

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

OCT. 25 and NOV. 1, 1935.*

I.—GENERAL; PLANT; MACHINERY.

Rate of heat transfer between condensing organic vapours and a metal tube. F. H. RHODES and K. R. YOUNGER (Ind. Eng. Chem., 1935, 27, 957—961).—The overall resistance to heat transmission from condensing C_6H_6 , PhMe, C_5H_{12} , C_6H_{14} , C_8H_{18} , $COMe_2$, 95% EtOH, EtOH, Et_2O , Pr^oOH , Bu^oOH , and *sec.*- $C_5H_{11}OH$ vapours to H_2O has been determined and found to vary linearly with $1/V^{0.8}$, where V is the H_2O velocity. The film conductance of each vapour is in general agreement with the val. calc. from the Nusselt equation, and for each homologous series decreases by about a const. amount in ascending the series. With a metal surface fouled by the vapour the film resistance is increased by 10—20%.
D. K. M.

Anthracite coal etc. [as filter medium]. Gas-oil separators.—See II. **Steam accumulators.**—See V. **Countercurrent extraction of polyhalite.**—See VII.

See also A., Sept., 1935, Colloidal ultra-filter. 1098, Höppler viscosimeter.

PATENTS.

Rotary drum furnaces. A. L. MOND. From METALLGES. A.-G. (B.P. 433,669, 8.10.34).—The drum is infinitely rotatable about its horizontal axis and together with the driving gear for that rotation is rotatable $\llcorner 180^\circ$ about a vertical axis so that the ends may be brought in succession into register with various charging and firing devices, it being possible to fire through each end alternately from one fixed burner.
B. M. V.

Firing of baths for melting metals or heating liquids. SOUTH METROPOLITAN GAS CO., D. CHANDLER, and A. J. SKINNER (B.P. 433,127, 2.2.34).—The upper part of the well containing the pot is lined with cast Fe or other conducting plates spaced from the brickwork, and the gases after heating these (and the pot) pass over the top of the brickwork and part way down the outside.
B. M. V.

Cooling towers. S. C. COEY (B.P. 433,113, 26.11.34).—Air is caused (by forced draught) to flow inwards, outwards, and inwards, successively upwardly, through interrupted falling curtains of H_2O .
B. M. V.

Apparatus for preserving foodstuffs, pelts, etc., for tanning pelts and hides and curing pig meat, and for drying and impregnating timber, and drying milk, grass, fruit, vegetables, etc. H. BOSTOCK (B.P. 432,552, 21.12.33).—A vac. vessel containing an internal, H_2O -operated exhaustor and baskets, or other containers for the goods, which are small enough to be withdrawn through the lid, is described.
B. M. V.

Grinding mills. F. B. LEHMANN (J. M. LEHMANN) (B.P. 432,708, 1.5.35. Ger., 17.5.34).—In a roller mill, at least one of the rolls is provided with a block or blocks the rubbing surface of which is of greater radius than that of the roll and is given a continuous rocking motion.
B. M. V.

Gyratory crushing mill. J. MEAUX (B.P. 432,848, 18.1.35. Fr., 18.1.34).—A self-adjusting, driven eccentric sleeve embodying a universal joint is described.
B. M. V.

Crushing and grinding machine. C. G. JØRGENSEN (P. JØRGENSENS MASKINFABRIK, VED C. JØRGENSEN) (B.P. 433,001, 25.5.34. Denm., 27.5.33 and 8.5.34).—Dry or moist grain, vegetable substances, or the like are first crushed between grooved rolls and then allowed to drop into a disintegrator comprising one or more "fans" and serrated housings, the fans being on the same shaft as is one of the rolls.
B. M. V.

Grinding and crushing machinery. E. NEWELL & Co., LTD., G. L. WOODHOUSE, and A. H. MOSS (B.P. 432,999, 12.5.34).—A combined ball and rod mill is formed in one cylindrical shell with a grid between the compartments; the outlet is peripheral.
B. M. V.

Gyratory grinding or crushing machines. H. J. C. FORRESTER. From SOC. ATELIERS NEYRET BEYLIER (B.P. 432,954, 25.4.35).—A bevel driving gear for the oscillating sleeve is described.
B. M. V.

Grinding and emulsifying machines. F. J. E. CHINA, and PREMIER COLLOID MILLS, LTD. (B.P. 432,570, 30.1.34).—In a disc-type homogeniser the distance between the working faces decreases from the central feeding point outwards, but the faces are an exact match and may be caused to touch over their whole surface when no material is present. To effect this the faces are formed with annular V-shaped grooves, the angle of the V becoming more acute in progression outwards.
B. M. V.

Separation of intermixed divided materials. R. PEALE and K. DAVIS, Assys. to PEALE-DAVIS Co. (U.S.P. 1,983,487, 4.12.34. Appl., 7.6.28).—An air-pervious shaking table is sloped one way and provided with riffles inclined mainly the other way to discharge (at the first pass) fine heavy material along one side and coarse heavy along the other. The lighter material (*e.g.*, coal) is then screened and the fines alone are re-separated on another table.
B. M. V.

Cleaning, separating, or classifying granular material. BLAW-KNOX, LTD. From BLAW-KNOX Co. (B.P. 433,147, 9.2.34).—The material is caused to fall in the form of an annular curtain, at least twice, after intermediate collections and redistributions, and then

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

subjected to upwardly- and outwardly-inclined air blasts, all outgoing air and dust streams being combined.

B. M. V.

Apparatus for washing or treating [pulpy] materials. W. F. TRAUDT (U.S.P. 1,983,155, 4.12.34. Appl., 16.2.34).—A circular tank is provided with a central bottom outlet leading to a pump which returns the pulp tangentially at an intermediate height. The entry to the outlet is through a bell mouth adjustable to different heights. Liquid and dirt overflow through a peripheral screen.

B. M. V.

Liquid-agitating means. A. H. STEVENS. From PFAUDLER CO. (B.P. 433,556, 17.2.34).—An adjustable gland for a propeller shaft passing through the wall of a tank is described.

B. M. V.

Preparation of dispersions. L. MELLERSH-JACKSON. From W. H. ASHTON (B.P. 433,583, 2.10.34).—The substances to be dispersed are caused to flow towards and then away from a source of compressional vibration within the range of sound, *e.g.*, \times 8000 cycles, and of sufficient amplitude to cause cavitation.

B. M. V.

Centrifugal bowls. AKTIEB. SEPARATOR-NOBEL (B.P. 433,668, 17.9.34. U.S., 16.9.33).—In a bowl having overflow weirs for lighter and heavier liquids and detachable nozzles for the exhaust of still heavier liquid the nozzles (which may be hooded or not) are screwed into the bowl wall from the inside so that they cannot work loose through corrosion or vibration, and a special tube spanner for detaching them is described.

