BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

OCT. 26 and NOV. 2, 1934.*

I.—GENERAL; PLANT; MACHINERY.

Technology of ball and pebble mills. S. W. KENDALL (Drugs, Oils, and Paints, 1934, **49**, 326—328).—Answers to a no. of enquiries relating to the technical use of these grinding mills are given. D. R. D.

How to modernise the power end of the paint mill. W. F. SCHAPHORST (Drugs, Oils, and Paints, 1934, **49**, 328).—Methods for bringing old-fashioned plant up to date are discussed. D. R. D.

Rapid and accurate determination of the volumes [of solids]. J. BOBIN (Chim. et Ind., 1934, **32**, 270—275).—The solid is immersed in a liquid contained in a glass cylinder fitted with devices for preventing evaporation, and the change in level of the liquid surface is determined in terms of the distance through which a point, making contact with the surface, has to be moved. The apparatus is calibrated by means of spheres of known diam., and a vol. of 4 c.c. is determined to within 0·001 c.c. Data for the swelling of rubber in C_6H_6 at 15°, $CHCl_3$ at 18°, and vaseline at 60°, and the absorption of fluids by porous substances are recorded. The apparatus can be used for determining *d* and coeffs. of expansion. J. G. A. G.

Countercurrent and multiple extraction. T. W. EVANS (Ind. Eng. Chem., 1934, **26**, 860—864).—Graphical methods are described for evaluating the theoretical efficiencies of multiple and countercurrent extraction processes, both for immiscible and for somewhat miscible solvents. A. G.

A new still. A. NOLL (Papier-Fabr., 1934, **32**, 369—370).—A chamber is provided with a horizontal outer gas compartment separated from an inner and concentric compartment for containing the residue by a perforated plate. It can be made of bronze or acid-resisting steel, and is particularly suited for strongly foaming substances. D. A. C.

Absorption of $C_2H_4Cl_2$.—See III. **Abrasion resistance of castings.**—See X. **Grinding pigments.**—See XIII.

See also A., Sept., 953, **Exchange of material and heat in binary mixtures.** 983, **Obtaining const. low temp.**

PATENTS.

Waste-heat boilers and their application in carbonising plants. WOODALL-DUCKHAM (1920), LTD., and J. W. REBER (B.P. 414,886, 30.6.33).—A waste-heat boiler is divided into two separate sections as regards the heating gases; through one are passed gases from the heating flues of the ovens, and through the other, gases used in the dry-quenching of coke are circulated in closed circuit. Breeches pieces and valves are provided so that either zone may be used for either purpose or both zones for one. B. M. V.

Vacuum drying apparatus. AKTIEB. SVENSKA MASKINVERKEN (B.P. 415,338, 27.2.34. Swed., 7.3.33).—In a rotary or oscillatory vac. drum the apertures in the wall through which the vapours are removed are closed by mushroom valves which are opened by a fixed cam only when above the level of the material under treatment. B. M. V.

Apparatus for drying materials [*e.g.*, tea]. L. N. LLOYD, and PHILLIPS ENG. CO., LTD. (B.P. 414,652, 3.2.33).—A no. of compartments are divided into two sets and conditioning chambers are placed between, and at each end of, the sets. Positive circulating means are provided so that part of the used air can be recirculated in the event of the external atm. being too dry. B. M. V.

Heat insulation. C. G. MUNTERS (B.P. 414,829 and 415,286, [A] 3.4.33, [B] 17.11.33. Swed., [A] 4.4.32, [B] Ger., 18.11.32).—(A) Paper is covered on one or both sides with metal flakes or powder the elements of which do not touch but are sufficiently close to form substantially complete reflecting surfaces. (B) Metal foil or other insulation which is conductive in its own plane is surrounded around its edges with strips of poorly conducting material, *e.g.*, paper treated as in (A). B. M. V.

Regeneration or purification of catalytic and like contact masses. HOUDRY PROCESS CORP., E. HOUDRY, and T. B. PRICKETT (B.P. 414,779, 16.2.33. U.S., 14. and 19.5.32. Addn. to B.P. 407,699; B., 1934, 435).—A fluid-distributing and -conducting unit is described. B. M. V.

Pulverising machines. L. ST. J. COLLEY (B.P. 414,781, 16.2.33).—Pulverisation is effected by the impact on a casing and each other of a no. of small balls or the like which are centrifugally flung by a rotor. The balls and insufficiently ground material drop out of the pulveriser and are lifted by an elevator and recharged. The finely-ground material is carried away pneumatically. B. M. V.

Apparatus for mixing pulverulent material with liquids. COPE & COPE, LTD., and A. J. LEE (B.P. 414,522, 24.8.33).—The solid material is discharged from a hopper by a stirrer and helical conveyor and mixed with the liquid in a device embodying intercalating fixed and rotating blades. B. M. V.

Homogenising or emulsifying apparatus or the like. E. R. HATT and E. J. SIMS (B.P. 414,689, 30.5.34).—An apparatus of the shearing type is arranged so

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

that although the thickness of the clearance space decreases in the direction of travel, its cross-sectional area remains approx. const. This may be effected by forming both the rotor and the casing (preferably twinned) with a parabolic contour, adjustments being effected by separating the two discs of the rotor to a greater or less extent. B. M. V.

Continuous extraction or treatment of liquids. Soc. Etabl. Lambiotte Frères (B.P. 414,558, 22.11.33. Fr., 19.5.33).—For the removal of a constituent (A) of a mixture, solution, or emulsion (A, B, C. . .) by means of a solvent (S) in which A is sol. but B, C. . . are not, a centrifuge divided into compartments is used. Assuming the d of S or of $S + A$ to be $<$ the d of $A\,B\,C$ . . or $B\,C$ . . . : from the last compartment at one end (*e.g.*, on the left), heavy stripped liquid, $B\,C$ . . ., is skimmed off, and from the last compartment on the right light conc. solution of A in S is skimmed by fixed pipes which lead outside the apparatus. To the 2nd compartment on the left new S is supplied by a fixed pipe from the exterior, and, after admixture with nearly stripped heavy layer, B, C . . ., skimmed from the 3rd compartment by means of fixed pipe which does not extend outside the apparatus; the mixture is sprayed against a conical surface, centrifuged, and the light layer passed to the right and heavy to the left. Similarly, at the right-hand end, $A\,B\,C$ . . is mixed with nearly saturated $S + A$ and sprayed in the second compartment. Intermediately, there may be as many countercurrent steps as are desired, effected by internal, fixed skim pipes. B. M. V.

Extraction apparatus. "Miag" Mühlenbau u. Ind. A.-G. (B.P. 414,521, 21.8.33. Ger., 10.9.32).—Extraction is effected by countercurrent flow of solids (S) and solvent in the annular space between inner (I) and outer horizontal cylinders (O), S being pushed around by perforated radial plates, entering through an upper portion of O and leaving through an upper portion of I after travelling a nearly complete circle. The solvent–solution travels around the reverse way by percolation and leaves through a perforated lower portion of O, whence it is drawn away in a pipe the outlet level of which can be adjusted to adjust the rate of flow. B. M. V.

Intimately contacting immiscible or partly miscible fluids in a washing or extraction process. N. V. de Bataafsche Petroleum Maats. (B.P. 414,734, 25.1.34. Holl., 11.2.33).—The apparatus comprises a tower (T) to which the lighter liquid (L) is admitted near the bottom and exhausted at the top and the heavier liquid (H) sprayed in below the top and exhausted from the bottom. T is divided into compartments by finely-perforated diaphragms which are reciprocated together and vertically through a distance $<$ the height of any compartment, so that on the upstroke H is diffused into L and on the downstroke *vice versa*, the pauses at the dead centres affording time for stratification. Alternatively, the diaphragms may be fixed and the whole column of fluid reciprocated by a pump independent of the supply pumps. B. M. V.

Centrifuges [for rayon etc.]. Brit. Thomson-Houston Co., Ltd., Assees. to H. M. Richardson (B.P. 415,301, 8.12.33. U.S., 14.12.32).—A lid for a rayon-spinning bucket is sprung into a shallow groove near the top edge of the bucket and is constructed in such a way that upward pressure at its centre hole (*e.g.*, when lifting the whole bucket by hand) causes it to lock tighter, but a downward and tilting pressure will release it. B. M. V.

Filter-presses. Manor Eng. Co., Ltd., and E. W. Malkin (B.P. 415,186, 28.3.33).—To facilitate the opening and closing of a press of the recessed-plate or similar type, each plate is supported on a pair of horizontal rollers (R) running on the side bars or other longitudinal rails and is also guided by vertical R engaging with auxiliary rails, the latter R being fixed to arms which are attached to the plate and inclined to its plane so that the plates always remain parallel. B. M. V.

Filters. H. Hocking, and Hocking & Co., Ltd. (B.P. 414,988, 8.3.34).—A filter suitable for the separation of oil or grease from condenser H_2O comprises a rough filter of coke or the like provided with an anti-splash device at the inlet, followed (in series) by a finer filter in cartridge form. B. M. V.

Mechanical production of coarse crystalline deposits. A.-G. der Chemischen Produkten-Fabriken Pommerensdorf-Milch, and R. Siegler (B.P. 415,346, 9.3.34).—A continuous crystalliser in the form of a troughed, very slowly moving conveyor belt is claimed, the troughing being positively produced by internal vertical rollers near the ends and the crystals removed at an end roller where the belt flattens out. B. M. V.

Wet filters for air or other gas. S. Booth, W. J. Frame, and Brit. Vacuum Cleaner & Eng. Co., Ltd. (B.P. 414,417, 30.12.32).—A filter of the material described in B.P. 412,605 (B., 1934, 785) is constructed as a hollow cylinder, through the wall of which the liquid trickles vertically and the gas passes horizontally. It is not usually necessary to stop filtering during the flushing operation. B. M. V.

Instrument for measuring smoke density. J. S. Owens (B.P. 414,817, 23.3.33).—Smoke issuing from a stack is viewed directly, and simultaneously the adjacent sky background is viewed through a device which causes a greyness by the rotation of an incomplete black disc. The disc is formed of several sections which may be caused to overlap to a greater or less extent ; *e.g.*, if of two semicircles, the measureable greyness will range from 50 to 100% of black. B. M. V.

Colorimeter. H. Hirschmüller (B.P. 415,282, 1.11.33).—A spectral colorimeter is illuminated by a source of light emitting only one spectral line, or a few lines all except one of which is removable by a filter, *e.g.*, a Na or other gas or vapour-discharge device. The radiation-sensitive device comprises a rectifier photo-electric cell connected to a galvanometer of low resistance so that the reading $\propto$ light transmission. B. M. V.

Controlling the hydrogen-ion concentration of solutions. H. S. Martin and T. A. Janney (U.S.P. 1,943,684, 16.1.34. Appl., 7.6.30).—Means are provided for continuously mixing a proportionate amount of an indicator with a sample of the solution continuously

withdrawn, for interposing the mixture between a source of light and a photo-electric cell so as to control the current through the latter in accordance with variations of colour of the mixture, and for automatically controlling the addition of a solution of a p_H-controlling agent at a point in advance of the point of removal of the sample. J. S. G. T.

Tunnel kilns.—See VIII. **Electrodes for treating gases.**—See XI.

II.—FUEL; GAS; TAR; MINERAL OILS.

Russian bituminous shales. G. Stadnikov (Brennstoff-Chem., 1934, **15**, 285—287).—A no. of the shales have been analysed and subjected to low-temp. carbonisation. The tars contained about 15% of constituents sol. in aq NaOH; these were not normal phenols but were a mixture of cyclic keto-alcohols. The tars differ from those obtained by the distillation of boghead coals also in the high aromatic hydrocarbon content of the light fractions of the neutral oils. It is concluded that the org. constituents of the shales are of mixed origin and consist of humin and sapropelitic material, the former, however, having undergone considerable reduction. This org. material forms an intermediate stage between coal and petroleum. A. B. M.

Determination of ash in coke and coal. F. Špetl (Chem. Listy, 1934, **28**, 118—120, 173—175, 185—187).—The contents of silicide, carbide, and elementary Fe are insignificant, and may be neglected in calculating the ash content. R. T.

Determination of inflammability of mine dusts. A. L. Godbert (Safety in Mines Res. Bd. Paper No. 87, 1934, 12 pp.).—Details of the apparatus (B., 1931, 704) have been modified to enable closer control to be kept over test conditions, whilst a more easily observable criterion of "inflammability" has been adopted. It is not possible to differentiate between incombustible dusts (I) so as to permit the standardisation of the apparatus irrespective of the character of the coal dust. When (I) used is limestone, pptd. $CaCO_3$, or gypsum, standardisation for each (I) is valid only for coals of the same volatile matter content. In these cases the apparatus must be calibrated for the particular coals used. The modified test and two forms of the apparatus, one with a gas- and the other with an electrically-heated tube, are described. E. S.

Recent developments in the construction of retorts for the low-temperature carbonisation of brown coal. A. Thau (Brennstoff-Chem., 1934, **15**, 281—284).—Developments involving pre-drying of the coal, decreasing the thickness of the layer of coal undergoing carbonisation, briquetting the coal, and the use of scavenging gases are discussed. A. B. M.

Distillation of Greek lignites at different temperatures. C. Vassiliadès (Chim. et Ind., 1934, **32**, 3—9).—Analyses of the carbonisation products from 3 lignites at temp. between 425° and 575° are tabulated. E. S.

Experience with coal-in-oil fuel ("Fliesskohle") in Germany. W. Schultes (Proc. World Petroleum Congr., 1933, **2**, 816—820).—Details of tests are given in which a suspension of pulverised coal in oil was used successfully as a liquid fuel for firing a boiler of the single-fire-tube type (cf. Glückauf, 1932, **68**, 1198). The fuel consisted of about 55% of coal (a caking coal of ash 6% and volatile matter 21·3%), of which 90% passed 10,000 meshes/sq. cm., and 45% of an anthracene oil; it contained a stabiliser of secret composition. The coal showed no tendency to separate from the mixture during the course of the experiments. Economic application of such fuels depends principally on the price of oil. A. B. M.

Automatic firedamp recorder. H. Lloyd (Safety in Mines Res. Bd. Paper No. 86, 1934, 16 pp.).—An instrument specially designed for research purposes and not suitable for the routine examinations of collieries is described in detail. The principle used is that of complete combustion of the CH_4–air sample at const. vol. followed by measurement of pressure decrease. Sweeping out the combustion chamber, sampling, combustion, cooling, and recording the pressure occupies about 8 min. Four combustion chambers are incorporated, sampling in succession at 2-min. intervals. E. S.

Determinations regarding the plastic properties of asphaltic bitumen. R. N. J. Saal (Proc. World Petroleum Congr., 1933, **2**, 515—523).—The usual methods for characterising flow in asphaltic bitumens do not give results which can be reduced to a uniform unit of measure. Viscosity (η) can, however, be expressed in abs. units and this method is here applied in the case of asphaltic bitumen. Experiments were carried out with a no. of instruments (including Redwood II, sinker, capillary-pressure, concentric, Pochettino, and rod viscosimeters) for which the relationships with abs. units are given. It was found that Walther's formula is applicable to non-plastic bitumens but not to plastic materials, for which latter plasticity curves are plotted by an experimental formula. The relation between penetration and η was examined both theoretically and experimentally. From a study of the influence of pressure on η it was concluded that the latter largely depends on the "free vol." Thixotropy may occur to a high degree with hard, blown asphaltic bitumens. The elasticity $\propto$ the degree of plasticity. C. C.

Tests of bituminous compounds for electrical apparatus—adhesiveness and plastic flow. E. B. Wedmore (Proc. World Petroleum Congr., 1933, **2**, 593—594).—Adhesion can be tested qualitatively by dipping a silvered-steel rod into the hot bitumen and withdrawing it when cold. More exact measurements are obtained with a cylindrical steel mould filled with the material resting on a polished steel plate. The mould and plate, after attaining 20° (±5°), are subjected to a slow, steady pull apart, and after separation the area of adhesion should be $\nless$ 90% of the whole area covered by the sample. C. C.

High-pressure hydrogenation of low-temperature tar. I. Effects of hydrogenating conditions. S. Andō (J. Soc. Chem. Ind., Japan, 1934, **37**, 357—361 B).—Low-temp. tar hydrogenated at 250 atm. with a Mo catalyst for 1 hr. at 465° gave 70% of its vol. as petroleum, b.p. $<$ 200°. The principal fraction of this (b.p. 60—

150°) contained 35—50% of aromatic, 30—40% of naphthenic, and 20—30% of paraffin hydrocarbons. The yield of unsaturated hydrocarbons was $< 1\%$. A. L.

Recent advances in catalytic hydrogenation under pressure. M. PIER (Proc. World Petroleum Congr., 1933, **2**, 290—294).—A survey of work carried out by the I. G. Farbenind. on sump-phase catalytic hydrogenation of petroleum products and of coal, using high and low concns. of catalyst, and under high pressure. C. C.

Hydrogenation of solvent benzol II and of coumarone resin. H. WINTER and G. FREE (Brennstoff-Chem., 1934, **15**, 287—291).—A solvent benzol (b.p. 150—200°) was hydrogenated at 400—500° and under a max. pressure of 250—325 atm., in a 200-c.c. vertical autoclave, alone and also in presence of various catalysts, *e.g.*, $AlCl_3$, NH_4 molybdate, Ni–Al, ZnO, Na. No considerable lowering of the b.p. was effected. A variable quantity (6·5—68·5%) of the oil was converted into constituents insol. in H_2SO_4. The amount of cracking which occurred was reduced when a glass lining was used in the autoclave. The N compounds present were converted into NH_3 and hydrocarbons. By the hydrogenation of coumarone resin, and of the fractions thereof sol. and insol., respectively, in light petroleum, products were obtained of which about 50% had b.p. 140—240°. The distillates turned red on keeping for a few days. The distillate from the hydrogenated total resin contained 28·3% of phenols sol. in 10% aq. NaOH. Re-hydrogenation of the residue from the distillation gave only a non-coherent solid mass. A. B. M.

Distillation of mineral oils in cathode-ray vacuum. M. LOUIS (Proc. World Petroleum Congr., 1933, **2**, 399—401).—The apparatus comprises a short-necked, 400-c.c. flask heated in a molten metal bath, a condenser and receiver, a trap immersed in solid CO_2, and a Hg-vapour pump. The types of distillation curves obtained with various transformer and lubricating oils are illustrated; they may be used to classify such oils. A. B. M.

Nomenclature used in extraction processes. A. W. J. MAYER (Proc. World Petroleum Congr., 1933, **2**, 375—379).—An historical survey of methods of classifying crude petroleum and fractions. The terms "naphthenic" and "aromatic," as applied in America and Europe to extracts obtained from petroleum by selective solvents, are shown to be inaccurate and misleading. C. C.

First homogeneous naphthenic acid from petroleum. J. VON BRAUN (Proc. World Petroleum Congr., 1933, **2**, 828—829; cf. A., 1933, 1290).—The presence of 3 : 3 : 4-trimethyl*cyclo*pentylacetic acid has been established in the naphthenic acids of crude petroleums of European, American, and Japanese origin. A method of isolating the acid in the pure state is described. A. B. M.

Determination of sulphur in fuels in the calorimetric bomb. K. WEISSELBERG (Petroleum, 1934, **30**, No. 33, 1—2).—The low vals. obtained by Griffin for the S content of solutions of elementary S in C_6H_6 etc. (B., 1929, 768) were apparently due to incomplete oxidation of SO_2 to SO_3. Determinations carried out on similar samples, to each of which, however, a small proportion of NH_4NO_3 was added, have given accurate results, no evidence of the formation of sulphonic acids being obtained. A. B. M.

Petrol–water emulsions. II. Reproducibility and viscosity. B. N. NARAYANASWAMY and H. E. WATSON (J. Indian Inst. Sci., 1934, **17A**, 75—84).—Failure to obtain reproducible results (B., 1930, 544) was due to inclusion of air and has been overcome. Using Na and $NHMe_3$ oleates as stabilisers, only petrol-in-H_2O emulsions are stable; with NH_4 oleate, both these and H_2O-in-petrol emulsions are stable. Some of mixed type are also formed. The viscosity–composition relationship is logarithmic except at the ends of the curve. G. H. C.

Effect of low temperatures on benzol fuels. L. G. SABROU and M. RENAUDIE (Chim. et Ind., 1934, **32**, 21—40).—The coagulation points (C) of various mixtures of petrols, benzols, benzine, toluol, xylol, EtOH, and the pure constituents of these fuels are given. C of various commercial products are compared with those of corresponding mixtures of the pure constituents. The presence of PhMe or EtOH in benzol–petrol mixtures reduces C and renders possible the use of a considerable concn. of benzol in even an aviation spirit. E. S.

Knocking and self-ignition characteristics of liquid fuels. D. SCHÄFER (Proc. World Petroleum Congr., 1933, **2**, 218—226).—The Jentzsch apparatus was used to study the relation between the spontaneous ignition temp. (S.I.T.) and the performance of a fuel in the engine. The ignition point of any fuel depends on the rate of O_2 supply, and there is a min. val. (T_1) which is not lowered by further increase in the rate of O_2, and a max. val. (T_2) corresponding to ignition in atm. air. Although S.I.T. determinations do not agree with engine knock-rating, an expression has been derived for "ignition index" (I), which is a function of T_1, T_2, and the rate of O_2 supply. T_1 and T_2 are both much higher for aromatics than for paraffins and naphthenes, whilst the latter give the lowest vals. of T_2 and paraffins the lowest T_1. I is highest for paraffins, aromatics giving a low figure. Both naphthenes and aromatics show larger ignition lag than paraffins. *iso*-C_8H_{18} (II) behaves similarly to aromatics in the Jentzsch apparatus and a curve is given showing the effect on I of adding (II) to n-C_7H_{16}. The detonation range in the self-ignition diagram is gradually reduced and there is also a diminution in the range between T_1 and T_2. By applying a correction for ignition lag when ignition was delayed beyond 6 sec., good agreement was found between C_8H_{18} no. calc. from I and as determined on the engine. Still closer agreement should be obtained when knock-intensity can be measured more accurately in the engine, *e.g.*, when auditory measurement of incipient detonation is possible. C. C.

Recent investigations in Germany on combustion and knocking, with a note on the measurement of knock in an aero-engine. VON PHILIPPOVICH (Proc. World Petroleum Congr., 1933, **2**, 210—217).—Recent work in Germany includes studies on the mechanism of

combustion, flame speeds, spontaneous ignition temp. determinations, and bomb experiments on combustion in which the rise in pressure is measured. It has been shown that ionisation decreases as the tendency to knock increases. The conclusion is reached that knocking is due to simultaneous combustion of the unburnt residue of the charge as a result of which the pressure rises rapidly to >40 atm., the flame front advancing at about 15—30 m./sec. A no. of indicators have been used to follow pressure variations in the engine while temp. measurements have also been made. Knock-ratings of fuels were compared in a H_2O-cooled "B.M.W."-aero-engine and an Armstrong test-engine, the latter at 50° jacket temp. and 750 r.p.m. and also at 150° and 900 r.p.m. Agreement between test- and aero-engines was fairly good for straight-run gasolines and their mixtures with benzol and $PbEt_4$, but cracked spirits and also alcohol fuels are rated too high by the Armstrong engine. The suitability of fuels for aircraft engines from the detonation viewpoint is best assessed by cylinder temp., power output, and the appearance of the exhaust smoke rather than by exhaust gas analysis and fuel consumption. C. C.

Equilibrium volatility of motor fuels from the viewpoint of their use in internal-combustion engines. O. C. Bridgeman (J. Res. Nat. Bur. Stand., 1934, **13**, 53—109).—Apparatus and procedure are described, and results given for 38 fuels. A correlation exists between equilibrium-volatility (V) data and distillation data obtained by the standard A.S.T.M. method. Equations are deduced, from which it is possible to obtain all the V data of interest in connexion with engine performance. E. S. H.

Relation between chemical constitution and knock-rating of fuels. A. W. Schmidt (Proc. World Petroleum Congr., 1933, **2**, 181—185).—Using an audibility method, the C_8H_{18} nos. (I) of certain hydrocarbons and alcohols have been compared in 30% mixture with a reference fuel in a variable-compression engine similar to the "C.F.R." Paraffins, unsaturated hydrocarbons, naphthenes, and aromatics were examined, paraffins as a class giving the lowest and aromatics the highest (I). Me groups in a branched-chain, OH and NH_2 groups all raise (I). Five-membered-ring naphthenes give higher (I) than the corresponding 6-membered compounds. Unsaturateds show a fall in (I) on storage except in the case of aromatics with an unsaturated side-chain. With monohydric alcohols, (I) fell with increasing mol. wt. C. C.

Influence of mechanical and physical conditions on knock-rating of fuels. A. W. Schmidt and F. Seeber (Proc. World Petroleum Congr., 1933, **2**, 160—162).—The effect of various factors on detonation in a single-cylinder engine with variable compression has been studied, using 4 gasolines of C_8H_{18} no. (I) varying from 56 to 86. (I) rises as r.p.m. increases, as the mixture strength is made richer, and with the R.H. of the air. It falls when the ignition is advanced (over the range 5° to 20°), as the air-intake temp. rises, and as the jacket temp. rises. C. C.

