basis metal, composition and temp. of baths, and control of process, shows the tendency towards using hot, rapid-plating solutions, and automatic equipment. Special mention is made of plating on Zn and Al. E. S. H.

Electrodeposition of tin from alkaline solutions. L. WRIGHT and F. TAYLOR (J. Electrodep. Tech. Soc., 1931—2, 7, 103—114).—Commercial baths for electrodeposition of Sn are critically reviewed, and the cathode efficiencies of a few have been tested. The solution recommended contains KOH (101 g.), $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$ (68 g.), peptone (0.7 g.), and H_2O (1 litre); it is used at 70° and has excellent throwing power at c.d. 4—6 amp. per sq. ft. In general, the content of free alkali should be kept low to assist anodic dissolution and the Sn anodes should be pure. The anode efficiency could not be determined satisfactorily. The formation of deposits thicker than 0.001 in. from the solutions examined is difficult. E. S. H.

Control of plating solutions. H. RILEY (J. Electrodep. Tech. Soc., 1931—2, 7, 166—169).—Practical notes are given on the electrodeposition of Cd, Sn, Cu, Ag, Au, Ni, Cr, and brass. E. S. H.

Lubrication.—See II. **Stability of C_2HCl_3 .**—See III. **Throwing power.**—See XI. **Paints for Al.**—See XIII.

See also A., June, 559, **Polymorphic transformations of Fe.** 562, **Fe—Sn alloys.** Lattice structure of NaIn. 565, **Wetting velocity and flotation.** 576, **Prep. of rare-earth amalgams, and of macroscopic Tl crystals.** Corrodibility of metals. 579, "Pyrophoric" Zn. 584, **Determination of Co.** 585, **Determination of Pd.**

PATENTS.

Electrode for welding cast iron and composition for coating same. R. L. SCOLLARD and T. D.

KETCHBAW, Assrs. to KAYNESS CORP. (U.S.P. 1,873,340, 23.8.32. Appl., 15.2.30).—A coating for a welding rod of cast Fe, for cast Fe, is composed of C < 75%, Si (as SiO_2) 8—25 (11.5)%, and a binder. B. M. V.

Toughening of steel. G. A. JOHNSON, Assr. to W. H. MNER, INC. (U.S.P. 1,874,103, 30.8.32. Appl., 30.8.29. Renewed 20.2.32).—Mild steel is heated above the Ac2 point, e.g., to 760—780°, air-cooled until it just exhibits magnetic properties, and then quenched in cold H_2O . A. R. P.

Treatment of steel sheets. J. H. STEELE, Assr. to MICHIGAN STEEL CORP. (U.S.P. 1,866,376, 5.7.32. Appl., 28.10.30).—Steel sheets from the hot-rolling mill are passed through a roller level, preferably in a H_2O -bath, then through cold rolls under H_2O , normalised in the usual way, pickled to remove scale, and again passed through cold rolls to the desired finished size. A. R. P.

Manufacture of ferrous alloys [stainless steels]. UNITED STATES PIPE & FOUNDRY Co., Asses. of F. C. LANGENBERG (B.P. 392,648, 1.1.32. U.S., 19.1.31).—Fe alloys having a high resistance to corrosion combined with free cutting and good forging properties contain < 8% Cr, about 0.2% Mn, 0.31% Mo, and 0.12% S, the S being sufficient to combine with all the Mn and Mo so that finely-divided MnS and MoS_2 remain dispersed throughout the metal. A. R. P.

[Corrosion-resistant] alloy steel. J. L. SCHUELER, Assr. to CONTINENTAL STEEL CORP. (U.S.P. 1,874,814, 30.8.32. Appl., 27.11.31).—The steel contains C 0.08, Mn 0.4, P 0.004, S 0.04, Si 0.01, Cu 0.1—0.3 (0.3), Ni 0.3—0.5 (0.5), and Cr 0.07—0.3 (0.08)%. A. R. P.

Articles manufactured from alloys of iron and chromium. B. VERVOORT (B.P. 392,564, 14.10.31. Ger., 14.10.30).—To render the article rustproof in the unpolished state it is made of an alloy of Fe with 23—40% Cr, 0.6—2.6% C, and 0.5—2.5% Si. The resistance to acids and to scaling at high temp. is improved by addition of > 5% of one or more of the metals V, Mo, Cu and by coating the articles with Al, Cu, or Al—Cu alloy. A. R. P.

Annealing process [for iron—chromium alloys]. C. S. HEATH, Assr. to ELECTRO METALLURG. Co. (U.S.P. 1,869,254, 26.7.32. Appl., 12.10.28).—Low-C Cr—Ni or high-Cr steels are heated rapidly to 800—1000° and immediately quenched, the process being repeated several times until the desired properties are obtained. The process may be used also for softening an alloy of 51.3% Ni, 27.5% Mn, and 20.5% Cu, using a temp. of 900° and 10 alternations of heating and quenching. A. R. P.

Malleable iron casting. R. T. RYCROFT, Assr. to JEWELL STEEL & MALLEABLE Co. (U.S.P. 1,874,361, 30.8.32. Appl., 20.6.29).—The Fe alloy contains C > 2.35, Ni 1, Cr 0.5%. B. M. V.

Methods of electrically insulating metals [iron]. INTERNAT. GEN. ELECTRIC Co., INC., Asses. of ALLGEM. ELEKTRICITÄTS-GES. (B.P. 392,260, 17.12.31. Ger., 17.12.30).—The layers of Fe in magnetic cores are heat-treated to obtain the desired magnetic properties, then

insulated by coating them with a phosphate layer in a bath containing H_3PO_4 , MnO_2 , and MoO_3 or WO_3 .

A. R. P.

Improving the mechanical and magnetic properties of iron-nickel-beryllium alloys. SIEMENS & HALSKE A.-G., and W. KROLL (Assec.) (B.P. 392,711, 19.3.32. Ger., 19.3.31. Addn. to B.P. 306,035; B., 1930, 868).—The alloys claimed in the prior patent are heat-treated by quenching from 800–1200° and annealing at 700–850°.

A. R. P.

Coating of metal [magnesium, zinc, and iron] surfaces. J. S. THOMPSON and R. R. TANNER, Assrs. to PARKER RUST-PROOF Co. (U.S.P. 1,869,121, 26.7.32. Appl., 21.2.31).—The article is immersed in or sprayed with a hot solution containing phosphates of Fe and Mn with 0.002–0.004% Cu; the acidity of the solution is such that when treated with standard alkali in the presence of Me-orange and phenolphthalein the ratio of the vols. of alkali added to produce the colour change is 1:6–1:15.

A. R. P.

Coating for ferrous metals. R. J. WIRSHING and H. R. FAAS, Assrs. to GEN. MOTORS RESEARCH CORP. (U.S.P. 1,872,614, 16.8.32. Appl., 1.8.29).—Fe or steel sheet (etc.) is plated with Sn, then coated with an asphaltic-base enamel, and baked at 230°. The Sn prevents flaking of the resulting japan finish.

A. R. P.

[Promoter for] mineral concentration [by flotation]. R. B. MARTIN, Assr. to AMER. CYANAMID Co. (U.S.P. 1,874,564, 30.8.32. Appl., 31.10.28).—The use of a xanthate made from a Me derivative of a hydrogenated phenol, e.g., methylcyclohexanol, is claimed.

A. R. P.

Froth-flotation processes [for fluorspar concentration]. ALUMINIUM, LTD., Assces. of O. W. GREENMAN and H. A. LILLY (B.P. 392,664, 25.1.32. U.S., 7.8.31).—The crushed CaF_2 ore is floated in soft H_2O containing an oxidising agent, e.g., $KMnO_4$ or $K_2Cr_2O_7$, and commercial cresol or a constituent thereof. [Stat. ref.]

A. R. P.

Concentrating [copper sulphide] ores by flotation. J. M. F. LEAPER, Assr. to BARRETT Co. (U.S.P. 1,878,154, 20.9.32. Appl., 16.1.28).—Thioformaldehyde is claimed as a promoter.

A. R. P.

Alloy [brass]. O. W. ELLIS, Assr. to WESTINGHOUSE ELECTRIC & MANUF. Co. (U.S.P. 1,869,554, 2.8.32. Appl., 14.12.28).—The alloy consists of Cu and Zn with 0.75–2% Fe, 0.25–2% Mn, and < 5% Al, the proportions of the metals present being such that the alloy has an ($\alpha + \beta$)- or a pure β -structure.

A. R. P.

[Copper] alloy. R. A. WILKINS, Assr. to REVERE COPPER & BRASS, INC. (U.S.P. 1,868,679, 26.7.32. Appl., 24.3.32).—Claim is made for a Cu alloy, consisting of the homogeneous α -phase and having a high tensile strength and ductility, which contains Cu 85–95 (90), Si 0.25–4 (3.25), Sn 0.25–1 (0.5), and the remainder (6.25%) Zn.

A. R. P.

[Heat-treatment of copper-manganese-nickel] alloy. G. P. HALLIWELL, Assr. to WESTINGHOUSE ELECTRIC & MANUF. Co. (U.S.P. 1,872,280, 16.8.32. Appl., 21.11.29).—Wire composed of an alloy of Cu 20, Mn 30, and Ni 50% is annealed, preferably in vac. at

300–450° (350°), for 12–24 hr. The treatment increases the elastic limit and tensile strength.

A. R. P.

Treatment of [zinc] ores. F. M. SIMONDS, Assr. to A. F. HYDE (U.S.P. 1,874,370, 30.8.32. Appl., 24.4.31).—The ore is coarsely ground and passed through alternate oxidising and reducing zones in a furnace heated at 500–650° to oxidise the sulphide minerals other than blende. The product is treated to separate the ZnS, which is ground to pass 200-mesh and roasted with a fresh charge of coarse ore in the same way as above.

A. R. P.

Breaking down of metals [lead]. V. L. DICKSON (U.S.P. 1,874,253, 30.8.32. Appl., 27.2.29. Renewed 1.12.31).—Pb is reduced to powder of metal or oxide by addition of small amounts of pitchblende and U while molten and stirring while cooling.

B. M. V.

[Lead-base bearing] alloy. O. W. ELLIS (U.S.P. 1,878,686, 20.9.32. Appl., 30.8.29).—The alloy consists of 65–85 (70%) Pb, 7–10 (8%) Tl, 5–20 (15%) Sb, 5–10 (5%) Sn, and 0.25–1% Na, Ba, or Ca.

A. R. P.

Manufacture of lead and lead alloys. W. SINGLETON, W. HULME, B. JONES, and GOODLASS WALL & LEAD INDUSTRIES, LTD. (B.P. 392,585, 19.11.31).—The grain structure is refined and resistance to corrosion improved by addition to Pb or Pb-Cd, Pb-Sb, Pb-Sn, or ternary Pb alloys with Cd, Sb, or Sn of 0.02–0.1% Te (cf. B., 1933, 351).

A. R. P.

Manufacture of [lead] shot. A. G. SCHURICHT and G. T. WRIGHT, Assrs. to WESTERN CARTRIDGE Co. (U.S.P. 1,865,727, 5.7.32. Appl., 4.8.27).—Pb shot containing 4–5% Sb and 0.5–1% As is plated with Cu, first in alkaline and then in acid solution, and the plated shot is annealed at about 243° to produce a eutectoidal structure, quenched in H_2O , and aged at room temp. for 2–3 weeks.

A. R. P.

Concentration of bismuth [in a lead] alloy. W. C. SMITH, Assr. to CERRO DE PASCO COPPER CORP. (U.S.P. 1,870,470, 9.8.32. Appl., 4.6.30).—Bi-Pb alloy containing about 10% Bi and small quantities of Cu, As, Sn, and Sb is melted and a blast of air blown through the molten metal without further application of external heat, so as to oxidise the impurities and the greater part of the Pb, leaving a pure Pb-Bi alloy containing about 65% Bi.