B. M. V.

Rectangular clarifying or sedimentation tanks. DORR CO., INC., and R. C. GIBBS (B.P. 433,051, 8.2.34).—In an elongated tank, the sediment is gradually removed sideways by rakes which reverse their inclination on reversal of travel, and after falling into a longitudinal channel is removed therefrom by rakes acting in one direction only, both sets of rakes being mounted on the same travelling carriage.

B. M. V.

Sedimentation apparatus or thickeners. E. W. A. (A) and P. H. I. HUMPHREYS. From ALEXANDRIA WATER CO., LTD. [in part to (A)] (B.P. 433,372, 3.2.34).—In a basin of less depth than diam. or length and having vertical walls (*V*) and sloping bottom, the inlet opening (*I*) extends from the bottom of *V* for a considerable distance upwards and is so inclined that the whole mass of liquid rotates very slowly. The overflow takes place over a weir at a level considerably above *I* and remote from it in the direction of rotation (*e.g.*, extending 120° backwards from *I*) the weir being kept submerged by having the final outlet from the arcuate launder at a suitable level. A central overflow may also be provided and both overflows have their lips inclined to prevent upward-drawing effect on the slime.

B. M. V.

Filters. F. W. YOUNG (B.P. 432,852, 4.2.35. U.S., 23.6.34).—In a rotary, external drum filter the buoyancy of the drum is neutralised by applying a vac. to the whole of the central space and allowing it to fill with filtrate to approx. the same level as the prefill; the network of interior piping is eliminated by the provision of gravity-operated valves attached to the interior wall of the shell and controlling the application of vac. to the filter cells.

B. M. V.

Cleaning of slow sand filters. N. G. ELLIOTT (B.P. 432,742, 14.2.35).—The washing apparatus is contained in a portable caisson which is lowered on to successive small portions of the sand bed while the filtering action continues. Washing is effected by a no. of rotating jets of H₂O inclined downwards towards the bed; the reaction of the issuing H₂O produces the rotation and a brake is provided to leave sufficient impulse in the jets to disturb the sand to a definite depth. Overflow of mud is effected at will from an upper or lower level.

B. M. V.

Manufacture of filtering masses for removing aerosols and like fine suspended matter from the atmosphere. SOC. ITAL. PIRELLI (B.P. 433,186 and 433,190, [A] 20.2.35, [B] 4.3.35. It., [A] 21.2.34, [B] 2.3.34).—An intimate mixture is made of fibres and inert powdered materials. In (A) one of the constituents is fusible, and during agitation of the mixture this constituent is maintained fused for a sufficient length of time to ensure permanency of bond with the others; in (B) the mixture is spun for the same purpose, preferably while moist. The process of (B) may follow that of (A) on the same material.

B. M. V.

Preparation of used filtering material for revivification. A. E. PEW, JUN., and L. A. TARBOX, ASSRS. to SUN OIL CO. (U.S.P. 1,982,828, 4.12.34. Appl., 17.6.32).—The filter medium is treated with inert (combustion) gases, solvent, and gases again, in succession, under such conditions that H₂O can never be pptd. from the gas.

B. M. V.

Evaporating apparatus. APPAREILS ET EVAPORATEURS KESTNER (B.P. 432,938, 2.11.34. Fr., 6.11.33).—Heating units comprising concentric return tubes are manufactured as a single piece, the outer tube having a conical end to suit a seat in the tube plate and the inner tube extending through a clearance hole in the other tube plate, a single nut and grommet securing the whole.

B. M. V.

Carrier supports for making films from cellulose derivatives, gelatin, and other plastic substances. G. FRENKEL (B.P. 432,846, 1.1.35).—A composite band upon which cellulose or other dissolved material may be evaporated to form a film, and from which the film is stripped, is formed of textile, paper, or other material chosen for its stripping properties rather than its strength and edged with metal strips, the film solution not being allowed to come in contact with the latter.

B. M. V.

Fractionation and apparatus therefor. J. F. WAIT (U.S.P. 1,983,058, 4.12.34. Appl., 18.6.30).—A cascade bubbling apparatus is contained in a drum (*D*) rotatable about its horizontal axis so that the submergence of the baffles may be varied; *D* is adapted to resist high vac., and an inert fluid (*e.g.*, air) subjected to the same vac. in the space between *D* and the bubbler.

B. M. V.

Water-softening apparatus. D. THOMAS, and THOMAS & CLEMENT, LTD. (B.P. 433,543, 14.2.34).—A device for transferring solid reagent from a hopper to a H₂O-measuring tank is operated by a float in such a way that the reagent is added to the H₂O at a

particular time after the tank has been emptied and commenced to refill. B. M. V.

Centrifugal apparatus for separating and collecting dust or other solid particles from air or gases.

C. H. W. and C. H. CHELTNAM (B.P. 433,647, 20.3.34).—In a cyclone separator with tangential inlet, two oppositely rotating vortices are formed in the inlet pipe and these become two oppositely and vertically rotating vortex rings in the separator; to prevent this turbulence, one vortex only is intentionally produced in the inlet pipe by suitable vanes. Turbulence in the dust outlet pipe is prevented by a central core or mast. B. M. V.

Apparatus for removing dust from air.

ST. GEORGE'S ENGINEERS, LTD., and F. W. WILSON (B.P. 432,760, 1.6.34).—The apparatus comprises a no. of filter bags suspended with open ends downwards in such a way that they will drop and shake themselves when the internal pressure of the dirty air is released, a hand-operated inlet valve being provided to produce fluctuations of pressure when desired. B. M. V.

Carrying out chemical reactions with circulating gases.

K. GORDON, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 432,574, 30.1.34).—In a closed system of circulating gases, usually under high pressure, one or more of the constituents which tend to accumulate is/are removed by passing the gases in rapid concurrent motion with a suitable absorbent; the motion is preferably upward in a pipe coil and the proportion of gas removed is so small at each pass that the partial pressures of the various gases are not materially changed. The liquid absorbent is also circulated continuously and a portion of it withdrawn for regeneration (effected, e.g., by release of pressure) and returned to the circuit. Kerosene is suitable for removing CH_4 , C_2H_6 , and N_2 from destructive-hydrogenation gases. B. M. V.

Manufacture of brake-lining compound.

W. NANFELDT, Assr. to WORLD BESTOS CORP. (U.S.P. 1,980,221, 13.11.34. Appl., 9.7.31).—The bonding material is prepared by heating cresylic acid (6), $\frac{1}{2}$ 90% of which distils at $> 208^\circ$, and formalin ($3\frac{1}{2}$ pts.) in presence of aq. NH_3 . Linseed and tung oils may also be incorporated. S. M.