Piezo-electric pressure indicator for knock investigations on an internal-combustion engine. J. Kluge and H. E. Linckh (Proc. World Petroleum Congr., 1933, **2**, 163—164).—The performance of the authors' indicator may be improved by application of the Braun tube, and a description of the apparatus used is given. H. S. P.

French methods for determining knock-rating. P. Dumanois (Proc. World Petroleum Congr., 1933, **2**, 206—209).—The "C.F.R." engine is favoured, the "alternative" method being employed with a cooling temp. of 165·5° and a mixture temp. of 107°. Details are also given of the Champsaur method which depends on the measurement of variations in the quantity of heat rejected in the cooling-H_2O of an engine running under various conditions of knock-intensity. In an example, 10% of added C_6H_6 reduced the jacket-temp. rise by 0·25°. The new method, results by which agree well with bouncing-pin determinations, is applicable to any H_2O-cooled engine. C. C.

Dilution of Diesel engine lubricating oil. Determination of dilution. A. T. Wilford (Proc. World Petroleum Congr., 1933, **2**, 462—470).—High-speed oil engines may be divided into two classes, viz., those which give rise to little or no dilution (D) and those in which D gradually increases, eventually reaching a high val. A fundamental difficulty in determining D of crankcase oil is that the diluent (fuel oil) has a high boiling range which overlaps that of the lubricating oil. A survey of possible methods leads to the conclusion that only those based on vac.- or steam-distillation are practicable. For routine determinations 100 ml. of crankcase oil are steam-distilled at 210° and the vol. of oil distillate recovered with 200 ml. of H_2O is recorded and converted into D by reference to a graph or the corresponding formula. The time for a complete determination is 45 min. The graph or formula was prepared by employing the method on known mixtures of lubricating oil and fuel oil. The method therefore requires that samples of the oils should be available. There is an indication, however, that the D of an unknown crankcase oil can be deduced by determining oil distillate at both 200 and 400 ml. of H_2O recovered. A. B. M.

Orientation of non-polar hydrocarbon molecules on boundary surfaces and the range of action of boundary surfaces in the lubrication process. S. Kyropoulos (Proc. World Petroleum Congr., 1933, **2**, 391—392).—The decrease of η of lubricating oil under bearing conditions due to flow-orientation of the mols. may be demonstrated experimentally by a machine designed by Prandtl. These experiments also indicate that hydrodynamic conditions prevail in bearing lubrication down to oil-film thicknesses of 2 or 3 μ, so that the upper limit for the range of the stray fields of the metallic surfaces under these conditions cannot exceed 1·1 μ. H. S. P.

New oil-testing machine. H. Hohenschutz (Proc. World Petroleum Congr., 1934, **2**, 396—398).—A machine is described by which the lubricating capacity of an oil is determined by measuring the time required for the temp. of a definite amount of oil, under const. pressure and velocity of flow, to attain such a val. that the friction exceeds a definite val. The turning moment of the friction is transmitted to a pendulum which, at a

certain deflexion, automatically stops the machine and a stop-clock. C. C.

Gas-works refractories.—See VIII. **Creosote from old timber.**—See IX. **Creosote oil.**—See XVI.

See also A., Sept., 953, **Viscosity on mixing or dilution.** 974, **Production of H_2 by the water-gas reaction.** 1016, **Analysis of gaseous hydrocarbons.**

Patents.

Manufacture of briquettes. R. T. Bowling (B.P. 413,882, 14.8.33).—Sawdust, wood shavings, or other vegetable fibres are compressed, cut into a spiral ribbon, and re-compressed in the form of a solid cylinder, which is then passed into a mould wherein it is cooled. Suitable apparatus is described. A. B. M.

Distillation of coal. H. Stevens, Assr. to H. Stevens (trustee) (U.S.P. 1,938,121—5, 5.12.33. Appl., [A—D] 18.10.30, [E] 6.2.31).—(A) Coal is carbonised in a vertical, cylindrical retort (*R*) which is externally heated by the circulation of hot combustion gases through flues surrounding *R*, and is simultaneously heated internally by passing a current through a central electrical resistor. As carbonisation proceeds the coke produced carries part of the current and so itself forms part of the heating element. The process may be either intermittent or continuous; in the latter case the current is carried by a central upper electrode which projects a suitable distance into the charge, and thereafter by the coke in the lower part of *R*, to an insulated portion of the base structure thereof. If desired, steam is introduced into the bottom of *R* to regulate the temp. of the coke. (B) The upper electrode is hollow so that a resistor device may be introduced through it; the device consists of a metal tube packed with particles of coke and extends the whole length of *R*, making contact with the lower electrode. It is so designed that when charging is complete the metal tube may be withdrawn, leaving the column of coke to form the initial heating resistor. (C) The heating is effected wholly by passing an electric current through the central resistor and through the progressively coked portions of the coal; the current is cut off prior to the coking of the peripheral layer of coke, this being effected by the sensible heat of the coke already formed. (D) The current is controlled to correspond with the increase in diam. of the effective resistor as the coking progresses. The gaseous and liquid products of distillation are withdrawn preferably from the bottom of *R*, but may be withdrawn also through offtakes in the sides thereof. (E) To prevent electrical leakage the outer metallic shell of *R* is constructed in $\nless$ 2 sections, with gaps therebetween, secured to each other by insulated bolts. A. B. M.

Carbonisation of powdered coal. A. H. Davis, jun., Assr. to Nat. Aniline & Chem. Co., Inc. (U.S.P. 1,937,552, 5.12.33. Appl., 15.8.28).—Coal is pulverised and introduced, together with hot furnace gases, into a chamber (*C*) wherein it is carbonised by the sensible heat of the gases; if necessary, further heat may be supplied by the introduction of sufficient air or O_2 into *C* to effect combustion of part of the coal or gases. The pulverised coal is prevented from agglomerating during carbonisation by inducing an electrical charge (*E*) on the particles, *e.g.*, by passing them through a metallic cylinder maintained at a high potential. When carbonisation is complete *E* is neutralised and the pulverised coke separated from the volatile products and utilised as fuel for steam production etc. The liquid constituents of the volatile products are condensed and recovered; the uncondensed gases are burned, either with the pulverised coke or separately, to provide the combustion gases for the carbonisation process. A. B. M.

Conversion and coking of hydrocarbons and carbonaceous materials. A. L. Mond. From Universal Oil Products Co. (B.P. 413,927, 8.11.33).—A mixture of a hydrocarbon oil and finely-divided coal is subjected to mild cracking in a heating coil under non-coking conditions and the product is then coked in suitable retorts (cf. B.P. 409,969; B., 1934, 708). The volatile products are fractionated; the light fraction is collected, the intermediate fraction (*A*) cracked, and the residue, together with the high-boiling products from the cracking of *A*, returned to the charging stock. A. B. M.

Coking of pitch and coal in a by-product coke-oven battery. W. Tiddy, Assr. to Semet-Solvay Eng. Corp. (U.S.P. 1,940,893, 26.12.33. Appl., 30.10.30).—Some of the chambers of a coke-oven battery are lined with a heat-resistant metal and pitch is coked therein, coal being simultaneously coked in the unlined chambers. The tar recovered from the admixed hot volatile products is distilled by being brought into intimate contact with the hot gases from some of the chambers, and the pitch residue is returned to be coked in the lined chambers. A. B. M.

Treatment of carbonaceous material. J. C. Morrell, Assr. to Universal Oil Products Co. (U.S.P. 1,940,725, 26.12.33. Appl., 15.11.29).—A mixture of pulverised coal and oil is fed into chambers into which a hot gaseous medium is simultaneously introduced at a temp. sufficiently high to carbonise and coke the fuel mixture. The heating medium may consist of combustion gases, superheated steam, and/or hot hydrocarbon vapours obtained by cracking the oil etc. The volatile products of the process pass to a fractionating column; the lighter oil is condensed and refined to give a high-anti-knock motor fuel, and the heavier oil is recycled. A. B. M.

Manufacture of low-volatile coke. G. Merkel (U.S.P. 1,939,457, 12.12.33. Appl., 18.10.28. Ger., 31.10.27).—Coal, lignite, etc. is passed down through a retort (*R*) wherein it is carbonised by means of a current of hot inert gas which is introduced into the bottom of *R* at 750—1000°. Just above the coking zone of *R* cold inert gas is introduced in sufficient quantity to lower the temp. of the gases to about 450°. Thus the coal is heated gradually to 450° and then rapidly to $>$ 750°. A hard, coherent coke is produced. A. B. M.

Treatment of powdered coal [to produce silica black]. C. A. Jacobson (U.S.P. 1,940,352, 19.12.33. Appl., 15.9.31).—Finely-divided coal is mixed with diatomaceous or infusorial earth in about equal proportions and the mixture carbonised at 900—1100°. The solid residue (SiO_2 black) is pulverised and separated by air flotation into at least two grades, viz., a lighter

grade suitable for use as a black pigment or as a carrier for Ni in the hydrogenation of oils, and one or more heavier grades suitable for use as an adsorbent for gases, a filtering medium for sugar refining, etc. A. B. M.

Separation of acetylene from gaseous mixtures. R. G. Wulff (U.S.P. 1,938,991, 12.12.33. Appl., 22.8.28).—C_2H_2 is separated from a mixture containing also C_2H_4, CH_4, and H_2 by washing it at —80° with C_6H_{14}, warming the solution in two stages, viz., (*a*) to about —12° to remove the CH_4 and (*b*) to about 87° to remove the C_2H_2 and C_2H_4 (together with some C_6H_{14}), and finally fractionating the mixture removed in stage (*b*) at about —70°/2 atm. A. B. M.

Separating the constituents of [recovering ethylene from] gaseous mixtures. Air Reduction Co., Inc., Assees. of C. C. Van Nuys (B.P. 414,918, 3.10.33. U.S., 27.10.32).—The fraction containing C_2H_4 and higher-boiling constituents is separated from complex gaseous mixtures by selective liquefaction, with backward return of the liquid, followed by rectification of the liquid, part of the effluent being returned to facilitate separation of pure C_2H_4. The process is continuous. C. C.

Treatment of exhaust gases of internal-combustion engines. H. M. Langton, E. J. Lush, and G. P. Watson (B.P. 413,744, 18.11.33).—The exhaust gases are freed from CO, particles of fuel, and other combustible constituents by passing them, after admixture with additional air if required, over one or more oxidation catalysts which are effective at relatively high temp., *e.g.*, V_2O_5, MoO_3, Cu and Mn vanadates, etc., and then over other oxidation catalysts which are reactive at low temp. (up to 250°), *e.g.*, Fe_2O_3 with Cr_2O_3 as promoter, CuO and MnO_2 with CeO_2 as promoter, etc. A. B. M.

Dispersion [in water] of water-immiscible bodies [, *e.g.*, normally solid asphalt and paraffin wax]. O. F. Neitzke, Assr. to Bennett, Inc. (U.S.P. 1,940,432, 19.12.33. Appl., 23.12.29).—Asphalt, m.p. 100°, or paraffin wax, preferably containing 1—5% of montan wax, is liquefied, blended with molten rosin at about 150°, and intimately mixed with a saponifying agent at 65—70°. Stable dispersions suitable for use as paints, waterproofing and impregnating compositions, particularly for papers, etc. are formed. Wax dispersions should be rapidly chilled to $<$ 54° after manufacture in order to maintain a low particle size. C. L. G.

Production of hydrocarbons having a high carbon content from hydrocarbons having a low carbon content. F. Fischer and H. Pichler (U.S.P. 1,940,209, 19.12.33. Appl., 15.7.31. Ger., 18.7.30).—Aliphatic gaseous hydrocarbons are converted into hydrocarbons of higher C content, *e.g.*, $CH_4 \rightarrow C_2H_2$, by passing a mixture of the initial gas with O_2, in amount insufficient for complete combustion, through a reaction zone at $>$ 1000° under conditions giving a reaction time of $<$ 0·01 sec. The products are cooled by admixture with cold gas immediately on leaving the hot reaction zone. The amount of O_2 used is preferably such that the ratio CO : H_2 in the resulting gas is approx. 1 : 2 so that after removal of the C_2H_2 the gas may be used for the synthesis of benzine. A. B. M.

Pyrolysis of hydrocarbon gases. C. C. Towne, Assr. to Texas Co. (U.S.P. 1,943,246, 9.1.34. Appl., 28.1.31).—Normally gaseous hydrocarbons rich in paraffinic constituents (above CH_4) are passed through bauxite or fuller's earth at 650—950° and aromatic compounds are separated from the reaction products. H. S. G.

Formation of olefines [from paraffins]. (A) P. K. Frolich and (B) B. C. Boeckeler, (A) Assr. to Standard Oil Development Co. (U.S.P. 1,944,419, 23.1.34. Appl., 2.5.29).—Paraffins above CH_4 are smoothly dehydrogenated to olefines by passage over a (reduced) ZnO–Cr_2O_3 catalyst (3 mols. : 7 mols.) at 450—700°. H. A. P.

Purifying unrefined hydrocarbon oils by action of high-pressure hydrogen. [Hydrogenation of petroleum oils.] R. P. Russell, Assr. to Standard–I.G. Co. (U.S.P. 1,940,649, 19.12.33. Appl., 8.2.30).—Contact of oil and H_2 and distribution over the catalyst are improved by directing the flow of oil and gas downwardly over the catalytic mass in a vertical, elongated reaction zone. Optimum conditions for the hydrogenation of different products and a list of preferred catalysts are given. C. L. G.

Improvement of hydrocarbon oils by treatment with hydrogen under elevated temperature and pressure. [Hydrogenation of lubricating oil.] R. P. Russell, Assr. to Standard–I. G. Co. (U.S.P. 1,940,650, 19.12.33. Appl., 18.4.30).—Lubricating oil is subjected to the action of H_2 in a reaction zone, packed with a catalyst, at 370—450°/20 to $>$ 50 atm., through which the products pass in an upward direction. Increased yield of oil of the required quality is obtained by increasing the mass velocity of the oil through the catalyst. This should be 0·25—1 lb. of oil per sec. per sq. ft. of reaction drum cross-section. The velocity may be obtained by recycling, using a narrow reaction chamber or arranging for several passings of the oil through the catalyst. The results of runs on Colombia lubricating oil distillates at different mass velocities are tabulated. C. L. G.

Production of refined hydrocarbon oils from unrefined hydrocarbon material. H. H. Semmes, Assr. to Standard–I. G. Co. (U.S.P. 1,940,651, 19.12.33. Appl., 30.1.30).—Hydrocarbon oils containing S are continuously mixed with a suspension of a finely-divided hydrogenation catalyst subject to S poisoning, and passed with a large excess of H_2 into a reaction zone (*Z*) at $>$ 20 atm. ($>$ 200 atm.) and at 400—466°. The level of the liquid suspension in the tower (*T*) is kept const. and a portion continuously withdrawn from the side of *T*, cooled, and the catalyst removed. This is re-activated by roasting and returned to *Z*. The vapours and gas are withdrawn from the top of *T* and passed to a purifying system, the purified H_2 being returned to *T*. C. L. G.

Catalytic production of refined hydrocarbon oils [lubricants] from heavier unrefined products by the action of high-pressure hydrogen. H. H. Semmes, Asst. to Standard–I. G. Co. (U.S.P. 1,940,652, 19.12.33. Appl., 30.1.30).—Heavy, unrefined hydrocarbon oils containing S are hydrogenated by passing

a suspension in the oil of 5—50 vol.-% of a hydrogenation catalyst (Fe, Ni, Co, and their oxides) subject to S poisoning, continuously at a speed of 0·2—0·8 vol. per vol. of reactor space per hr., through a reaction zone (Z) maintained under a pressure of $H_2 > 50$ atm. at $> 370°$. From the top of the tower vapour, gas, and the liquid suspension of catalyst are continuously withdrawn as soon as, or just before, the catalyst is completely poisoned; the gas is then purified, and the liquid suspension cooled and freed from the catalyst, which is re-activated and returned to Z. C. L. G.

Multiple-step partial oxidation method [of treating hydrocarbons]. J. H. JAMES, Assr. to C. P. BYRNES (U.S.P. 1,941,010, 26.12.33. Appl., 26.5.33).—A mixture containing a hydrocarbon gas or vapour and O_2 is passed through a catalytic reaction zone under conditions giving a relatively short time of contact, and the major portion of the mixture, after condensation and separation of the desired oxidation product (*e.g.*, CH_2O when CH_4 is the initial hydrocarbon), is recirculated, sufficient fresh gas and O_2 being added thereto to make up for the amount converted. The process may be carried out under increased pressure and/or with ozonised O_2. The catalyst preferably consists of the "blue oxides" of Mo or similar complex oxides containing U, Co, V, etc. A. B. M.

Refining of petroleum oil. W. L. SAVELL, Assr. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,945,121, 30.1.34. Appl., 5.10.32).—The oil is treated with substantially dry $CaOCl_2$, containing $> 50\%$ of available Cl, at sub-cracking temp. (93—315°), and a refined fraction is separated from the mixture by distillation. H. S. G.

Removal of mercaptans from [petroleum] hydrocarbons. L. ROSENSTEIN (U.S.P. 1,943,744, 16.1.34. Appl., 3.10.28).—The hydrocarbon is first contacted with an aq. solution of an alkali salt of a weak acid of p_H 10^{-12}—10^{-8} ($NaHCO_3$, Na_2CO_3), and then with an aq. alkali hydroxide, H_2S being absorbed in the first case and mercaptans in the second. Air-oxidation of the spent solutions in presence of insol. sulphides (CoS, NiS) gives S and org. disulphide, respectively, and absorption media that can be re-used. H. A. P.

Refining of hydrocarbon oils. A. LACHMAN, Assr. to VAPOUR TREATING PROCESSES, INC. (U.S.P. 1,945,114, 30.1.34. Appl., 23.2.32).—Mineral oil vapours at 204—210° are brought into contact with $ZnCl_2$ solution (50% H_2O) to purify the oil partly, to concentrate the $ZnCl_2$ solution, and to reduce the vapour temp. to 176—182°. The vapours are then re-treated with the hot $ZnCl_2$ solution maintained at approx. 82% concn. by the continuous addition of steam, and are finally separated from the products of reaction and excess reagent. H. S. G.

Purifying hydrocarbon oil from hydrogen sulphide. C. J. SMITH, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,942,071, 2.1.34. Appl., 13.3.30).—H_2S is removed in a cyclic system by treating the oil with a re-activated alkaline carbonate solution from which only about one half of the absorbed H_2S has been removed. H. S. G.

Purifying a hydrocarbon gas and a hydrocarbon oil. C. W. GARRISON, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,942,054, 2.1.34. Appl., 17.3.30).—H_2S is removed by passing the gas in countercurrent contact with aq. Na_2CO_3; the liquor is then used for treating the oil and is regenerated by blowing in air. H. S. G.

Refining of residual hydrocarbon oil. J. KOCHAN, Assr. to STANDARD OIL CO. (U.S.P. 1,938,629, 12.12.33. Appl., 10.3.30).—The emulsions formed when acid-treated oils are washed with H_2O can be prevented or reduced by washing these oils instead with an aq. extract of the acid sludge from the refining of a heavy lubricating oil at 82—100°. This reagent also removes the undesired constituents (sulphonic acids etc.) from the oil and improves its bloom, odour, and colour. C. L. G.

[Petroleum–water] emulsion-decomposing body. C. FISCHER, JUN., and W. T. REDDISH, Assrs. to KONTOL CO. (U.S.P. 1,941,886, 2.1.34. Appl., 17.10.29. Cf. U.S.P. 1,727,164; B., 1929, 884).—A reagent comprising a mineral oil sulphonate with EtOH is claimed. H. S. G.

Treatment [de-emulsification] of wet oil. J. C. WALKER, Assr. to EMPIRE OIL & REFINING CO. (U.S.P. 1,944,021, 16.1.34. Appl., 27.5.27).—H_2O-in-oil emulsions are resolved, or their formation is prevented (in petroleum refining), by addition of a sulphonated polynuclear aromatic hydrocarbon–(*sec.*-)aliphatic alcohol condensation product (di*iso*propylnaphthalenesulphonic acid). H. A. P.

Decolorisation of hydrocarbon distillates. S. E. CAMPBELL (U.S.P. 1,938,094, 5.12.33. Appl., 24.4.29).—Hydrocarbon distillate is treated successively in towers with dil. H_2SO_4, alkali solution, conc. H_2SO_4, alkali solution, and a H_2O-wash. The acid towers contain acid-resistant contact material. Reaction products, *e.g.*, alcohol derivatives, are recovered by hydrolysis on diluting the exhausted conc. acid, dil. acid being thus obtained for the initial treatment. C. C.

Refining of motor spirit. N.B.A., LTD., W. H. HOFFERT, and G. CLAXTON (B.P. 414,644, 4.1.33).—Crude motor spirit (benzol) is refined by selective removal of coloured, odour-forming, and S-containing substances by treatment of all or of special fractions of the crude, but without removing unstable unsaturated hydrocarbons. Suitable treatments include the restricted use of H_2SO_4, or, in the vapour phase, of absorbent clay; doctor solution, alcoholic alkali, etc. may also be used. A gum inhibitor, *e.g.*, cresols, is then added. C. C.

Leadised gasoline. F. W. SULLIVAN, JUN., and F. F. DIWOKY, Assrs. to STANDARD OIL CO. (U.S.P. 1,938,547, 5.12.33. Appl., 21.3.32).—Pb alkyl compounds (I) are prepared by the action of a high-tension electric arc (about 25,000 volts) on hydrocarbons (II) (liquid, vapour, or gaseous) in presence of Pb. The arc may be struck between Pb electrodes immersed in (II). Vaporised (II) are preferably treated under reduced pressure. (I) can be recovered in the pure state by fractional distillation, or in solution in the hydrocarbon liquid in which they are formed (*e.g.*, in gasoline). C. C.

Manufacture of non-detonating gasoline. F. W. SULLIVAN, JUN., and V. VOORHEES, Assrs. to STANDARD

OIL CO. (U.S.P. 1,938,546, 5.12.33. Appl., 15.1.32).—Hydrocarbon compounds of Pb are prepared by the action of a silent electric discharge on hydrocarbon vapours in presence of Pb. With volatile hydrocarbons, *e.g.*, C_2H_6, C_3H_8, C_2H_4, C_3H_6, the product is almost entirely Pb alkyl compounds (I), but with liquids, *e.g.*, C_6H_{14} or gasoline, a solution of (I) in the hydrocarbon is obtained. Pb may be introduced as a fog by arcing Pb electrodes in a current of H_2, or a Pb-lined reactor may be used. C. C.

Gum inhibitor for gasoline. W. S. CALCOTT and I. E. LEE, ASSRS. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,940,445, 19.12.32. Appl., 7.8.29).—The formation of colour and gum in straight-run or cracked gasoline is inhibited by the addition of a small % of one or more aliphatic amines. A list of effective inhibitors is given, together with the improvement in gum content and colour stability effected by the addition of (*a*) 0·05% of $NH(C_2H_4{\cdot}OH)_2$ and (*b*) 0·002% of $NHBu_2$ to two unrefined cracked gasolines. C. L. G.

(A) **Fuel for, and** (B) **operation of, internal-combustion engines.** G. ALLEMAN, ASSR. to SUN OIL CO. (U.S.P. 1,940,439—40, 19.12.33. Appl., [A] 18.1.29, [B] 11.12.29).—(A) An anti-knock motor fuel is produced by adding to petrol an organo-metallic compound (I) containing $\not< 1$ $CHEt_2$ group, *e.g.*, $PbMe_2(CHEt_2)_2$. Convenient methods of preparing such compounds are described. Colloidal Pb may also be added if desired (cf. U.S.P. 1,805,199; B., 1932, 190). (B) (I) is introduced into the cylinder of the engine; no knocking occurs when the engine is subsequently operated with a fuel having knocking characteristics. A. B. M.

Dewaxing petroleum. R. E. STANTON (U.S.P. 1,940,654, 19.12.33. Appl., 4.5.31).—Solid wax particles are removed from chilled petroleum oil (diluted with naphtha or other solvent) by subjection to the action of a high-tension (125—250 kv.) d.c., the charged particles of wax collecting on the opposite electrode. The oil is pumped into a hollow, perforated anode through which it escapes in jets towards the horizontal cathode shell, which is slowly rotated. The wax is continuously scraped from the shell and the oil withdrawn from the bottom. C. L. G.

Dewaxing mineral oils. R. N. GILES, ASSR. to STANDARD OIL CO. (U.S.P. 1,943,236, 9.1.34. Appl., 31.8.31).—Filterable wax crystals are obtained by dissolving at about 60°/110 lb. per sq. in. a wax-bearing oil in liquid C_4H_{10} and chilling after releasing the pressure. H. S. G.

Extraction and dewaxing of lubricating oils. F. X. GOVERS, ASSR. to INDIAN REFINING CO. (U.S.P. 1,945,350, 30.1.34. Appl., 20.4.31).—Wax-bearing oil is dissolved in a selective solvent comprising substantial proportions of $COMe_2$ and C_6H_6, and cooled at $< -17°$ to form a concentrate of solid wax, semi-solid hydrocarbons, and solvent containing dissolved hydrocarbons, which is separated and washed in stages with fresh solvent at temp. successively rising above that at which it was separated, in order to dissolve out desirable lubricating fractions. H. S. G.