A. R. P.

(A) Separation of metals, and (B) extraction and separation of cadmium [from flue dusts]. (A, B) R. TEATS and (B) S. HUGHES, Assrs. to AMER. SMELTING & REFINING Co. (U.S.P. 1,869,213 and 1,869,259, 26.7.32. Appl., [A] 6.4.26, [B] 29.7.27. Renewed [B] 30.9.31).—(A) The material is leached with H_2SO_4 to a paste which is dried and heated at 600–800° until most of the Zn is converted into a basic salt. The sintered product is ground and leached with H_2O , the solution is digested with CdS to ppt. Pb, Cu, Bi, and part of the As, and the filtrate is conc. to d 1.30, treated with $NaClO_3$ and CaO to oxidise and ppt. the Fe and As, filtered again, and treated with Na_2CrO_4 to ppt. Tl. Excess of Na_2CrO_4 is removed by treatment with $PbSO_4$ and the Cd recovered by electrolysis. (B) $Fe_2(SO_4)_3$.aq. is used for leaching instead of dil. H_2SO_4 .

A. R. P.

Recovering thallium. S. HUGHES and R. TEATS, Assrs. to AMER. SMELTING & REFINING CO. (U.S.P. 1,869,214, 26.7.32. Appl., 29.7.27. Renewed 23.1.32).—The sulphate solution containing Cd and Tl obtained in the purification of Cd is reduced with SO_2 and the Tl pptd. as Tl_2CrO_4 , which is collected, washed with dil. H_2SO_4 to remove CdSO_4 , and dissolved in dil. H_2SO_4 and NaHSO_3 . The Tl is then pptd. with Zn and melted to form bars which are cleaned, remelted, granulated, and dissolved in dil. H_2SO_4 . From the solution Tl_2SO_4 is crystallised, the crystals are redissolved in hot H_2O , and pure Tl is recovered by electrolysis, the mother-liquor being returned to the Zn-pptn. stage. A. R. P.

Forming nickel oxide capable of reduction at a low temperature. ROSE, DOWNS & THOMPSON, LTD., and T. ANDREWS (B.P. 392,600, 21.10.31).—Ni in the form of powder or turnings is oxidised superficially by immersion in HNO_3 and the product is heated to produce a NiO coating on the Ni. The oxidised Ni is then treated with a suspension of $\text{Ca}(\text{OH})_2$ in aq. hypochlorite, washed successively with H_2O , dil. HCl, and H_2O , dried, and reduced in H_2 at 300° . A. R. P.

Preparation of carbides [of cobalt and tungsten]. R. L. SESSIONS, Assr. to MOLYBDENUM CORP. OF AMERICA (U.S.P. 1,874,641, 30.8.32. Appl., 9.10.28).—A mixture of CoWO_4 and Co paratungstate containing Co and W in the ratio 15 : 80 is intimately ground with C sufficient to reduce the CoO to metal and the WO_3 to WC, and the mixture is heated at 1000° in a reducing atm. The powder is ground, pressed into shape, and sintered to form a hard tool. Co may be wholly or partly replaced by Ni and W by Mo and/or Cr. A. R. P.

Preparation of rare refractory metal [tantalum] powders by electrolysis. F. H. DRIGGS, Assr. to WESTINGHOUSE LAMP CO. (U.S.P. 1,874,090, 30.8.32. Appl., 1.11.28).—Ta is prepared by the electrolysis of a fused 1 : 2 : 1 mixture of KF, KCl, and K_2TaF_7 , to which is added 5% of Ta_2O_5 . Addition of KCl increases the grain size of the Ta deposit. A. R. P.

Recovery of [aluminium] metal from coated metal foils. R. B. DEER, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,869,886, 2.8.32. Appl., 9.4.31).—Paper-backed Al foil is packed to a d of 0.75–1.25 lb./cu. ft. and heated in a closed retort at 450–550° until all volatile matter is expelled; air is then admitted and the temp. kept const. until the C is burnt out. The residual Al is removed and melted with the usual fluxes. A. R. P.

Protection against corrosion of aluminium and its alloys and magnesium and its alloys. Soc. CONTINENTALE PARKER (B.P. 392,728, 26.4.32. Fr., 27.4.31).—The metals are immersed in a bath containing (a) KVF_6 or K_3VF_6 10, Na_2SiF_6 1, and Na K tartrate 1 g. per litre, or (b) K_2TlF_6 2, CrF_3 1, and NaF 0.5 g. per litre. A. R. P.

Malleable and age-hardenable aluminium alloys. DÜRENER METALLWERKE A.-G., and K. L. MEISSNER (B.P. 392,388, 29.7.32. Ger., 12.9.31).—The alloys consist of Al with 3–5 (4)% Cu, 0.7–1 (1)% Mg, 0.4–0.58 (0.58)% Si, and 0.6–1.4 (1.2)% Mn, the Mg and Si being present in the proportion of Mg_2Si . A. R. P.

Controlling grain growth in aluminium-manganese alloys. T. W. BOSSERT, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,869,996, 2.8.32. Appl., 19.6.30).—Addition of Cu to Mn-Al alloys restrains grain growth without appreciably affecting the resistance to corrosion. Claim is made for alloys with 0.75–3 (1–1.5)% Mn and 0.2–0.5 (0.25)% Cu. A. R. P.

Metals or massive Si. MnO_2 , Sb oxides.—See VII. Induction furnace.—See XI.

XI.—ELECTROTECHNICS.

Throwing power [of electrolysis baths]. Its quantitative expression. S. FIELD (J. Electrodep. Tech. Soc., 1931–2, 7, 83–90; cf. B., 1931, 166).—Throwing power (T.P.) is defined arbitrarily as the % deviation of the wt. of deposited metal from the linear ratio on cathodes placed at a distance ratio 2 : 1. A modified form is applied to negative throwing powers. Experimental results show that with this scheme the T.P. vals. vary more uniformly over the range 0–100 than those obtained by former methods. E. S. H.

Electrical apparatus for determining moisture in grain [etc.]. G. B. PUSRIN (Mühlenlab., 1933, 3, 69–74).—A correct moisture determination by the conductivity method can be carried out on a sample of grain, flour, or groats only if the effect of the following factors is allowed for: (a) size of the surface of the electrodes; (b) the average distance between the electrodes; (c) the pressure exerted between the electrodes (*i.e.*, the packing of the sample); (d) the temp. of the sample; (e) the chemical composition of the sample. The effect of *a* and *b* is easily eliminated. By increasing the pressure exerted on the electrodes to 2000–2500 kg./sq. cm., the effect of *c* disappears. A new moisture tester which gives effect to this principle is described and figured. The null galvanometer of the usual Wheatstone bridge circuit is replaced by a condenser of const. capacity which can accumulate sufficient energy to deflect a galvanometer sensitive to 10^{-5} ohm. A thermometer is provided to allow for *d*. The factor *e* is eliminated by adjusting the voltage exactly to 75 volts by a rheostat; *f* exerts little effect except in the case of oily tissue, when it can be compensated for by the use of a smaller or larger sample. The mean experimental error is 0.15%, the max. 0.35%. The apparatus can also be used for determining the moisture content of coal, peat, wool, paper, cement, etc. E. A. F.

Granular composition of materials.—See I. [Detecting] corrosion in gas mains.—See II. Measuring [H]. Conductivity of cotton.—See V. Determining p_{H} of MOCl solutions.—See VII. Protecting Fe pipes. Metal cleaning. Plating on Fe and steel. Coatings on metals. Ni- and Sn-plate. Plating solutions.—See X. Ascertaining soil fertility.—See XVI. H_2O purification.—See XXIII.

See also A., June, 555, New detector. Cs- O_2 -Ag photo-electric cell. 559, Thermo-electric powers of Ni and Ni-Cr alloys. 572, Standard battery. 576, Prep. of rare-earth amalgams, and of macroscopic Tl crystals. 580, Prep. of at. Cl. 582,

Quinhydrone electrode [for soils]. 585, Sonic nephelometer. 586, Comparing the strengths of coloured solutions. Measuring high electrolytic conductivity. Automatic apparatus for electro-metric titration.

PATENTS.

Electric induction furnace. W. S. JACKSON, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,875,298, 30.8.32. Appl., 24.10.30).—The upper part of a vertical shaft furnace for the melting of scrap metal is provided with conveyors on the walls, from which fingers project into the scrap and compress it into the lower zone, which is surrounded by the electric winding. B. M. V.

[Coreless] induction electric furnace. F. LINNHOF (U.S.P. 1,872,990, 23.8.32. Appl., 20.2.30. Ger., 27.2.29).—An inductor coil surrounding the crucible is wound inclined to the vertical axis of the crucible at an angle $>$ the pitch of the winding. J. S. G. T.

[Pressure] multi-cell electrolyzers. A. MENTZEL (B.P. 392,838, 11.11.32).—An arrangement for circulating electrolyte within the cells of a battery to effect uniform rinsing of the cells is claimed. J. S. G. T.

Electron-emitting material. E. WIEGAND, Assr. to ALLGEM. ELEKTRICITÄTS GES. (U.S.P. 1,873,730, 23.8.32. Appl., 2.10.28. Ger., 2.10.27).—A mixture of alkaline-earth oxide, Al, and a refractory oxide not reduced by Al, e.g., Al_2O_3 , is heated near the cathode. J. S. G. T.

Manufacture of electrodes for gaseous-conduction lamps. F. SCHAEFER and O. S. DUFFENDACK (U.S.P. 1,874,124 and 1,874,127, 30.8.32. Appl., 19.8.29).—In (A) finely-ground NiO and BaO are pressed to shape and fritted in an oxidising atm. In (B) a Ba-Ni alloy has a layer of fused oxides formed on the surface by strong heating. B. M. V.

Production of films or the like particularly for use in electric condensers. E. PFIFFNER, Assr. to RADIO PATENTS CORP. (U.S.P. 1,873,474, 23.8.32. Appl., 10.2.27. Ger., 22.3.26).—Cellulose derivative films, one of which is attached to a condenser plate, are united under pressure while plastic. J. S. G. T.

Protecting boilers.—See I. MnO_2 .—See VII. **Welding rod. Insulating Fe. Magnetic alloys. Separating metals.** Ti. Ta.—See X.

XII.—FATS; OILS; WAXES.

General features common to most fruit-coat fats. T. P. HILDITCH (J.S.C.I., 1933, 52, 169—171 τ).—The component acids of fruit-coat fats from a no. of different botanical families, described by different workers, consist almost wholly of palmitic (I), oleic (II), and linoleic acids (III). The wide differences in the physical properties of different fruit-coat fats [e.g., *Stillingia* tallow (IV), palm oil, olive oil] are due only to variations in the relative proportions of the three acids mentioned. The qual. identity of the component acids of all fruit-coat fats is in sharp contrast to the variety of fatty acids encountered in seed fats; here, although in many cases (I), (II), and (III) are still the major components, other acids (e.g., lauric, stearic, erucic) frequently occur in quantity, the appearance of any of the latter usually being sp. to the seed fats of

particular families or even genera. There seems to be no connexion between the composition of fruit-coat and seed fats from the same fruit. A hard fruit-coat fat [e.g., (IV)] may be associated with a drying oil in the seed, a liquid fruit-coat fat may accompany a solid or semi-solid seed fat (e.g., laurel berries), or, occasionally, the compositions of both fats may be very similar (e.g., olive).

Composition of commercial palm oils. III. Difference between component acids of oils from Liberia or the Ivory Coast and those of native or plantation palm oils from other localities. H. K. DEAN and T. P. HILDITCH (J.S.C.I., 1933, 52, 165—169 τ).

—In the districts between Sierra Leone and the Cameroons east of longitude 4—6° W. the mixed fatty acids of native palm oil have a titre of 44—45° and contain about 40—42% of palmitic (I), 40—42% of oleic (II), and 9—11% of linoleic acid (III), the last-named forming 18—20% of the unsaturated acids (IV). The mixed acids of oils from the Ivory Coast and Liberia have a low titre (40—42°) and are made up of less (32—35%) (I) and more (49—52%) (II); (III) is present to the extent of 8—10% [13—14% of (IV)]. (I) seems to be at a min. and (II) at a max. in oils from the region of Cape Palmas. In Sierra Leone there is again a tendency towards somewhat more (I) and less (II) in the oils, which, however, remain still nearer to the Liberia-Ivory Coast group than to the Gold Coast-Nigeria group in composition. Factors such as altitude, rainfall, soil, or similar external conditions are unlikely to account for these differences in composition, which are ascribed to differences in the botanical variety of the oil palm. The observed differences are closely parallel with the occurrence of the thin-shelled, high oil-content Lisombé variety of *Elaeis guineensis* in the easterly areas and with that of hard-shelled varieties of lower oil content in Liberia and Sierra Leone. A Sumatra plantation palm oil has also been examined and comparison of the data for Malaya, Belgian Congo, and Sumatra plantation palm oils shows that the component fatty acids are in all cases closely quantitatively similar to each other and to native Gold Coast or Nigerian oils (especially to those from Lagos). The oils from the cultivated palms thus seem to owe their composition entirely to the variety from which they originated, and not to have been altered in character by differences in external factors.