[Boiler] furnaces. H. WILLIAMS, LTD., and C. M. SMITH (B.P. 432,878, 3.11.33).

Heat insulation [for refrigerating cabinets]. C. G. MUTERS (B.P. 433,135, 8.2.34. Swed., 14.2.33).

Mixing devices or whisks. AMER. MACHINE & FOUNDRY Co. (B.P. 432,849, 19.1.35. U.S., 6.1.34).

II.—FUEL; GAS; TAR; MINERAL OILS.

Alteration of coal seams in the vicinity of igneous intrusions, and associated problems.

H. BRIGGS (Trans. Inst. Min. Eng., 1935, 89, 187—211).—An igneous intrusion may result either in conversion into anthracite or in the coking and burning of the coal. The temp. of an intrusion, associated with H_2O and steam, is probably $< 1000^\circ$ when injection takes place. This will usually be associated with the imposition of high pressures and severe shear stress. Evidence of such pressure is a feature common to anthracite areas. When an intrusion bodily replaces a coal seam, the coal

is decomposed by steam and no tar is formed. Anthracitization is produced by pressure, H_2O , and heat. Variations in type are due to the shares taken by these agents. Devolatilisation of coal can be produced by the application of pressure or pressure differences creating shear stress, and whilst this loss is accelerated by heating it is retarded by the presence of excessive mineral matter. An appreciable amount of ash can be dissolved out of coal by H_2O and H_2CO_3 at 100° , and the decrease in ash content on anthracitization is attributed to this cause. It is concluded that temp. $> 100^\circ$ are not necessary for conversion into anthracite, and that this is essentially a low-temp. product. E. S.

Studies in coal by X-ray diffraction methods.

C. MAHADEVAN (Fuel, 1935, 14, 231—242; cf. B., 1931, 184).—Samples of vitrain gave X-ray diffraction haloes corresponding to crystal spacings of 3.38 and 2.12 Å., respectively, both being in the same positions as for the hexagonal C rings in graphite. The linear dimensions of the particles, calc. from the angular width of the haloes, were of the order 10—40 Å., i.e., the particles were of colloidal size. Durain and fusain also gave haloes corresponding to those given by graphite, together with others due to the ash; fusain in addition showed localised spots of intensity indicating the persistence of fibrous structure. The amount of general scattering in the pattern appeared to be correlated with the sum of the H_2O and volatile matter contents of the coals. The coke residue exhibited little general scattering and slightly wider haloes than the original coal; the position of the haloes was unchanged. The α - and β -compounds (obtained by extraction with $\text{C}_6\text{H}_5\text{N}$ and fractionation of the extract with CHCl_3) gave patterns similar to that of the coal itself; the γ -compounds gave a different pattern, resembling, but more complex than, that obtained with natural and fossil resins. The X-ray examination showed that the ash (principally SiO_2 and Al_2O_3) existed in the colloidal form in vitrain, whereas it was partly in colloidal form and partly in coarse suspension in durain, and mostly in coarse form in fusain. The patterns for the Tertiary coals differ slightly from those for the Permocarbiniferous coals; the significance of this for the theory of coal formation is discussed. A. B. M.

Shape and specific surface of coal particles.

L. W. NEEDHAM and N. W. HILL (Fuel, 1935, 14, 222—230; cf. B., 1934, 431).—The sp. surface, i.e., surface per unit wt., has been calc. for a series of sieved fractions [for mean sieve openings (M) from 3.2 down to 0.007 cm.] of a Leicestershire coal, using the formula $S = [\pi/2k + 4 \sqrt{\{(1+r)^2/\pi r\}}]/\rho d$, where d = "statistical diam.," i.e., the average length of a line bisecting the projected area of the particle, r = their average ratio of length to breadth (approx. 1.5), ρ = density, and k is derived from the relation $V = kd^3$, where V is the average vol. of the particles. k varied with M according to the empirical relation $k = 0.29M^{0.15}$. S was measured directly on the larger sized fractions ($\frac{1}{2}$ — $1\frac{1}{2}$ in.) by covering the particles with a thin layer of plasticene which is subsequently opened out flat on to squared paper; agreement of calc. and measured vals. of S was satisfactory. The meaning of the observed

variation in k is discussed; it is concluded that the best val. to be taken for sizes < 0.007 cm. is the mean of the estimated vals. for the largest- and smallest-sized particles present. Preliminary experiments show that the relation of k to M varies with different coals and must be determined in each case if an accurate estimate of S is required. A. B. M.

Sulphur content of coals of the Stalino-Makeeva region of the Donez basin, and the origin of the sulphur. P. P. KOZAKEVITSCH (Koks i Chim., 1935, No. 2—3, 32—44).

New uses for anthracite coal and slate. O. J. JONES and E. L. BULLER (Ind. Eng. Chem., 1935, 27, 953—954).—The possibility of using these materials as filter media, fillers for asphalt and concrete, and for sintering Fe ore is discussed. D. K. M.

New principle of [domestic] furnace design for anthracite. A. J. JOHNSON (Ind. Eng. Chem., 1935, 27, 944—948).—The furnace is cylindrical with increased radiant-heat surface provided by the insertion in the fuel bed of a H_2O -jacketed cylinder which also forms the chimney. This enables a lower combustion temp. to be maintained and consequently eliminates clinkering. Air is admitted through holes in the periphery above the solid grate, which is movable and over the periphery of which the ash is discharged. No combustion space is provided. Such furnaces are cheaper than those of older type and operate with 16% of CO_2 in the flue gases; the efficiency is 70—76% according to size. D. K. M.

Heat regenerators for coke ovens. S. AYABE (J. Fuel Soc. Japan, 1935, 14, 31—32).—Data relating to the dimensions of oven chambers and regenerator chambers, the vols. of chequerwork and bricks per regenerator, and the kinds of fuel and types of chequerbricks used at 19 different coking plants are recorded. G. M.

Coking property of coal. T. SHIMMURA (J. Fuel Soc. Japan, 1935, 14, 30).—Large-scale tests at a coke-oven plant confirmed the previous observation (B., 1933, 209) that the O content of the α -constituents of the parent coal influences the hardness of the coke. Shatter indices of 6 coke samples, measured by the U.S. Bur. Mines method, varied from 46.3 to 90.1, whilst the O content of the α -compounds ranged from 12.09% to 8.15%. At the same time the % of γ -compounds in the coals varied erratically between 12.60 and 16.11. G. M.

Softening of coal by heat. Is it a distinctive and measurable characteristic? H. C. PORTER (Ind. Eng. Chem., 1935, 27, 962—966).—The softening effect of five coals has been determined by measuring the penetration of powdered coal into a bed of powdered coke on which it rests and the extrusion through small holes in the side of a closed cylinder when heated to 520°. The mechanism of the softening process and its industrial significance are discussed. D. K. M.