Treatment of lubricating oil stocks with liquid sulphur dioxide. W. GROTE and P. OBERGFELL, ASSRS. to EDELEANU GES.M.B.H. (U.S.P. 1,945,500, 30.1.34. Appl., 20.10.32. Ger., 29.10.31).—Counter-current extraction of high-viscosity stocks with liquid SO_2 is rendered possible by diluting the oil, prior to treatment, with liquid SO_2 in amount $\not>$ that completely miscible with the oil at extraction temp. H. S. G.

Manufacture of soap-oil [lubricating] compositions. A. E. BECKER and R. G. SLOANE, ASSRS. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,943,806, 16.1.34. Appl., 24.6.26).—About 0·5% of soap (dissolved in a solvent, or prepared *in situ*, etc.) is dissolved in a lubricating oil by heating at about 190°, and the mixture is rapidly cooled through the range 175—65°, in order to avoid gelation. E. L.

Apparatus for cracking hydrocarbon oils. R. C. POWELL, ASSR. to TEXAS CO. (U.S.P. 1,947,110, 13.2.34. Appl., 9.2.31).

Cracking of hydrocarbon oils. A. W. JURRISSEN, A. B. COX, and A. M. WOOD, ASSRS. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,946,939, 13.2.34. Appl., 15.3.33).

Cracking of mineral oil. A. E. PEW, JUN., ASSR. to SUN OIL CO. (U.S.P. 1,946,329, 6.2.34. Appl., 9.11.29).

Cracking of oils. R. J. GAROFALO, ASSR. to UNION OIL CO. OF CALIFORNIA (U.S.P. 1,948,345, 20.2.34. Appl., 11.10.30).

Protective lining in cracking vessels [for hydrocarbons]. T. MONTGOMERY and J. C. MORRISON, ASSRS. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,948,391, 20.2.34. Appl., 15.2.29).

Conversion of petroleum hydrocarbons. A. G. DAVIS, ASSR. to GASOLINE PRODUCTS CO., INC. (U.S.P. 1,947,001 and 1,948,492, [A] 13.2.34, [B] 27.2.34. Appl., [A] 18.1.26, [B] 21.5.27).

Conversion of [hydrocarbon] oils. C. P. DUBBS, ASSR. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,946,463, 6.2.34. Appl., 22.6.21. Renewed 10.3.27).

Conversion of hydrocarbon oils. L. C. HUFF, ASSR. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,946,938, 13.2.34. Appl., 27.5.32).

Hydrocarbon oil conversion. D. F. GERSTENBERGER, ASSR. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,945,604, 6.2.34. Appl., 4.4.32).

Oil-wax separation system. C. E. ADAMS, ASSR. to STANDARD OIL CO. (U.S.P. 1,948,018, 20.2.34. Appl., 28.1.31).

Preheating chamber [for distilling hydrocarbon oils]. E. W. THIELE, ASSR. to STANDARD OIL CO. (U.S.P. 1,947,319, 13.2.34. Appl., 14.1.29).

Fractionating [hydrocarbon oil] vapours. J. S. WALLIS, ASSR. to ALCO PRODUCTS, INC. (U.S.P. 1,947,817, 20.2.34. Appl., 4.2.32).

Apparatus for condensing hydrocarbons. J. C. MAHONEY, ASSR. to ALCO PRODUCTS, INC. (U.S.P. 1,947,863, 20.2.34. Appl., 28.1.33).

Stabilisation of light distillate produced in distilling or cracking hydrocarbons. R. C. COOK,

Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,945,599, 6.2.34. Appl., 27.3.29).

Treatment of residue of hydrocarbon oil distillation. C. J. PRATT, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,946,947, 13.2.34. Appl., 8.7.26. Renewed 11.7.31).

Waste-heat boilers in carbonising plant.—See I. **EtCl from petroleum. Gum inhibitors.**—See III. **Roofing felt.**—See V.

III.—ORGANIC INTERMEDIATES.

Tower absorption coefficients. VI. Absorption of ethylene dichloride. H. B. OSBORN, JUN., and C. W. SIMMONS (Ind. Eng. Chem., 1934, **26**, 856—857; cf. B., 1934, 559).—$C_2H_4Cl_2$ can be recovered from waste gases by absorption in kerosene followed by rectification. Absorption coeffs. are given. A. G.

Naphthenic acid from petroleum.—See II.

See also A., Sept., 991, **Prep. of Et malonate.** 993, **Prep. of succinimide.** 996, **Prep. of *iso*stilbene.** 997, **High-pressure hydrogenation of $C_{10}H_8$.** 999, **Prep. of 2 : 6-dichlorophenol-indophenol. Isomeric nitrocresols. Prep. of germicidal hydroxyalkyldiphenyls.** 1005, **Prep. of thymoquinone.** 1016, **Determining gaseous paraffins and olefines.** 1034, **Fermentation [product] of glyceric acid.** 1036, **Lactic fermentation.**

PATENTS.

Manufacture of alkyl halides. E. H. STRANGE and T. KANE (B.P. 414,766, 13.2.33).—A C_2—C_7 olefine (C_3H_6) and HBr or HCl are passed into a porous catalyst mixed with heat-absorbing material (*e.g.*, SiO_2 gel–Al_2O_3,xH_2O + Fe turnings) until the temp. approaches the b.p. of the product, which is then distilled away by reducing the pressure, leaving the catalyst at a suitable temp. for repetition of the first stage. H. A. P.

Manufacture of ethyl chloride from petroleum refinery gas. E. B. HJERPE and W. A. GRUSE, Assrs. to GULF REFINING CO. (U.S.P. 1,944,839, 23.1.34. Appl., 8.4.32).—The gas is fractionally distilled under pressure, the C_2H_4 fraction combined with HCl in presence of a catalyst ($AlCl_3$, $BiCl_3$) still under pressure, and the EtCl removed by scrubbing with a relatively non-volatile petroleum fraction, and recovered by distillation of the extract. Apparatus is claimed. H. A. P.

Preparation of [concentrated] formic acid. R. KOEPP & CO. CHEM. FABR. A.-G. (B.P. 414,312, 27.2.34. Ger., 18.4.33).—Dry HCO_2Na (I) (etc.) is treated with dry HCl in anhyd. or highly conc. HCO_2H (II). The HCl may be passed as gas into (II) to which (I) is added in portions, and (II) then distilled off in vac. C. H.

Preparation of gluconic acid and its lactones. R. PASTERNACK and W. R. GILES, Assrs. to C. PFIZER & CO. (U.S.P. 1,942,660, 9.1.34. Appl., 6.6.32).—(Slow) crystallisation of a supersaturated aq. solution of gluconic acid (I) yields at $< 30°$ (I), at 30—70° glucono-δ-lactone, and at $> 70°$ the -γ-lactone. H. A. P.

Manufacture of aldehydes of high mol. wt. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 414,148, 6.2.33).—Carboxylic acid vapours $> C_{11}$ (*e.g.*, oleic acid) are led with HCO_2H over decarboxylation catalysts (MnO–pumice) at 300—400° (335—355°), preferably in apparatus lined with Cr–Ni steel or Al. C. H.

Production of acetone. K. RÓKA, Assr. to DEUTS. GOLD- U. SILBER-SCHEIDEANSTALT VORM. ROESSLER (U.S.P. 1,944,109, 16.1.34. Appl., 23.7.31. Ger., 21.7.24).—MeCHO and H_2O are passed over mixed oxides of metals capable of forming isomorphous carbonates at 250—660° (Fe + metals of group II), preferably on a metallic carrier (Fe). Examples of catalysts used are breunerite [(Mg,Fe)CO_3], and Fe oxides + $CaCO_3$, ZnO, or Mn oxide. H. A. P.

Preparation of (A) wax-like substances [hydroxyalkyl ketones] and (B) [unsaturated] aliphatic ketones. (A, B) D. K. TRESSLER and (A) C. SCHADE, Assrs. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,941,639—40, 2.1.34. Appl., [A] 14.8.29, [B] 10.8.31).—(A) Unsaturated higher ketones [cf. (B)] are combined with H_2SO_4 and the sulphates hydrolysed; *e.g.*, oleone (I) in solvent naphtha is treated with 95% H_2SO_4 in the cold and the product boiled with H_2O to give dihydroxystearone, m.p. 74°. (B) Unsaturated fatty acids or mixed fatty acids are heated with catalysts (cf. J.C.S., 1911, **99**, 2298) in absence of O_2; *e.g.*, oleic acid with Fe or Fe_2O_3 in CO_2 at 200—310° gives 83% of theory of (I). H. A. P.

Manufacture of substances suitable as wetting, washing, dispersing, and like agents. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 414,712 and 414,772, [A, B] 5.11.32).—(A) Aliphatic aldehydes or ketones containing $\not< C_6$ are condensed with primary or *sec.*-amines containing H_2O-solubilising groups (I) or groups convertible into (I) by further treatment, *e.g.*, conversion into quaternary NH_4 salts (if necessary, after reduction), sulphonation, phosphorylation, or reaction with C_2H_4O (II). Thus, *e.g.*, lauraldehyde (III) (1 mol.) is condensed with $C_2H_4(NH_2)_2$ (1 mol.), the product reduced (CO–H_2 at 325°/180 atm.), and the product, if desired, condensed with (II). Other examples are: (III) + *p*-NH_2·C_6H_4·SO_3H; $C_{17}H_{33}$·COMe (from oleic acid) + NH_2·$[CH_2]_2$·NMe_2 at 200° (+ EtBr); and (III) + $NH(C_2H_4·OH)_2$ + HCO_2H in AcOH at the b.p., followed by sulphonation. (B) Aliphatic aldehydes having $\not< C_6$ are converted into acetals with alcohols containing $\not< 3$ OH or 1 OH and a halogen, NH_2, or inorg. ester group, and the products solubilised as above. Thus (III) or olealdehyde is condensed with glycerol and HCl at 130°, and the acetals, b.p. 190°/15 mm., and 200—220°/2 mm., thus formed are converted into their H sulphates, and, in the former case, H phosphate and polyethylene glycol ether, or (III) is condensed with C_2H_4Cl·OH and the resulting chloroacetal heated with Na_2SO_3 at 180°. H. A. P.

[Preparation of] *tert.*-alkyl-substituted *o*-dihydroxybenzenes. [Gum inhibitors for petroleum distillates.] L. E. MILLS and B. L. FAYERWEATHER, Assrs. to DOW CHEM. CO. (U.S.P. 1,942,847, 9.1.34. Appl., 27.3.33).—3 : 4-*Dihydroxy*-tert.-*butyl*- (I), m.p. 47—48°, b.p. 144—147°/5 mm., and -*amyl-benzene*, m.p. 46·5—47°, b.p. 139—142°/2·5 mm., are obtained from the 3-bromo-4-hydroxy-compound, aq. NaOH, and Cu_2O at the b.p. (I) is also prepared from *o*-$C_6H_4(OH)_2$,

$Bu^{\gamma}Cl$, and $ZnCl_2$. These and higher homologues are used as antioxidants generally. H. A. P.

Manufacture of polyhalogeno-derivatives of pyrene and of pyrenequinones. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 414,230, 11.9.33).—1 : 3 : 6 : 8-Tetrachloropyrene, m.p. 368°, gives with excess Cl_2 a tetrachloride, decomp. 290°, which by loss of 2HCl (*e.g.*, at 300—390°) gives 1 : 3 : 4 : 6 : 8 : 9- (or 10-)hexachloropyrene, m.p. 283°, oxidisable by HNO_3 or oleum to 1 : 4 : 6 : 9-tetrachloropyrene-3 : 8-quinone, m.p. 320—325°; the quinone is similarly obtained directly from the tetrachloride. Tetrabromopyrene, m.p. 402°, yields a tetrachloride, decomp. 290°, which by loss of HBr gives a pyrene, m.p. $>$300°, containing Cl and Br. C. H.

Production of condensation products of α-ethyl-[Δ^{α}-]hexenaldehyde and primary [aryl]amines. [Vulcanisation accelerators.] H. A. MORTON (U.S.P. 1,944,843, 23.1.34. Appl., 17.1.27).—Prep. of Schiff's bases by condensation of the aldehyde with the amine (NH_2Ph) at 105° and neutralisation of the product with an org. acid (AcOH, abietic acid) is claimed. H. A. P.

Preparation of secondary aromatic amines. GOODYEAR TIRE & RUBBER CO. (B.P. 414,738, 7.11.32. U.S., 9.6.32).—A phenol or naphthol is heated (at 160—235°) with a cyclic primary amine and a polybasic acid or its acid salts (*e.g.*, H_3BO_3, $KHSO_4$, NaH_2PO_4) and the H_2O formed allowed to escape. Examples include the prep. of β-$C_{10}H_7$·NHPh (from β-$C_{10}H_7$·OH), *o*- and *p*-tolyl-β-naphthylamine, *p*-$C_6H_4(NHPh)_2$, *cyclo*hexyl-, m.p. 74°, and furfuryl-β-naphthylamine, b.p. 162—168°/42—45 mm. H. A. P.

Manufacture of aromatic sulphodihalogeno-amides. H. MIRAU, Assr. to CHEM. FABR. VON HEYDEN A.-G. (U.S.P. 1,944,568, 23.1.34. Appl., 18.5.31. Ger., 27.6.30).—An arylsulphonamide or its *N*-Cl-derivative is treated with a H_2O-sol. hypochlorite (NaOCl) and CO_2 in H_2O under pressure (20—30 atm.). Increased stability is claimed. H. A. P.

Manufacture of stable diazonium compounds. I. G. FARBENIND. A.-G. (B.P. 414,768, 13.2.33. Ger., 13.2.32).—Diazonium salts of acylaminoarylsulphonic acids are claimed. Examples of acids used are *m*- and *p*-NHAc·C_6H_4·SO_3H, 1 : 4- and 1 : 5-NHAc·$C_{10}H_6$·SO_3H, 1 : 2 : 4-NHAc·$C_6H_3(SO_3H)_2$, 2 : 5 : 7-NHAc·$C_{10}H_5(SO_3H)_2$, 1 : 4 : 6 : 8-NHAc·$C_{10}H_4(SO_3H)_3$, and ·CO·CH_2Cl, ·COEt, ·CO·CO_2Et, ·CO·CO·NH_2, ·CO·NH_2, and Bz derivatives of *p*-NH_2·C_6H_4·SO_3H. The amines employed are mainly nitro- and chloro-anilines and homologues. H. A. P.

Recovery of amines and phenols from aqueous solutions. W. L. SEMON, Assr. to B. F. GOODRICH CO. (U.S.P. 1,942,838, 9.1.34. Appl., 22.8.28).—An amine is recovered by addition of $\not<$ 1 equiv. of a naphthol or (polyhydric) phenol, and *vice versa*, a H_2O-insol. "salt" being formed, from which the components may be recovered by metathesis or occasionally (*e.g.*, with quinol–NH_2Ph) by simple heating. H. A. P.

Manufacture of [tetra]alkyl[di]amino[diaryl]-carbinols. F. H. KRANZ, Assr. to NAT. ANILINE & CHEM. CO., INC. (U.S.P. 1,942,820, 9.1.34. Appl., 7.2.30).—The corresponding methane is oxidised (with PbO_2) in suspension in aq. HCO_2H. Thus 4 : 4′-$CH_2(C_6H_4$·$NEt_2)_2$ (650 pts.) is dissolved in 90% HCO_2H (750 pts.), the solution is added to H_2O (11,000 pts.) and ice (7000 pts.), and PbO_2 (502 pts.) gradually run in at 0°; 80% of theory of the carbinol is obtained. H. A. P.

Preparation of sodium *p*-phenylphenate [*p*-diphenylyl oxide]. E. C. BRITTON, Assr. to DOW CHEM. CO. (U.S.P. 1,942,800, 9.1.34. Appl., 6.11.29).—Dissolution of *p*-C_6H_4Ph·OH in hot aq. NaOH and cooling yields the *salt* *p*-C_6H_4Ph·ONa,H_2O, which is completely dehydrated at $>$ 105°. H. A. P.

Purification of organic acids. A. O. JAEGER and L. C. DANIELS, Assrs. to SELDEN CO. (U.S.P. 1,943,892, 16.1.34. Appl., 8.8.29).—The Na salt is treated with a hypohalite (NaOCl) or peroxide in H_2O at $<$ 80° (40—60°). Purification of BzOH and 1 : 8-$C_{10}H_6(CO_2H)_2$ is specifically claimed. H. A. P.

Manufacture of acylbenzoic acid compounds. B. H. JACOBSON, Assr. to CALCO CHEM. CO., INC. (U.S.P. 1,942,430, 9.1.34. Appl., 28.6.29).—*o*-$C_6H_4(CO)_2O$ is condensed with excess of an aromatic hydrocarbon (I) (PhMe) and $AlCl_3$ at $\not>$ 40°, the product decomposed with cold dil. acid, and the cryst. ppt. of acylbenzoic acid filtered off. Excess of (I) is separated and distilled. Apparatus is claimed. H. A. P.

Separation of *o*- and *p*-halo[geno]benzoic acids. L. E. MILLS, Assr. to DOW CHEM. CO. (U.S.P. 1,942,826, 9.1.34. Appl., 6.3.30).—The method of partial neutralisation (HCl) of an aq. solution of the (Na) salts is used, pptn. of *p*-C_6H_4Cl·CO_2H being almost quant. at p_H 4—5 at $<$ 75°. H. A. P.

Production of diphenylmonosulphonic acid. W. C. STOESSER and R. F. MARSCHNER, Assrs. to DOW CHEM. CO. (U.S.P. 1,942,386, 2.1.34. Appl., 2.6.32).—Ph_2 is heated with 95—98% H_2SO_4 (1·1—1·4 mols.) at 100—175°/$<$ 150 mm. (130—150°/50—150 mm.); any unchanged Ph_2 distils and is recovered. H. A. P.

Manufacture of halogenated phenylthioglycollic acids. SOC. CHEM. IND. IN BASLE (B.P. 414,952, 19.12.33. Switz., 23.12.32).—A phenylthioglycollic acid containing $\not<$ 1 halogeno-, alkyl, alkoxy-, or alkylthiol group in an *ortho* or *meta* position, but free from *o*-CO_2H, is treated with $SOCl_2$, Cl_2, or Br (and a carrier). Thus 1 : 4 : 2-$C_6H_3Me_2$·S·CH_2·CO_2H, m.p. 77° (from 1 : 4 : 2-$C_6H_3Me_2$·SO_2Cl, by reduction to thiol and condensation with CH_2Cl·CO_2H), gives with SO_2Cl_2 and $SbBr_5$ in PhCl at 60° the 5-*Cl*-, m.p. 97°, and with Br and I in PhCl at 30° the 5-*Br*-derivative, m.p. 107—108°; similarly 5 : 2 : 1-OEt·C_6H_3Cl·S·CH_2·CO_2H gives the 2 : 4-Cl_2-compound, m.p. 122—123°. H. A. P.

Production of dibenzanthrone. H. J. WEST, Assr. to SELDEN CO. (U.S.P. 1,941,771, 2.1.34. Appl., 2.8.29).—The alkali fusion of benzanthrone is conducted in presence of oxidising agents (*e.g.*, $NaNO_3$, $KClO_3$, V_2O_5) (in addition to reducing agents). H. A. P.

Separating C_2H_2, and C_2H_4, from gases. Production of hydrocarbons. Pyrolysis of hydrocarbon gases. Forming olefines from paraffins. Mercaptans from hydrocarbons.—See II. **Fe-red colours. Hydrogenated Me abietate.**—See XIII. **Pb 4 : 6-dinitro-*o*-tolyloxides.**—See XXII.

IV.—DYESTUFFS.

Purification and properties of Congo Red. L. R. Parks and M. P. Keller (Amer. Dyestuff Rep., 1934, **23**, 445—448).—Purification was effected by repeated crystallisation from solution in approx. 50% EtOH; dialysis methods were unsatisfactory. A 0·001*N*-aq. solution of the purified dye (I) is 87% ionised and has sp. conductivity $92·4 \times 10^{-6}$ at 25°. Absorption of CO_2 by an aq. solution of (I) produces partial pptn. of (I), so that the solution becomes cloudy, and a deep reddish-violet colour. In aq. solution (I) is slightly hydrolysed. Blue, lavender, and pink or red shades on cotton are obtained with (I) by controlling the p_H of the dye liquor. A. J. H.

See also A., Sept., 1011, **Azined yes.** 1013, **Indolethionaphtheneindigos. Indigoid dyes.**

Patent.

Manufacture of indigoid dyes. Soc. Chem. Ind. in Basle (B.P. 415,632, 22.12.33. Switz., 27.12.32).—Indigoids from 7-alkoxy-4-alkylisatin α-chlorides (etc.) and α-$C_{10}H_7$·OH, which may carry Cl or Br in position 5 or 4′, are halogenated, *e.g.*, with SO_2Cl_2 in PhCl. Green-blue vat dyes are obtained. C. H.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Effect of atmospheric sulphur dioxide on cotton textiles. O. M. Morgan and B. J. Kenalty (Canad. J. Res., 1934, **11**, 53—61).—The loss of strength of cotton cloth which was power-laundered with soap and Na_2CO_3, moistened with H_2O containing Fe, bleach, soap and bleach, soap, bleach and $H_2C_2O_4$, soap, bleach and AcOH, or $(NH_4)_2CO_3$, dried in air containing 1 or 2×10^{-4}% SO_2, and ironed at 205° was after 50 cycles ≯ that of cloth similarly treated in absence of SO_2. A. G.

Properties of chlorinated wool and determination of damage in chlorinated knitted goods. S. R. Trotman, H. S. Bell, and H. Saunderson (J.S.C.I., 1934, **53**, 267—273 T).—Microscopical estimation of damage in chlorinated wool is not altogether satisfactory since it depends on partial or complete destruction of the epithelium of the fibre, and cannot detect damage to the cortex. The Pauly method of examination, depending on the fact that damaged fibres are stained by diazotised sulphanilic acid in alkaline solution, is capable of detecting damage to the cortex, but is not very satisfactory in practice. Chlorinated wool has a marked affinity for acid dyestuffs in cold 0·005*N*-HCl and the quantity of dyestuff absorbed increases directly with the % of damage. 2 g. of the sample are treated for 90 min. at room temp. with 100 c.c. of 0·005*N*-HCl containing 0·5 millimol. of indigo-carmine or, preferably, Kiton Red G per 100 g. of wool; the liquor is then filtered through glass wool and an aliquot part of the filtrate matched with a standard solution of the dyestuff containing 0·01 millimol. per litre. The average absorption for unchlorinated wool is 0·162 millimol. per 100 g. The max. absorption for a well-chlorinated sample is 0·35 millimol. per 100 g., an absorption of 0·4 millimol. indicating 50% of damaged fibres. The affinity of chlorinated wool for basic dyestuffs in a cold acidified bath, although marked, decreases with increasing damage and is unsuitable for a quant. test. The affinity of chlorinated wool for H_2O and its solubility in aq. Na_2CO_3 were also found to be unreliable as quant. tests.

Photochemical decomposition of silk. M. Harris (J. Res. Nat. Bur. Stand., 1934, **13**, 151—155).—On exposure to sunlight or north skylight the strength of silk cloth decreases and the NH_3-N content increases. These effects, which are ascribed to oxidation by the atm. in presence of light, are reduced by treating with 0·1*N*-NaOH or 1% Na_2CO_3, but intensified by treating with 0·1*N*-H_2SO_4. E. S. H.

Identification and microscopy of woods and wood fibres used in the manufacture of pulp. E. S. Harran and J. E. Lodewick (Paper Ind., 1934, Feb., 630—637; May, 103—111; Aug., 327—335).—A very large no. of pulpwoods and pulpwood fibres are described in detail, with numerous photomicrographs. H. A. H.

Pulping of cajeput, white mangrove, Australian pine, and Cunningham pine by the sulphate process. C. E. Curran, S. L. Schwartz, and M. W. Bray (Paper Trade J., 1934, **98**; T.A.P.P.I. Sect., 288—291).—All these woods are unsuitable for the manufacture of first-quality pulps, and can be utilised as fillers only in conjunction with longer-fibred strong pulps. H. A. H.

Aëration of sulphite[-cellulose] liquor. M. J. O'Dell and A. Z. Greenlaw (Paper Trade J., 1934, **99**; T.A.P.P.I. Sect., 77—78).—Under properly controlled conditions ponding (I) and aëration (II) greatly reduce the biochemical O_2 demand of sulphite-cellulose waste liquor, thus diminishing its pollutional effects. (II) is considered to be economically feasible; (I) is only a temporary measure. H. A. H.

Simple differentiation between genuine vegetable parchment paper and its substitutes. H. Salvaterra and F. Noss (Papier-Fabr., 1934, **32**, 371—373).—Differentiation is obtained by microscopical examination in polarised light of thin strips cut in cross-section. The vegetable parchment shows a darkly illuminated central layer with few details, as opposed to all other papers which show uniformly illuminated details of their structure. D. A. C.

Wool content of paper. C. A. Blaisdell and J. E. Minor (Paper Ind., 1934, Feb., 625—627).—Chemical methods of determining the wool content of paper have only limited application; errors arising from various sources are discussed. A microscopical dot-count method is preferred. H. A. H.