Sitosterol esters in wheat-flour oil. M. A. SPIELMAN (Cereal Chem., 1933, 10, 239—242).—The sitosterol ester prepared from a flour extract (COM₂) by a method similar to that of Walde and Mangels (B., 1931, 41) when hydrolysed with KOH-EtOH gave pure palmitic acid and a sterol consisting of a mixture of approx. 28% (as determined by the degree of unsaturation indicated by camphoric acid peracid titration) of dihydrositosterol and 72% of sitosterols which, in view of their low rotatory power, must be rich in the α - and β -modifications. E. A. F.

Analysis of sulph[on]ated oils. III. [Report of] Committee of Society of Leather Trades' Chemists on oils, fats, and waxes. D. BURTON and G. F. ROBERTSHAW (J. Soc. Leather Trades' Chem., 1933, 17,

293—320; cf. B., 1933, 275).—Methods are given for the determination of the saponifiable matter, neutral oil, I val., Et_2O -insol. bromides, Ac val., inorg. salts and other constituents. Emulsification tests are also referred to. D. W.

Sardine and tuna oils as sources of vitamin-D. R. W. TRUESDALE and H. J. CULBERTSON (Ind. Eng. Chem., 1933, 25, 563—564).—Four samples each of raw sardine oil (A) and refined tuna oil (B) were compared with a sample of medicinal cod-liver oil (C). Three of the A oils were uniform but slightly inferior to C; the other was equal to it. Two samples of B were slightly inferior to the three A oils and two were equal or superior to C. W. J. B.

Chemical plant.—See I. Cracking of seal oil.—See II. MeBr [as fat-solvent]. Analysis of sulphonates.—See III. Linseed oil sizes.—See V. Oils and fats used in tanning. Sulphonated oils in fat-liquoring. Fat spews on leather.—See XV. Olive oil in canned sardines.—See XIX.

See also A., June, 592, Azelao-glycerides. 624, Fatty materials found in Egyptian tombs. 630, Nutritive val. of whale oils. 644—6, Vitamins (various). 650, Seed oils (various). 651, Fruit of *Tribulus terrestris*.

PATENT.

Manufacture of sulphonation products from higher hydroxy-fatty acids, or esters or other derivatives thereof. A. G. BLOXAM. From Soc. CHEM. IND. IN BASLE (B.P. 392,568, 18.11.31).—Sulphonation of C_{16} (or higher) acids is carried out with excess 80—90% H_2SO_4 , which produces little heat and avoids polymerisation or hydrolysis of the product. J. L.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Water paints and distempers. H. C. BRYSON (Synth. and Appl. Finishes, 1933, 4, 39—43, 50).—The various types of paints based on aq. binding media are summarised, working formulæ and precautions necessary in manufacture being included. The binders detailed are starch and dextrin, casein, Irish moss, Na silicate, latex, etc., and the relationships between pigment and binder are discussed. S. S. W.

Paints for aluminium and its alloys. H. RABATÉ (Peint. Pig. Ver., 1933, 10, 64—65, 67—69).—A general account is given of the suitability of coatings made from oils, asphalt, tar, nitrocellulose, and synthetic resins and of the prep. of the metal surfaces. S. M.

Paints and varnishes containing tar oils. A. PIGNOT (Peint. Pig. Ver., 1933, 10, 84—88).—A series of paints was made from coal-pitch and C_6H_6 and their durability observed when spread on metal alloys or wood and (a) immersed in sea- H_2O and gasometer- H_2O , (b) exposed to an electric potential, (c) exposed to air after immersion in earth and org. matter. The results bear out the usefulness of pitch as a cheap coating material under various conditions. Fe and light alloys are not attacked, but for covering Pb the paint must be free from PhOH. S. M.

Ships' compositions containing rubber. M. BELLAIS (Peint. Pig. Ver., 1933, 10, 81—83).—The use of rubber latex is urged for the prep. of anti-fouling compositions. The latex adheres to a surface consisting of very short textile fibres in a layer of varnish or other medium which is spread either directly on the metal or on an undercoat of paint. Cold vulcanisation ensues *in situ*. S. M.

Mechanism of development of pigment value in zinc sulphide. II. Development of pigment value in calcination. L. T. WORK and I. H. ODELL (Ind. Eng. Chem., 1933, 25, 543—549; cf. B., 1933, 436).—Tables and curves are given which show the effect of varying calcination temp. on the H_2O content, H_2O absorption, composition, and several pigmentary properties of pptd. ZnS. Loss of H_2O , which is present in the absorbed state, occurs chiefly at 150—450°, but the parallel change of the porous gel to cryst. structure with consequent development of pigment val. is more marked from 450° to 600°. Crystal growth continues slowly up to 900°, but some pigmentary properties, e.g., staining and hiding power, begin to decrease. Photomicrographs, microscopical counts, and X-ray patterns confirm the gradual disappearance of very fine particles with increase in the calcination temp. The final particle size depends primarily on the temp. and only secondarily on the duration of heating (usually 3 hr.). The data support the hypothesis of crystal growth by condensation on the larger particles of ZnS vapour from the smaller particles in consequence of the higher v.p. of the latter. S. M.

Mechanical properties of nitrocellulose lacquer films. W. TOELDT (Farbe u. Lack, 1933, 233—235, 245—246).—Four clear cellulose lacquers comprising nitrocellulose, Bu phthalate, and treated dammar in the proportions 3:1:2, 2:1:1, 3:2:1, 3:1:1, and a pigmented composition of these three ingredients and ZnO (2:1:1:2) were sprayed in 1, 2, and 3 coats on metal and (for the prep. of "isolated" films) in 2 coats on parchment paper. Film thickness, elasticity and adhesion (mandril test), hardness (gramophone-needle penetration), and resistance to abrasion (sand) were observed with special reference to variation of behaviour with film thickness, content of plasticiser, and artificial ageing in air and H_2O . The results (tabulated, graphed, and discussed) show that storage in H_2O at 80° has greater effect on film properties (increased elasticity and softness) than corresponding air-storage, sea- H_2O being less effective than distilled H_2O in this connexion. S. S. W.

Fillers [for plastic materials]. H. C. BRYSON (Ind. Chem., 1933, 9, 135—137, 150—153).—The real d of the filler largely determines the amount which can be incorporated into a binding material. There is an optimum fineness of particle size, and when this is exceeded, viscosity and binding power decrease. Coarse particles form centres from which fractures may occur when the finished material is stressed. Rounded rather than flat particles are preferred in most cases. The methods of determining d and particle size are reviewed. Flocculation is probably desirable in rubber and synthetic resins, but not in paints. When the filler is wetted by the binder, the latter becomes a reinforcing

agent; in other cases it is a diluent. Curves showing the relationship between strength and hardness of lac compositions and filler content and between the strength and flexibility of synthetic resin compositions and fibrous filler are given. The behaviour of fibrous fillers in gramophone records is discussed. D. K. M.

Nature and constitution of shellac. V. Effect of small amounts of certain impurities. W. H. GARDNER (Ind. Eng. Chem., 1933, 25, 550—554; cf. B., 1932, 314).—The prep. of shellac and possible sources of impurities are described. Three unusual samples characterised by (a) poor bleaching, (b) poor filtering, and (c) presence of insol. lac were each separated by hand into several components which are shown to display widely varying properties (tabulated). The effects on the composite shellac are discussed. S. M.

New resin ester. F. FRITZ (Chem.-Ztg., 1933, 57, 354).—Stearyl alcohol, obtained, e.g., during the hydrogenation of technical stearic acid, reacts with colophony after prolonged heating at 200° to give a liquid resin ester, which suddenly solidifies to a fat-like mass having the viscous properties and odour of colophony. Possible uses are indicated. J. G.

Manufacture of sealing wax. R. DITMAR (Farben-Chem., 1933, 4, 205—208).—A review is made of recent patents for combining the wax with a candle, improving the flexibility and hardness by the use of rubber, preparing powdered and liquid wax, and substituting rosin and shellac by cellulose esters etc. S. M.

Unbreakable [gramophone] records. H. C. BRYSON (Chem. & Ind., 1933, 495—499).—A lecture.

Chemical plant. Sp. gr. of pigments.—See I. **Corrosion in gas mains.**—See II. **Rosin sizing.**—See V. **Glycerides of elæostearic acids.**—See XII.

See also A., June, 567, **Rosin sizing.** 613, **Colour reactions for abietic acid.**

PATENTS.

Dissolving and dispersing nitrocellulose. W. B. PRATT and R. T. HALSTEAD, Assrs. to DISPERSIONS PROCESS, INC. (U.S.P. 1,870,864, 9.8.32. Appl., 26.2.29).—To a solution of nitrocellulose in wood creosote or "hexalin acetate" is added an aq. solution of a hydrophilic colloid, e.g., gum tragacanth, and sufficient H₂O to disperse the nitrocellulose. S. M.

[Fireproof] cellulose compositions. M. J. THEUMANN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,870,972, 9.8.32. Appl., 24.1.30. Fr., 21.5.29).—Triresorcinyll phosphate is used with any cellulose derivative as plasticiser and fireproofing agent. S. M.

Rubber coating compositions for varnishing fabrics, leather, etc. G. GALIMBERTI and G. PEVERELLI (B.P. 392,797, 5.9.32. It., 20.4.32).—An aq. emulsion containing latex, a drying oil, resin, casein, and CH₂O is applied on an undercoat of an aq. paste made from latex or macerated rubber and a pigment and the material is then cold-vulcanised with S₂Cl₂. The product may be coated with a nitrocellulose lacquer. S. M.

Production of [aqueous] colour matrix behaving like oil. O. BRATKE (B.P. 392,237, 24.11.31. Ger., 24.11.30).—H₂O containing about 0.01% of the dispersing agent, which consists of a distillate (250—350°) from beech-wood tar mixed with excess of alkali, is stirred into a drying oil or varnish. S. M.

Manufacture of [phenol-formaldehyde] synthetic resins. W. F. GREENWALD, Assr. to WEISBERG & GREENWALD, INC. (U.S.P. 1,873,575, 23.8.32. Appl., 6.6.30).—Triethanolamine, or other alcohol-substituted amine, is used as the catalyst. S. M.

Manufacture of phenol-formaldehyde resin sheets and forms. G. J. CROSSMAN, Assr. to PANELYTE CORP. (U.S.P. 1,868,566, 26.7.32. Appl., 28.5.31).—Paper pulp is beaten with a colloidal paste of mica and the sheets made therefrom are impregnated with a PhOH-CH₂O resin. S. M.

Precipitation of [phenol-formaldehyde] resins from residual oils. M. R. BHAGWAT, Assr. to COMBUSTION UTILITIES CORP. (U.S.P. 1,873,105, 23.8.32. Appl., 26.11.28).—Resins of the A type, which are retained in the residual oils from the treatment with CH₂O of a tar distillate, are pptd. by addition of a dil. aq. mineral acid on other demulsifying agent. S. M.

Purification of phenol-aldehyde resins. F. SEEBACH, Assr. to BAKELITE GES.M.B.H. (U.S.P. 1,868,079, 19.7.32. Appl., 10.7.29. Ger., 17.7.28).—Excess of PhOH is removed by dissolving the resin in an aq. solution of NH₂Ph.HCl and distilling. S. M.

[Oil-modified] resinous compositions from phenols and acetaldehyde or polymerides thereof. BAKELITE, LTD., and S. E. CHUBB (B.P. 392,226, 18.11.31).—A PhOH-MeCHO resin is heated with a fatty oil, e.g., tung oil, until the product is brittle when cooled. S. M.

Manufacture of [aniline-formaldehyde] synthetic resin. F. VACHER, Assr. to CONTINENTAL-DIAMOND FIBRE Co. (U.S.P. 1,873,799, 23.8.32. Appl., 16.12.26).—A resin which is suitable for lacquers, plastics, etc. is obtained by distilling the initial condensation product under partial vac. The second-stage insol. resin is resistant to alkalis. Phenols can be employed as catalysts. S. M.