Coalite low-temperature carbonisation process. W. A. BRISTOW (Brennstoff-Chem., 1935, 16, 281—286; cf. B., 1934, 740). A. B. M.

Low-temperature coke as a blending material [in coke manufacture]. A. SHIMOMURA (J. Fuel Soc.

Japan, 1935, 14, 25—29).—The development of the Shimomura process (Chem & Ind., 1923, 556) in Japan is described, together with the desirable properties of a low-temp. coke suitable for blending with raw coal for the manufacture of furnace coke. The low-temp. coke should contain 15—25% of volatile matter; it should be crushed to < 2 mm. and the raw coal to < 3 mm. The best conditions of blending and carbonisation are outlined. The bulk d of the blend should be as high as possible. G. M.

Blast-furnace coke quality and some practical experiences of coke testing in connexion with blast-furnace operation. C. E. WALLIN (Coke Oven Managers' Year Book, 1935, 153—160).—When coking 100% high-volatile coal, the tumbler test could be correlated with blast-furnace operation, but the shatter test could not. When coking an 80:20 blend of high- and low-volatile coals neither test could be so correlated. J. W.

Outline of carbon black. I. DROGIN (India-Rubber J., 1935, 90, 259—274).—A detailed account is given of the manufacture and uses of C black. The yield averages 1.43 lb. per 1000 cu. ft. of natural gas burned, or approx. 3% of theory; the yields of soft blacks are higher, e.g., 3—10 lb. The influence of various factors in the conditions of combustion of the natural gas on the % of C black produced is indicated by curves. D. F. T.

Gas purification. H. HOLLINGS and W. K. HUTCHISON (Chem. & Ind. 1935, 726—732, 752—760).—A typical crude coal gas may contain 550—650 grains of S (as H_2S) per 100 cu. ft., which in the course of purification has to be reduced to > 0.1 p.p.m. Data relating to the operation of oxide purifiers are recorded. The cost of purification is estimated at 0.628d. per 1000 cu. ft. Recontamination of the gas may occur during storage by absorption of H_2S from the holder H_2O , produced principally by bacterial reduction of sulphates therein. The rate of transfer of H_2S from the H_2O to the gas increases greatly when the air temp. falls below the temp. of the H_2O in the tank (in Sept. or Oct.), due to the convection currents thereby set up. H_2S in the holder H_2O may be removed by pptn. with ZnO or $Zn(OAc)_2$, or by oxidation with air or H_2O_2 . Small concns. of H_2S in the gas are determined by passing a measured vol. through a porous paper impregnated with $Pb(OAc)_2$ and measuring the optical density of the stain produced. Small concns. in H_2O are determined by passing a current of CO_2 through the H_2O and then through the impregnated paper. A. B. M.

Storage of dry gas in wet holders. H. KEMMER and M. RASCHIG (Gas-u. Wasserfach, 1935, 78, 553—556).—To prevent the re-saturation of dried gases in wet holders it is suggested that the H_2O surface be covered with a layer of oil. The rate of diffusion of H_2O through a quiescent oil layer is negligibly small. Evaporation of H_2O into the gas (due to disturbances of the surface), from the cups, or from the sides of the holder when it is rising, is insufficient to raise the H_2O content of the gas unduly, except under very unfavourable operating conditions. A. B. M.

Determination of naphthalene in [coal] gas by means of picric acid. J. A. VAN DIJK (Chem. Weekblad, 1935, 32, 111—113).—Phase-rule considerations and actual determinations indicate that Jorissen and Rutten's method (A., 1909, ii, 523) is more reliable than Knublauch's (B., 1917, 702). D. R. D.

Determination of naphthalene in gas. H. A. J. PIETERS, K. PENNERS, and W. GEEL (Chem. Weekblad, 1935, 32, 286—290).—The views and results of van Dijk (see above) are criticised. The amount of $C_{10}H_8$ (I) carried through a solution of picric acid (II) by a stream of gas is independent of the velocity up to 60 litres/hr. but depends on the concn. of (II) and the temp. [results are tabulated up to 30° for saturated and unsaturated solutions of (II)] and is a const. for any given set of conditions. The best absorbent at temp. > 20° is a saturated solution of (II) containing undissolved solid, but at < 20° a 0.9% solution is satisfactory. Practically no (I) escapes absorption at low temp. (4—7°). The Rutten method is tedious and inaccurate for low concns. of (I), and the following simplified Knublauch method is preferred. 80—100 c.c. of a 0.9% solution of (II) are placed in two Drechsel wash-bottles, the second being cooled to 4—7°. Gas is passed through at a velocity of 60 litres/hr. until sufficient picrate (III) for weighing has been pptd. (III) is then filtered off and determined by titration with 0.02N-NaOH (to phenolphthalein). S. C.

Determination of naphthalene in gas. J. A. VAN DIJK (Chem. Weekblad, 1935, 32, 290—291).—A reply to Pieters *et al.* (cf. preceding abstract). Further experimental results are cited to show that the Rutten method is more accurate than that of Knublauch. Previous views are maintained. S. C.

Ignition temperatures of gas mixtures. K. BUNTE and A. BLOCH (Gas- u. Wasserfach, 1935, 78, 537—541, 560—566; cf. B., 1935, 660).—The ignition temp. (*I*) of mixtures of $H_2 + CO$, $H_2 + CH_4$, $H_2 + C_2H_4$, $CO + CH_4$, $CO + C_2H_4$, $CH_4 + C_2H_4$, with air have been determined. The vals. for mixed gases are not, in general, related to the *I* of the single gases by any simple law; some mixtures, e.g., $H_2 + CO$, exhibit a min. val. of *I* as the ratio of the two gases is varied. The fuel gas: air ratio giving the lowest val. of *I* for such mixtures can, however, be calc. from the vals. for the separate fuel gases by a simple proportional law. The lowest val. of *I* in mixtures of single gases with air or O_2 occurs in the mixture having the composition corresponding to the max. reaction velocity according to the law of mass action, and not in the mixture containing the O_2 theoretically necessary for combustion. The variation of *I* with composition of the gas mixture can be correlated with the flame velocity in the inner cone of the Bunsen flame. The mechanism of the initial stages in the combustion of gas mixtures is discussed. A. B. M.