Colloid chemistry of wax-sizing [of paper]. W. Seck (Papier-Fabr., 1934, **32**, 373—375).—Paper containing 1% of resin (I) and 1% of wax size (II) was very much more resistant to H_2O-penetration (*P*) and gave rather higher and less variable readings on the Bekk "smoothness tester" (*B*) than that containing 1·5% of (I) and 0·5% of (II). The influence of the wax on *P* is ascribed to its hydrophobic properties and on *B* to its greater malleability when dehydrated. D. A. C.

Glossmeter and surface-texture comparator [for paper]. R. S. Hunter (Paper Trade J., 1934, 99; T.A.P.P.I. Sect., 70—72).—The Hunter Glossmeter is described. The instrument is claimed to make more reliable distinctions than the Ingersoll Glarimeter (I) on white surfaces above 80% Glarimeter val.; below 60%, (I) is the more reliable. It is possible to measure the gloss of coloured and transparent papers. Special emphasis is given to surface texture. H. A. H.

Still.—See I. **Suint solutions as detergent.**—See XII.

See also A., Sept., 961, **Titration curve of wool keratin.** 980, **Micro-Kjeldahl determinations.**

Patents.

Treatment of silk. Wallerstein Co., Inc. (B.P. 414,778, 16.2.33. U.S., 19.4.32).—Raw gum-silk is impregnated with a protease prep. (papain, KCN, and NaH_2PO_4), Na_2SO_3, and a sulphonated oil at room temp., and is afterwards freed from adhering liquor and dried at low temp. After fabrication, the silk is readily degummed by warm H_2O or dil. soap solution. F. R. E.

Degumming of silk. Brit. Celanese, Ltd., H. C. Olpin, and G. H. Ellis (B.P. 415,027, 11.1.33).—When the silk is associated with other fibres, *e.g.*, cellulose acetate, likely to be adversely affected by the ordinary degumming process the materials are first treated at room temp. with NaOH solution (2—12 g./litre) or with another alkali (Na_2CO_3) of equiv. alkalinity; they are then degummed at $\not>$ 80° by diluting the alkaline liquor and adding soap. F. R. E.

Protection of fibre products [from fungi etc.]. F. A. Irvine (U.S.P. 1,942,706, 9.1.34. Appl., 12.5.32).—A dry, finely-divided, relatively insol., solid, toxic substance (As_2O_3) is added to the dil. fibre suspension (H_2O 99 pts., fibre 1 pt.) before felting. F. R. E.

Retting of textile materials. J. A. M. Faut, Assr. to Fibres Textiles (U.S.P. 1,941,793, 2.1.34. Appl., 20.8.32. Belg., 21.8.31).—The plants, *e.g.*, flax, are immersed in H_2O at $\not>$ 35° to which are separately added after a suitable interval a saponified oil, *e.g.*, linseed, Na_2CO_3, and $Na_2S_2O_4$ (total 2%). F. R. E.

Covering material for tyres and the like. D. G. Higgins, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,934,711, 14.11.33. Appl., 17.10.31).—A textile fabric is coated on its outer surface with a light-coloured cellulose-derivative (nitrate) film (I) and on its inner surface with a composition containing a hydrophilic colloid (casein) and a softener (glycerin), which makes contact with the tyre and prevents migration of the antioxidant in the rubber and the resultant discoloration of (I). F. R. E.

Continuous treatment of vegetable materials with soda and gaseous chlorine for the industrial production of cellulose. U. Pomilio (B.P. 415,224, 22.5.33. Italy, 10.6.32).—The minced material while descending a first tower (I) by gravity is treated with dil. alkali lye admitted at the top and with steam rising from a convenient point in (I). It is then treated in a second tower with Cl_2 in countercurrent. F. R. E.

Treatment of lignocellulosic material and products obtained therefrom. H. Dreyfus (B.P. 414,751, 8.2.33).—Wood chips are treated with dil. alkali ($\not>$ 4% NaOH or KOH) at 100—140° under pressure followed by conc. alkali (10—20%) at room temp. After washing, the cellulose pulp may be bleached with Cl_2, when it is suitable for production of esters or ethers. F. R. E.

Stabilisation of cellulose esters. A. H. Stevens. From E. Berl (B.P. 415,329, 30.1.34).—The esters are treated at normal temp. and pressure with MeOH and a little $COMe_2$ or diacetone alcohol if desired, either alone or in solution in H_2O, petrol, C_6H_6, or CCl_4. F. R. E.

Production of cellulose esters. O. Sindl (B.P. 414,461, 24.3.33. Ger., 24.3.32).—Cellulose or cellulose-containing material is soaked in a swelling liquid (AcOH, HCO_2H, EtOAc), with or without admixture of a non-swelling liquid, at temp. $\not>$ b.p. and, if necessary, under pressure. After removal of the bulk of liquid, the fibres are allowed to remain in a closed chamber until the desired degree of reactivity for the subsequent esterification is attained. F. R. E.

Production of nitro-mixed fatty acid esters of cellulose. D. R. Wiggam and J. S. Tinsley, Assrs. to Hercules Powder Co. (U.S.P. 1,943,231, 9.1.34. Appl., 13.2.32).—Cellulose is treated at 40—90° with a mixture of a fatty acid anhydride, a fatty acid of different mol. wt., a mineral acid catalyst (H_2SO_4), and a salt of HNO_3 with a weak base (NH_4NO_3, urea nitrate). F. R. E.

Cellulose organic ester compositions containing (A) dibutyl malate, and (B) an ester of dibromosuccinic acid. H. B. Smith, Assr. to Eastman Kodak Co. (U.S.P. 1,942,843—4, 9.1.34. Appl., [A, B] 16.5.32).—Cellulose esters (acetate) are plasticised by (A) Bu_2 malate, and (B) Et_2, Pr^n_2, or Bu^n_2 esters of $(CHBr{\cdot}CO_2H)_2$, prepared by bromination of the corresponding malate. H. A. P.

Spinning viscose solutions while applying long precipitating distances. J. Voss, Assr. to Visking Corp. (U.S.P. 1,942,990, 9.1.34. Appl., 5.10.29. Ger., 13.10.28).—The delivery roller in the coagulating bath is vertically adjustable, being moved nearer towards the nozzle at the start of spinning. Tubular bodies, however, are discharged through two similarly adjustable rollers, the distance between which is regulated by a micrometer screw. D. A. C.

Production of artificial filaments, threads, films, and the like. C. W. Bonniksen (B.P. 415,042, 15.12.32 and 15.6.33).—A solution of Na and NH_4 alginates (concn. $\not>$ 10% as alginic acid) of p_H 5—6 containing a sterilising agent ($CuSO_4$) is formed into films or filaments without delay and rapidly dried. The product, which is free from opacity, may be tanned by treatment with a solution of a Ca salt. F. R. E.

Manufacture [saponification] of filaments, threads, ribbons, and the like materials comprising cellulose acetate or other organic esters of cellulose and of fabrics containing such materials. H. Dreyfus (B.P. 415,094, 14.2.33).—The stretched materials, after application of a hygroscopic substance and/or

a substance capable of forming a viscous solution with H_2O (NaOAc, Na silicate or oleate, polyhydric alcohols, H_2O-sol. cellulose ethers), are treated with an aq. saponifying agent (NaOH) and immediately dried by heat to effect rapid saponification (partial or complete). F. R. E.

Manufacture and treatment of textile materials containing cellulose derivatives. H. Dreyfus (B.P. 415,077, 16.2.33).—Filaments, threads, yarns, ribbons, etc. containing cellulose ether-esters, which have $\not> 1$ ether (preferably lower alkyl) group per $C_6H_{10}O_5$ mol., after stretching or shrinking, are saponified with aq. or alcoholic caustic alkali. The products have high tenacity and affinity for cotton colours. F. R. E.

Production or treatment of shaped articles of cellulose derivatives or other film-forming bases. Brit. Celanese, Ltd., W. A. Dickie, and P. F. C. Sowter (B.P. 414,394, 2. and 14.2.33).—Films, sheaths, etc. of org. derivatives of cellulose or other materials sol. in org. solvents, *e.g.*, polymerised vinyl compounds, are shrunk by treating with a medium containing a latent solvent (I) (CH_2Cl_2, $C_2H_4Cl_2$, EtOAc), the amount of shrinkage being limited to 5—20% either by addition of a diluent [H_2O, $C_2H_4(OH)_2$] to (I) or by application of sufficient tension to the articles. F. R. E.

Production of a material from vegetable matter of high pentosan-containing pento-cellulose materials. O. R. Sweeney and C. E. Hartford (U.S.P. 1,941,817, 2.1.34. Appl., 18.5.31).—Cornstalks and cobs, peanut shells, cotton stalks, burrs and seed hulls, oat hulls, or cereal straws are cooked under pressure in alkali and H_2O, washed, and, after adjustment to p_H 5, are subjected to grinding and cutting to produce particles of fibre length $\not> 0\cdot1$ mm. The mass is treated with a preservative (CH_2O, phenols), heated to remove H_2O, moulded, and allowed to dry and age. F. R. E.

Cellulose digester. F. Krüger, Assr. to Zellstoff-fabr. Waldhof (U.S.P. 1,943,221, 9.1.34. Appl., 5.11.31. Ger., 30.12.30).—The major portion of the circumference of an annular pipe supplying pump-operated circulating liquor (*L*) to the digester (*D*) is bedded into the lining of *D* and its free portion finely perforated so that *L* is squirted from it in divergent jets. D. A. C.

Sulphite-pulp digester system. A. Christensen, Assr. to Fibre Making Processes, Inc. (U.S.P. 1,942,685, 9.1.34. Appl., 16.6.32).—Cooking liquor is withdrawn from the top of the digester (*D*) through a perforated pipe placed around the circumference of *D*, then through a single intake pipe, and pumped down through a vertical heater (*H*) into the bottom of *D*. By maintaining the correct pressure in the circulating system liberation of free SO_2 with consequent deposition of insol. Ca salts on the tubes of *H* is prevented. D. A. C.

Digestion of fibrous material. O. C. Schoenwerk, Assr. to Chemipulp Process, Inc. (U.S.P. 1,943,489, 16.1.34. Appl., 4.5.32).—An accumulator (*A*) is provided where fresh acid liquor (*L*) is preheated and preconditioned by feeding in relief gases and liquor from the digester (*D*). Mixing of these takes place in pipes through which *L* from *A* is being constantly circulated by means of a pump which also withdraws the low-pressure relief gases at the end of the cook. As many as six *D* may be worked in series with one *A*. D. A. C.

Manufacture of pulp from fibrous material. O. Kreissler, Assr. to Amer. Lurgi Corp. (U.S.P. 1,942,760, 9.1.34. Appl., 30.9.32. Ger., 17.2.32).—Sulphite cooking liquor (*L*) is forced into the filled digester (*D*) by means of a pump which is kept running until 3 atm. (or even the working pressure) is reached. *L* is then withdrawn to a level which would normally be reached by blowing off relief gases etc. The gases liberated by the vac. thus formed are reinjected into *D* together with the cooking steam, while *L* is circulated independently. D. A. C.

[Sized] paper product. G. J. Manson, Assr. to Manson Chem. Co. (U.S.P. 1,942,438, 9.1.34. Appl., 2.5.30).—A waterproofing composition containing a mineral wax, an org. dispersion agent (I) (glue, casein), and an org. stabilising or insolubilising agent for (I) (CH_2O) is incorporated with the pulp before sheeting. F. R. E.

Manufacture of paper tubes. W. H. Woodford, Assr. to Remington Arms Co., Inc. (U.S.P. 1,943,501, 16.1.34. Appl., 15.11.29).—Paper tube to be used for shot shells is rendered charproof by dipping in castor oil, which also acts as a plasticiser for the nitrocellulose lacquer subsequently applied to both sides of the tube to make it waterproof. D. A. C.

[Dry] transfer. W. S. Lawrence, Assr. to Kaumagraph Co. (U.S.P. 1,941,697, 2.1.34. Appl., 16.3.31).—A paper base is marked with a fusible composition of an artificial resin, a rosin ester, wax (carnauba), thickened oil (castor), $CdSe_2$, and a solvent of b.p. $>200°$ (diethylene glycol Bu ether). F. R. E.

Waxed wrapper. C. B. Wilkins, Assr. to Nashua Gummed & Coated Paper Co. (U.S.P. 1,938,949, 12.12.33. Appl., 4.12.31).—A moisture-resisting, opaque wrapping of high gloss and effective contrast to display adjacent colourings is composed of a body of paper stock, coated or associated with a finely-divided pigment (TiO_2, ZnO, titanox) of relatively high μ ($\not< 1\cdot80$) and afterwards treated on both surfaces with a colourless wax (paraffin). F. R. E.

Film-shrinkage control. H. W. Menke, Assr. to Cinemacolor Corp. (U.S.P. 1,943,687, 16.1.34. Appl., 3.5.30).—The film is dried to reach a max. *d* in a chamber at 66° for 1 hr., the H_2O vapour being withdrawn through a fan at the top of the chamber. Embrittlement during drying of the film is prevented by spraying with a mixture of EtOH, glycerin, and cedar oil. D. A. C.

Apparatus for manufacture of textile [pile] fabrics. R. F. McKay. From Internat. Latex Processes, Ltd. (B.P. 415,650, 6.2.34).

Manufacture of [composite] textile yarns [resembling spun yarn]. Brit. Celanese, Ltd., and P. F. C. Sowter (B.P. 415,054, 15.2.33).

Apparatus for coagulating bodies [filaments] formed from solutions of cellulose derivatives. S. Wild, E. Hugentobler, and E. F. Gellrich (B.P. 415,323, 17.1.34. Switz., 17.1.33).

[Apparatus for dry] spinning of artificial silk threads. CELLULOSE ACETATE SILK CO., LTD., P. C. CHAUMETON, and C. C. TYRER (B.P. 415,046, 9.2.33).

Centrifuge for rayon.—See I. **Coatings on regenerated cellulose.**—See XIII. **Adhesives for Cellophane.**—See XV. **Foodstuff.**—See XIX.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Dyeing of "Wollstra" fabrics. H. LINT (Textilber., 1934, 15, 412—415).—Methods are described for desizing, bleaching, dyeing, and finishing fabrics woven from yarn spun from a mixture of wool and Vistra (short-staple viscose rayon); specially selected dyes are tabulated which allow various degrees of fastness to be obtained. A. J. H.

Azoic colours on cotton piece goods. C. W. NELSON (Amer. Dyestuff Rep., 1934, 23, 451—454).—Naphthols, bases, fast-colour salts, and their methods of application are reviewed. Processes for improving the fastness of dyeings are described. A. J. H.

PATENTS.

Bleaching of fur skins. W. E. POPKIN (U.S.P. 1,940,768, 26.12.33. Appl., 12.6.30).—Bleaching with H_2O_2 is preceded by steeping the "killed" skins in a solution of a colourless "cyclic oxidising catalyst" (*e.g.*, $Na_2B_4O_7$, glucose, urea, EtOH, and CH_2O) which reduces the usual tendering and discoloration of the skins during bleaching. A. J. H.

Dyeing of furs. SOC. CHEM. IND. IN BASLE (B.P. 414,872, 1.6.33. Switz., 2.6.32).—The furs are pretreated with a Cr mordant followed by a chlorinating agent or a phosphate, and then dyed with metalliferous (azo) dyes. H. A. P.

Printing or dyeing of animal fibres. I. G. FARBENIND. A.-G. (B.P. 413,713, 14.11.32. Ger., 13.11.31).—Colourings free from the defect of rubbing are produced by completely fixing in wool and silk materials an ester salt of a leuco-vat dye (I) in its unchanged leuco-ester form and then oxidising. Fabric is printed with a paste containing (I), a thickening agent (*e.g.*, gum tragacanth, methylcellulose), and a substance which splits off acid when steamed but does not thereby cause dissociation of (I) [*e.g.*, an NH_4 salt (NH_4CNS) or alkyl ester of a non-volatile org. acid such as diethyltartaric acid]; it is then dried, steamed for 10—60 min., and developed by passage through a hot acid bath containing an oxidising agent (*e.g.*, $NaClO_3$). Alternatively, $PbCrO_4$ is added to the printing paste and development effected (after steaming) by treatment in a hot bath containing a mineral acid (*e.g.*, HCl). A. J. H.

Dyeing of acetylcellulose and mixed materials containing it. J. R. GEIGY A.-G. (B.P. 414,770, 4.1.33. Ger., 8.1.32).—The material is dyed in an acid bath, prepared with H_2O of any degree of hardness, by means of H_2O-insol. dyes dispersed with esters of $HO{\cdot}CH_2{\cdot}CH_2{\cdot}SO_3H$ and aliphatic acids containing $> C_8$ or their H_2O-sol. salts. (Cf. B.P. 412,945; B., 1934, 830.) H. A. P.

Treatment of textile materials [to prevent tendering by sulphur dyes]. H. A. LUBS and H. W. WALKER, ASSTS. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,941,991, 2.1.34. Appl., 25.2.31).—The material is impregnated with (0·5—15% of) an *o*-aminoarylthioglycollic acid [2 : 5 : 1-$NH_2{\cdot}C_6H_3(OEt){\cdot}S{\cdot}CH_2{\cdot}CO_2H$]. H. A. P.

Manufacture or treatment [delustring] of textile and other shaped materials and articles made of or containing organic derivatives of cellulose. BRIT. CELANESE, LTD., E. B. JOHNSON, and R. P. ROBERTS (B.P. 414,153, 8.2.33).—Cellulose acetate (etc.) yarn or fabric is impregnated (or the rayon spinning solution is incorporated) with 5—15% of a fat or oil (coconut oil) and then heated at 180—200°; the material gradually loses lustre during subsequent storage so that it may acquire a full matt appearance after 1 day. The presence of H_2O in the material prevents loss of lustre and on this is based a process for producing lustre pattern effects. A. J. H.

Delustring knit [cellulose ester or ether rayon] fabric. W. M. CAMERON and C. M. CROFT, ASSTS. to CELANESE CORP. OF AMERICA (U.S.P. 1,937,544, 5.12.33. Appl., 21.1.29).—Cellulose acetate (etc.) rayon hose and garments are subjected to the usual delustring processes while suspended individually under tension so that distortion or wrinkling is avoided. A. J. H.

Sizing of [cellulose ester or ether] artificial fibres. C. F. CHANDLER, ASSR. to DU PONT RAYON CO. (U.S.P. 1,943,000, 9.1.34. Appl., 17.8.28).—The adherence of aq. sizing pastes (I) to cellulose acetate (etc.) yarns is secured by the presence in (I) of substances capable of swelling the yarn, *e.g.*, NH_4CNS, CH_2O, PhOH, $COMe_2$. A. J. H.

Impregnation or treatment of textile materials with liquids. N. LAWSON, and LEWIS & TYLOR, LTD. (B.P. 413,299, 10.12.32).—Woven belting (laminated) is more thoroughly impregnated with rubber latex by treatment while in a bent condition (*e.g.*, while being led over a series of rollers immersed in the impregnating liquor). A. J. H.

[Preparation of] sterile and self-sterilising cellulosic fibrous products. P. PICK (B.P. 415,213, 1.5.33).—Colloidal Ag or Cu (0·5—25%) is deposited within cotton material containing a considerable amount of oxycellulose and/or hydrocellulose, the adherence of the metal to this material being much $>$ to non-degraded cotton. A. J. H.

Manufacture of fireproof and waterproof fabrics and yarns. J. E. C. BONGRAND and L. S. M. LEJEUNE (B.P. 414,692, 2.2.33).—Mineral fibrous materials consisting of asbestos, SiO_2 wool, etc. are impregnated with rubber as in B.P. 344,414 (B., 1931, 535). As a preliminary bath a solution of an alkali silicate may be used, and as the fireproofing agent a solution of H_3BO_3 or NH_4 phosphate. A. J. H.

(A) **Protecting,** (B) **proofing, animal fibres from (or against) moth larvæ, mould, and rotting.** W. LOWE (B.P. 413,445 and Addn. B.P. 413,529, [A] 30.3.33, [B] 5.10.33).—(A) The fibres are impregnated with 0·65% of CrF_3. (B) The green tint given to the fibres by treatment as in (A) is avoided by adding about 0·16% of Sb chloride to the CrF_3. A. J. H.

Cloth-finishing [mechanism]. Cluett, Peabody & Co., Inc., Assees. of S. L. Cluett (B.P. 415,239, 26.6.33. U.S., 15.8.32).

Dispersing wax etc.—See II. **Wetting etc. agents.**—See III. **Treating cellulosic textile materials.**—See V.

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

Properties of calcium hydroxide. I. D. G. R. Bonnell (J.S.C.I., 1934, **53**, 279—282 T).—The physical properties (density of the lime putty, workability) vary with the particle size and the particle-size distribution as produced by different methods of hydration. The mechanism of the reaction is discussed. T. W. P.

Development and application of phosphate flotation. J. A. Barr (Ind. Eng. Chem., 1934, **26**, 811—815).—An account is given of the application of the flotation process to Florida pebble phosphates and Tennessee brown-rock deposits. If part of the fatty acid is replaced by a hydrocarbon such as fuel oil, selectivity is increased and cost reduced. The best p_H is 8·5—9·2. A. G.

NaOCl as germicide.—See XXIII.

See also A., Sept., 973, **High-temp. catalysts for CO oxidation.** 974, **Prep. of pure metallic hydroxides. Catalysts for production of H_2 by the water-gas reaction. Catalytic oxidation of NH_3.** 977, **Prep. of I-free KOH.** 978, **Prep. of thiostannates.** 979, **Prussian and Turnbull's blue.** 980, **Rapid determination of NH_3.** 981, **Determining NO_2' and NO_3-N.** 985, **Conductometric titrations.**

Patents.

Manufacture of zinc chloride. Grasselli Chem. Co., and A. W. Wahlgren (B.P. 415,057, 15.2.33).—Molten anhyd. $ZnCl_2$ is granulated and screened at 90° to prevent absorption of moisture. The hot, screened product is fed into containers, which are sealed and then rotated during cooling. W. J. W.

Apparatus for production of liquid and solid carbon dioxide [in absorption refrigerating apparatus]. Maiuri Refrigeration Patents, Ltd., and G. Maiuri (B.P. 415,659, 20.2.34).

Fe-red colours.—See XIII.

VIII.—GLASS; CERAMICS.

[Revised] standard specifications for refractory materials for gas-works. Anon. (Gas J., 1934, **207**, 414—416).—Materials arenow classed thus: sect. (I) SiO_2 (> 92%) and siliceous (78—92% SiO_2) bricks, blocks, tiles, etc.; (II) firebricks, blocks, tiles, etc. (containing generally ≯ 78% SiO_2); (III) moulded fireclay and siliceous retorts (cone 28—about 1630°—is specified for the refractoriness safety test, and 0·75% as the max. after-expansion or contraction when tested at 1410°); (IV) special materials (including firebricks), passing the refractoriness safety test at cone 32. The soaking temp. in the after-expansion test for SiO_2 materials is now 1450°, and the tolerated variations from specified dimensions of all materials are, in general, slightly reduced. A. L. R.

Porosity. C. R. F. Threlfall (Trans. Ceram. Soc., 1934, **33**, 299—320).—The relation between porosity (P) and the spalling tendency and thermal conductivity of refractories, and the effect on the P of the grading and packing of the particles, making faults, and de-airing, are discussed. From an analysis of the causes of P in grogged clay bricks, it is suggested that the unavoidable P (*i.e.*, inherent in the materials) is rarely > 8%, the remainder (*e.g.*, 17%) being more or less avoidable. The P of present general-purpose refractories (*e.g.*, 22—28%) is considered too high; in the future, bricks of low P (10—15%) will probably be found to give high strength and resistance to slagging and spalling. The spalling tendency of dense bricks should be < that of more porous ones, provided that the greater d of body is obtained without increased vitrification; ZrO_2 and other bricks of very low P (0—5%) and great resistance to spalling are now produced. With highly-grogged (75%) bricks of 20—35% P, those of lower P were stronger, harder, and more resistant to spalling and slagging. Manufacturing processes introduce much avoidable P; the amount of bonding clay used should be sufficient (40—50%) to fill the voids between the aggregate. P is caused mostly by the inadequate packing of particles; shaking, rather than the present application of pressure, might be more effective in increasing the packing. Angular grog particles tend to "arch over," prevent proper mixing, and so increase the P, a decrease in which of 2—3% may be secured by substituting rounded for angular grog. It is suggested that dense bricks could be prepared by adopting standard concrete gradings for the grog (*e.g.*, particles ½—1½ in. diam.); for SiO_2 bricks precalcination of the raw material might overcome the difficulty of converting large quartz particles. De-airing of clays increases the packing of the particles; the reduction in P on de-airing a closely packed clay mix was only 1%. The effect of making faults (*e.g.*, laminations and cavities) in increasing the P is discussed. A. L. R.

See also A., Sept., 955, **Mineral pptn. in glass.** 964, **System SiO_2–Al_2O_3.** 965, **Binary glasses of B_2O_3 with Na_2O and BaO.**

Patents.