Manufacture of (A) carbohydrate[-phenolic] resinous material, (B) resinous products. J. V. MEIGS, Assr. to PLASTIX CORP. (U.S.P. 1,868,215—6, 19.7.32. Appl., [A] 5.3.26, [B] 15.1.27. Cf. U.S.P. 1,832,038; B., 1932, 808).—(A) The proportion of a phenol which can be made to react with the carbohydrate increases in the presence of H₂SO₄. The product, after treatment with a hardening agent, e.g., (CH₂)₆N₄, and filler gives resins possessing greater strength. Heating with furfural increases the resistance to NH₃. (B) Tung or other fatty oil or fatty acid is added to improve the fluidity and H₂O-resistance. The PhOH-carbohydrate-oil resin is hardened by heating with > 10% of (CH₂)₆N₄. S. M.

Manufacture of oxidised resinous product. C. ELLIS, Assr. to ELLIS-FOSTER Co. (U.S.P. 1,872,568,

16.8.32. Appl., 6.12.27).—A glyptal-type resin, which may be modified with a resin or drying oil, is hardened by prolonged exposure of the powdered material to air at a temp. below the fritting point. S. M.

Manufacture of [modified phenolic glyptal] synthetic resin. C. G. MOORE and M. ZUCKER, Assrs. to GLIDDEN Co. (U.S.P. 1,867,583—4, 19.7.32. Appl., [A] 10.6.29, [B] 12.6.29).—The polyhydric alcohol and polybasic acid are heated together with unsaturated drying oil acids and either (A) a sol. phenol-aldehyde resin, or [B] a phenol and an aldehyde or ketone. The product can be used for spirit varnishes. S. M.

(A) **Manufacture or treatment of products or articles made of or containing cellulose derivatives.** (B) **Solvent treatments of cellulose derivatives.** H. DREYFUS (B.P. 391,769 and 391,828, [A] 26.9. and 30.11.31, [B] 5.11.31).—(A) Dimethylene oxide and its alkylated derivatives have a softening or solvent action on natural and artificial resins, cellulose esters, and ethers. Their use is claimed for the manufacture of varnishes or plastic masses, spinning of cellulose acetate, etc., and the dyeing or other treatment of the product. (B) Similar claims are made for alkylated 1:4-cyclo-tetramethylene dioxides. S. M.

Mouldable [filled] compositions. H. WADE. From BAKELITE CORP. (B.P. 391,784, 2.11.31. Addn. to B.P. 359,986; B., 1932, 235).—The formation of a non-tacky filler coating is promoted, prior to moulding, by adding to the liquid coating a sol., brittle, phenolic resin in the A-stage. S. M.

Making composite mica plates. L. T. FREDERICK, Assr. to CONTINENTAL DIAMOND FIBRE Co. (U.S.P. 1,873,753, 23.8.32. Appl., 24.6.27).—A compromise between uncurable shellac with cheap solvent and curable binder with expensive solvent is effected by making thin sheets with shellac dissolved in aq. NH_3 ; after drying they are coated with a curable resin (the solvent being recovered as far as possible), then stacked, pressed to final thickness, and cured, causing the resins to blend. B. M. V.

Azo pigments.—See III. **Azo pigments.**—See IV. **Cellulose ester compositions.**—See V.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Determination of the specific gravity [of rubber products]. N. BAN (Chem.-Ztg., 1933, 57, 415).—In determining d by the hydrostatic balance, the difficulty of air bubbles forming on the surface of the material may be obviated by adding 0.1% of a wetting agent (Nekal BX or Igepon T) to the H_2O used for immersion. E. B. H.

Ships' compositions containing rubber.—See XIII.

See also A., June, 586, **Rapid determination of surface tension [of latex etc.].** 590, **Synthetic rubbers.**

PATENTS.

Coagulation of rubber [latex]. W. B. WESCOTT, Assr. to DEWEY & ALMY CHEM. Co. (U.S.P. 1,873,913, 28.8.32. Appl., 10.6.30).—An aq. dispersion of rubber

to which a heat-denaturable protein (I), e.g., egg-albumin or haemoglobin, has been added contains also a coagulant, especially one composed of particles of solid material (C black) the activity of which is kept in suspense by the protein. On raising the temp. (I) coagulates and thereby ceases to be protective, so that coagulation ensues. D. F. T.

Preservation of [rubber] latex. J. MCGAVACK, Assr. to NAUGATUCK CHEM. Co. (U.S.P. 1,872,161, 16.8.32. Appl., 27.8.30).—By adding a small % of CH_2O to latex and subsequently, when there remains substantially no excess of CH_2O , adding aq. NH_3 , the advantages attendant on the separate use of CH_2O and NH_3 are obtained without any increase in the rate of vulcanisation relative to rubber from ordinary NH_3 -preserved latex. When such latex is desiccated, e.g., by spraying, the rubber obtained is unusually H_2O -resistant and has superior milling qualities. D. F. T.

Obtaining rubber in granular form from dispersions such as latex, or from solutions. A. J. A. Y. DE SCHEPPER (B.P. 392,592, 21.8.31).—Rubber dispersions or solutions are formed into droplets, e.g., by liberation from jets, and allowed to fall separately on to a drying surface which traverses their line of fall; the apparatus for removal of the dried, non-cohering particles may be moistened and the particles themselves dusted with talc to prevent adherence. D. F. T.

Artificial leather.—See V. **Rubber varnish. Fillers.**—See XIII.

XV.—LEATHER; GLUE.

Apparatus for extraction of tanning materials for analysis. A. TURNBULL (J. Soc. Leather Trades' Chem., 1933, 17, 266—268).—The tanning material is placed on a filter of cotton wool held between two perforated Cu discs, which fit into the lower end of an upright Cu cylinder (A), surrounded by a steam-jacket to maintain the temp. and supply distilled H_2O . A ball condenser is fitted to A for extraction at 100° , and a siphon is provided to remove the infusion of the material. D. W.

Integral utilisation of *Cæsalpinia spinosa* (Mol.), Kuntze. A. CASTIGLIONI (Boll. Uff. Staz. sperim. Ind. Pelli, 1933, 11, 314—319).—The endosperm of the seeds of *C. spinosa* contains: galactans 30.31, mannans 58.85, proteins 4.27, pentosans 2.20, cellular tissue 3.73, ash 1.07%, thus closely resembling that of *Ceratonia siliqua*. In contact with H_2O it yields a gum solution which behaves towards tannin like carob gum, does not reduce Fehling's solution, and gives a no. of other reactions. The solution may be used with fair results in tanning, but its possible development in this direction is considered unimportant. T. H. P.

Determination of iron and manganese in vegetable [tanning] products. A. PONTE and R. ALLEGRI (Boll. Uff. Staz. sperim. Ind. Pelli, 1933, 11, 297—305).—A colorimetric determination of Fe in wood or bark with KCNS is given. Mn is determined colorimetrically as KMnO_4 . Chestnut wood (dry) contains 0.00143—0.00286% Fe_2O_3 and 0.00032—0.00241% Mn_2O_4 and the bark 0.00914—0.0314% Fe_2O_3 and 0.077173—0.0293%

Mn_3O_4 ; and holm-oak bark 0.0060% Fe_2O_3 and 0.1271% Mn_3O_4 . T. H. P.

Determination of iron and copper in tanning extracts. G. A. BRAVO (Boll. Uff. Staz. sperim. Ind. Pelli, 1933, 11, 251—263).—Fe may be determined by dissolving the ash in HCl, rendering the SiO_2 insol., oxidising with HNO_3 , expelling the latter, adding HCl and NH_4CNS , and examining in a photometer. The results are not disturbed by the presence of Cu in 10-fold excess over the Fe. Photometric determination of Cu as CuS is useless if Fe also is present. T. H. P.

Sulphite-cellulose liquor [in tanning]. A. GANSSER (Boll. Uff. Staz. sperim. Ind. Pelli, 1933, 11, 224—229). The purification of this liquor and its use in tanning are discussed. T. H. P.

Emulsive oils and complex fats used in tanning. IV, V. M. GERONAZZO (Boll. Uff. Staz. sperim. Ind. Pelli, 1933, 11, 320—325; cf. B., 1930, 731).—Analyses were made of a no. of materials supplied for tanning purposes: (1) Emulsive oils, consisting of: soap, fish oil, mineral oil; fish sulpholeate, tallow, beeswax, and glue (?); oleine soap, mineral oil, etc.; sulphonated mineral oil, beeswax, glycerol; mineral oil, beeswax, resin soap (?); mineral oil, beeswax, birch oil. (2) Complex fats composed of: sulphonated fish oil, castor oil, soap; sulphoricinate, mineral oil; neatsfoot oil (partly sulphonated), egg yolk; sulphonated fish oil, castor oil, mineral oil, Tetralin. T. H. P.

Use of sulphonated oils in the fat-liquoring of chrome leather. C. SCHIAPARELLI (Boll. Uff. Staz. sperim. Ind. Pelli, 1933, 11, 124—208).—A crit. summary of the literature, dealing with the theory, practical application, analytical methods, etc. T. H. P.

Absorption of oil by vegetable-tanned leather. R. H. MARRIOTT (J. Soc. Leather Trades' Chem., 1933, 17, 270—292).—The spreading of oils on liquid surfaces (H_2O , tan liquors) and on wet leather is considered. Oils were absorbed by wet leather in the following diminishing order: sulphonated castor, sulphonated cod, cod, linseed, castor, paraffin. The rate of absorption of oil was practically equal to the rate of evaporation of the H_2O from the leather, after a preliminary time lag. For 34—49% H_2O , the rate of absorption of oil was inversely proportional to the H_2O in the leather; above 49% H_2O it decreased considerably. A longer period of time was required for leather at high p_H vals. to absorb oil than for leather at low p_H vals. The rate of absorption of oils by leather was unaffected by their viscosity or interfacial tension to tan liquors. The evaporation of H_2O is retarded more by oils which form a coherent film, e.g., castor, paraffin, than by those which do not form such films, but this does not lead to the production of good colour or to freedom of grain from crackiness. D. W.

Causes of the formation of fat spews on "Russia" leather. N. A. SCHULGIN (Collegium, 1933, 283—284).—Fat spews were not avoided by the use of fats containing a low % of tallow or by treatment of the surface of the leather with solvents for solid fatty acids, but they were diminished by treatment with birch-tar oil or by more gradual drying of the leather. No spews

were obtained on impregnated leathers. Fat spews are caused by the unsuitable drying of leather in which the fat has been deposited between the damp fibrils, thus producing two phases—fat and the "aquogel" fibrils. No spewing occurs when there is only one phase, e.g., grease-impregnated fibrils. D. W.

Automatic determination of water-soluble matter in [vegetable-tanned] sole leather. J. N. GERSSEN (Collegium, 1933, 285—287).—A modified Koch extractor is described. D. W.

Dyeing of furs.—See VI. Lakes of vegetable colouring materials. Cellulose ester adhesives.—See XIII.

PATENTS

Preparation of glue stocks. C. H. CAMPBELL (U.S.P. 1,869,881, 2.8.32. Appl., 29.1.31).—Raw glue stock is mixed with a granular abrasive material to facilitate grinding. D. W.

Artificial leather.—See V. Varnish for leather.—See XIII.

XVI.—AGRICULTURE.

Characterisation of the condition of weathering of humid soils by determination of the free and KCl-soluble alumina and its relationship to soil acidity. M. TRÉNEL and E. ZEIHNER (Z. Pflanz. Düng., 1933, 29, A, 298—308).—Acid forest soils of N. Germany contain considerable proportions of "free" Al_2O_3 (i.e., sol. in cold 1% NaOH solution). This occurs partly as $Al(OH)_3$, partly in mixed gels with highly dispersed org. matter and SiO_2 , and partly in complex org. compounds. The "exchangeable" Al_2O_3 (KCl extract) content depends, not on the abs. content of "free" Al_2O_3 , but on the extent to which free alkali, primarily produced by the action of KCl on "free" Al_2O_3 , enters into combination with free SiO_2 , acid humus, or colourless org. acids in the suspension. The total acidity and $[Al^{III}]$ in surface soils is > that of subsoils. The "exchangeable" Al increases with the proportion of weak org. acids as indicated by the difference between titration vals. with phenolphthalein and Me-red indicators. In podsolised brown-earth soils "free" Al_2O_3 accumulates in the B-horizon. A. G. P.