Catalytic hydrogenation of neutral oil from low-temperature tar. I. Effect of some catalysts. S. ANDŌ (J. Soc. Chem. Ind., Japan, 1935, 38, 267—269B).—In one series of experiments 100 g. of the neutral oil and 5 g. of catalyst were heated for 1 hr. at 470° in H_2 (initial pressure 100 atm.), in a 0.6-litre autoclave;

the amount of H_2 charged was 4.46% of the neutral oil. The % of gasoline in the product varied from 51.6 (MoO_3 catalyst) to 40.4 (Cr_2O_3), intermediate vals. being given with $SnCl_2$, Fe_2O_3 , CoS , etc.; the original oil contained 4.8% of gasoline. The kerosene content of the product, 30—34%, varied little with the catalyst. A second series of experiments was carried out in a 5-litre autoclave, in which the amount of H_2 charged was 17.34% of the sample of oil. The % of gasoline in the product varied from 80.3 (MoO_3 catalyst) to 44.6 ($SnCl_2$). A. B. M.

Composition, properties, and methods of treatment of primary tars of Cheliabinsk brown coal. II. M. K. DJAKOVA, A. V. LOZOVOL, and S. I. TSCHERTKOVA (J. Appl. Chem. Russ., 1935, 8, 695—706; cf. B., 1935, 789).—The benzene fraction of b.p. < 230° contains > 1% of S, not eliminable by the ordinary methods. A stable, S-free product is obtained in 86% yield by catalytic hydrogenation (400°/100 atm.; 2 hr.), whereby the content of aromatic hydrocarbons is unaffected, whilst unsaturated are converted into naphthenic hydrocarbons in presence of CoS , and chiefly into paraffinic hydrocarbons by MoS_3 . R. T.

Ukrainian plant sources of technical materials. I. Tar, essential oil, and acids from Ukrainian lupulin. N. A. VALJASCHKO and J. G. BORISIUK (Ukrain. Chem. J., 1935, 10, 210—219).—The dry product yields tar 55, essential oils 2—3, and org. acids (chiefly $PrCO_2H$ and Bu^iCO_2H) 2.3—5.4%. The tar is suitable for jappanning metal surfaces, but the essential oil is of no commercial val. R. T.

Hydrogenation of peat tar. I. A. TREFILIEV and K. A. BUSCHMAN (Ukrain. Chem. J., 1935, 10, 220—227).—The distillate, b.p. > 180°, yields 31% of good-quality petrol when hydrogenated at 470—480°/80 atm. (1.5 hr.) in presence of 5% of MoS_3 . R. T.

Surface tension of asphalt bitumens. R. N. J. SAAL (Chem. Weekblad, 1935, 32, 486—488).—The break in the surface tension-temp. curves obtained by Nellensteyn (A., 1930, 1369) is due to experimental error. D. R. D.

Viscosity and thixotropy of drilling mud. P. EVANS and A. REID (J. Inst. Petroleum Tech., 1935, 21, 677—679).—The terms are discussed and methods of measurement described. C. C.

Interfacial tension measurements in the petroleum industry. E. VELLINGER (Petroleum, 1935, 31, No. 34, 17—21).—The curve relating interfacial tension (*t*) between oil and aq. solution and the p_H of the latter may be one of two kinds: (1) a curve approx. parallel to the p_H axis, (2) a curve in which a steep fall occurs for high p_H vals. Light petroleum distillates give curves of the first type, crude oil those of the second type, whilst other products may give either type of curve. *t* is independent of mol. wt., but is mainly governed by the degree of refining. Refining by acid or earth may be controlled by measurements of *t*; the most highly refined oils give the highest *t*. Used oils give low vals. owing to the dissolved oxidation products, and the deterioration of an oil in practice may be followed by periodical determinations of *t*. Curves of type (1) are

given when the oil contains no active substance which will be dissociated, the rapid fall of t in curves of type (2) being due to the presence of active acids, or, in the case of crude oils, to active bases, the surface activity of which varies with the degree of dissociation.

C. C.

Gas-oil separators. J. W. HARDY (J. Inst. Petroleum Tech., 1935, 21, 741—746).—Five types of float-controlled valves are described, and of these the most reliable is considered to be a sleeve valve operated by a large float in which the pressure is equalised. This will operate both for high and low pressures. For extensive high-pressure separation, the combined bean and pilot-operated valve is very efficient. At high pressures, stubborn foaming may occur in the separator, usually with low gas-oil ratios; no simple explanation is yet possible.

C. C.

Methods of examining mineral oils, especially the high-boiling components. II. J. C. VLUGTER, H. I. WATERMAN, and H. A. VAN WESTEN (J. Inst. Petroleum Tech., 1935, 21, 701—708; cf. B., 1935, 836).—With increasing mol. wt. the sp. dispersion (D) of paraffins decreases, that of monocyclic naphthenes remains const., and for all other series D increases with increased mol. wt. Saturated isomeric compounds have the same D , but the vals. for aromatics and olefines are much $>$ those calc. from at. refraction, owing to the increase in n . It is not possible to deduce the % of aromatic compounds or aromatic C rings from D if little is known of the type of aromatic present. The D of aromatic hydrocarbons is much $>$ that of saturated hydrocarbons, so that D may therefore be used as an indication of the absence of aromatics. Vals. are given for D calc. from r_L and r_G (for n_C and n_G) for a no. of mono- and di-cyclic aromatics, paraffins, mono- and di-cyclic naphthenes. The results calc. from Gladstone-Dale vals. are approx. twice as high as those calc. by the Lorentz-Lorenz formula. It is concluded that an oil is practically free from aromatics when D [= $10^4(n_G - n_C)/d$] has been decreased to < 158 , e.g., by hydrogenation or treatment with H_2SO_4 . For turbid or dark-coloured oils n_G cannot be determined, but it can be extrapolated from the vals. of n_C and n_D since the Cauchy formula $n = A + B/\lambda^2$ gives a linear relation between n and $1/\lambda^2$.

C. C.

Refining of a cracked motor spirit. D. G. JONES (J. Inst. Petroleum Tech., 1935, 21, 709—724).—Gas oil from Comodoro Rivadavia crude oil was cracked at 475° in a Cross plant and the product subjected to vapour-phase refining by the Gray process. Two towers in series, charged with fuller's earth, were necessary to render the product colour-stable and of low gum content. Economy was effected by using a local clay in place of fuller's earth. Details are given of the prep. of the clay. The latter was evaluated after activation at various temp. by measuring the rise in temp. on mixing 60 ml. of clay with 50 ml. of refined gasoline. The method of operating the Gray towers is outlined. Gum-forming and coloured constituents are apparently removed by simple polymerisation, the polymerides being either condensed in the tower or separated in the rectifier. Mercaptans are removed by

treatment with CaO, while H_2S escapes with the fixed gases from the stabiliser.