[Muffled] tunnel kilns. T. W. Shook (B.P. 414,610, 13.3.34).—In a kiln comprising zones: (I) H_2O-smoking and preheating, (II) high-heat, (III) cooling, clean air is admitted to the ware tunnel in (III), passes to (II), and thence outwards to the combustion spaces which are separated from the ware by muffle plates. Clean air is also admitted to a crown flue, and after passing over most of the length of the kiln is passed among the ware in (I). Flues are formed in the bed of the ware carriages and these are used for the withdrawal of heated air from (II); their upper boundaries, being the actual supporting bed of the ware, are heated by radiation from skew blocks placed below the main combustion chambers on which some of the burners are caused to impinge directly. B. M. V.

Manufacture of boron carbide. W. W. Triggs. From Norton Co. (B.P. 415,392, 18.11.32).—See U.S.P. 1,897,214; B., 1934, 62.

[Plant for] preparation of material for making bricks and the like. T. C. Fawcett, Ltd., D. L. Fawcett, and A. E. Bottomley (B.P. 415,243, 1.7.33).

IX.—BUILDING MATERIALS.

Chemistry applied to cement manufacture. N. C. Rockwood (Rock Products, 1934, **37**, [8], 32—37).—Methods for the separation of the mineral constituents in cement raw materials, on a works scale, are described. More complete control of the product, when manufacturing special cements, is obtained by the use of these methods. T. W. P.

Hydration of Portland cement compounds. R. H. Bogue and W. Lerch (Ind. Eng. Chem., 1934, **26**, 837—847).—$3CaO,SiO_2$ (I) reacts rapidly with H_2O, yielding cryst. $Ca(OH)_2$ and amorphous $2CaO,SiO_2,xH_2O$; β-$2CaO,SiO_2$ combines more slowly with xH_2O. Compounds containing Al_2O_3 react rapidly to form cryst. $3CaO,Al_2O_3,6H_2O$ (II); $4CaO,Al_2O_3,Fe_2O_3$ yields cryst. $3CaO,Al_2O_3,6H_2O$ and an amorphous hydrate. The Al compounds increase the early strength by reducing the amount of H_2O available for reaction with (I), and reduce the later strength because the formation of (II) results in an open and weak structure. Fe compounds reduce the strength by deposition of CaO,Fe_2O_3 on the grains of hydrating Ca silicates. Gypsum retards the initial set by forming $3CaO,Al_2O_3,3CaSO_4,31H_2O$; it counteracts the weakening effect of Al and Fe compounds by forming Ca sulphoaluminate and ferrite, respectively. A. G.

Some new relations bearing on concrete mixtures. W. A. Blanchette (Public Roads, 1934, **15**, No. 3, 57—75; Road Abs., 1934, **1**, No. 454).—From measurement of strength and the *d* of concrete specimens, certain new relationships can be derived. The method of measurement, results, and conclusions are given in detail. T. W. P.

Effect of duration of moist curing on the principal properties of concrete. A. G. Timms (Proc. Amer. Soc. Test. Mat., 1934, Preprint No. 54, 14 pp.; Road Abs., 1934, **1**, No. 453).—The difference in strengths through moist-curing (I) and air-curing of a normal Portland cement is $>$ in the case of a rapid-hardening Portland cement, after 28 days. Long periods of (I) increase the expansion of mortars in moist air, but decrease the drying shrinkage. The resistance to disintegration under freezing and thawing cycles increases with increase in (I) and with richness of the mix. The rate of capillary flow in mortars $\propto$ the type of cement, the H_2O–cement ratio of the mix, and the duration of exposure to H_2O. T. W. P.

Determination of the linear thermal expansion of concrete bars. S. L. Meyers (Rock Products, 1934, **37**, No. 8, 38—39).—Suitable apparatus is described. Concretes made with common aggregates all have lower thermal expansion coeffs. than in the case of neat cements. T. W. P.

Chemistry in road-making. R. Rasch (Chem.-Ztg., 1934, **58**, 697—699, 717—718).—A review.

Decomposition of timber under industrial conditions. VII. Telegraph poles. E. A. Rudge (J.S.C.I., 1934, **53**, 208—211 T; cf. B., 1934, 675).—Specimens of three poles in different stages of decay were examined, and a series of steps in the process of disintegration is put forward. It is shown that under suitable conditions of humidity the mineral matter inherent in the wood migrates to concentric zones which produce lines of weakness. These develop into shakes, and the pole behaves like a series of cylinders or partial cylinders, ending in the final collapse of the structure under superimposed stresses. The limitations to the effectiveness of creosote as a preservative are suggested. The study is considered to afford support to the theory of decay by "ionic infiltration." C. I.

Creosotes extracted from old timbers. W. A. Richardson (Chem. & Ind., 1934, 710—712).—Portions of telegraph poles and sleepers of *Pinus sylvestris* treated initially with creosote and in sound condition when taken out of service were reduced to sawdust and extracted with C_6H_6. Little variation was found in the proportion of low-boiling oils left in wood after 18 years and after 50 years, and it is probable that the preferential loss of low-boiling constituents ceases after 10 years' use. Both tar acids and $C_{10}H_8$ were still present. The total loss of creosote was 50—90%. No generalisations are possible as to the relative val. of the different creosote constituents. C. I.

$Ca(OH)_2$.—See VII.

See also A., Sept. 965, **System CaO–SiO_2–H_2O at 30°.** 987, **Destructive action of soil-H_2O on Portland cement.**

Patents.

Manufacture of magnesia cement. R. Matsuura, Assr. to Minami Manshu Tetsudo Kabushiki Kaisha (U.S.P. 1,946,327, 6.2.34. Appl., 14.2.30).—The cementitious part comprises light burned magnesite (85% MgO) (I), and a nearly insol. $MgSO_3$ manufactured by injection of SO_2 into a sludge of (I). B. M. V.

Dispersing asphalt etc.—See II.

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

Recent trends in blast-furnace operation and design. B. J. Harlan (Min. & Met., 1934, **15**, 375—378).

Wear of grate bars in the Dwight–Lloyd sintering process. M. Paschke and E. Schiegries (Stahl u. Eisen, 1934, **54**, 773—777).—During the sintering process the grate bars become covered with an adherent film of oxide scale, chiefly Fe_3O_4, the thickness of which slowly increases. Wear of the bars is caused by flaking of this scale and the exposure of fresh surface of metal. Flaking is due to the action of SO_2, mechanical stresses, and sharp temp. changes; it can be prevented to a large extent by coating the bars with whiting or, preferably, with clay, which produces a gas-tight, adherent film. There is practically nothing to choose between ingot steel and cast Fe for making the bars. A. R. P.

Metallurgical reactions in the Thomas process. P. Bardenheuer and G. Thanheiser (Stahl u. Eisen, 1934, **54**, 725—728).—Analyses of the metal bath and slag during various stages of blowing pig Fe in a Thomas

converter show that FeO is the first reaction product and that this then acts as an O carrier to the other elements in the metal bath. Si, Ti, V, and the greater part of the Mn are rapidly oxidised in the early part of the blow, forming very fusible MnO–FeO slags with a high V and Ti content; thus after 9 min. pig Fe with 0·15% V and 0·04% Ti gave a slag containing 2·3% V_2O_5 and 0·8% TiO_2. Combustion of the C commences only when the greater part of the above elements have been removed, and the FeO content of the bath remains very low until the C is reduced to $<$ 0·2%. Since the slags produced in the early part of the blow are acidic in character, due to the slow rate of reaction of the added CaO, very little P is removed; in the later stages, however, enrichment of the bath in O and the formation of a basic slag result in rapid oxidation of the P, sometimes at so vigorous a rate that deoxidation of the metal occurs unless the supply of O is increased. Removal of S follows that of P. As the slag becomes more and more basic towards the end of the blow, Mn is reduced back into the metal bath but again begins to oxidise when all the P has been removed. Absorption of N by the metal is small until all the C has been removed, and then increases with the temp. of the bath. A. R. P.

Interactions of gases and ores during iron smelting. Anon. (Nature, 1934, **134**, 312—313).—A summary of recent research. L. S. T.

Use of steel recuperators in ironworks. J. Müller-Berghaus (Stahl u. Eisen, 1934, **54**, 822—827).—Heat-resistant Cr and Ni–Cr steels instead of brickwork for regenerators working at $\not>$ 900° afford economies of $>$ 25%; they have a high efficiency and long life. Examples are given. A. R. P.

Time factor in the decomposition of cementite in cast iron. E. H. Klein (Stahl u. Eisen, 1934, **54**, 827—830).—Measurements have been made of the dimensional changes and rate of decomp. of cementite (C) in cast Fe on annealing in N_2 at 550—700°. The results show these changes to be interdependent, the rate of decomp. of C being characteristic of a reaction of the first order provided that there are sufficient graphite (G) nuclei present to initiate the reaction. Irrespective of the size of the G particles there is a period of induction during which diffusion occurs through the layer of ferrite which surrounds every G particle. Decomp. of C is more rapid the finer is the size of G, but in all cases the rate depends on the temp. according to the logarithmic law of Arrhenius. A. R. P.

Ageing and hot strength of cast steel. E. Knipp (Stahl u. Eisen, 1934, **54**, 777—778).—The tensile strength (S) of mild steel (0·2% C) made in the electric furnace shows an increase between 20° and 400° only when the test is made sufficiently slowly, especially after the yield point is passed. The increase starts at lower temp. and is greater the more rapidly the steel has been cooled from the γ-field. These facts indicate that the inflexion in the S–T curve in the range of blue-brittleness is due to pptn.-hardening, and this conclusion is confirmed by notched-bar impact tests on specimens cooled from $>$ the A3 point at various rates, cold-worked, and then tempered at 100—300°, max. S being produced at temp. at which the impact val. (V) is a min. V–T curves for $T = -80°$ to 100° are given for the steel after (a) annealing at 920°, (b) quenching from $>$ A3, stretching 10%, and ageing at 20° for 24 hr., and (c) ageing for 30 min. at 250° after treatment (b). Curves (b) and (c) are almost parallel, the vals. for (c) being about 2 m.-kg. per sq. cm. $<$ for (b) at any temp.; curve (a) is above (b) and approaches it most closely at 0°. A. R. P.

Thermal autostabilisation method [of determining creep limit] and its use in studying the behaviour of heat-resistant steels. G. Ranque and P. Henry (Rev. Mét., 1934, **31**, 248—265).—An apparatus is described with reference to diagrams for measuring the creep limit (L) of steel by utilising the expansion of the specimen to regulate the temp. of the furnace. Tests have been made with the apparatus to determine the effect of alloying elements on the L of steel with 0·27—0·3% C. Si up to 1·5% increases L up to 450°, after which it has no effect; 1·5% Mn increases L at $<$ 500° and decreases it at higher temp.; 2—5% Mn has a similar effect to Mn at $<$ 425°, but decreases L at $>$ 425°; and 0·6% Mo increases L at all temp. $<$ 650°. Small amounts (1·5%) of Cr have a similar action to Ni and large amounts (14%) a similar action to Mo, but the effect bears no simple relation to the Cr content. A. R. P.

Heat-resisting steels. S. Tamaki (J. Fuel Soc. Japan, 1934, **13**, 67—68).—The heat-resisting properties (I) of steels are compared by measuring the increase in wt. on heating for 5 hr. at temp. between 500° and 1100°. A high % of Cr, Ni, and Si and a low % of C were found to confer (I). Mo or W increases the strength of steel at high temp. E. S.

Corrosion of ferrous metals in acid soils. I. A. Denison and R. B. Hobbs (J. Res. Nat. Bur. Stand., 1934, **13**, 125—150).—A correlation has been observed between the average rates of pitting in acid soils for 8—10 years and the total acidity of the soil, and between the losses of wt. of steel specimens in a laboratory test and the total acidity of the soil. The pitting factor (the ratio of the max. depth of pits to the average depth of penetration) is approx. $\propto$ the ratio of the uncorroded to corroded areas of the metal surface. The tendency for the corrosion to take the form of pitting increases with increasing permeability of the soil (excluding sands). E. S. H.

Rapid test of thickness of tin coatings on steel. S. G. Clarke (Analyst, 1934, **59**, 525—528).—Sn is removed by treatment with aq. $SbCl_3$ and HCl, and the consequent loss in wt. determined. The method is applicable to both electro-deposited and hot-dipped Sn coatings. With the latter, the underlying layer of Sn–Fe alloy is almost completely dissolved, and a correction for the Fe constituent amounting to one third of the alloyed Sn is necessary. This latter is const. at approx. 3 oz. per base box. The thickness of Sn on a selected area may be determined after coating the remainder of the sample with Necol varnish. E. C. S.

Abrasion-resistance of castings for chemical apparatus. K. Roesch and A. Clauberg (Chem. Fabr., 1934, **7**, 297—300).—For the most severe conditions in

mills etc. a cast steel containing 12—14% Mn and 1·2% C is used. Where resistance to actual impact is not so necessary Cr–Ni or Cr–Mo alloys can be employed. A cheaper material is hard cast Fe (3·0% C, 0·5% Si), but this is brittle. Case-hardened steel is suitable only for small parts. Tests of the abrasion losses from these materials under the action of a rotating disc with varying pressures are described. Case-hardened steel showed the least loss, followed by Mn steel. An experimental pump with interchangeable rotors enables tests to be made in which the various alloys are under the influence of erosion at low surface pressures and of corrosion. Cr steel under these conditions appears advantageous. C. I.

Welding in chemical industries. C. O. SANDSTROM (Chem. Met. Eng., 1934, **41**, 360—364).—Different types of welds and their advantages are described. D. K. M.

Precipitation-hardening of copper–silver alloys. R. MITSCHE (Z. Metallk., 1934, **26**, 159—160).—If the pptn.-hardening of Cu–Ag alloys quenched from 750° is interrupted at 300° before hardening is complete a slow further hardening takes place on storage at room temp.; thus the 8% Cu alloy hardened to 110 (Brinell) at 300° shows a hardness of 132 after 3 days at 20°. Hardening effects can be obtained in all alloys containing Cu between the eutectic composition and the limit of solid solubility at 300°. A. R. P.

Comparison of the hardening of a worked and a cast [silver–copper] alloy. P. WIEST and U. DEHLINGER (Z. Metallk., 1934, **26**, 150—152).—The slower and less-pronounced pptn.-hardening obtained with cast alloys (I) compared with the effects produced in worked alloys is attributed to the greater inhomogeneity of (I) and to the less ideal formation of their lattice structure. The hardness–time curves obtained on tempering a quenched 5% Ag–Cu alloy in the polycryst. cast state are similar to those obtained with single crystals produced from the melt, and, like these, are much smoother and less complicated than those obtained with the recryst. alloy. Cast single crystals, however, harden more strongly than polycryst. metal. Cold-work after quenching cast alloys improves the hardening effect obtained on tempering. A. R. P.

Poisoning by preparations for cleaning silver. FREITAG (Chem.-Ztg., 1934, **58**, 701).—An epidemic of non-fatal poisoning cases in America was traced to the use of such a prep. containing 20% of NaCN. C. I.

Effect of heat-treatment on corrosion of high-purity aluminium. F. A. ROHRMAN (Trans. Electrochem. Soc., 1934, **66**, 121—128).—Strips of 99·95% Al annealed at 600—650° which had cooled slowly to room temp. were slightly more readily attacked at first by 10—20% HCl than those which had been quenched in H_2O, but on further exposure to the acid the quenched specimens exhibited very marked intergranular corrosion leading to dislodgement of complete crystal grains, this effect being the more notable the higher was the temp. from which they were quenched. *X*-Ray examination, electrode potential measurements, and the effect of added impurities give no definite indication of the cause of the phenomenon. H. J. T. E.

Reheating of duralumin rods. M. CHARTRON (Rev. Aluminium, 1934, **11**, 2487—2498).—Curves are given showing the rate of heating of thick (13—25 cm. diam.) bars of duralumin in electric (I), reverberatory (II), and gas-fired muffle furnaces (III) and in a salt-bath furnace (IV) maintained at const. temp. (500° or 540°). The results with (III) were irregular, (IV) gave by far the most rapid heating, owing to the high heat content of the fused salt mixture, and (II) heated the bars about twice as quickly as (I). A bar of 25 cm. diam. attained 500° in (IV) after 24 min.; after removal from the bath the temp. of the exterior fell to 470° in 1 min. and remained at 30—38° < that of the interior during cooling for 24 min. in still air, after which the outside temp. had fallen to 370°. A. R. P.

Behaviour of aluminium and copper electrical transmission lines under vibrational stresses. W. SCHWINNING and E. DORGERLOH (Z. Metallk., 1934, **26**, 162—164).—Fatigue tests on wire ropes of Al and Cu for free-suspension conductors have been made under corrosive conditions. The results show that the individual wires of the rope should be as thick as possible to give min. surface, should have smooth surfaces to avoid notch effects, and should be covered with grease to prevent penetration of corrosive media into the centre of the rope. A. R. P.

See also A., Sept., 948, **Pt films as catalysts.** 953, **Systems Cu–Zn, Cu–Mg, Co–Si, As–Sn. Sn bronzes. Cr–Ni steel.** 954, **Solubility of Cu in Zn. Systems Fe–Al, Tl–Bi, Li–Cd, Fe–Mn–Cr, and Al–Cu–Mn.** 973, **Dissolution of Fe.** 975, **Cr-plating. Electrolysis in a magnetic field.** 981, **Spark spectra of B– and P–Fe alloys.**

PATENTS.

Roasting, or roasting and sintering, pulverulent sulphuriferous ores. METALLGES. A.-G. (B.P. 415,273, 23.9.33. Ger., 21.12.32. Addn. to B.P. 350,828; B., 1931, 764).—The apparatus may be as indicated in the prior patent, or the main bed (*M*) may move continuously downwards in the form of a column between perforated walls. The ignition is effected by pulverised, highly pyritic ore, but *M* is composed of previously obtained sinter and/or other oxidised material mixed with C so that the metal is reduced, volatilised, and re-oxidised to fume, the latter being separated in a dust collector and the gases passed on to a H_2SO_4 plant. B. M. V.

Apparatus for de-greasing and cleaning metal articles by means of a volatile solvent. Dr. A. WACKER GES. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 415,639, 11.1.34. Ger., 1.2.33).

Rubber-coated metal.—See XIV.

XI.—ELECTROTECHNICS.

Bus-bars for electrochemical plants. L. C. PAN (Trans. Electrochem. Soc., 1934, **66**, 103—108).—For such low-voltage installations the criterion of bus-bar design is not merely max. current-carrying capacity as in power-station plant, but rather min. "*I.R.*" drop secured at a min. cost. Relations are given for calculating the most economical cross-section of bus-bars under various

conditions. Cu is more economical than Al for low-voltage transmission when its price is $\not>$ 45% of that of Al in bar form. H. J. T. E.

Bituminous compounds for electrical apparatus. Distilling mineral oils. Piezo-electric pressure indicator.—See II. **Al and Cu transmission lines.**—See X. **Determining bacteria in soils. Examining humic acid etc.**—See XVI. **Determining moisture in starch products.**—See XVII.

See also A., Sept., 975, **Cr-plating. Electrolysis in magnetic fields.** 985, **Conductometric measurements.**

PATENTS.

Manufacture of an electrode for use in electrophoretic deposition of solids [rubber] from an aqueous dispersion. INTERNAT. LATEX PROCESSES, LTD. (B.P. 415,341, 3.3.34. U.S., 6.3.33).—A conducting member, on which, if desired, a decorative design is embossed, is mounted on a dielectric support, *e.g.*, of rubber or PhOH–CH_2O resin. J. S. G. T.

Electrodes for use in apparatus for electrical precipitation of suspended particles from gaseous fluids. LODGE–COTTRELL, LTD. From SIEMENS–LURGI–COTTRELL–ELEKTROFILTER-GES.M.B.H. F. FORSCHUNG U. PATENTVERWERTUNG (B.P. 415,676, 13.4.34).—A hollow box electrode comprising strips arranged normally to form a plane surface facing the electric field and provided with means for inclining the strips so that deposited dust is discharged into the box is claimed. J. S. G. T.

Selenium and like cells [of the condenser type]. C. CHILOWSKY (B.P. 415,497, 17.3.33. Fr., 17.3.32 and 11.2.33).

p_H control. Colorimeter.—See I. **Distilling coal. Dewaxing petroleum. Leadised, and non-detonating, gasoline.**—See II. **Moulding compositions.**—See XIII. **Rubber-insulated conductors.**—See XIV. **Classifying fruit etc.**—See XIX. **Photogelatin printing.**—See XXI.

XII—FATS; OILS; WAXES.

Free and hydrolytically-split alkali and its significance in soaps. J. DAVIDSOHN (Allgem. Oel- u. Fett-Ztg., 1934, **31**, 313—320).—The problem of free alkali in soaps is discussed in relation to their keeping properties and the alkalinity of their solutions. E. L.

Detergent properties of suint solutions. (MISS) E. STOTT and K. P. MENGI (J.S.C.I., 1934, **53**, 211—213 T).—Surface tension–concn. curves have been determined for samples of suint (I) isolated from five different wools. The concns. at which the surface tension is identical with that of a 0·45% K oleate solution occur between 2 and 6%, varying with the type of (I). The utility of (I) as a detergent is impaired by its inability to impart any considerable stability to oil emulsions.

Self-acting washing agents and [detergent] assistants. (Bleaching-soda.) F. OHL (Allgem. Oel- u. Fett-Ztg., 1934, **31**, 321—325).—Oxidising bleaching agents of the per-salt type are not regarded as damaging to fabrics; "bleaching-soda" (*i.e.*, Na_2CO_3 + Na silicate) is a valuable H_2O softener and detergent assistant. E. L.

Methods of extracting oil from olives. F. PROVVEDI (L'Ind. Chimica, 1934, **9**, 1040—1044).—Some of these methods result in considerable losses of oil. The oils from different varieties of olives vary appreciably in acidity, but this is usually low if the fruit has been stored properly. Variation in the method of working has little influence on the acidity, although the organoleptic properties show greater differences. The acidity of the oil is increased by faulty storage or cleaning of the olives and by their prolonged contact with H_2O, which causes lypolytic action and, ultimately, rancidity. T. H. P.

Behaviour of natural and refined olive oils towards filtered ultra-violet rays. D. CORTESE (L'Ind. Chimica, 1934, **9**, 1048—1056).—Physico-chemical and chemical consts. are given for a no. of Italian and foreign olive oils extracted in various ways; their behaviour in Wood's light and their absorption and fluorescence (*F*) spectra are compared with those of chlorophyll (I) and carotene (II) solutions, and their spectrophotometric characteristics are described. Examination of the *F* in Wood's light is insufficient to establish whether an olive oil is a pressed or refined oil, since suitable addition of (I) or (II) imparts to refined oils the *F* regarded as characteristic of pressed oils. T. H. P.

New constant for fixed oils: hypochlorous acid value. M. GOSWAMI and K. L. BASU (Analyst, 1934, **59**, 533—534).—The oil is saponified and neutralised, and the amount of HOCl absorbed by the soaps is determined. The HOCl and I vals. of a no. of oils are compared. E. C. S.

Cacao butter.—See XIX.

See also A., Sept., 1017, **SCN nos. [of oils].** 1023, **Ba vals. of butter fats. Camel's milk fat.** 1046, **Oil of barley rootlets. Fatty oil from pumpkin seed.**

PATENTS.

Stabilisation of fats and/or oils. SWIFT & CO., Assees. of D. P. GRETTIE and R. C. NEWTON (B.P. 415,205, 18.4.33. U.S., 15.8.32).—The addition of 1—5% of unrefined cottonseed oil (preferably hot-pressed and therefore gossypol-free) stabilises refined edible oils against rancidification, and improves the cold test of "winterised" cottonseed oil by retarding the crystallisation of solid glycerides. E. L.

Hydrogenation of fats and fatty oils. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 415,203, 12.4.33).—Catalysts for the low- or high-pressure hydrogenation of fats, fatty acids, etc., which are not susceptible to poisoning by S compounds, comprise the sulphides of solid, heavy, base metals of groups V and VI (*e.g.*, Mo, W), and/or the sulphides of Re, Ni, and Co. The catalyst (pptd. on carriers if desired) is conveniently prepared by treating the metals, or their compounds, with S, H_2S, or CS_2, at 300—450°, or by thermal decomp. of the thio-salts, *e.g.*, NH_4WS_4. E. L.

Drying of soap flakes. H. P. FORTÉ, Assr. to LEVER BROTHERS CO. (U.S.P. 1,942,418, 9.1.34. Appl.,

3.5.32).—The curvature of thin soap flakes (imparted to them by the use of suitable roll and scrapers) is retained if the soft, warm flakes are rapidly removed by a conveyor to the cooling tower, where they are laterally distributed by a conical spreader and allowed to fall against a flow of cold air (at room temp.); the curled, bulky flakes obtained retain their shape and aggregate vol. in the package, and have little tendency to cohere when thrown into H_2O. E. L.

Toilet soap powder. W. H. Alton, Assr. to R. T. Vanderbilt Co., Inc. (U.S.P. 1,943,253, 9.1.34. Appl., 16.11.29).—Powdered soap is intimately mixed with finely-ground pyrophyllite, talc, or mica (passing 100—300-mesh); the soap is readily sol., but the powder does not cake in the container or on the hands. E. L.