Reaction and lime condition of some Danish soils. S. T. JENSEN (Arch. Pflanzenbau, 1933, 10, 72—82).—The "liming factor" relating the field requirement of CaO to that determined in the laboratory (Bjerrum and Gjaldbæk method) approximates closely to 2.9 in Danish soils. The $p_{H(H_2O)}$ of soils varies considerably with the season, but $p_{H(KCl)}$ remains practically const. throughout. Rates of removal of Ca from surface soil under varying conditions are recorded. On limed soils the Ca leached is proportional to the CaO applied. A. G. P.

Agricultural utility of blast-furnace slag. H. KAPPEN (Arch. Pflanzenbau, 1933, 10, 87—128).—The Ca present as silicate in the slag has not the same neutralising power on acid soils as have CaO and $CaCO_3$. Increased crop yields following the use of finely-ground slag are, however, < those produced by corresponding dressings of CaO. This is attributed to the beneficial

effects in plant growth of the increased intake of SiO_2 . A. G. P.

Determination of easily soluble nutrients by means of direct-current electricity; an aid to ascertaining the fertility of cultivated soils. P. KÖTTGEN (Z. Pflanz. Düng., 1933, 29, A, 275—290).—Apparatus is described for the electro-ultrafiltration of soils. Its application to the determination of bases, NH_3 , and NO_3^- in soils is indicated. A. G. P.

Determination of the phosphate requirement of soils by Mitscherlich's pot-culture method, using oats, mustard, buckwheat, western rye grass, and black millet as experimental plants. C. KRÜGEL, C. DREYSPRING, and W. HEINZ (Z. Pflanz. Düng., 1933, 29, A, 380—396).—Comparison is made of the Mitscherlich and the Neubauer methods with a no. of crops. In Mitscherlich tests the customary use of oats may be replaced by that of black millet. Other crops examined were unsuitable for the purpose. A. G. P.

Influence of continuous potash manuring on reaction and phosphoric acid solubility in soils. A. FREY (Landw. Jahrb., 1933, 77, 207—230).—The effects of various K fertilisers on soil reaction were small and somewhat irregular. Determinations, by a no. of recognised methods, of the available PO_4^{4-} in soils after K manuring indicated no uniformity in the action of the fertilisers or in the vals. recorded by the various methods of examination. A. G. P.

Potato scab and manuring. III. EICHINGER (Superphosphat, 1933, 9, 2—10; cf. B., 1932, 1047).—The effect of various combinations of fertilisers on the proportion of scabbed potatoes is recorded. The repeated use of $(\text{NH}_4)_2\text{SO}_4$ (I) minimised the appearance of scab. The ill-effects of KCl and of basic slag may be counteracted by using (I). Soil reaction is not the only factor concerned in the distribution of scab. Among complete fertilisers examined, K Mg sulphate + superphosphate + (I) caused least scab, which was still further reduced by applications of S. A. G. P.

Influence of soil reaction on intake of various nutrients [by plants]. K. NEHRING (Z. Pflanz. Düng., 1933, 29, A, 320—334).—Artificial alteration of soil reaction from acid to neutral resulted in an increased ash content in cereals. In legumes there was a general tendency for ash contents to approach a min. when the soil reaction was optimum for growth. In the early growth stages of plants soil p_{H} has a more variable effect. The Ca intake of acid-sensitive plants was not appreciably affected by a reaction change from acid to alkaline, but that of plants not sensitive to acidity was markedly increased. The N intake of all plants was greatest and the % dry matter least in the neighbourhood of neutrality. The intake of P and K was less definitely influenced by reaction changes. A. G. P.

Soil reaction and the growth of the perennial blue lupin (*Lupinus polyphyllus*). G. JOHN (Z. Forst- u. Jagdw., 1931, 63, 493—510; Bied. Zentr., 1932, 3, A, 21).—The lupin tolerates acidity corresponding to $p_{\text{H}(\text{KCl})}$ 3.8. The favourable action of CaO on lupins

in moderately acid soils may be attributed mainly to the improved physical condition of the soil. A. G. P.

Chlorosis of yellow lupins (*Lupinus luteus*) in relation to iron. W. SCHOLZ (Z. Pflanz. Düng., 1933, 28, A, 257—298).—Chlorosis of the young leaves of lupins results from Fe deficiency occurring naturally in soils or induced by liming, which restricts the intake of Fe by plant roots. Older leaves accumulate more Fe than young ones and no translocation takes place. On soils containing excessive Ca old leaves have higher Ca contents than young ones. The intake of Ca and Fe by the plants and the subsequent utilisation of these elements within the plant system are inversely related. Lupin seeds contain insufficient Ca to ensure complete utilisation of other nutrient elements present. The Fe content of seeds is sufficient for the formation of 3 leaves only. In the early stages of growth translocation of Fe occurs from cotyledons to leaves even under chlorotic conditions. Later this movement is restricted and cotyledons become relatively richer in Fe, although there is practically no external supply. A. G. P.

Nitrogen fixation by nodule bacteria in the field. H. RHEINWALD (Z. Pflanz. Düng., 1933, 29, A, 396—406).—Inoculation of serradella with nodule bacteria in soils initially free from these organisms increased the yield more than did a dressing of $(\text{NH}_4)_2\text{SO}_4$. A. G. P.

Effect of magnesium on crop yields. A. GEHRING, U. CREUZBURG, E. POMMER, H. VON STOCKHAUSEN, and O. WEHRMANN (Z. Pflanz. Düng., 1933, 29, A, 335—380; cf. B., 1931, 689).—Results of field trials and pot-culture experiments are recorded in which the influence of various fertiliser combinations on the appearance of symptoms of Mg deficiency are examined. The CaO status and level of application of animal manures are important factors in this respect. Results are discussed in relation to the mutual effects of cations on the mineral intake of plant roots. The significance of Mg in chlorophyll activity and indirectly on the utilisation of mineral matter within the plant is examined. A. G. P.

Pasture fertilisation at the Virginia agricultural station. C. W. HOLDAWAY and A. D. PRATT (J. Dairy Sci., 1933, 16, 95—99).—On both manured and unmanured pastures rotational grazing resulted in only very small increases in amount of total digestible nutrient produced in comparison with continuous grazing. The val. of the increased milk and fat production due to manurial treatment approximated, in the first year, to the cost of the fertiliser, but only a portion of the added fertiliser constituents were removed in the herbage during this season. A. G. P.

Seasonal composition of pasture grasses. R. H. LUSH (J. Dairy Sci., 1933, 16, 149—152).—The proportions of protein, N-free extract, fat, fibre, and ash in herbage from various fertile pastures varied but little. The N and fibre contents of monthly-clipped herbage were influenced more by season and rate of growth than by botanical composition. A. G. P.

Mineral content and feeding value of natural pastures in the Union of South Africa. P. J. DU TOIT, A. I. MALAN, J. G. LOUW, C. R. HOLZAPFEL,

and G. C. S. ROETS (18th Rep. Dir. Vet. Serv., Union S. Afr., 1932, 525—577).—There was a marked deficiency of available P in most South African soils, as indicated by analyses of soils, pastures, and blood of cattle.

NUTR. ABS.

Reducing the inflammability of fumigants [for control of insect pests in grain] with carbon dioxide. R. M. JONES (Ind. Eng. Chem., 1933, 25, 394—396).—The compositions of inflammable mixtures of CO_2 , air, and each of the following vapours, viz., CS_2 , $(\text{CH}_2)_2\text{O}$, AcOH , EtCO_2H , propylene oxide, and EtOAc , have been determined and the results are plotted. The min. amounts of CO_2 required in each case to reduce the upper and lower limits of inflammability to non-inflammability are given.

D. K. M.

Granular composition of materials.—See I.

See also A., June, 564, Adsorption by colloidal clay. Adsorption of NH_4 compounds in soils. 582, Quinhydrone electrode [for soils]. 589, Soil classification and structure. 647, Sugar-beet seedlings. Tobacco plants. 652, Nutritional disorders of plants. 653, Plant disease [conifers]. Determining F in plant materials.

PATENTS.

Production of distributable and non-caking fertilisers containing calcium nitrate. LONZA ELEKTRIZITÄTWERKE U. CHEM. FABR. A.-G., E. LÜSCHER, and E. STIRNEMANN (B.P. 392,531, 16.10.31. Switz., 1.11.30).— $\text{Ca}(\text{NO}_3)_2$ solutions are concn., preferably in vac. in a kneading machine during the latter stages, to 90—95% $\text{Ca}(\text{NO}_3)_2$ content, and the mass is granulated at 50—100°; other salts, preferably K salts, may be added before or after concn.

L. A. C.

Fungicides [containing copper oxychloride]. ELECTRO CHEM. PROCESSES, LTD., and E. HATSCHKE (B.P. 392,556, 17.11.31).— $\text{Cu}(\text{OH})_2$, prepared by pptn. from CuSO_4 , is treated with 25% of the wt. of HCl necessary to convert it into CuCl_2 , and the product, after removal, is stirred (without drying) into sufficient sulphite lye to give a Cu concn. of 12.5%. The product is diluted, e.g., to 600 times, with H_2O before use.

L. A. C.

XVII.—SUGARS; STARCHES; GUMS.

Storage of dried [sugar-beet] cossettes. G. S. BENIN (Nauk. Zapiski, 1932, 9, 1—18).—Beet cossettes having 7—8% H_2O will keep without apparent deterioration under good storage conditions, i.e., when the humidity is low, and when little of their surface is exposed. The border line at which deterioration begins is about 13%, but this depends largely on temp. conditions. 1 cu. m. of dry beet cossettes weighs about 320 kg.

J. P. O.

Determination of the lime addition in [sugar-juice] carbonatation. K. D. DEKKER and W. THOMSON (Archief Suikerind. Ned.-Indië, 1932, 40, Deel I, 393—396).—To 100 g. of unfiltered carbonatated juice are added 50 c.c. of $N\text{-HCl}$, and this is back-titrated (bromocresol-green) with $N\text{-NaOH}$, taking as end-point the change to greenish-blue (about p_{H} 4.5).

Then, wt. of milk-of-lime added % wt. of raw juice = $100x/(y-x)$, x being the % CaO in the carbonatated juice, and y that in the milk. Laboratory carbonatation tests showed this method to check well with the actual amount added.

J. P. O.

Troubles with [beet-juice] pre-defecation. O. SPENGLER (Deut. Zuckerind., 1933, 58, 73—75).—Troubles usually follow when the original directions prescribed by the author are departed from, these calling for predefecation at 40° with < 0.25% of CaO on the roof, after which the juice is heated in at most 3 min. to 80°, at which degree the main addition of about 0.75% of CaO is made. Thymol-blue test-paper should be used to ensure that these operations have been properly conducted. Syrup from the last evaporating unit when diluted to its original density should never be darker than the thin-juice.

J. P. O.

Phosphate determination [in sugar-cane juice] by the cœruleomolybdate method. B. E. BEATER (Internat. Sugar J., 1933, 35, 182).—Applying the molybdate colorimetric method of determining P_2O_5 to cane juices, it was found impossible to obtain accurate results unless the concn. of both standard and unknown solutions are nearly the same. A correction curve correlating mg. P_2O_5 per 100 c.c. of the unknown and mm. of the standard has been drawn up for readings ranging from approx. 13 to 35 mm. of the unknown.

J. P. O.

The settling process [in sugar solutions]. J. MARCHÉS (Archief Suikerind. Ned.-Indië, 1932, Deel III, Meded. No. 10, 750—785).—Addition of electrolytes, e.g., 0.1% of KCl , had no effect on the rate of settling of $\text{Ca}_3(\text{PO}_4)_2$ suspended in a sugar solution of about 20° Brix, nor had kieselguhr, using 0.02%. Using raw cane juices, good results were obtained when AlCl_3 , BaCl_2 , or Na phosphate (I) was added before liming; (I), however, gave the best effect, the juice after settling being sparkling, and of very light colour, but none of these reagents increased the rate of settling very much. Convection currents caused by irregular cooling exerted a marked influence in settling, the ppt. settling much more rapidly when the temp. was maintained const. at about 80° than when it was allowed to fall to say 40°.