C. C.

Thermal treatment of gaseous hydrocarbons. A. E. DUNSTAN, E. N. HAGUE, and D. A. HOWES (Chim. et Ind., 1935, 34, 273—275; cf. B., 1934, 486).—Polymerisation and condensation have advantages over pyrogenic dissociation for converting gaseous hydrocarbons into liquid motor fuels, particularly in the case of unsaturated hydrocarbons. Under favourable conditions the product obtained by the second method may be mainly aromatic. By polymerising pure olefines (I) in an autoclave at 380 — $400^\circ/100$ atm., a 92% yield of liquid product was obtained. A comparison of the effect of different metal surfaces, using a continuous-flow apparatus, showed that under the same pressure, a higher temp. was required to give the same result with Cu as with steel, but at high pressures violent decomp. of (I) occurred with Cu.

C. C.

Cracking hydrogenation of Fushun shale oil under high pressure. II. Cracking of shale oil under high nitrogen and hydrogen pressure without catalyst. III. Cracking hydrogenation of shale oil under high hydrogen pressure with several catalysts. IV. Effect of amount of sulphur added to catalyst, reaction temperature, and reaction time. V. Effect of initial pressure and purity of hydrogen. T. MIZOSHITA and M. UENO (J. Soc. Chem. Ind., Japan, 1935, 38, 248—251 B).—II. The oil was cracked in a 2.8-litre autoclave, with an initial gas pressure of 74 atm., a reaction time of 60 min., and a reaction temp. of 400 — 450° . The yield of benzene and the quantity of free C produced were greater with N_2 than with H_2 . The degree of unsaturation of the product was $>$ that of the original oil, and passed through a min. val. at a reaction temp. of 430° in H_2 , or 420° in N_2 .

III. The most effective catalysts were Ni-Mo-S or Fe-Mo-S, supported on Japanese acid clay, and $(NH_4)_2MoS_4$.

IV. The consumption of H_2 , the yield of benzene, and the degree of saturation of the product increased with the amount of S in the Ni-Mo-S-clay catalyst, up to 4 mols. of S per mol. of Ni or Mo; further addition was ineffective. The higher was the reaction temp. or the longer the reaction time the greater were the consumption of H_2 and the yield of benzene. The degree of unsaturation of the product passed through a min. val. at 430° [cf. (II)].

V. The higher was the initial H_2 pressure, or the H_2 partial pressure when mixtures of H_2 and N_2 were used, the greater were the consumption of H_2 and the degree of saturation of the product, but the smaller was the yield of benzene.

A. B. M.

Application of physical constants to determination of the ignition behaviour (cetene number) of Diesel fuels. R. HEINZE and M. MARDER (Brennstoff-Chem., 1935, 16, 286—290; cf. B., 1935, 660).—The relation between the cetene no. (C) [corr. to correspond with a standard "b.-p. index" (B)] and the parachor (P) of Diesel fuels can be represented by a simple curve, from which the C of any fuel can be deduced when its P and B are known. The C can be determined in

similar manner, but less accurately, from the *d* or *n* of the fuels. The sp. refraction and surface tension are unsuitable consts. for this purpose. A. B. M.

Ignition temperatures of hydrocarbons. H. BRÜCKNER and R. SCHÖNEBERGER (*Brennstoff-Chem.*, 1935, 16, 290—292).—The ignition temp. (*I*) were determined by Bunte and Bloch's method (B., 1935, 660) in which pre-oxidation of the hydrocarbon is avoided. In general, *I* passed through a min. val. as the ratio of gas or vapour to air increased. The min. vals. for C_3H_8 , C_4H_{10} , C_5H_{12} , C_6H_{14} , C_7H_{16} , C_6H_6 , PhMe, and cyclohexane were 586°, 597°, 530°, 560°, 539°, 695°, 658°, and 547°, whereas the vals. for the theoretical ratio of gas to air were 638°, 615°, 647°, 617°, 552°, 707°, 659°, and 587°, respectively. The ignitable mixtures lay mainly within the range of compositions containing excess of combustible gas. A. B. M.

Effect of ozone on spontaneous-ignition phenomena of gasoline. K. TAWADA (*J. Soc. Chem. Ind., Japan*, 1935, 38, 270—271 B; cf. B., 1933, 1043).—The spontaneous-ignition temp. of a gasoline in O_2-N_2 was lowered by the addition of 0.1—0.2% of O_3 only under a limited range of conditions of temp., rate of gas flow, and O_2 content of the gas. The addition, however, always shortened the ignition lag. A. B. M.

Quality of waste cylinder oil. R. YAMASAKI and H. NORO (*Chem. & Ind.*, 1935, 808—809).—The properties of samples of used motor oil taken at intervals during a 640-km. run are tabulated. C. C.

Laboratory testing of lubricants. F. J. SLEE (*Chem. & Ind.*, 1935, 809—814).—The usual laboratory tests applied to lubricating oils are summarised and their significance is discussed. The essential requirements of lubricants for various types of machinery are discussed. C. C.

Theory of lubrication. I. Viscosity and friction. II. Film thickness, film pressure, and load capacity. III. Dimensional theory, with applications. IV. Temperature rise and temperature distribution in bearings. M. D. HERSEY (*J. Franklin Inst.*, 1934, 219, 677—702; 1935, 220, 93—119, 187—214, 305—331).—A course of lectures. G. H. C.

Determining *m*-xylene.—See III. **Porosity of limestone.** **Gas analysis.** See VII. **SiO_2 bricks.** **Gasworks refractories.**—See VIII. **Oil-well cement.** **Paving compositions.**—See IX. **Lubricants.**—See X. **Gas-meter paint.**—See XIII. **Thixotropy.**—See XIV. **Tar oil sprays.**—See XVI.

PATENTS.

Method of forming a fuel briquette. C. B. WOOD, Assr. to CARBON PRODUCTS CO., INC. (U.S.P. 1,977,332, 16.10.34. Appl., 30.3.32).—A hard, slow-burning fuel briquette which may be stored out of doors without deterioration is made by mixing charcoal (2 pts.) with sand (1 pt.), using sugar syrup as binder. The mix is thoroughly agitated and placed into moulds, without applying pressure. After heating in an evaporating oven, the briquette is held at 370° for 2 hr. and then allowed to cool under airtight conditions. The briquette may be impregnated with an inflammable fuel. E. H. M. B.

Retort bench for continuous distillation of fuel briquettes liable to be effected by pressure. C. DELKESKAMP (B.P. 431,496 and 431,506, 24.7.34. Ger., [A] 21.8. and 8.12.33).—(A) A no. of externally-heated, inclined, narrow, tubular retorts of rectangular cross-section are arranged in helical formation on a cylindrical surface. The retorts may be spaced from one another with heating flues lying between them, or they may be in contact with the flues on both sides. The retorts open at the top into a common annular shaft which serves as a receptacle for the briquettes to be distilled. They open at the bottom into a common coke receptacle; the discharge is regulated by means of a common rotating discharge device. Means are provided for withdrawing the volatile products of distillation. (B) A rotating distributing device, down which the material slides gently, charges the briquettes from a bunker into the annular feed shaft. A. B. M.