Cleansing composition. R. H. Brownlee (U.S.P. 1,946,272, 6.2.34. Appl., 19.8.31).—A shampoo or the like is composed of an aq. solution of alkali salts that do not hydrolyse much to an alkaline reaction, *e.g.*, NaH_2PO_4 and Na_2HPO_4, and a H_2O-sol. non-drying sulphonated castor or coconut oil in quantity only sufficient to neutralise the alkalinity. The composition is whipped into suds and a saponin stabiliser may be present if desired. B. M. V.

Manufacture of fish-liver oils. A. T. A. D. Middlemass (B.P. 414,717, 10.1., 9.3., and 23.5.33, and 12.2.34).—The minced livers are well mixed with sufficient glacial AcOH (*e.g.*, 1 c.c./lb.) to reduce the p_H of the mass to 4·6 or below, which prevents putrefaction and induces separation of the oil on keeping; the proteins may be coagulated, and the liberation of the oil accelerated, by treating the acidified mass with, *e.g.*, anhyd. Na_2SO_4 or by heating to $\nless 70°$. E. L.

Distillation of liquids containing vitamins. Brit. Drug Houses, Ltd., F. H. Carr, and W. Jewell (B.P. 415,088, 17.1.33).—Vitamin-containing substances, *e.g.*, liver oils and their derivatives, are subjected to short-path evaporative distillation (at, *e.g.*, 0·01—0·0001 mm.) in a modification of Burch's apparatus (B., 1929, 269). The substance enters through a de-gassing chamber and then passes on to the dome of a closed, vertical, inner tube heated from the inside and surrounded by a cooled outer tube from the bottom of which the distillate is removed. Residual oil may be passed to a further evaporating chamber and the fractionation continued. The liver oils or their fractions may be irradiated. E. H. S.

SiO_2 black. Soap-oil lubricants.—See II. **Wetting etc. agents. Wax-like substances.**—See III. **Testing oil containers. Condensation products.**—See XIII. **Imitation rubber.**—See XIV. **Margarine.**—See XIX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Proper grinding of chemical pigment colours. A. F. Brown (Drugs, Oils, and Paints, 1934, **49**, 324).—The inefficient methods employed commercially for grinding pptd. pigments result in considerable economic loss. More thorough grinding would increase the tinting strength of the pigment and improve the durability of the paint. D. R. D.

"Iodometric acid values" of varnishes. W. Ruziczka (Farben-Chem., 1934, **5**, 329—332).—The determination of the iodometrically registerable acidity of emulsified unsaponified oils (cf. B., 1930, 1118) is shown to be adaptable to varnishes, resins, and enamels, experimental details being given. The vals. obtained by this method as well as by the methods of Kolthoff and of Clavera and López—of which it is a development—are given for a representative range of oils, resins, and varnishes. S. S. W.

Bloom of varnish films. I. Measurement of the water-attracting power of varnished surfaces. N. K. Adam and R. S. Morrell. **II. The maleic anhydride compounds of α- and β-elæostearin.** N. K. Adam, R. S. Morrell, and H. Samuels (J.S.C.I., 1934, **53**, 255—260 T, 260—262 T).—I. A method for measuring the contact angle (A) between varnished surfaces and H_2O is described, with a correction for the frictional effect ("hysteresis") of A. This corr. or equilibrium A is a measure of the H_2O-attracting power of surfaces. Varnished surfaces which bloom in moist air have $A < 60°$; non-blooming surfaces have higher A, up to 90°. The high attraction for H_2O associated with blooming surfaces is probably due to exposure of peroxide groupings, formed during the drying of the varnishes, at the surface of the dried varnish.

II. The surfaces of dried β-elæostearin–maleic anhydride varnishes attract H_2O decidedly $>$ that of the maleic anhydride compound of α-elæostearin; some reduction of H_2O-attracting power can be produced by esterifying the maleic anhydride group. The mols. are probably oriented at the surface of the dried varnish film so that the unsaturated linkings are nearer the surface with the β- than with the α-compound.

Shellac as paint vehicle. II. H. Hadert (Farben-Chem., 1934, **5**, 328—329).—The properties of films deposited from EtOH solutions of wax-containing and wax-free shellacs are tabulated, the wax-free variety showing greater clarity, brittleness, H_2O-resistance, etc. On heating shellac films at 140° for 1½—2 hr. no reddening occurs, but H_2O-resistance, hardness, and flexibility are all improved. Commercial "polymerised shellac" which can be cooked into oil is mentioned, and various known methods of incorporating ordinary shellac into drying oils, *e.g.*, by the assistance of PbO, glycerin, rosin, etc., are summarised. S. S. W.

Paint mills.—See I. **Hydrogenating coumarone resin.**—See II.

See also A., Sept., 978, **Action of $AgNO_3$ on ultramarines.** 979, **Prussian and Turnbull's blue.**

Patents.

Paint and pigment therefor. W. G. Randolph, Assr. to Egyptian Lacquer Manufg. Co. (U.S.P. 1,942,491, 9.1.34. Appl., 23.1.31).—Mixed pigments are prevented from floating by binding the particles together in aggregates with a medium insol. in the medium in which the pigment is finally to be used. *E.g.*, Prussian-blue and Pb-chrome are ground together in nitrocellulose or glue, dried, and then ground in oil for use as an oil paint. G. H. C.

Production of raw materials for manufacture of iron-red dry colours. J. B. Castner and R. W. Powers, Assrs. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,943,948, 16.1.34. Appl., 7.3.30).—The sludge formed in the reduction of aromatic NO_2-compounds to amines with Fe is treated with only 30—50% of the equiv. quantity of H_2SO_4 and the product calcined. The by-product acid from nitration of benzol can be used without denitration. S. M.

Manufacture of intaglio printing inks. J. Y. Johnson. From I. G. Farbenind. A.-G. (B.P. 414,801, 6.3.33).—A solution of asphalt in benzine (b.p. 130—180°) is stirred into an aq. suspension of the colouring matter; the dispersing agent employed consists of the condensation product of either (i) Et_2O or a polyglycol (several mols.) with a substantially H_2O-insol. org. acid, *e.g.*, ricinoleic or stearic, alcohol, or amine above C_{10}, *e.g.*, dodecyl (1 mol.), or (ii) an aliphatic or *cyclo*-aliphatic acid with an org. amino- or hydroxy-sulphonic acid. S. M.

Varnish composition and shellac substitute. J. B. Dietz and E. F. Oeffinger, Assrs. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,942,413, 9.1.34. Appl., 19.2.32).—Batu (galla-galla) gum (18—20 pts.) and rosin (10—20 pts.) are heated together to 260°, CaO (1—4 pts.) is added, and the mixture heated to 320° and, after cooling, thinned with varnish thinners to give a shellac-substitute solution. Fossil gum and/or ester gum may also be introduced, and drying oils, *e.g.*, tung oil, in amount $\nless$ that of the batu gum, may be incorporated according to known varnish practice. S. S. W.

Lacquer manufacture. L. Roon, Assr. to Roxalin Flexible Lacquer Co., Inc. (U.S.P. 1,942,902, 9.1.34. Appl., 16.10.30).—Cellulose ester lacquers containing undissolved hard waxes in uniformly dispersed solid particle form, giving matt films, are claimed. A preferred composition is: nitrocellulose 3·4, BuOAc 62·8, and carnauba wax 33·8 wt.-%. S. S. W.

Coating compound. M. B. Parrish (U.S.P. 1,943,926, 16.1.34. Appl., 20.10.28).—A decorative paint is prepared in described manner from a dye, hyssop, AcOH, and NaCl to which the reaction product of gelatin, ox gall, and pancreatin is added as a thickening agent. S. M.

Coating composition [for floor coverings]. W. F. Whitescarver and H. H. Hopkins, Assrs. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,942,736, 9.1.34. Appl., 2.7.30).—The vehicle for a suitable print paint is made by incorporating a polyhydric alcohol–polybasic acid resin which has been modified with a resin acid into a preheated drying oil and adding thinners and driers. S. M.

Surface ornamentation [of floor coverings] and apparatus for same. G. Prifold, Assr. to Cott-A-Lap Co. (U.S.P. 1,944,528, 23.1.34. Appl., 23.10.31).—The print paint contains $<$ 1% of drier and is spread on a wet undercoat of a solution containing $\nless$ 1% of drier. S. M.

Resinous coating composition. J. W. Iliff and H. R. Young, Assrs. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,942,757, 9.1.34. Appl., 20.8.30).—An oil-modified polyhydric alcohol–polybasic acid resin is dispersed in a hydrocarbon solvent having narrow b.-p. limits ($\ngtr$ 30°) within the range 150—250°; loss of gloss is prevented by addition of a small proportion of an oxidation inhibitor, *e.g.*, guaiacol. 15 recipes are given. S. M.

Coating compositions employed in testing oil containers and the like for the presence and quantity of water. W. O. Cracknell (B.P. 414,866, 20.5.33).—The dipping rod is coated with a paste made from chalk (16), glycerin (12), a saturated solution of rosin in turpentine (1), and methylene-blue dissolved in methylated spirit (1); contact with H_2O lightens the colour. S. M.

Composition containing chlorinated diphenyl and nitrocellulose. R. L. Jenkins, Assr. to Swann Research, Inc. (U.S.P. 1,942,926, 9.1.34. Appl., 25.5.31).—The use of such mixtures for coatings is claimed. Diagrams show the compatibility of the mixtures with various resins and the effect of several plasticisers. S. M.

Production of transparent and impermeable coatings on sheets, bands, films, or the like of regenerated cellulose. Soc. Industr. de la Cellulose Soc. Anon. (B.P. 414,911, 20.9.33. Ger., 26.9.32).—A moisture- but not water-proof varnish is first applied which contains wax ($\ngtr$ 10% of total solids), a resin, and plasticiser; the upper coat is a nitrocellulose lacquer containing a large proportion ($\nless$ 35% of total solids) of the plasticiser, *e.g.*, $(C_6H_4Me)_3PO_4$. S. M.

[Plasticisers for] cellulose derivative composition. E. F. Izard, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,943,972, 16.1.34. Appl., 20.5.32).—The use is claimed of esters of monoaryl ethers of polyglycols with org. and inorg. acids, *e.g.*, $PhO{\cdot}(CH_2)_2{\cdot}O{\cdot}(CH_2)_2{\cdot}OAc$ (prep. described). 23 examples of suitable compounds are given. S. M.

Separation of the crude resin obtained by extraction from kauri timber into light- and dark-coloured resinous products. E. Marsden (B.P. 414,716, 9.2.33. N. Zealand, 11.10.32).—The impure resin extracted with EtOH is treated with hot benzol or C_6H_6 (3 pts.) and EtOAc (1 pt.). The lighter layer is decanted, cooled, treated with 1% aq. NH_3, scrubbed with H_2O, filtered, and evaporated at 190—200°; the darker (lower) layer is separately distilled. Solvents are recovered. Plant is described. S. M.

Preparation of oleo-resinous material. M. Cline (U.S.P. 1,945,421, 30.1.34. Appl., 23.5.31).—The H_2O and H_2O-sol. acids are distilled from natural oleo-resins; the products do not crystallise and are comparatively stable. S. M.

Production of hydrogenated methyl abietate. I. W. Humphrey, Assr. to Hercules Powder Co. (U.S.P. 1,944,241, 23.1.34. Appl., 3.6.31).—Hydrogenation of Me abietate or an isomeride is effected at 140—250° and, preferably, under 15—100 atm. in presence of Ni, and may be continued in presence of a Pt catalyst. The products include tetrahydromethyl abietate. S. M.

Cooling and granulating resin. S. P. Miller, Assr. to Barrett Co. (U.S.P. 1,942,764, 9.1.34. Appl., 28.2.29).—Resins are granulated by causing them to adhere to a belt or chain while molten, to cool and solidify as the latter travels along, and finally to be broken off by passing the belt around a small pulley which gives it a sharp bend. The last remaining particles are removed by beating or brushing the belt. G. H. C.

Preparation of [thiourea-formaldehyde] resin solution. J. H. Schmidt and R. S. Daniels, Assrs. to Bakelite Corp. (U.S.P. 1,944,867, 23.1.34. Appl., 7.5.27).—A thermo-hardening resin is obtained by dissolving paraformaldehyde or other anhyd. $:CH_2$ compound together with the initial, fusible reaction product of $CS(NH_2)_2$ and CH_2O in a common solvent, *e.g.*, Et lactate, $(CH_2{\cdot}OH)_2$, etc. S. M.

[Vinyl] resinous compositions. H. E. Potts. From Shawinigan Chemicals, Ltd. (B.P. 414,703, 8.2.33).—Incorporation of yacca gum with vinyl ester polymerides and vinyl ester–aldehyde products reduces the H_2O-absorption and increases the resistance to warping without lowering the m.p. S. M.

[Manufacture of] low-viscosity vinyl polymeride. H. J. Barrett, Assr. to E. I. Du Pont de Nemours & Co. (U.S.P. 1,942,531, 9.1.34. Appl., 3.6.30).—A solution of a vinyl ester, vinyl chloride, or styrene, an org. peroxide, *e.g.*, Bz_2O_2, and rosin or a rosin ester is passed through a Pb-lined tube at about 115° under pressure (500 lb./sq. in.). S. M.

Manufacture of condensation products [possessing drying properties]. I. G. Farbenind. A.-G. (B.P. 414,665, 7.2.33. Ger., 8.2.32).—Oils and resins sol. in varnish solvents are obtained by condensing a polyhydric alcohol (glycerol) with a mixture of an unsaturated aliphatic acid (linoleic) and an aromatic mononuclear *m*- or *p*-polybasic acid (*iso*phthalic or terephthalic acid). S. M.

Manufacture of artificial compositions [synthetic resins]. J. Y. Johnson. From I. G. Farbenind. A.-G. (B.P. 414,699, 6.2.33).—Polymeric vinyl alcohol or hydroxystyrenes are condensed with α-halogenoalkyl ethers or vinyl ethers, in presence of a hydrogen halide (HCl) and a catalyst (C_5H_5N) if desired. The products are white resinous solids sol. in chlorinated hydrocarbons and alcohols. H. A. P.

Moulded article. C. A. Nash, Assr. to Bakelite Corp. (U.S.P. 1,942,874, 9.1.34. Appl., 18.3.31. Can., 2.12.29).—A hardenable moulding composition comprising $<$ 40% of reactive phenolic resinoid and $>$ 60% of a filler containing approx. 5% of finely-divided mica, and having a low temp. coeff. in presence of fluids absorbed by the composition, is claimed for use in fluid-meter parts etc. S. S. W.

Treatment of plastic moulding compositions including a fibrous filler and an organic binder. L. T. Richardson, Assr. to Cutler-Hammer, Inc. (U.S.P. 1,944,464, 23.1.34. Appl., 28.3.28).—To improve the surface finish of electric insulating material, the mixture of asbestos etc. and resin or pitch is continuously kneaded under pressure and extruded and the resultant strip cut transversely into blanks, which are passed through a lubricant and cold-moulded. Suitable apparatus is described. S. M.

SiO_2 black. Dispersing asphalt etc.—See II. **Cellulose ester compositions.**—See V. **Electrode for deposition of solids.**—See XI.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Reclaimed rubber. II. T. Yokoyama and T. Kusama (Bull. Inst. Phys. Chem. Res. Japan, 1934, **13**, 910—919).—A new theory of the mechanism of vulcanisation and devulcanisation is outlined. P. G. M.

Determining [swelling] vols. [of rubber].—See I.

Patents.

Treatment of rubber latex. A. H. Stevens. From Rubber Res. Inst. of Malaya (B.P. 415,133, 23.2.33).—The creaming of latex after the addition of an org. colloid (gum tragacanth) for concn. purposes is accelerated by the presence of a substance, *e.g.*, EtOH, which is neither alkaline nor acid and is more volatile than H_2O. The process may be further expedited by centrifugal effect. D. F. T.

Manufacture of rubber solutions and of rubber conversion products therefrom. I. G. Farbenind. A.-G. (B.P. 415,438, 24.2.33. Ger., 25.2.32).—Rubber solutions of low viscosity and high concn., even $>$ 20%, are obtained by treating unmasticated rubber in a solvent, such as hot CCl_4, with O_2 or a compound capable of liberating O_2, *e.g.*, H_2O_2, in presence of an oxidation catalyst, *e.g.*, Cu oleate, until the rubber has dissolved; the action may be accelerated by irradiation. The solutions are convenient for the prep. of conversion products, *e.g.*, by chlorination, ozonisation, etc. D. F. T.

Manufacture of porous rubber. Soc. Ital. Pirelli (B.P. 414,234, 20.9.33. Italy, 20.9.32, 1.4.33, and 30.5.33).—Sponge rubber or an article composed thereof is formed by coagulating an aq. rubber dispersion throughout which are dispersed grains or fragments of a substance, such as gelatin, agar, or gum arabic, which remains solid therein at room temp. but is sol. or colloidally dispersible by hot H_2O or by prolonged action of cold H_2O. The dispersed fragments are eventually removed so as to leave a porous product. D. F. T.

Making rubber thread. J. R. Gammeter, Assr. to Revere Rubber Co. (U.S.P. 1,943,381, 16.1.34. Appl., 4.5.32).—A film of determinate width is formed by depositing liquid rubber, such as an aq. dispersion, on a travelling surface, and is subsequently withdrawn from the latter at an angle under tension so as to produce a thread of round cross-section, *e.g.*, by concurrent twisting. D. F. T.

Production of rubber or like transfers and rubber or like prints. Internat. Latex Processes, Ltd., and J. S. Tidmus (B.P. 414,205, 17.6.33).—A stamp of suitable hard material, provided with the desired pattern as a raised surface, is coated on the raised areas with coagulant, *e.g.*, aq. $AlCl_3$, and is then coated with an aq. dispersion of rubber, *e.g.*, by spraying. The coagulated rubber on the stamp is thereafter transferred to a,

preferably adhesive, backing material such as tracing cloth which has been thinly coated with rubber solution. D. F. T.

Manufacture of imitation rubber. S. FUJI and T. FUKUDA (U.S.P. 1,938,015, 5.12.33. Appl., 15.5.31).—A rubber-like product is obtained by introducing 5—10% of $PbCO_3$ (I) into a vegetable oil, such as perilla oil, at approx. 250° and heating at 300° until the (I) decomposes with liberation of CO_2. D. F. T.

Rubber[-metal] adhesives. W. W. DUNFIELD, Assr. to NAUGATUCK CHEM. CO. (U.S.P. 1,943,423—4, 16.1.34. Appl., [A] 25.1.29, [B] 24.10.31).—(A) An adhesive, *e.g.*, to attach rubber to metal by vulcanisation is made by mixing rubber, previously melted (*e.g.*, by heating for > 10 hr. at 180—300°), with new rubber (*e.g.*, 10—20%), a solvent, and vulcanising ingredients. (B) The melted rubber is mixed with an approx. equal amount of masticated rubber containing a reaction product of turpentine and H_2SO_4 ("Newbrough rubber"); a small proportion of new rubber may also be added together with vulcanising agents. D. F. T.

Rubber-coated [metal] articles. R. F. MCKAY. From INTERNAT. LATEX PROCESSES, LTD. (B.P. 413,186, 27.11.33).—A foraminous metal base is coated with a composition of or containing rubber, so that all or most of the holes are completely filled, by forming thereon a deposit of rubber formed *in situ* from an aq. dispersion such as compounded latex. D. F. T.

Rubber-insulated electrical conductor. H. D. RICE, Assr. to NAT. INDIA RUBBER CO. (U.S.P. 1,936,994, 28.11.33. Appl., 5.8.31).—A core of conducting material is insulated by a vulcanised and grainless unmilled rubber composition which may be deposited thereon from rubber latex containing ≯ 3% of natural non-rubber constituents and being substantially free from natural H_2O-sol. constituents. D. F. T.

Process and composition for rubberising water-repellent material [with latex]. M. C. TEAGUE, Assr. to GEN. RUBBER CO. (U.S.P. 1,936,999, 28.11.33. Appl., 20.4.31).—Material which mechanically resists penetration is rubberised by treating with an aq. dispersion of rubber containing a wetting agent such as sulphonated castor oil, and drying. D. F. T.

Providing articles of or coated with rubber with a hardened surface finish. DUNLOP RUBBER CO., LTD., D. F. TWISS, F. A. JONES, and D. J. HADLEY (B.P. 415,195, 31.3.33).—A permanent hardening of unvarnished surfaces of vulcanised rubber is effected by treatment with free halogen, *e.g.*, Cl_2, possibly together with a halogen compound containing a non-metallic element, such as SCl_2, $SOCl_2$, or PCl_5, conveniently in an inert solvent. D. F. T.

Vulcanisation of rubber. E. I. DU PONT DE NEMOURS & CO. (B.P. 415,135, 23.2.33. U.S., 25.2.32).—A substance of the formula NR′R″·CS·SM, where R′ and R″ are alkyl groups ≮ C_4 and M is an alkali metal, *e.g.*, Na or K, such as Na dibutyldithiocarbamate, is used to accelerate the vulcanisation of latex. D. F. T.

Vulcanisation of rubber. J. R. INGRAM, Assr. to RUBBER SERVICE LABS. CO. (U.S.P. 1,943,797, 16.1.34. Appl., 23.3.31).—A diaryl ketone in which the substituents in the radicals are only alkyl groups or groups consisting of C, H, and O atoms, *e.g.*, *o*-benzoylbenzoic acid, COPhMe, or $COPh_2$, is incorporated to prevent premature vulcanisation. D. F. T.

Curing [vulcanisation] of gutta-percha, balata, and the like. TELEGRAPH CONSTRUCTION & MAINTENANCE CO., LTD., J. N. DEAN, and H. F. WILSON (B.P. 412,995, 7.1.33).—In order to effect vulcanisation of gutta-percha (I) or articles covered with this, such as insulated conductors, the (I) mixed with S, and in admixture or intimate contact with an accelerator such as piperidine piperidinocarbothionolate, is subjected to a temp. or conditions sufficient to initiate and eventually to produce vulcanisation without causing the (I) to become plastic. D. F. T.

Vulcanisation of rubber. C. O. NORTH, Assr. to RUBBER SERVICE LABS. CO. (U.S.P. 1,936,115, 21.11.33. Appl., 17.2.30).—Vulcanisation is accelerated by the reaction product (m.p. 142·5—147°), of approx. 3 mols. of mercaptobenzthiazole and 1 mol. of 2 : 4-diaminodiphenylamine obtained, *e.g.*, by heating the reagents in EtOH at 35—65°. D. F. T.

Rubber vulcanisation accelerator. F. L. KILBOURNE, JUN., and J. N. STREET, Assrs. to FIRESTONE TIRE & RUBBER CO. (U.S.P. 1,936,561, 21.11.33. Appl., 17.1.31).—Vulcanisation is accelerated by a solution of a mixture of a guanidine, *e.g.*, di-*o*-tolylguanidine, a mercaptothiazole, *e.g.*, 2-mercaptobenzthiazole, and phthalic anhydride in stearic acid. D. F. T.

Accelerator for vulcanisation of rubber. F. L. KILBOURNE, JUN., Assr. to FIRESTONE TIRE & RUBBER CO. (U.S.P. 1,936,562, 21.11.33. Appl., 19.1.31).—Vulcanisation is accelerated by a resinous mixture of a guanidine, *e.g.*, di-*o*-tolylguanidine, a mercaptothiazole, *e.g.*, 2-mercaptobenzthiazole, and phthalic anhydride or other similar inhibitor of prevulcanisation. The mixture (m.p. 72°) is conveniently obtained by dissolving the ingredients in a solvent ($COMe_2$) and then removing this by evaporation. D. F. T.

Accelerator for vulcanisation of rubber. C. S. WILLIAMS, Assr. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,943,570, 16.1.34. Appl., 25.3.32).—The difficultly removable H_2O formed in the prep. of resinous accelerators, such as NH_2Ph–MeCHO products, is substantially eliminated by chemical action, *e.g.*, by incorporating ≯ 10% of CaO therein. D. F. T.

Preservation of rubber. E. I. DU PONT DE NEMOURS & CO., I. WILLIAMS, and A. M. NEAL (B.P. 415,073, 15.2.33).—A substance of the formula NHR′·C_6H_4·C_6H_4·NHR″, where R′ is an alkyl or aralkyl group and R″ is alkyl, aralkyl, or H, and the N atoms are preferably in the *p*-position, *e.g.*, benzyl- and other substituted benzidine, is used as an antioxidant. D. F. T.

[Preservative] treatment of rubber. W. P. TER HORST, Assr. to NAUGATUCK CHEM. CO. (U.S.P. 1,935,279, 14.11.33. Appl., 17.12.32).—The condensation product of a ketone, *e.g.*, $COMe_2$, and a di(arylamino)diaryldialkylmethane, such as *pp′*-di(naphthylamino)diphenyldimethylmethane, is used as an antioxidant. D. F. T.

Preservation of rubber. Imperial Chem. Industries, Ltd., W. Baird, M. Jones, and W. J. S. Naunton (B.P. 413,012, 12.1.33).—A bis(hydroxyphenyl)methane substituted in ∢ 2 positions, each *ortho* to a OH group, in which the substituents are preferably Me groups and the methylene H atom(s) may be substituted, *e.g.*, 4 : 4′-dihydroxy-3 : 3′-dimethyldiphenylmethane, is incorporated as an antioxidant in rubber which is intended to be cold-vulcanised. D. F. T.