J. P. O.

Viscosity of impure cane sugar solutions. R. H. KING (Internat. Sugar J., 1933, 35, 187—189).—No two of all the samples of final molasses examined were found to have the same crit. viscosity. Above 45°, the viscosity did not appear to be a limiting factor when the dry substance is low, but below this temp. certain samples showed great increase in viscosity. A correlation of the chemical and physical properties of various final factory molasses showed a high Ca content associated with a low reducing sugar content to result in a high viscosity. There was no relationship between the dye val. and the viscosity, which was also increased by entrained air. Graphs are presented illustrating these and other factors bearing on the viscosity of syrups, molasses, and massecurites.

J. P. O.

Factors governing the yield of jelly massecurites. R. M. BECHARD and L. DUPONT (Internat. Sugar J., 1933, 35, 182).—Samples of jelly massecurite taken from

20 tanks were cured on a laboratory centrifuge and the crystals obtained weighed. Although the Brix val. varied only from 89° to 91.5°, and the purities from 48.4 to 52.1, the yields showed a remarkable divergence, varying from 21.7% to 67.6%. Analyses of the massecuites, the sugars, and the molasses did not explain the wide variation of yield observed. J. P. O.

New test-paper for controlling tempering [in sugar factories]. R. M. BECHARD (Internat. Sugar J., 1933, 35, 181—182).—Brilliant-yellow, used as an indicator in the cane factory, has the following advantages: it has a single colour change easily detected in any light; it shows a positive narrow band of sensitivity at p_H 7.3—7.4; it bridges the gap between litmus and phenolphthalein; and it indicates changes from p_H 7.3 to p_H 8.0 which are easily distinguished by the depth of colour. In liming with the aid of this indicator, it is found possible to have at least 98% of the tests within p_H 0.1 of the desired reaction, thus making tempering much more precise. Whereas formerly the increase in the ash ratio from mixed to clarified juice was 30.6, now it is < 15%.

J. P. O.

Digestion of cereal starch.—See XIX.

See also A., June, 566, Subsidence of starch milk. 568, Gelatinisation of potato starch by heat. 585, New types of polarimeter. 597, Determining sugars in starch-degradation products. Starch nitrates. 626, Sugars of human milk. 647, Sugar-beet seedlings. 651, Sol. sugars of *Lemanea nodosa*.

XVIII.—FERMENTATION INDUSTRIES.

Recognition and evaluation of fruit wines. F. SEILER (Z. Unters. Lebensm., 1933, 65, 466—470).—As a confirmation of the Werder sorbitol test, the content of extractives, ash, and lactic acid and the alkali val. may be used to detect addition of sugar to fruit wines. Data are given for pure fruit wines of the Trier district for 1930 and 1931. E. C. S.

Iron in wine: Can it be present in complexes? J. RIBÉREAU-GAYON (Ann. Falsif., 1933, 26, 224—233).—A reply to Ferré et Michel (B., 1933, 281), who discountenance the ferrocyanide method (A) for the colorimetric determination of Fe in wine and advocate using the CNS' method. The author states that if the solution is acidified sufficiently the two methods give identical results, but that low results are obtained by method A for unacidified wines. In the latter case, the Fe is present as complexes, and is not determined until the wine is acidified. E. B. H.

Spices and yeast fermentation. Honey diastase.—See XIX.

See also A., June, 595, Prep. of dihydroxyacetone. 597, Determining sugars in starch-degradation products. 634, Peroxidase from fruit of *Tribulus terrestris*. 635, Amylosynthase. 637, Production of acids and EtOH by *Aspergillus*, and of citric acid by moulds. 639, $PrCO_2H$ bacteria. $COMe_2$ -butanol and gluconic acid fermentations. 640, Trimethylene glycol fermentation.

PATENTS.

Apparatus for producing aldehyde-free alcoholic liquids. H. HEUSER (U.S.P. 1,867,554, 19.7.32. Appl., 8.11.28. Cf. U.S.P. 1,785,447; B., 1931, 778).—The apparatus consists of two steam-heated kettles in which the liquid is boiled to remove toxic aldehydes. The residual liquids are then combined in one kettle, cooled in absence of O_2 , and carbonated. EtOH may be added to compensate boiling losses. R. H. H.

Egg product. Food product.—See XIX.

XIX.—FOODS.

Nitric acid flocculation reaction for determining the milling grade of wheat flour. H. KÜHL (Mühlentab., 1933, 3, 81—88).—The flocculation reaction produced by the acidification of aq. flour extracts with HNO_3 can be used for differentiating between: (a) first reductions (patent flours), straight-run flours, and straight-run flours from which the first reductions have been removed; (b) 0—42.5%, 0—45%, and 0—50% flours; (c) 0—75% and 30—70% flours, by heating the extracts on the H_2O -bath for 2 min. after acidification. The time which elapsed before flocculation decreased with increasing degree of extraction. The origin of the wheat had no effect on the reaction. Grain milled, or milling products stored, in an excessively moist condition behaved abnormally. The flocculated masses consisted of adsorption compounds of N compounds, carbohydrates, and fat, and, probably, lecithin.

E. A. F.

Effect of numbers of bacteria on development of rancidity in soft wheat flour. C. B. GUSTAFSON and E. H. PARFITT (Cereal Chem., 1933, 10, 233—238). The total bacterial count of wheat was > that of the flour made from it; lower grades had a higher bacterial count than patent flours, and experimentally milled than commercially milled flours. The bacterial count of flours decreased with the time of storage. Self-raising and plain flours had practically the same count. The total bacterial count appeared not to be a dominant factor in the development of rancidity (as determined by the odour of the Et_2O extract and spectrographic examination of the Kreis test). E. A. F.

Wheat-meal fermentation time test of "quality" in wheat as adapted for small plant breeding samples. G. H. CUTLER and W. W. WORZELLA (Cereal Chem., 1933, 10, 250—262).—A description is given of the wheat-meal fermentation test for wheat quality and of the conditions necessary for a satisfactory determination (cf. B., 1933, 281); this can be carried out on a min. sample of 3.5 g. Significant positive correlations were obtained between the fermentation time and protein content, loaf vol., absorption, and vitreous kernels. Varieties, with certain exceptions, tend to react the same way in different seasons. The inter-annual correlation coeffs. showed high positive correlations between the results of different seasons when wheats of diverse nature were grown under similar environmental conditions. The fermentation test seemed capable of accurately selecting strains of wheat from standard varieties which vary genetically. Blending tests support the validity of the fermentation test as a measure

of the gluten strength in wheat and indicate the possibility of its use in blending wheats. A classification of wheats based on "time" is suggested for pastry and bread wheats. Flour granulation in pastry wheats is measured by the fermentation test only in so far as this characteristic is positively correlated with the texture of the berry. E. A. F.

Diastatic degradation of wheat- and rye-starch in flour. H. KÜHL (Mühlenlab., 1933, 3, 65—70).—Three types of compounds can be recognised as the degradation products of rye and wheat flours: amylo-dextrins (blue with I; sol. in 25% EtOH; pptd. by 40% EtOH); erythro-dextrins (reddish-brown with I; sol. in 50% EtOH; pptd. by 65% EtOH); achroö-dextrins (no I reaction; sol. in 70% EtOH; pptd. by 85% EtOH). The higher sugar content of the diastased rye suspension may be due to its greater diastase content or to a greater activity of the enzyme in rye. A greater amount of sol. protein is present in the diastased wheat suspension than in the diastased rye suspension. Considerably more erythro-dextrins are formed in the diastatic degradation of rye than of wheat flour. This was demonstrated qualitatively and also by the intensity of the I reaction. E. A. F.

Estimation of flour diastatic value. M. J. BLISH and R. M. SANDSTEDT (Cereal Chem., 1933, 10, 189—202).—The Hagedorn-Jensen micro-method for determination of blood-sugar (A., 1923, ii, 265) has been adapted to the determination of the diastatic activity of flour and similar cereal products, using an AcOH-NaOAc buffer mixture and an acid tungstate clarifying agent. The method is claimed to combine accuracy and reliability with convenience and simplicity of operation and equipment. Maltose determinations on ground wheat are significant only when the material is ground to a standard fineness. E. A. F.

Volumetric method for measuring gas production during dough fermentation. E. ELION (Cereal Chem., 1933, 10, 245—249).—A simply constructed H₂O-displacement gasometer is described with which a const. gas pressure may be maintained during all readings and in which the measured vol. of H₂O is equal to the gas produced (cf. B., 1933, 168). E. A. F.

In vitro digestion of the starch of long- and short-cooked cereals. I. T. NOBLE, M. DEAN, M. WING, and E. G. HALLIDAY (Cereal Chem., 1933, 10, 243—244).—Cereal foods, raw and cooked for 20- and 90-min. periods, were digested with malt diastase for 1 hr. at 38°. The amount of maltose formed is approx. the same for all the cereals, whether cooked or not, granular or rolled, or whether they consisted of endosperm only or of the whole of the grain. Raw cereals show much lower figures than the cooked sample, indicating that though raw cereal starches may be completely digested, as in the case of *in vivo* experiments, they are not converted into sugar as readily as when cooked. E. A. F.

Use of milk and whey in breadmaking. L. LARSEN (Tidsskr. norske Landbruk., 1933, 40, 18—25).—Total replacement of H₂O by whey (I) or skimmed milk (II) and half replacement by (II) gave a bread of superior quality, but the increased quantity of bread from a given wt. of flour was not sufficient to cover the increased cost.

Dough mixed with (I) or (II) rose very slowly; this was attributed to the neutralising action of the salts present, the optimum degree of acidity not being obtained.

NUTR. ABS.

Higher versus lower mathematics in interpreting baking quality [of flour]. W. PLATT (Cereal Chem., 1933, 10, 213—222).—The difficulties involved in the use of a single factor as an index of baking quality are discussed. A "surface of baking qualities" in three dimensions is preferred for depicting the baking quality of any given flour. E. A. F.

Determination of the egg content of pastry. B. ALBERTI (Chem.-Ztg., 1933, 57, 454—456).—The explanation that the failure of Juckenack's method when applied to old samples is of physical origin (cf. B., 1931, 413) is supported by the fact that both the Et₂O (I) and the EtOH (II) extracts of the moistened dough are > those of the air-dry dough, the differences being greatest for (II) and for the oldest samples; the nature of the ingredients and method of prep. may also influence the results. A decrease in wt. of (I) occurs on drying above air temp. J. G.

Detection of plant lecithin in pastry. O. MEZGER, H. JESSER, and M. VOLKMANN (Chem.-Ztg., 1933, 57, 413—415).—If sufficient be added, soya- as distinct from egg-lecithin may be detected as follows: (1) by Weyl's lutein reaction, when the Et₂O extract has a greenish-yellow fluorescence; (2) the N of the Et₂O extract is higher; (3) the lecithin-P₂O₅ of the Et₂O extract is higher; (4) in the Hübl I-val. determination an orange ppt. is obtained, which is insol. in excess KI. Contrary to Diller (B., 1932, 329), plant lecithin is not shown by determination of the I val. E. B. H.

Heat-resistant spore-bearers in milk. G. HEUSER and E. KRAPOHL (Z. Unters. Lebensm., 1933, 65, 429—435).—The decomp. of milk observed in continuously hot summer weather is caused by anaërobic sporing PrCO₂H bacilli. They are detected by the Weinzirl test. E. C. S.

Detection of neutralised milk. K. EBLE and H. PFEIFFER (Z. Unters. Lebensm., 1933, 65, 435—439).—The milk (20 c.c.) is treated with 30 c.c. of pure MeOH. Normal dairy milk (heated) forms immediately, or within a few sec., a coarse coagulum of protein. The supernatant layer (p_H 6.3—6.5) on centrifuging is clear. Neutralised milk gives a nearly homogeneous mixture, from which a fine coagulum separates only after setting aside for some hr. The supernatant layer, p_H 6.5, is cloudy. This test fails when applied to milk in which the lactic acid has been incompletely neutralised, but such milk is recognised by its high acid content. Excessive addition of alkali results in a supernatant liquid containing protein. Raw milk low in CO₂ gives the same result as alkalisated milk, but this is immaterial since milk is never neutralised in the cold. E. C. S.