Coal-carbonising apparatus. J. B. JENSON, Assr. to J. A. MARKS (U.S.P. 1,975,396, 2.10.34. Appl., 19.11.31).—The apparatus comprises an externally-heated gas producer (*P*) and an adjacent retort (*R*) internally heated by passing through it the hot gases from *P*. Steam is introduced into the bottom of *P*, which is charged with coal and heated to about 760°. Within *R* is a hollow suction chamber so designed that the gases from *P* are caused to pass back and forth through the coal charge in *R*. The coke product is easily ignitable and is suitable as a domestic fuel. The oils recovered from the volatile products have undergone some hydrogenation and are similar to petroleum products. A. B. M.

Thermal treatment of carbonaceous substances. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 431,519, 8.1.34).—In the destructive hydrogenation of carbonaceous materials in presence of acidic substances capable of corroding the metal of the inner walls of the apparatus, such corrosion is inhibited by adding to the material in the neighbourhood of the outlet from the reaction vessel a small proportion of an As compound, e.g., As_2S_5 , a cyanide, or an org. base, e.g., NH_2Ph . A. B. M.

Distillation of carbonaceous material. H. J. HOLFORD (B.P. 431,397, 5.1.34).—The finely-divided material, e.g., coal, is fed from a hopper into a retort (*R*) formed by the annular space between a rotary vertical column (*A*) and a surrounding stationary casing (*B*). The material is spread on to shelves attached to *A*, being distributed thereon, and at the same time fed downwardly through suitably arranged apertures on to successively lower shelves, by means of scrapers attached to *B*; the residue is discharged from the bottom of *R* by means of a screw conveyor. Within *A* is a mass of refractive material of large heat capacity, heated by superheated steam (500°) or by means of burners. Superheated steam is also introduced into *R* at different levels thereof. The volatile products of distillation are withdrawn through apertures in *B* into an outer annular chamber, and also directly from the top of *R*, and pass thence into a condenser. A. B. M.

Catalytic destructive hydrogenation under pressure of solid carbonaceous materials. INTERNAT.

HYDROGENATION PATENTS CO., LTD., Asses. of I. G. FARBENIND. A.-G. (B.P. 431,435, 24.7.34. Ger., 29.8.33).—The catalyst is distributed in the material to be treated, *e.g.*, brown coal, in presence of sufficient H₂O to produce a homogeneous paste. Improved effects with relatively small amounts of catalyst are obtained. The H₂O is removed by evaporation, preferably after admixture with heavy oil, before subjecting the material to destructive hydrogenation. A. B. M.

Production of graphitic carbon. I. H. DERBY, Assr. to P. C. REILLY (U.S.P. 1,975,259, 2.10.34. Appl., 27.4.29).—Petroleum coke or coal-tar coke is passed through a vertical furnace wherein it is progressively heated by surface combustion to about 1800°, and is then further heated by means of a coreless electric-induction furnace (forming part of the same apparatus) to about 2500°. A. B. M.

Producer gas generators. H. KAHLBETZER (B.P. 431,635, 15.3.35).—A producer utilising wood, maize cobs, or other waste carbonaceous matter as fuel comprises an inner (*A*) and outer (*B*) cylindrical shell. The upper part of *A* forms the raw fuel container and the lower part, which is of inverted cone shape, the gas-generating chamber. The lower end of *A* opens into the surrounding annular chamber between *A* and *B*, from which the gas exit-pipe leads. The upper end of *A* opens into a chamber closed by a domed cap (*C*) fixed to the edge of *B*, and by an annular horizontal trough (*D*) connecting the upper ends of *A* and *B*. *D* serves to collect H₂O and tar which condenses on *C*. The apparatus is adapted for use as a suction gas producer for power purposes. A. B. M.

Manufacture of illuminating gas. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 431,489, 11.4.34).—Gases from the low-temp. carbonisation or hydrogenation of coal, the cracking of oil, etc., which are unsuitable for direct use as town's gas, are blown, together with steam and/or CO₂ if desired, into a gas producer operated with finely-divided fuel kept in movement similar to that of a boiling liquid (cf. B.P. 214,544; B., 1924, 549), the producer being simultaneously blown with a gas rich in O₂, together with steam and/or CO₂ if desired, in such amounts that the resulting gas contains 20–30% of CH₄. A. B. M.

Gas purification. A. L. WARD and C. W. JORDAN, Assrs. to UNITED GAS IMPROVEMENT CO. (U.S.P. 1,976,704, 9.10.34. Appl., 16.7.32).—The gas is freed from N oxides by treatment with a metal sulphide, *e.g.*, FeS, to which preferably an alkali or alkaline-earth carbonate has been added. The subsequent polymerisation of the gum-forming constituents (styrene, indene, etc.) is thereby inhibited. A. B. M.

Treatment of [town] gas. W. VON PIOTROWSKI and J. WINKLER (U.S.P. 1,977,101, 16.10.34. Appl., 30.8.33. Poland, 12.11.32).—Products (b.p. 150–250°) obtained by the oxidation of mineral oils are used in place of tetralin for preventing deposition of C₁₀H₈ in gas mains. E. H. M. B.

Distillation of tar. S. P. MILLER, Assr. to BARRETT CO. (U.S.P. 1,976,243, 9.10.34. Appl., 6.8.29).—The tar is distilled, by direct contact with hot gases from a coal-

carbonisation plant, to produce a pitch of m.p. 65–77°, and the resulting gases and vapours are passed successively through a rectifying column (*R*) and a fractional condensing system (*C*). Oils of relatively high boiling range and low tar-acid content are condensed in the first section of *C* and returned to *R*. Oils of relatively low boiling range and high tar-acid content are condensed in the other sections of *C* and collected. A. B. M.

Treatment of tars. L. WITTENBERG, Assr. to BARRETT CO. (U.S.P. 1,976,908, 16.10.35. Appl., 28.10.29).—Pitch of high free C is obtained from coke-oven tar or water-gas tar of low free C by distilling until decomp. and free C formation occur. Distillate oils are added to the residue and the mixture is redistilled. Mixing with gas tar is avoided. E. H. M. B.

(A) **Treatment of, (B) treated, bitumen.** O. R. DOUTHETT, Assr. to BARBER ASPHALT CO. (U.S.P. 1,979,676–7, 6.11.34. Appl., [A] 8.6.28, [B] 14.4.30).—Bitumen of low susceptibility to temp. changes and of high m.p. for a given consistency is obtained by blowing heated bitumen, or mixed asphaltic and paraffin-base petroleum residues, with a mixture of air and a small proportion of gaseous halogen (Cl₂; 1–10% of the residuum treated) at 232–315° (245–275°), the product being finally blown with steam. The product contains > 0.53% of halogen and is substantially free from undesirable, non-volatile, Cl-decomp. products. C. C.