Vulcanisation accelerators.—See III. **Covering for tyres.**—See V. **Waterproof fabrics.**—See VI. **Electrode for depositing rubber.**—See XI.

XV.—LEATHER; GLUE.

Detection of diamines in leather. W. Mather and W. J. Shanks (Analyst, 1934, **59**, 517—521; cf. B., 1930, 183; 1931, 584).—Portions of the aq. tannin-free extract of leather are treated for the detection of *m*-diamines (I) with dimethyl-*p*-phenylenediamine hydrochloride; and of p-$C_6H_4(NH_2)_2$ (II), with the hydrochloride of NH_2Ph or of $NPhMe_2$. In each case $K_2Cr_2O_7$ is added and the colour noted (*a*) in the cold, (*b*) on warming to 50°, (*c*) on boiling. 0·005% of (II), 0·017% of m-$C_6H_4(NH_2)_2$, and 0·01% of *m*-tolylenediamine in leather can be detected. E. C. S.

Effect of salts on the setting of aqueous solutions of gelatin. S. R. Trotman and H. S. Bell (J.S.C.I., 1934, **53**, 225—228 T).—All salts except $NaIO_3$ either raise or depress the setting temp. (*S*) of a 10% solution of gelatin. When a salt causes a rise in *S* the latter increases with % of the salt. On the other hand, when the salt depresses *S* this depression increases with % of the salt up to 2·5. Salicylates, thiocyanates, benzoates, iodides, sulphocarbolates, chlorides, bromides, nitrates, chlorates, persulphates, bromates, and succinates depress *S*, whilst iodates, acetates, formates, sulphates, borates, tartrates, fluorides, and citrates raise it. Salts which have a high solubility in H_2O depress *S* in proportion to their solubility. Thus the effect of $NH_4NO_3 > Cu(NO_3)_2 > NaNO_3 > KNO_3$. In the case of salts which raise *S* a similar effect is observed. By selecting a suitable salt it is possible to control *S* of a 10% solution down to 0°. The m.p. of the gel follows *S* but is considerably higher. The time of setting is closely related to *S*, *i.e.*, the lower is *S*, the longer the solution remains liquid. The principal factor affecting time of setting is the rate of cooling. When *S* is < 10° the solution remains liquid indefinitely at atm. temp. Aromatic sulphonic acids are particularly active in depressing *S* and time of setting.

See also A., Sept., 1020, **Action of KCNS on collagen.**

Patents.

[Manufacture of] bleached condensation products of carbohydrates and crude hydrocarbons [tanning agents]. A. O. Jaeger and H. W. Witzel, Assrs. to Selden Co. (U.S.P. 1,941,475, 2.1.34. Appl., 25.2.31).—Products of condensation of a carbohydrate, o-$C_6H_4(CO)_2O$, and residues from (solvent) purification of anthracene, $C_{10}H_8$, etc. in presence of H_2SO_4 are bleached (aq. hypochlorite). H. A. P.

Retannage of chrome[-tanned] leather. T. Blackadder, Assr. to Röhm & Haas Co. (U.S.P. 1,945,461, 30.1.34. Appl., 10.12.30).—The leather is retanned with various known synthetic tanning materials at p_H 2·5—5. D. W.

Manufacture of glue and glue preparations. J. Y. Johnson. From I. G. Farbenind. A.-G. (B.P. 415,238, 24.6.33).—Casein or similar albuminous substances are decomposed with 10—15 wt.-% of an alkali silicate prepared according to B.P. 391,407 (B., 1933, 506). D. W.

Adhesives [for Cellophane]. V. C. E. Le Glohec (B.P. 415,256, 24.7.33. U.S., 26.7.32).—A mixture of gelatin, $ZnCl_2$, EtOH, and H_2O is claimed. D. W.

Dyeing furs.—See VI. **Rubber adhesives.**—See XIV. **Peanut flour for adhesives.** See XVII. **Treating fish offal.**—See XIX.

XVI.—AGRICULTURE.

Soils of Wales. G. W. Robinson (Empire J. Exp. Agric., 1934, **2**, 258—273).—Analytical data and profile characteristics are recorded and discussed. A. G. P.

Limiting values for humid tropical soils of central America. E. Deger (Z. Pflanz. Düng., 1934, A, **35**, 1—6).—Data showing the total, HCl-sol., and root-assimilable K and P in these soils are utilised to distinguish 3 principal classes of soils in this area. A. G. P.

Examination of soils by means of *Aspergillus niger*. A. M. Smith and A. Dryburgh (J.S.C.I., 1934, **53**, 250—254 T).—The results show that (1) the concn. of inoculum may be varied within wide limits without affecting the results, (2) NH_4 citrate is not such a suitable source of N as the sulphate or nitrate, (3) the surface area of growth is very important, (4) normal dressings of CaO to acid soils are unlikely to have much influence. The % standard error is only 2·3, but there is a significant interaction between strain and soil, and strain has a sp. effect. In a comparison of the results for 40 soils with the corresponding Mitscherlich figures, the correlation is 0·77 for P_2O_5 and 0·40 for K_2O.

Determination of exchangeable bases in soil. Anon. (Imp. Bur. Soil Sci., Tech. Comm., 1934, No. 30, 33 pp.).—Technique of a no. of current methods is described. A. G. P.

Use of electrometric p_H measurements in determining the numbers of bacteria in soil. II. D. Fehér (Arch. Mikrobiol., 1934, **5**, 436—442).—The applicability of the author's method (B., 1933, 1071) is confirmed. Electrical conductivity data may also be utilised in determining bacterial nos. The customary expression of the microbiological status of soils in terms of bacterial nos. is preferably replaced by use of the "degree of (bacterial) activity." A. G. P.

Moisture and p_H of soil under forest trees. G. M. Shear and W. D. Stewart (Ecology, 1934, **15**, 145—153).—Rates of removal of H_2O from various depths of soil under several species of trees are examined. The p_H of soil was least under white oak, rising under white pine, larch, green ash, and silver maple, in the order named. Irrespective of movements of the H_2O table the p_H of soil 6 ft. below the surface maintained a const. val. under each species. A. G. P.

Determination of the inorganic colloidal complex in soils of the acid humus zone. E. JUNG (Z. Pflanz. Düng., 1934, A, **35**, 37—46).—Analysis of the bases extracted from soil by a nearly neutral tartaric acid buffer solution serves to distinguish between the inorg. colloidal materials of brown earths and podsols in weathered soils of humid areas. A. G. P.

Polarographic examination of humic acid, hymatomelanic acid, and peat by means of the dropping mercury cathode. M. TOKUOKA and J. RUŽIČKA (Z. Pflanz. Düng., 1934, A, **35**, 79—88).—Humic acid (I) is not reduced at a dropping Hg cathode, but in alkaline solution hymatomelanic acid (II) is reduced at approx. 1·4 volts. The reducible group in (II) is not aldehydic but is a conjugated group (possibly ketonic) in which the unsaturated linking is not in the furan ring. HCl slowly hydrolyses (I), yielding (II). A method of determining (II) in peat is described. A. G. P.

Determination of the potassium supply in soils by Mitscherlich's method. E. A. MITSCHERLICH (Ernähr. Pflanze, 1934, **30**, 181—183).—A reply to criticisms of Scheffer (B., 1934, 642). Soils from permanent fertiliser plots are unsuitable for investigations of this kind, since continued treatment induces abnormal conditions. A. G. P.

Proposed modified procedure for soil potash [determination]. E. BEATER (Chem. and Ind., 1934, 712).—In the determination of K_2O in soils by the Na cobaltinitrite method (cf. B., 1931, 731) it is not satisfactory to extract the ignited residue with hot H_2O as extraction is incomplete. The residue should be dissolved in conc. HCl, diluted, pptd. with dil. aq. NH_3, filtered, and washed. The filtrate should then be evaporated to dryness and ignited at low temp. to remove NH_4 salts and destroy org. matter. The final residue is then dissolved in H_2O. C. I.

Determination of the annual available quantity of potassium and other nutrients in soils. III. Methods and range of application. K. PFEILSTICKER (Z. Pflanz. Düng., 1934, A, **35**, 53—77; cf. B., 1934, 338).—Air-dried soil is repeatedly extracted with a solution of NH_4Cl (0·01*N*) and $CaCl_2$ (0·2*N*). A second sample is extracted with 0·02*N*-Na citrate containing sufficient Na_2CO_3 to produce a p_H approx. that of the natural soil. K, Mg, and P are determined in the extracts and the total extractable amounts of these nutrients calc. Comparison is made of the results of this method and those obtained by Neubauer's method, by pot culture, and by field trials. A. G. P.

Theory of error in the use of the *Aspergillus* and seedling methods in respect of potash fertiliser requirements [of soils]. H. NIKLAS and M. MILLER (Z. Pflanz. Düng., 1934, A, **35**, 46—52).—Probable error in the two methods is discussed mathematically. A. G. P.

Is *Azotobacter* suitable for determining the phosphate and potash requirement of soil? F. SCHEFFER and L. E. KIESSLING (Ernähr. Pflanze, 1934, **30**, 161—165).—The *Azotobacter* plate method (I) indicates K deficiency in fewer soils than do the Neubauer and Dirks methods. Better agreement is obtained in respect of PO_4'''. Method (I) is insufficiently accurate for modern requirements. A. G. P.

Manurial effectiveness of ammonium phosphate. II. Experiments in British Isles to compare concentrated fertilisers containing ammonium phosphate with ordinary mixtures containing superphosphate. A. H. LEWIS and D. TREVAINS (Empire J. Exp. Agric., 1934, **2**, 239—250).—In nearly all cases little difference between the action of the two types of mixtures on a no. of crops was apparent. On certain acid sandy soils $NH_4H_2PO_4$ (I) gave slightly inferior results with mangolds. Injury to seedlings sometimes caused by (I) may be counteracted by addition of $CaSO_4$ or $CaCO_3$. A. G. P.

Influence of phosphoric acid manuring with basic slag on sugar beet, especially on the ease of factory treatment. O. SPENGLER and S. BÖTTGER (Z. Ver. Deut. Zuckerind., 1934, **84**, 537—547).—Crop increases produced by applications of basic slag were greater on acid than on alkaline soils. Juice from treated beet contained relatively higher proportions of alkali phosphates and was more easily handled in the manufacturing process. A. G. P.

Colloidal substances in organic manures as production factors. B. NIKLEWSKI (Z. Pflanz. Düng., 1934, B, **13**, 331—337; cf. B., 1933, 759).—The H_2O-sol. colloids of org. fertilisers must be considered in the evaluation of cattle manures, composts, etc. A. G. P.

Combined variety and nitrogen fertiliser trials with wheat and oats. Å. ÅKERMAN [with I. GRANHALL] (Z. Pflanz. Düng., 1934, B, **13**, 320—331).—Different varieties of wheat (I) and oats (II) exhibit differences in ability to utilise generous applications of N fertilisers. Resulting differences in quality, protein content of grain, period of ripening, and resistance to disease are more apparent in (I) than in (II). A. G. P.

Influence of various applications of nitrogen on the yield and composition of oats with special reference to the intake and utilisation of nutrients. O. VOIGT, O. UNVERDORBEN, J. GRIMM, G. STORCK, G. SPIELMEYER, D. W. KRÜGER, G. WIMMER, and H. LÜDECKE (Z. Pflanz. Düng., 1934, A, **35**, 6—31).—In pot trials with varying dressings of N max. dry matter yields of oats were, in general, associated with max. utilisation of the N fertiliser affected. Max. utilisation of K fertilisers occurred at a level of supply below that producing max. yield. The ratio of the intakes of K : N varied with growth conditions to a much greater extent than did that of P : N. Dry-matter production per unit of N, P, or K varied considerably from year to year. A. G. P.

Frost resistance and nutrient requirements of the Müller-Thurgau grape vine. H. ZAHN (Ernähr. Pflanze, 1934, **30**, 185—188).—The val. of heavy K manuring in maintaining the frost resistance of this variety is demonstrated. A. G. P.

Plant distribution as influenced by soil heterogeneity in Cranberry Lake region of the Adirondack mountains. V. A. YOUNG (Ecology, 1934, **15**, 154—196).—The influence of plant succession on the physical and chemical properties of soil is considerable. H_2O-sol.

Ca is generally more abundant in humus covers than in any other horizon of the profile. The N content alone cannot control plant distribution. Accumulation horizons are more acid than bleached layers. Soils of virgin forest have higher nutrient vals. than those of less highly developed vegetation. A. G. P.

Apparatus for measuring compactness of soil in the field and results obtained in a cultivation experiment. O. V. S. HEATH (Empire J. Exp. Agric., 1934, **2**, 205—212).—Apparatus suitable for examination of the effects of ploughing etc. is described. A. G. P.

Biological decomposition of plant materials. IX. Aërobic decomposition of hemicelluloses. A. G. NORMAN (Ann. Appl. Biol., 1934, **21**, 454—475).—Characteristics of many fungi and bacteria which are able to use hemicellulose in straw, manure, etc. are recorded. Under natural conditions fungi are probably the more important organisms concerned. A. G. P.

Cotton root rot in Texas. D. C. NEAL (Phytopath., 1934, **24**, 838).—The satisfactory character of treatment with aq. NH_3 is confirmed. A 3% solution killed sclerotia at a depth of 12 in. after an exposure of 5 days. A. G. P.

Control of heart-rot and dry-rot in sugar beet. W. KRÜGER, G. WIMMER, and H. LÜDECKE (Z. Ver. Deut. Zuckerind., 1934, **84**, 507—536).—Application to soil of an industrial product (Ca Fe Al silicate) reduced the proportion of diseased roots. S in small dressings produced some improvement, but in larger amounts retarded growth as a result of acidity produced in soil. A. G. P.

Treatment of sweet potato plants for control of black rot. L. E. MILES (Phytopath., 1934, **24**, 836—837).—Plants are dipped, prior to packing for transit, in a 20–20–5 Bordeaux mixture. A. G. P.

Potato scab control. J. J. TAUBENHAUS (Phytopath., 1934, **24**, 836).—Good control resulted from applications of S in the furrow, 3 weeks before planting. The effect was independent of the reaction of the soils and was operative in calcareous soils in which 500—1500 lb. of S per acre were used without change in p_H. A. G. P.

Drought spot. J. G. MASCHHAUPT (Z. Pflanz. Düng., 1934, **B**, **13**, 313—320).—Possible causes of this disease of oats are discussed. A. G. P.

Control of seedling blight of rice in Arkansas. E. M. CRALLEY (Phytopath., 1934, **24**, 836).—Seed treatment with CH_2O, Cu–CaO dusts, or Ceresan was unsatisfactory, and better results were obtained by sowing at a period when seedlings can make immediate and vigorous growth. A. G. P.

Control of annual weeds in cereal crops by dilute sulphuric acid. G. E. BLACKMAN (Empire J. Exp. Agric., 1934, **2**, 213—227).—Satisfactory control of a no. of weeds was obtained by spraying with 9·2—18·4% H_2SO_4. Crop damage results only on barley sprayed late in the season. Malting val. was not affected. Rainfall 3 hr. after spraying rendered 5% $CuSO_4$ ineffective, but 9·2% H_2SO_4 gave 94—98% control of *Brassica sinapsis*. A. G. P.

Susceptibility of winter rye to *Puccinia dispersa* in relation to mineral nutrition. M. EGLITS (Ernähr. Pflanze, 1934, **30**, 167).—Manuring with K reduced, and with N increased, susceptibility. Phosphatic fertilisers reduced susceptibility where N supplies were small, but increased it where generous dressings of N were given. Max. infection followed use of manures in which P was high relative to K and N. Max. injury by leaf insects occurred with high N, moderate P, and no K in the fertiliser. A. G. P.

Effect of silicic acid in cereals, especially on resistance to mildew. B. GERMAR (Z. Pflanz. Düng., 1934, **A**, **35**, 102—115).—The yield of cereals grown in sand culture with deficient K was markedly increased by additions of colloidal SiO_2. Plants so treated accumulated much SiO_2 in the epidermal cells and became more resistant to infection by mildew. Storage of SiO_2 was influenced by external conditions, and favoured by strong lighting and by deficiency of N or excessive K in the nutrient. A general parallelism is shown between the rates of transpiration and of SiO_2 accumulation. A. G. P.

Use of creosote oil to control San José scale and peach-leaf curl. W. W. STANLEY, S. MARCOVITCH, and J. O. ANDES (Phytopath., 1934, **24**, 837—838).—Mixtures of creosote oil (1%) and mineral oil (3%) emulsions gave 97—99% control and were superior to either constituent used alone at this or higher concn. A. G. P.

Seed treatment with fungicidal dusts. V. H. YOUNG (Phytopath., 1934, **24**, 840—841).—Org. Hg dusts and CH_2O controlled oat smut and the former exhibited stimulating effects on early sown seed. Dusts containing Hg Et chloride or phosphate improved the stand of cotton, although actual yield increases were few. A. G. P.

Chlorosis of blue lupin and serradella in relation to iron and manganese. W. SCHOLZ (Z. Pflanz. Düng., 1934, **A**, **35**, 88—101).—Excessive liming of soil causes chlorosis in blue lupin (I) and serradella (II), (II) being the more sensitive to injury. Mn is an essential nutrient for (I) and may be absorbed in large amounts without injury provided a sufficiency of Fe is present. If the Fe supply is restricted, Mn intensifies CaO-chlorosis. The Mn content of seeds of (I) is inadequate for the grown plant, and if soil is deficient in available Mn a form of chlorosis (distinct from that produced by CaO) may occur. For (II) Mn is probably not essential, and excessive amounts restrict the intake of Fe and retard the growth of the plant. A. G. P.

Modern developments of ensilage. H. E. WOODMAN (J. Min. Agric., 1934, **41**, 566—569).

Acid soils and corrosion.—See X.

See also A., Sept., 957, **Negative adsorption in soil, clay, and humus.** 987, **Prep. of microsections of soil.** 1017, **Determination of rotenone.** 1036, **Soil respiration.** 1043, **Plant growth substances.** 1044, **Growth of sugar beet.** 1048, **Absorption of Mn by plants.** 1049—50, **Tobacco mosaic.**

PATENTS.

Rendering soil and rock formations compact and impermeable to water. G. RODIO (B.P. 415,565, 18.7.33. Ger., 18.7. and 8.11.32).—Soil is impregnated with SiO_2-containing solutions (*e.g.*, water-glass) and simultaneously or subsequently with substances reacting slowly therewith [$Ca(OH)_2$ and/or $CaCO_3$]. Prior to complete pptn. of SiO_2, rapidly reacting substances (acids or salts) are introduced into the soil mass, or, alternatively, clay suspensions or cement may be used. A. G. P.

[Preparation of] seed disinfectants. M. S. KHARASCH, Assr. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,943,540, 16.1.34. Appl., 12.5.30).—The use of alkyl (Et) mercuriacetates in the manufacture of dry dusts (*e.g.*, with clay, $CaCO_3$, talc) is claimed. H. A. P.

Package [to preserve the insecticidal constituents of chrysanthemums] and its preparation. W. A. HUGHES, Assr. to HARVEL CORP. (U.S.P. 1,945,148, 30.1.34. Appl., 24.12.30).—The flowers are coated or sprayed with kerosene or other middle fraction of petroleum. Cymene also may be added. E. H. S.

[Fertiliser from] polluted liquids.—See XXIII.

XVII.—SUGARS; STARCHES; GUMS.

Hyposulphites in beet-sugar manufacture. R. BROQUET (Bull. Assoc. Chim. Sucr., 1934, **51**, 47—49; cf. B., 1934, 343).—During most of the 1933 campaign at Morigny factory the raw juice, of average purity 82·3, was treated in the measuring vessels with 80 g. of Redoid ZnB (ZnS_2O_4) per ton of beets. In addition to decolorising, deodorising, and antiseptic effects, this enabled double carbonatation to be effected with 2·17 kg. of CaO per hectolitre, compared with 3 kg. in neighbouring factories, and greatly improved subsequent working, practically the whole factory output consisting of good white sugar of polarisation 99·8. Redoid ZnB is preferred to Redoid ZN (*loc. cit.*). Careful control of carbonatation is necessary to obtain the best results with these hyposulphites; they do not eliminate Ca from the juice, and at Morigny the syrups contained 1·65 g. of CaO/litre in spite of addition of some Na_2CO_3 to the second carbonatation juice. J. H. L.

Efficiency of the open-pan system of making white sugar. B. N. IYENGAR (Current Sci., 1934, **3**, 24).—Figures are given for the recovery of sugar by this system and doubts are expressed as to the wisdom of attempting further improvement. H. W.

Determination of glucose in dextrins. G. STEINHOFF (Z. Spiritusind., 1934, **57**, 175).—Fehling's solution should be used for determining the reducing power of dextrins (I) in terms of glucose (II). Different procedures described previously (B., 1933, 520) gave concordant results ranging from 3·1 to 6·9% in 10 white and yellow (I). Higher vals. (4·2—10·1%) were obtained with Luff's solution, the Na_2CO_3 in which increases the reducing power of (I) in course of heating, NaOH having a contrary action. Still higher results (8·6—10·9%) were obtained with the iodometric method of Willstätter and Schudel, and with Rothenfusser's method using a solution of $Ba(OH)_2$ in MeOH (15·2—20·7%). In the last method some dextrin is pptd. and carries down $Ba(OH)_2$. The reducing power of dextrin is only in part due to (II). With the 10 samples mentioned, containing 10·2—12·0% of H_2O, the scheme of analysis proposed previously (*loc. cit.*) showed 1·4—2·4% of (II), 2·5—7·3% of maltose, and 78·5—85·5% of (I). J. H. L.

Determination of invert sugar with Fehling's solution at temperatures below the b.p. O. SPENGLER and W. MEYER (Z. Ver. Deut. Zuckerind., 1934, **84**, 548—554).—In determining invert sugar in presence of sucrose best results are obtained by heating the reaction mixture at 58—60° for 8—10 min. or at 67—70° for 3 min. A. G. P.

Rapid determination of moisture in starch products by measurements of dielectric constants. G. STEINHOFF (Z. Spiritusind., 1934, **57**, 145—146).—The difference between the dielectric const. of H_2O (80) and those of carbohydrates and proteins ($<$ 10) offers a means of determining H_2O in starch products, but direct measurements on powdery materials are unsatisfactory. Good results can be obtained by first extracting the H_2O from the material by Exluan (dioxan) and then measuring the dielectric const. of the extract in a Dielkometer. The extract is poured into a sort of tap funnel containing the plates of an electrical condenser, the capacity of which, varying according to the H_2O content of the extract, is accurately measured by a thermionic valve apparatus with telephone or loudspeaker. Complete extraction of the H_2O from starch, dextrin, or starch syrup, by Exluan 06 in the cold, could not be attained within reasonable time, but by heating 1 g. of the sample with 30 c.c. of Exluan ba 10 to boiling for 3 min. in the case of starch or dextrin, and for 10 min. in the case of starch syrup, and then cooling and measuring the dielectric const. of the liquid as indicated above, the H_2O content of the sample could be determined to within 0·4%, in 10—15 min. J. H. L.

Sugar beet.—See XVI. **Sucrose in fruit-canning.**—See XIX.

See also A., Sept., 961, **Swelling of potato starch. Physical chemistry of starch and bread-making.** 992, **Prep. of xylose. Determination of mixed sugars.** 1044, **Sugar beet.** 1048, ***d*-Xylose from pecan shells. Micro-determination of sugar. Sucrose from senega.**

PATENTS.

Production of starch and glutinous materials. W. J. BELLINGHAM (B.P. 415,235, 15.6.33. N. Zealand, 8.12.32).—A "sponge" of the type used in breadmaking is diluted, after the normal fermentation process, with a solution of NaCl which retards further fermentation and causes a separation of the starchy and glutinous portions of the flour by sedimentation. The starch settles and is removed and the glutinous material may be added to foodstuffs deficient in protein. E. B. H.

Preparation of peanut flour for manufacture of adhesives. I. F. LAUCKS, Assr. to I. F. LAUCKS, INC. (U.S.P. 1,942,109, 2.1.34. Appl., 19.1.28).—The strength of adhesives prepared from peanut flour (I) is increased $\nless$ 50% if (I) is heated for 5 min. in a container with steam at 80 lb. pressure in the jacket. E. B. H.

SiO_2 black.—See II.

XVIII.—FERMENTATION INDUSTRIES.

Control of fermentation [of beer]. G. W. A. Brischke (Woch. Brau., 1934, **51**, 265—270).—Ordinary fermentation (F) charts are considered inadequate. In the scheme described, the course of F is followed by plotting against the time in days, not the actual extract contents of the wort, but the losses in extract during successive time intervals, calc. from (1) the d and (2) the EtOH content of the wort. Other magnitudes used to give a complete picture of the course of F are: the mean heat content of the fermenting wort, the quantity of heat corresponding with 1 kg. of fermented extract, the mean temp. during F, and the fermenting power of the yeast expressed in kg. of extract fermented per 100 hectolitres per day. T. H. P.