Metallic contamination [of milk] in processing. W. L. DAVIES (Milk Industry, 1933, 13, 55—57).—The natural Cu content of milk is 0.30—0.75 p.p.m. The presence of 1.5 p.p.m. Cu in milk kept at 0—5° is sufficient to taint the milk within 24 hr., a "tallowy" flavour being developed. To determine the sources of contamination in a processing plant, the contents of Cu

and Fe have been determined at the following stages: (a) raw milk, (b) after the pasteuriser, (c) after the holder, (d) after the cooler, (e) the bottled product. The increase in Cu content during the process is generally accompanied by an increase in Fe content, but the amount of Fe taken up does not appear to affect the flavour of the milk. The Fe content of raw milk varies from 1.18 to 2.52 p.p.m. No contamination is received by hot milk of uniform temp., containing no dissolved O₂, if the holder is properly tinned. E. S. H.

Examination of milk. J. FRODEVAUX (Ann. Falsif., 1933, 26, 202—217).—The relation (solids-not-fat × 10)/(total N × 6.39) is used to distinguish between the milks of different animals. The ratio is affected by the period of lactation, being a min. at the time of calving. The val. is not affected by concn. on drying, and may be used to detect the presence of colostrum and the milk of other animals. E. B. H.

Determination of soya-bean milk as an adulterant in cow's milk. W. H. ADOLPH and E. F. YANG (J. Chinese Chem. Soc., 1933, 1, 29—34).—The adulterant is determined colorimetrically by the yellow colour produced with NaOH under standard conditions. The coloration is not due to oxidation of the proteins. A method based on the determination of the I val. of the fat is also described. Both methods are accurate to about 5%. A. A. L.

Colouring matter of butter. A. LOEWY and G. CRONHEIM (Z. Unters. Lebensm., 1933, 65, 450—451).—After first extracting with EtOH to prove that no artificial colouring matter is present, the intensity of natural colouring matter in butter is determined by extraction with Et₂O or light petroleum and comparison with a fresh solution of saffron (0.5%). E. C. S.

Vitamin-A activity of butter produced by Guernsey and Ayrshire cows. J. W. WILBUR, J. H. HILTON, and S. M. HAUGE (J. Dairy Sci., 1933, 16, 153—156).—Considerable differences occur in the colour and carotene contents of the butters. The vitamin-A activity, in trials with rats, was, however, the same irrespective of breed of cow or colour of butter. A. G. P.

Sodium chloride-free ash of raw and melted cheese. F. E. NOTTBOHM and O. BAUMANN (Z. Unters. Lebensm., 1933, 65, 439—450).—With few exceptions the NaCl contents, calc. from the chloride [determined by von Roeder's modification (Käse-Ind., 1932, 6) of von Frielinghaus' method] and Na contents, respectively, differ only by 0.2%. The loss of Cl in ashing is independent of the NaCl concn. The amount of NaCl-free ash, calc. on the fat-free dry wt., varies from 1 to 9% according to the method of prep. of the cheese. Rennin gives a curd which, when not too ripe, has a NaCl-free ash content approx. 7% of the fat-free dry wt. Camembert is an exception. Compared with the raw product, melted Emmenthal cheese has a higher NaCl-free ash content (12—15% of the fat-free dry wt.) than have other melted cheeses. To make evaluation easier, Emmenthal cheese might be brought in line in this respect with other cheeses. E. C. S.

Effect of regulation of lactic acid fermentation on quality of cheese. P. MAZÉ, P. J. MAZÉ, and R.

ANXIONNAZ (Compt. rend. Soc. Biol., 1933, 112, 423—425).—After having allowed true lactic acid fermentation to take place during coagulation of milk for cheese production, it is necessary to destroy or to mask the flavour of the end-products. This might be done by suitable replacement of the lactic acid produced. Between this process and that of allowing high acidity to develop, it is possible to obtain a large series of cheeses of acidities depending on (a) the dilution of the milk, and (b) the sugar concn. NUTR. ABS.

Changes occurring during freezing and subsequent thawing of fruits and vegetables. M. A. JOSLYN and G. L. MARSH (Fruit Products' J., 1933, 12, 236—239, 248).—The changes in pectin content on freezing, the inversion of sucrose by naturally occurring and added enzymes, and the absorption of sugar by the fruit have been studied and are tabulated. E. B. H.

Composition of fruit beverages. H. AREF and W. V. CRUESS (Fruit Products J., 1933, 12, 228—229).

Detection of paprika pigment in sausages. W. PFAHL and A. ROTSCH (Z. Unters. Lebensm., 1933, 65, 452—454).—The fat must be extracted and saponified, and the pigment taken up with 95% EtOH before the usual test for paprika pigment can be applied. E. C. S.

Arnold's reaction between sodium nitroprusside and protein and the denaturation of meat protein by concentrated urea. K. BECK and H. URACK (Z. Unters. Lebensm., 1933, 65, 399—418; cf. B., 1929, 375).—The nitroprusside reaction given by denatured protein is applied to the detection of CH₂O and H₂O₂ and of preheating in milk. The fractions of the proteins of meat which are sol. and insol., respectively, in 50% urea solution have almost identical hydrolysis products. No true protein is detectable in Liebig's extract of beef. E. C. S.

Java cacao. A. STEINMANN (Z. Unters. Lebensm., 1933, 65, 454—460).—The formation of pigment in cacao beans is mainly determined by the action of light and the duration of fermentation. Cacao-red (I) and -brown (II) (B., 1928, 911; 1929, 300) are formed from a colourless precursor. The former may be either free or bound. Both bound (I) and (II) are converted by treatment with acid into (I). Free (I) occurs only in beans with violet cotyledons, is produced in colourless beans by illumination, and when so formed disappears during fermentation. The increase of pigment during fermentation is due to the action of the acids formed (especially AcOH) on bound (I) forming free (I), which slowly changes to (II). Beans dried in diffuse light can be pigmented by moistening and illuminating. The most intense reddening is caused by blue light. E. C. S.

Caffeine content of infusions of "caffeine-free" coffee. K. BRAUNSDORF (Z. Unters. Lebensm., 1933, 65, 460—466).—The caffeine (I) content of infusions of reputed caffeine-free coffee should be > 8.8 mg. per 150 c.c. When the coffee contains 0.02% of (I) the infusion contains 1.3 mg. per 150 c.c. E. C. S.

Determination, minimum content, and origin of honey diastase. H. WEISHAAR (Z. Unters. Lebensm., 1933, 65, 369—399).—Koch's method ("Der Honig,"

1927) is the most suitable for the determination of diastase in honey. The min. content for honeys of various origins is 30% on Koch's scale. Of the total diastase in a particular honey, 1.5—2.5% arose from the nectar, 0.25—0.75% from the pollen, and > 95% from the bee. E. C. S.

Preservative action of spices and related compounds against yeast fermentation. J. W. CORRAN and S. H. EDGAR (J.S.C.I., 1933, 52, 149—152 T).—Of the ground spices mustard is definitely the most potent in preventing spoilage of yeasts, with cloves next in order. Cinnamon has some action, but cardamoms, cummin, coriander, caraway, celery seed, pimento, nutmeg, ginger, thyme, bay leaves, marjoram, savory, rosemary, black and cayenne peppers have no significant action. Of the oils, volatile oil of mustard has the strongest preservative action with oil of cinnamon next, closely followed by oils of cloves, thyme, and bay leaves. Of the remaining oils only caraway and cummin show any preservative action. Mustard and its volatile oil are definitely stronger in preservative action against yeasts than is SO_2 or BzOH . Clove spice is about as strong as BzOH and superior to SO_2 . Evidence is obtained that black pepper and certain herbs contain yeast stimulants.

Sudan grass as hay, silage, and pasture for dairy cattle. J. R. DAWSON, R. R. GRAVES, and A. G. VAN HORN (U.S. Dept. Agric. Tech. Bull., 1933, No. 352, 28 pp.).—Analytical data and results of feeding trials with cows are recorded and discussed. A. G. P.

Purity of olive oil from canned sardines. R. F. BOAN (J. Proc. Sydney Tech. Coll. Chem. Soc., 1933, 5, 21—22).—Two samples contained sardine oil, detected by odour, I val., and Et_2O -insol. bromides. A. A. L.

Determining moisture in grain.—See XI. **Wheat-flour oil. Sardine and tuna oils.**—See XII. **Prickly pear and diabetes.**—See XX.

See also A., June, 597, **Determining sugars in starch-degradation products.** 626, **Influence of Cu on peroxidase reaction of milk.** 630, **Nutritive val. of whale oils, and of pentosan.** 641, **Determining bactericidal properties of chemical sterilisers [for milk etc.].** 644—6, **Vitamins (various).**

PATENTS.

Food product. C. HOFFMAN, Assr. to WARD BAKING Co. (U.S.P. 1,873,709, 23.8.32. Appl., 20.8.24).—Cereal germs are freed from oil and leached with an infusion of malt, preferably in two stages, and the extract is evaporated to dryness. The product (rich in vitamin-B) contains maltose 60—65, dextrin 35—40, mineral salts rich in phosphates 5%. B. M. V.

Treating cream to increase its viscosity. T. V. BERGMAN and H. A. SVEDBERG (B.P. 392,127, 6.1.33. Swed., 14.1.32).—Cream is cooled to 5—6° for 2—3 hr., warmed to 25—35°, and again cooled. Heating and cooling may be repeated and the cream may be agitated during warming. E. B. H.

Manufacture of cheese. F. M. G. LUECKE (U.S.P. 1,868,422, 19.7.32. Appl., 24.2.28).—Milk is pasteur-

ised, treated with lactic acid bacteria and CaCl_2 , and maintained at 31—32° until acidity is 0.25—0.27%. Rennin is added to coagulate, and the curd and whey are maintained at 39—41° for 30 min. The separated acid is subjected to steam-treatment to raise the acidity to 0.30—0.60%, salted, and subjected to pressure. E. B. H.

Manufacture of cheese. A. F. STEVENSON, Assr. to BORDEN Co. (U.S.P. 1,868,547, 26.7.32. Appl., 30.9.25).—Cheese for sale in tins is made from homogenised milk; the curds are ripened in the tin in an inert gas. E. B. H.

Egg product. D. K. TRESSLER, Assr. to FROSTED FOODS Co., Inc. (U.S.P. 1,870,269, 9.8.32. Appl., 16.8.30).—Coagulation of egg-yolk proteins during freezing is prevented by adding small amounts of suitable enzymes, e.g., pepsin, pancreatin, trypsin. E. B. H.

Treatment of dried [packaged] fruits. C. R. FELLERS, Assr. to HILLS BROS. Co. (U.S.P. 1,870,802, 9.8.32. Appl., 24.1.31).—Insects and micro-organisms in dried fruit may be rendered innocuous by subjecting the packaged fruit to a temp. of 66—85° at R.H. 60—100% for < 25 min. E. B. H.

Fruit product. W. A. ROOKER and V. E. SPEAS, Assrs. to SPEAS MFG. Co. (U.S.P. 1,870,588, 9.8.32. Appl., 31.7.29).—Fruit juice is freed from tannins by addition of egg-white, and from starches, proteins, and pectinous substances by suitable enzymes. Fruit acids are removed by CaCO_3 , whilst animal charcoal removes flavours and colouring matters. The resulting colourless, flavourless liquid is suitably conc. and contains the H_2O -sol. vitamins, salts, and sugars of the fruit. E. B. H.

Improving and removing the odour and/or flavour of legumes. L. W. HAAS and H. O. RENNER, Assrs. to J. R. SHORT MILLING Co. (U.S.P. 1,870,450, 9.8.32. Appl., 17.6.30).—The ground legume is treated with gaseous CH_2O , or with a solution of CH_2O or MeCHO in H_2O , EtOH , or COMe_2 , the gaseous CH_2O being afterwards removed by air and the solution removed by hydraulic pressure and subsequent drying. E. B. H.

Spray drying apparatus.—See I.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Sterilisation of sodium bicarbonate solutions [for injections]. W. BONDE (Pharm. Zentr., 1933, 74, 285—286).—Owing to the non-destructive action of EtOH and Et_2O on bacterial spores, Mihalovici's method of sterilisation (B., 1933, 445) is considered ineffective. Prep. of sterile NaHCO_3 solution by means of a Seitz E.K. filter is suggested. V. P. P.

Use of prickly-pear in the treatment of diabetes, and preparation of a concentrated extract. A. R. PENFOLD and F. R. MORRISON (J. Proc. Sydney Tech. Coll. Chem. Soc., 1933, 5, 51—53).—The efficacy of the extract of *Opuntia inermis* leaf is confirmed. A conc. and more palatable extract is made by boiling the EtOH extract in order to ppt. arabin, followed by concn. in vac. A. A. L.