Determination of tartaric acid in cider. D. W. Steuart (Analyst, 1934, **59**, 532—533).—The method is a modification of the German 1921 wine method. When $<$ 1 g. of tartaric acid per litre is present, a known wt. of K H tartrate is added to hasten pptn. A solubility correction varying with the % EtOH is applied. E. C. S.

See also A., Sept., 1032, **Pure carboxylase.** 1034, **Effect of O_2 and of monochromatic light on alcoholic fermentation of yeast. Fermentation of glyceric acid.** 1035, **Alcoholic fermentation by *Rhizopus*.** 1036, **Lactic fermentation.**

Patents.

Production of (a, b) butyl alcohol and (a) acetone by fermentation. Commercial Solvents Corp., Assees. of (a) E. F. McCoy, (b) J. Muller and D. A. Legg (B.P. 415,311—2, 27.12.33. U.S., [a] 7.1.33, [b] 3.1.33).—(a) High yields of $COMe_2$ and Bu^nOH are obtained by fermenting sugar mashes with *Clostridium saccharo-acetobutylicum* (I), and particularly with the individual (I) α at 24—40°. Suitable nutrients may be added, and the initial p_H suitably adjusted, usually to 7 or a little below. (I) (characteristics described) may be isolated from soil, rotted wood, etc.; it does not give good yields of solvents from mashes containing cereal meal and H_2O only. (b) A sugar mash, *e.g.*, inverted molasses, is fermented with *Clostridium propyl butylicum* (II) at 23—38° in presence of hydrolytic degradation products of proteins (preferably NH_3); Bu^nOH, Pr^iOH, EtOH, and $COMe_2$ are produced. The initial p_H may vary, but the final p_H must be regulated to fall between definite limits, preferably 5·8—6·1; this is ensured by adding sufficient base, *e.g.*, $CaCO_3$, to neutralise free acidity and to give an excess representing approx. 6—8% of the wt. of sugar. Nutrients, *e.g.*, PO_4''', may be added if required. Methods of isolation of (II) (morphological and cultural characters quoted) from soil, rotted wood, etc. are given. (II) does not liquefy gelatin nor does it produce appreciable yields of solvents from starch or sucrose. I. A. P.

XIX.—FOODS.

Relation of quality to amino-acid content of bread. M. V. Donitsch (Problems of Nutrition, U.S.S.R., 1934, **3**, No. 1, 29).—The N content of good-quality wheat and rye bread is const. when the dough has been properly fermented. Nutr. Abs. (m).

Apparatus for determining temperature of crystallisation of cacao butter. S. A. Ashmore (Analyst, 1934, **59**, 515—517; cf. B., 1927, 614).—The crystallisation temp. (I) is determined by observing the appearance of luminosity in cooling molten fat illuminated by a beam of light. The (I) of Borneo tallow was 31·2—31·4°, and that of cacao butter from various sources 20·0—20·8°. E. C. S.

Lead ursolate in relation to fruit cleaning. R. F. Cohee and J. L. St. John (Ind. Eng. Chem., 1934, **26**, 781—782).—The solubilities of ursolic acid, isolated from apple wax, and *Pb ursolate* (I) (m.p. 199—200°) in various solvents are discussed in relation to the removal of Pb and As from sprayed fruits. (I) is insol. in aq. HCl of the concn. used in fruit cleaning, and only slightly sol. in 10% aq. Na_2SiO_3, but small amounts of org. solvents increase the solubility. It is recommended that 1% of $CHCl_3$ or xylene should be added to the cleaning solutions. E. C. S.

Preparation and packing of oranges for shipment. J. R. Winston (Ind. Eng. Chem., 1934, **26**, 762—765).—Plant for use in decolorising the chlorophyll in citrus fruit by treatment with C_2H_4 is described. Decay is best prevented by treatment with 8—10% aq. $Na_2B_4O_7$ within a few hr. of gathering. The processes of washing and polishing are described. E. C. S.

Microbiology of frozen food. II. Frozen fruits and vegetables. G. I. Wallace and F. W. Tanner (Fruit Products J., 1934, **13**, 366—369, 377; cf. B., 1934, 170).—The influence of varieties, vac. freezing, and storage temp., and the addition of sugar was studied, the effect on quality and microbiological condition of the article being noted at intervals. Strawberries, peaches, raspberries, gooseberries, fruit salad, beans (Lima, green, and wax) were examined in this way. E. B. H.

Destruction of micro-organisms in presence of sugars. I. Rôle of sucrose in the commercial processing of canned fruits. J. G. Baumgartner and M. D. Wallace (J.S.C.I., 1934, **53**, 294—297 T).—An investigation into the rôle of sugar syrups in the processing of canned fruit reveals that the thermal resistance of sporing bacteria and yeasts is not changed by heating in sucrose (I) solutions of a concn. up to 50%. In the case of vegetative bacteria, however, the thermal resistance of *B. coli* is considerably increased when heated in neutral (I) solutions. The min. effective concn. is 10%. This increase varies directly with (I) concn. It is doubtful if this phenomenon, which is thought to be due to alteration by the (I) of bacterial protein, has any practical significance as the p_H of the syrup masks any protective action of the (I). In concns. up to 50—55% (I) has no inhibitory effect on the growth of organisms usually encountered in under-processed fruit. Any inhibition is entirely due to the $[H^+]$ of the syrup.

Citrus fruit juices from the bottler's viewpoint. J. H. Toulouse (Ind. Eng. Chem., 1934, **26**, 765—768).—The mean sugar, citric acid, and CO_2 contents and the p_H of a no. of samples of citrus-flavoured beverages are given. The prevention of spoilage due to oxidation and micro-organisms is discussed. E. C. S.

Oxygen-consuming phenomena in beverages. J. H. Toulouse (Ind. Eng. Chem., 1934, **26**, 769—770).—Oxidative changes in beverages, which may occur in

spite of the predominance of CO_2 in the gases present, are best prevented by the use of efficient filling plant and higher CO_2 pressure, and by the removal of air from syrups and H_2O. E. C. S.

The Matzka process for preserving fruit juices. ANON. (Food, 1934, **3**, 446—447).—The process is based on the oligodynamic property of certain metals (cf. B.P. 267,058 and 276,254; B., 1927, 376, 827). The theory of this action is briefly discussed. A detailed description and diagram of the apparatus used, which is capable of dealing with 200 litres of fruit juice (*J*) per hr., are given. It is claimed that *J* sterilised by this process retains the natural physiological composition of fresh *J* and can be stored indefinitely in airtight packing. The vitamins are not affected, with the exception of vitamin-*C*, and this much less than by ordinary preserving methods. E. B. H.

Preservation of orange juice by de-aëration and flash-pasteurisation. H. W. VON LOESECKE, H. H. MOTTERN, and G. N. PULLEY (Ind. Eng. Chem., 1934, **26**, 771—773).—Juice (I) immediately de-aërated after slow reaming, pasteurised at 96° (approx.) for $\not> 5$ sec., filled into containers at 76—82°, and vac.-sealed at a pressure sufficiently high to prevent boiling was satisfactorily stored for 10 months at 16°, but for $\not> 3$ months at 32°. The keeping qualities of (I) are enhanced by addition of sucrose and terpene-free orange oil. "Sweated" fruit, or that which has been through the colouring rooms, or has been kept for > 1 week, or fruit of low acidity, is unsuitable. (I) kept in glass darkens, particularly if significant amounts of Sn are absent, and if kept at $\not< 27°$. During storage at 32—38° reducing sugars and p_H increase, non-reducing sugars and reducing power toward dichloroindophenol decrease. There is no change in titratable acidity. E. C. S.

Cool-storage methods of handling orange juice. A. F. CAMP and A. L. STABLE (Fruit Products J., 1934, **13**, 361—364, 379).—Orange juice extracted by different methods was tested for flavour after freezing for several days. Bitterness developed if under-ripe fruit was used, and terpenous flavours if oil and other rind extracts were included. De-aëration proved only moderately advantageous. Subsequent use of CO_2 is preferable to that of N_2, the latter giving sometimes a slight musty flavour; neither is essential. A temp. of 0° prevented increase in the no. of micro-organisms, 4—10° held it within reasonable limits for 72 hr. E. B. H.

Examination of dried green mint. C. E. SAGE (Analyst, 1934, **59**, 535—536).—The qualities by means of which fresh and dried (I) green mint are evaluated are enumerated. Analytical data on 15 samples of (I) are given. E. C. S.

Effect of respiration on vegetable flavour. E. F. KOHMAN and N. H. SANBORN (Ind. Eng. Chem., 1934, **26**, 773—776).—Injury by bruising, or freezing and thawing, causes a decrease in the CO_2 production of peas and the development of off-flavours (I). Similar (I) are also produced by anaërobic conditions, such as, *e.g.*, storing in N_2 or in H_2O. Vegetables should, therefore, be stored with free access of air. E. C. S.

Effect of exposure to low temperatures on the number of bacteria in fish's muscle. (MISS) M. M. STEWART (J.S.C.I., 1934, **53**, 273—278 T).—Temp. between $-1\cdot2°$ and $-12°$ were studied. The method of viable counts was used. An immediate decrease in the nos. of organisms varying in degree with the temp. was observed. This was followed by a lag phase varying in length with the temp., 1—15 days at $-1\cdot2°$ to $-3°$ and 35—50 days at $-4°$. At $-6°$ it was doubtful if any growth occurred up to 60—80 days. At $-12°$ there was no growth up to 103—210 days. The results suggest that in supercooled and frozen tissue at the same temp., viz., $-2°$, bacterial growth is more rapid on the supercooled muscle.

See also A., Sept., 961, **Physical chemistry of starch and bread-making.** 1008, **Tea-catechin II.** 1022, **Composition of milk.** 1027, **Feeding val. of skim-milks.** 1045, **Jugoslavian maize.**

PATENTS.

Treatment of bread. K. P. KEENEY and H. E. TURLEY (U.S.P. 1,945,436, 30.1.34. Appl., 3.12.31).—Stale bread in H_2O acidified with HCl is digested with pepsin, sieved to remove undigested crust, and cooled rapidly. The material may be incorporated in a bread dough or dried, after treatment with diastase, trypsin, and erepsin if required. E. B. H.

Manufacture of (A) baked flour products, (B) margarine with improved flavour. A. K. EPSTEIN and B. R. HARRIS (U.S.P. 1,945,346—7, 30.1.34. Appl., 15.8.30).—C_4—C_8 α-diketones (Ac_2, 3 pts. of Ac_2 + 1 pt. of COAcEt) are added to (A) batter, pastry, etc., and (B) margarine and similar products, to impart a flavour and aroma of butter. H. A. P.

Edible baked products. PROCTER & GAMBLE CO. (B.P. 414,916, 30.9.33. U.S., 3.10.32).—The aëration and stability of cake batters containing a high sugar : flour ratio is improved by substituting a free fatty acid ($\not< C_{16}$) for 2—10% of the shortening. E. B. H.

Foodstuff. C. DREYFUS (U.S.P. 1,943,374, 16.1.34. Appl., 8.7.31).—Cellulose esters (acetate) or ethers, in the form of fibres or flakes, are added to cereal foods in order to stimulate peristaltic action. E. B. H.

Classification of fruit and vegetables. A. R. THOMPSON and K. OMSTED, ASSRS. to PACIFIC MACHINERY CO. (U.S.P. 1,943,278, 9.1.34. Appl., 14.4.30).—Fruit is graded into different classes of maturity according to its ability to transmit light. The fruit is separated by shaker tables and evenly spaced on travelling bands, and then passed over an aperture illuminated at const. intensity. The transmitted light is received by a photo-electric cell and all fruits transmitting $<$ a predetermined intensity are automatically rejected. E. B. H.

Preservation of fish by cold storage. SOC. RENÉ MAUBAILLARCQ & CO. (B.P. 415,303, 13.12.33. Ger., 16.12.32).—The appearance and quality of fresh fish are preserved for 1 month by placing caught fish immediately in air- and water-tight metal boxes (described) which are cooled in 4—7 hr. to 0° by spraying with or immersing in brine at $\not< -6°$. E. B. H.

Treatment of fish offal, waste fish, or the like. G. N. DAVIDSON (B.P. 415,179, 22.3.33).—Albuminoid liquor from the digestion of offal is treated with air and Cl_2 to remove offensive gases and decomp. products. At the same time its alkalinity is neutralised with

H_2SO_4, causing a "cracking" or separation of dispersed oil and tissue. The purified liquor is conc. to a glue. E. B. H.

Drying tea.—See I. **Stabilising fats. Distilling liquids containing vitamins.**—See XII. **Starch etc. [in bread-making].**—See XVII.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Deterioration of certain medicaments under the influence of light. H. V. Arny, A. Taub, and R. H. Blythe (J. Amer. Pharm. Assoc., 1934, **23**, 672—679).—50 medicaments, exposed in various coloured bottles for periods of 1—12 months in daylight, diffused light, and darkness, are classified as deteriorating by light, volatilisation, or other changes; those showing no change are also tabulated. Amber glass (among commercial containers) affords the best protection, though red and green Corning filters are better. C. G. A.

Use of different substances for preserving medicines. II. Moulds. V. Jensen and H. Ørner (Dansk Tidsskr. Farm., 1934, **8**, 233—261).—22 substances were tested for toxic action on 18 varieties of mould. The order of toxicity was essentially the same as that found previously (B., 1934, 43) for bacteria. R. P. B.

Drying by means of silica gel in pharmaceutical practice. H. Breddin (Pharm. Ztg., 1934, **79**, 913).—EtOH extracts can be conveniently evaporated at room temp. in a desiccator containing SiO_2 gel. S. C.

Chemistry of mineral waters. L. Fresenius (Angew. Chem., 1934, **47**, 609—611).—The chemical examination of mineral waters, especially in relation to their therapeutic uses, is discussed. J. W. B.

Reactions of adaline and bromoural. L. Ekkert (Pharm. Zentr., 1934, **75**, 535; cf. B., 1932, 702).—Adaline and bromoural give identical colour reactions with (*a*) $PhN_2{\cdot}SO_3H$ (rose-red on warming with NaOH), (*b*) m-$C_6H_4(NO_2)_2$ and aq. NaOH (brownish-red), (*c*) m-$C_6H_4(OH)_2$ and H_2SO_4 (brownish-red), (*d*) KI–NaOH (CHI_3 reaction). S. C.

Comparison of neoarsphenamine and sulpharsphenamine when they are dialysed. A. E. Jurist and W. G. Christiansen (J. Amer. Pharm. Assoc., 1934, **23**, 686—689).—Neoarsphenamine (I) has a higher undialysable As and lower undialysable S content than sulpharsphenamine (II). Pptn. occurs in the undialysed portion of (I) but not of (II). C. G. A.

Determination of arsenic in certain organic arsenical products. III. F. Monforte (L'Ind. Chimica, 1934, **9**, 1045—1048).—The method already given (B., 1934, 650) is applicable to the arsenobenzenes. T. H. P.

Methyl alcohol [content] of Rumanian tobacco. I. Manta and N. Radu (Biochem. Z., 1934, **271**, 378—380).—A table gives the MeOH content (I) of a no. of tobaccos, the vals. corresponding closely with those of Neuberg for German tobacco. In dry, unfermented tobacco (I) represents 9% of the dry wt. and after fermentation 0·04—0·20%. About 25% of the (I) is lost on distillation with steam. P. W. C.

Preparation of nicotine from tobacco waste. R. Hofmann (Chem.-Ztg., 1934, **58**, 700).—The residues are moistened with their own wt. of 10% K_2CO_3 solution and distilled with steam, the hot vapour being passed through an adsorption mass prepared by carbonising tobacco plants. This contains about 20% SiO_2 and will absorb 3—5% of its wt. of nicotine (I). The saturated mass is extracted with Et_2O, $COMe_2$, or light petroleum, the extract dried with CaO or Na_2SO_4, and distilled. A 50—80% solution of (I) is obtained, which contains $\not>$ 0·2% NH_3. The recovery of (I) is 95%. C. I.

Determination of alkaloids in cinchona preparations. E. Léger (J. Pharm. Chim., 1934, [viii], **20**, 103—111).—The method of the Swiss Pharmacopœia is slightly modified. C. G. A.

See also A., Sept., 980, **Determining moisture in unstable products.** 992, **Emetic of saccharic acid. Determination of aldehydes and ketones.** 993, **Dimethanes as local anæsthetics.** 999, **Germicides.** 1014, **Alkaloids.** 1017, **Determination of rotenone. Identification of alkaloids.** 1038, **Powder preps. of thyroid, adrenal, gastric mucosa, and pancreas.** 1039-42, **Vitamins.** 1042, **Antiscorbutic preps.** 1045—6, **Alkaloids. Volatile oil from Chinese *Ephedra*.** 1049—50, **Tobacco mosaic.**

Patents.

Pharmaceutical preparations. [Dentifrices.] R. S. Bley (U.S.P. 1,943,467, 16.1.34. Appl., 8.2.32).—Compositions comprising an active enzyme (diastase) and a *C*-alkyldihydroxybenzene (hexyl- or furfuryl-resorcinol) are claimed. H. A. P.

Manufacture of barbituric acid derivatives. Chem. Fabr. von Heyden A.-G. (B.P. 414,293, 5.1.34. Ger., 6.1.33).—Medicinal substances having good hypnotic but low toxic properties are obtained by causing a barbituric acid derivative substituted in the 5-position by a hydrocarbon residue and by a halogen atom (*e.g.*, 5-bromo-5-ethylbarbituric acid) to react with a primary or *sec.*-amine or substitution product thereof (*e.g.*, piperidine) under substantially anhyd. conditions (*e.g.*, in presence of an org. solvent). The prep. of 5-*ethyl*-5-*anilino*-, m.p. 240°, 5-*ethyl*-5-p-*phenetidino*-, m.p. 244°, and of 5-*ethyl*-, m.p. 215°, 1-*methyl*-5-*ethyl*-, m.p. 150°, and 1 : 3 : 5-*trimethyl*-5-*piperidino*-*barbituric acid*, m.p. 108° (*hydrochloride*), is described. A. J. H.

Self-sterilising cellulosic products.—See VI. **Distilling liquids containing vitamins.**—See XII.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

See A., Sept., 972, **Mg and Zr lights.** 975, **Production of latent images. Infra-red sensitisers.** 976, **Photolysis of Ag halides. Shape of the density curve in relation to coloured lights. Temp. coeff. of sensitivity. Optimum of detail reproduction by photographic layers.**

Patents.

Photo-gelatin printing. J. A. Fleischmann, W. W. Sullivan, and F. O. Sullivan, Assrs. to G. Abbott (U.S.P. 1,944,123, 16.1.34. Appl., 4.9.30).—A metal plate, lightly grained, is coated with two layers of gelatin, the top layer being sensitised with $K_2Cr_2O_7$. The required image is printed on this layer by projection,

and the plate is washed for 15 min., which swells the unexposed parts, and then soaked in a bath of 1 : 1 glycerin and H_2O; it is then ready for use in printing. The process is very suitable for multicolour work. J. L.

Photo-mechanical printing processes. E. E. Eckardt (B.P. 415,399. Appl., 18.2.33. Ger., 16.1.33).—An emulsion containing a Ag image is treated with a bath of warm H_2O (at, *e.g.*, 30—36°) to soften, but not dissolve, the gelatin, until the Ag particles coalesce to form lines and dots, somewhat similar to a half-tone screen effect, the form and gradations of the whole image being preserved. Two or more baths at different temp. may be used; the developer or fixer may have been used warm; subsequent warm baths of aq. NH_3 or $K_4Fe(CN)_6$ may be used. Various modifications of the process, in order to obtain different grades of thickness and clarity of lines or dots, are described. After treatment with a U bath, a metal emulsion carrier may be suitably etched corresponding to the image. Better definition and clearer whites than with screen processes are obtained, either for collotype or metal-plate methods. J. L.

Photomechanical reproduction of photographic illustrations in natural colour by rotary (newspaper) printing. W. G. B. Moore (B.P. 415,502, 21.3.33. Addn. to B.P. 365,155).

Film-shrinkage control.—See V.

XXII.—EXPLOSIVES; MATCHES.

See A., Sept., 993, **Nitration and nitric esterification of alcohols.** 994, **Determination of fulminic acid.**

Patents.

Chemical compound. [Preparation of lead 4 : 6-dinitro-*o*-tolyloxides.] W. Brün, Assr. to Remington Arms Co., Inc. (U.S.P. 1,943,513, 16.1.34. Appl., 19.10.31).—The *salts* 1 : 4 : 6 : 2-$C_6H_2Me(NO_2)_2$·O·PbOH and [1 : 4 : 6 : 2-$C_6H_2Me(NO_2)_2$·O]$_2$Pb are prepared from equiv. amounts of their components at 70—80° and 80—90°, respectively. They are used as primers for detonators. H. A. P.

Manufacture of [low-density] explosive compositions of the character of dynamite. E. I. Du Pont de Nemours & Co. (B.P. 415,136, 23.2.33. U.S., 23.2. and 19.5.32).—Carbonaceous material consisting of a cereal, *e.g.*, maize, is softened with H_2O, treated with live steam, and passed through a degerminator to separate the germ, hull, and softer portion of the starch, leaving the horny portion. This is heated to 93—120° and converted into a stiff sheet by passing through rolls, the sheet being subsequently reduced to flakes. 1—20% of this product (*d* 0·1—0·2) is mixed with $\nless$ 5% of nitroglycerin, and with NH_4NO_3, if desired, the final composition giving a 1¼ in. × 8 in. cartridge wt. of $<$ 146 g. W. J. W.

Blasting explosive cartridges. A. G. White, and Imperial Chem. Industries, Ltd. (B.P. 414,718, 10.1. and 2.6.33).—The wrapped cartridge is placed in an outer paper cylinder, and the intervening space filled with a mixture of NH_4NO_3, an alkali perchlorate, and $\nless$ one cooling agent, with or without a small amount of a sensitising explosive or of oxidisable carbonaceous material. Good propagation and sensitiveness, combined with a high degree of safety in fiery mines, are claimed. W. J. W.

Manufacture of waterproof matches. L. E. Larsson (B.P. 414,938, 21.11.33. Swed., 28.11.32).—The igniting composition is mixed with a binding agent, *e.g.*, a PhOH–CH_2O condensation product (resole) or a cellulose derivative (Cellite), dissolved in an org. solvent. The combustibility of the binding agent does not increase the combustibility of the igniting composition beyond that of the usual glue-containing compositions. The mixture is dried and may be hardened by heating at 100—150°, and $(CH_2)_6N_4$ may be added to accelerate hardening. The matches are paraffined after hardening. W. J. W.

Paper tubes.—See V.

XXIII.—SANITATION; WATER PURIFICATION.

Biology of the mite, *Glycyphagus domesticus*, de Geer (*Tyroglyphidæ acarina*). A. M. Hora (Ann. Appl. Biol., 1934, **21**, 483—494).—Biological data relating to infection are examined, and chemical treatment of furniture stuffing is considered. Me salicylate and CCl_4 gave good control of the hypopial form. A. G. P.

Germicidal power of sodium hypochlorite. Effect of addition of alkali. C. K. Johns (Ind. Eng. Chem., 1934, **26**, 787—788).—The greater destruction of *Escherichia coli* by strongly alkaline aq. NaOCl at 50° (B., 1932, 78) is due to the combined effect of p_H and high temp. At 20° addition of alkali diminishes the effect of NaOCl. The effect of NaOCl on *Staph. aureus* is decreased at both 20° and 50° by addition of alkali. E. C. S.

Removal of fluorides from drinking water. R. H. McKee and W. S. Johnston (Ind. Eng. Chem., 1934, **26**, 849—851).—Fluorides can be removed from potable H_2O by adsorption on C at $p_H \ngtr 3$. A. G.

Sulphite waste liquor.—See V. **Poisonous Ag-cleaning preps.**—See X.

See also A., Sept., 981, **Determining Ca and Mg in waters.** 985, **Conductometric titrations.**

Patents.

Treatment of [polluted] liquids. W. C. Laughlin, Assr. to Filtration Holding Corp. (U.S.P. 1,945,051, 30.1.34. Appl., 5.4.30).—The screened sewage is treated with a pulp of finely-divided fibrous material which aids the separation of greasy particles and of finely-divided solids. The resultant sludge is densified and dried for use as a fertiliser. C. J.

Pest-destroying agents. H. T. Böhme A.-G., H. Bertsch, and H. Stober (B.P. 414,299, 27.3.33 and 22.1.34. Cf. B.P. 410,956; B., 1934, 680).—The active ingredient is a quaternary NH_4 salt of mol. wt. $>$ 150, obtained by the action of a *sec.*- or *tert.*-amine (C_5H_5N) at raised temp. and pressure on an alkyl H sulphate ($C_{12}H_{25}$·O·SO_3H) or with the alcohol and a sulphating agent. C. H.

Production of water-soluble [disinfectant] derivative of 8-hydroxyquinoline. J. D. Riedel–E. de Haën A.-G. (B.P. 414,941, 24.11.33. Ger., 9.12.32).—Prep. of the Na 8-hydroxyquinoline salt of 2 : 1 : 5-OH·$C_6H_3(CO_2H)$·SO_3H in aq. solution (at 80—90°) and isolation by crystallisation is claimed. H. A. P.