Extraction of acid fruit essences. F. LA FACE (Boll. Uff. Staz. sperim. Ind. Essenze, 1933, 8, 29—39).—A summary of practical methods of extraction. T. H. P.

Preservation of citrus essences. G. LOUVEAU (Boll. Uff. Staz. sperim. Ind. Essenze, 1932, 7, 164—168; 1933, 8, 16—20).—Pure anhyd. bergamot oil keeps unchanged for 2 or 3 years in filled, well-closed glass or tinned-Cu vessels; deterpenation increases its solubility in EtOH without greatly changing its odour. Of the citrus oils, oil of lemon is most difficult to keep, and hydrogenation, suggested as a means of preventing destruction of the aldehydes and alcohols by the oxidising enzymes of the aq. juice contaminating the oil, is scarcely a practical method. Dehydration with Na_2SO_4 , followed by rapid filtration through a Chardin filter, gives a product which keeps for 12—15 months in glass vessels with ground stoppers in a cool place. Such purified oil keeps for at least 2 years if mixed with 0.02% of quinol or *p*-diphenol or indefinitely if dissolved in 20—25 wt.-% of 96% EtOH; deterpenation is of less advantage. Sweet orange oil is less changeable than lemon oil, and its keeping qualities are improved by the same treatments. Bitter orange oil keeps almost indefinitely in a cold place if previously dehydrated. Mandarin oil should be kept in the dark to prevent coloration. T. H. P.

Bulgarian otto of rose. E. J. PARRY and J. H. SEAGER (Perf. & Essent. Oil Rec., 1933, 24, 149—155).—A discussion of possible causes of the unusually high citronellol content of otto of rose distilled in 1932. The validity of analysis by formylation is confirmed.

A. A. L.

Ageing and alteration of essential oils. G. LOUVEAU (Boll. Uff. Staz. sperim. Ind. Essenze, 1932, 7, 122—126, 158—163; 1933, 8, 6—15, 40—44).—The properties of the various constituents of essential oils and the ways in which they undergo change are summarised. Citronella and certain rare oils do not alter sensibly with time, but essences generally change either by interaction of their components or by the action of external conditions, or from both these causes together. Some few improve in quality, but most suffer deterioration, which is enhanced and accelerated by contact with air, H_2O , or metal and especially by the action of heat and light, and may be delayed by storage of the dehydrated oils in filled and hermetically-sealed neutral glass bottles in a cool, dark place. T. H. P.

Caffeine in coffee infusions. Spices as preservatives.—See XIX.

See also A., June, 583, Colorimetric determination of As. 599, Prep. of Bi compounds of thiolacetic acid. 604, 1-Alkyl- β -naphthols as antiseptics. 617, *Sophora* alkaloids. Bicuculline. *Strychnos* alkaloids. 618, Organo-As compounds. 621, Determination of As in org. compounds. New reagent for identification of alkaloids. Determination of morphine. 640, Pure typhoid toxin. 641, Determination of bactericidal properties of chemical sterilisers. 641, Pure secretin. 642, Adrenal. 644—6, Vitamins (various). 647, Tobacco plants. 651, Bay oil. 652, Alkaloids. 654, Folin-Denis colorimetric method [for alkaloids etc.].

PATENT.

Production of blood-pressure-lowering substance. R. H. MAJOR, Assr. to E. LILLY & Co. (U.S.P. 1,872,775, 23.8.32. Appl., 10.4.26).—The EtOH extract of the liver is fractionally extracted with varying concns. of EtOH and the ppts. and filtrates obtained at higher concns. are either combined and re-treated or treated separately for the prep. of therapeutic extracts. E. H. S.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Photographic sensitisers. H. V. HORTON (Chem. & Ind., 1933, 495).—A review.

See also A., June, 577, Solarisation. Fine grain in photography. 585, Measuring the relative intensities of spectral lines.

PATENTS.

[Manufacture of] photographic emulsions. I. G. FARBENIND. A.-G. (B.P. 390,037, 14.7.32. Ger., 24.7.31).—Chemical fogging (by the gelatin) of hypersensitised emulsions is prevented by adding, before pouring the emulsion on the support, an org. compound the Ag salt of which is not more sol. in H_2O than AgCl. Examples are ethylthiotriazole and nitrobenzimidazole. C. H.

Separation of cellulosic materials.—See V. Fire-proof cellulose.—See XIII.

XXII.—EXPLOSIVES; MATCHES.

Developments in the manufacture and use of nitrocellulose. A. FOULON (Z. ges. Schiess- u. Sprengstoffw., 1933, 28, 143—146).—Various improvements are recorded. A device for nitrating cellulose consists of a hollow, perforated cube, which revolves horizontally in the mixed acid, ensuring that the cotton, which is fed on to its surface, is thoroughly immersed. An apparatus for producing low-viscosity nitrocellulose comprises a series of narrow tubes through which the purified nitrocellulose, mixed with H_2O , is forced at an elevated temp., under pressure produced by a spring valve at the end of the coil. W. J. W.

Modern large-scale production of lead azide. E. VON HERZ (Z. ges. Schiess-u. Sprengstoffw., 1933, 28, 141—143).—Polemical against Stettbacher (B., 1933, 492); further facts are adduced to show that the non-continuous process is suitable for large-scale production. W. J. W.

See also A., June, 592, Nitrates of glycols. Prep. of α -butylene glycol dinitrate. Nitroisobutane-triol trinitrate. 597, Starch nitrates. Prep. of nitric ester of β -hydroxyethylamine nitrate.

XXIII.—SANITATION; WATER PURIFICATION.

Bactericidal efficiency of chlorocresol and chloroxylenol. N. F. RAPPS (J. S. C. I., 1933, 52, 175—176 T).—Variations of Rideal-Walker PhOH coeffs. of 6-chloro-*m*-cresol (I) and of 2-chloro-*m*-5-xyleneol (II) with the method of effecting dissolution were noted. The highest vals., obtained by using the Na soap of castor

oil, were, for (I) 25·2, and for (II) 62·0. Caustic alkali drastically reduces the efficiency of (I) and (II).

Use of anthracite coal as a filter medium [in waterworks' practice]. M. A. FARRELL (J. Amer. Water Works' Assoc., 1933, 25, 718—724).—This medium is as efficient as sand when used in rapid pressure-filters. The first cost is similar, but the lower d of the coal reduces the wt. required. C. J.

Chemical and biological characteristics of Pacific Northwest waters. H. W. NIGHTINGALE (J. Amer. Water Works' Assoc., 1933, 25, 740—746).—Tables quoted from the U.S. Geological Survey indicate the wide variation in chemical and mineral substances contained in the fresh waters of Washington and Oregon. Certain streams contain "glacial milk"—a suspension of finely-divided SiO_2 —which can be removed by coagulation and filtration. The groundwaters are fairly soft and pure, though there are wells containing an excessive amount of Fe, several springs containing S compounds, and one containing As. C. J.

Taste and odour control in water supplies. A. V. DE LAPORTE (J. Amer. Water Works' Assoc., 1933, 25, 677—679).—Tastes due to dissolved gases, *e.g.*, CO_2 or H_2S , may be removed by aeration, but if due to excess Cl_2 the remedy lies in more careful control or the additional use of NH_3 . No means are at present available for the elimination of tastes due to dissolved salts, *e.g.*, NaCl or CaCl_2 , but Fe may be removed by oxidation or pptn. The tastes resulting from the presence of dissolved org. compounds or the by-products of micro-organisms frequently may be removed by activated C or prevented by NH_3 and Cl_2 . C. J.

Elimination of tastes in the water supply at Wallaceburg [Ont.]. J. E. CAUGHEY (J. Amer. Water Works' Assoc., 1933, 25, 683—685).—The addition of 0·3 grain of $(\text{NH}_4)_2\text{SO}_4$ per gal. to the chlorinated H_2O about $\frac{1}{2}$ hr. before reaching the filters prevented chlorophenolic tastes in a supply drawn from a branch of the St. Clair river. C. J.

Experience with taste in water at Guelph [Ont.]. H. S. NICKLIN (J. Amer. Water Works' Assoc., 1933, 25, 691—694).—Chlorophenolic tastes probably derived from a new creosoted wood-stave pipe-line have been prevented by the addition of $(\text{NH}_4)_2\text{SO}_4$ to the H_2O prior to chlorination. C. J.

Removal of taste and odour from municipal water supplies. D. H. MATHESON (J. Amer. Water Works' Assoc., 1933, 25, 680—682).—The experience of the Ontario Department of Health with regard to the use of KMnO_4 , NH_3 - Cl_2 , activated C, etc. for the control of tastes etc. is summarised. It is considered uneconomical to pass the whole of the H_2O supplies through beds of granular activated C. C. J.

Activated carbon [treatment of water supplies] at New Toronto [Ont.]. A. H. R. THOMAS (J. Amer. Water Works' Assoc., 1933, 25, 689—690).—Taste and odour due to algal growths have been eliminated by adding 0·13 grain of powdered activated C per gal. to the coagulated H_2O shortly after admission to the sedimentation basins. The cost is \$1·45—1·80 per 10^6 gals. C. J.

Chloroamine treatment [of water] at the Chatham [Ont.] filtration plant. J. W. MUSTARD (J. Amer. Water Works' Assoc., 1933, 25, 686—688).—Tastes have been reduced by preventing the formation of algal growths in the sedimentation basins etc. $(\text{NH}_4)_2\text{SO}_4$ is added as the H_2O comes in from the river, and Cl_2 30 ft. farther along. The final Cl_2 dosage has been reduced by $\leq 50\%$. C. J.

Oxidation potential concept of [water] chlorination. F. C. SCHMELKES (J. Amer. Water Works' Assoc., 1933, 25, 695—703).—The oxidation potential of Cl_2 , or the intensity of its oxidising power, has been measured for the concns. used in waterworks' practice. This potential is influenced by the p_{H} , decreasing as the val. rises, and also by combination, *e.g.*, with NH_3 , to form various chloroamines which though still retaining the full oxidising capacity of the Cl_2 have a lower oxidising potential which decreases as the amines become more complicated. Chloroamines thus react less readily with PhOH and so produce less chlorophenolic taste; they combine less readily with the org. matter in the H_2O with consequent reduction in Cl_2 consumption, but also cause a lag in the rate of sterilisation, which is probably due to the decreased rate of attack on the protein matter of the cell. C. J.

Electro-osmotic purification of water. A. H. W. ATEN (Pharm. Weekblad, 1933, 70, 478—484).—The principle of the method and a commercial form of apparatus are described. The H_2O obtained has p_{H} 4·4—4·8, residue on ignition 0·5 mg. per 100 c.c., sp. conductivity (20°) 8×10^{-6} (7×10^{-6} after removal of CO_2), and is almost sterile; it reduces 2·5—3·5 c.c. of 0·01N- KMnO_4 per 100 c.c. Its production requires 0·1 kw.-hr. (86 kg.-cal.) per litre, as compared with 550 kg.-cal. per litre for distilled H_2O , and the quantity of cooling- H_2O necessary is only 0·5 litre per litre. H. F. G.

Toxicity of coke-oven effluents. B. A. SOUTHGATE (Gas J., 1933, 202, 216—218).—Coke-oven effluents discharged into the River Tees poisoned young fish during migration to the estuary. The concn. of tar acids in estuary- H_2O was too small to cause toxicity. Cyanides from the coolers were chiefly responsible, for removal of these compounds with CH_2O rendered most samples innocuous. A method of treating effluents with CaO and FeCl_2 from spent pickle liquor converted cyanide into innocuous ferrocyanide, whilst spraying the heated liquor into the air substantially reduced the toxicity. The application of either method to the effluents as a whole was rendered impossible by their vol., and a modification in works practice to reduce the vol. of the effluent is necessitated. C. E. M.

Protecting Fe pipes.—See X.

PATENT.

Production of rodent-repellant and insecticidal composition. H. T. BOTTRELL, Assr. to REPULSO, INC. (U.S.P. 1,871,949, 16.8.32. Appl., 10.4.28. Renewed 12.3.31).—The composition comprises, preferably, 0·5% of peppermint oil, 1·5% of NaOBz, 2% of "sulphonethylmethane," 12·5% of animal glue, 0·5% of MeOH, and 83% of H_2O . L. A. C.