Cracking of oils. G. ZOTOS (B.P. 432,736, 19.2.34).—Heavy oils are cracked by means of superheated gases or vapours in a reaction chamber (*R*) the temp. of which is controlled by a heat exchanger (contained in *R*) through which pass the materials to be superheated. C. C.

Manufacture of hydrocarbon oils by treatment of distillable carbonaceous materials at elevated temperatures and in presence of catalysts and/or surface-active materials. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 432,638, 25.1.34).—Coals, tars, mineral oils, etc. are heated in liquid phase in presence of 0.1–10% of finely-divided catalyst, *e.g.*, compounds of a metal of group V or VI, and/or surface-active material, with or without H₂ under pressure. Between the preheater and the reaction chamber the material passes through a settling vessel from the bottom of which oil richer in catalyst is withdrawn and returned to the preheater. C. C.

Resolution of [water-in-oil] emulsions. C. TYLER, Assr. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,980,118, 6.11.34. Appl., 18.7.31).—Oilfield (etc.) emulsions are resolved by adding 0.5–2% of H₂O-insoluble aliphatic alcohol (I) containing C₄–C₇ or above C₈, *e.g.*, a mixture of (I), b.p. 100–210°, obtained by catalytic hydrogenation of a C oxide under high pressure. C. C.

Separation of wax from hydrocarbon oils. R. E. MANLEY, Assr. to TEXAS CO. (U.S.P. 1,980,071, 6.11.34. Appl., 20.4.31).—In solvent processes of dewaxing mineral oils (in which chilled mixtures of solvent and oil are filtered) after a cake of wax of desired thickness has been built up in the filter-press, the dissolved oil-wax mixture passing through the filter is replaced by chilled pure solvent which removes oil from the wax. Retained

solvent is finally removed by forcing cool gas through the washed cake. C. C.

Treatment of hydrocarbon oils. R. F. DAVIS, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,980,189, 13.11.34. Appl., 21.5.31).—Heterocyclic S compounds, *e.g.*, thiophens, are removed from the lighter hydrocarbon distillates by treatment with halogen in presence of a catalyst, *e.g.*, Fe or Al for Cl₂ and Br, HgO for I. The mixture is then heated with a hydrogenated derivative of a heterocyclic N compound containing < 5 members in the ring, *e.g.*, piperidine and its homologues, with or without added alkali. C. C.

Refining of hydrocarbon liquids. ANGLO-IRANIAN OIL Co., LTD., F. B. THOLE, and S. F. BIRCH (B.P. 433,197, 3.1.34).—Hydrocarbon liquids, *e.g.*, kerosene, are refined by extraction with, *e.g.*, liquid SO₂. The lower layer containing aromatics, after separation, is cooled to 11–22° below the extraction temp. Two layers are again formed, the lower being richer in aromatics than is the normal extract. C. C.

Production of sulphonation products from mineral oil, tar oils, or the like rich in sulphur. E. A. WERNICKE (B.P. 432,797, 2.1.34. Ger., 11.1.33).—Oils containing < 2% S are first refined by treatment with, *e.g.*, < 80 (70)% H₂SO₄, NaOH, AlCl₃, etc. to remove colouring and resinifying impurities without removing S. The product is carefully sulphonated either in the cold or with H₂SO₄ slightly > 80%, or using a diluent for the oil such as the unsulphonatable residue from previous sulphonations. Sulphonation may be repeated with acid of increasing concn. After neutralisation, the undissolved portion is separated. The products are used for making pharmaceutical preps. C. C.

Reclaiming or refining of petroleum oils. G. R. PIERCE and L. B. DENNING (B.P. 433,876, 22.2.34).—Used crank-case oils are agitated with clay, *e.g.*, bentonite, and heated, whereby volatile constituents are vaporised. The hot oil is filtered under gaseous pressure and the filtered oil then passes through a cooler metal tube (of Cu), whereby residual entrained C or carbonaceous material is deposited on the interior of the tube. C. C.

Transformation of mixtures of alcohols and fatty or aromatic hydrocarbons into highly anti-knock economical fuels for internal-combustion engines. SOC. ANON. CARBURANTI ITALIA, and E. LIVRAGHI (B.P. 433,410, 4.12.34. It., 4.12.33).—The mixture, containing 20–75% of the alcohol, is introduced as a fine spray into a reaction vessel (Fe) heated to < 150° above the b.p. of the least volatile component (400–600°/1 atm.). The condensate has a lower boiling range than the original mixture and is used directly as a fuel. H. A. P.

Treatment of [hydrocarbon] oils with an alkaline sulphide. W. A. SCHULZE and F. E. FREY, Assrs. to PHILLIPS PETROLEUM Co. (U.S.P. 1,980,555, 13.11.34. Appl., 17.1.32).—Hydrocarbon oils, *e.g.*, kerosene, gasoline, which have been refined by treatment with Cu salts are stabilised against discoloration and gum formation by treatment at room temp. with a 0.5–10%

solution of an alkali or alkaline-earth sulphide, preferably with addition of 5–10% NaOH solution. C. C.

[Gum inhibitors for] motor fuels. C. W. HANNUM, Assr. to GASOLINE ANTIOXIDANT Co. (U.S.P. 1,980,200–1, 13.11.34. Appl., [A] 12.2.32, [B] 18.2.32).—The addition of approx. 0.005% of (A) disubstituted (alkyl or aralkyl) aminophenols, *e.g.*, *o*- or *p*-benzylmethyl-, or *o*-, *m*-, or *p*-dibenzyl-aminophenol, and (B) a benzylideneaminophenol, *e.g.*, *p*-benzylidene-, *p*-cinnamylidene-, or *p*-*o*-chlorobenzylidene-aminophenol, is claimed to inhibit gum formation on storage. H. A. P.

Refining of aeroplane engine oil. A. B. BROWN and A. W. NEELEY, Assrs. to STANDARD OIL Co. (INDIANA) (U.S.P. 1,980,377, 13.11.34. Appl., 12.9.30).—Ash-free lubricating oil of specially low η -temp. coeff. is prepared from mixed- or paraffin-base oils (first diluting, if necessary, with kerosene or gas oil) by treating the oil first with 93% H₂SO₄ at 82° and then with 104.5% H₂SO₄. Refractory sulphonic acids and soaps left in solution are removed from the sour oil by treatment with anhyd. AlCl₃. The oil is then separated from sludge and neutralised etc. C. C.

Organic compositions [liquid lubricants] and uses therefor. W. A. CUSTER (U.S.P. 1,976,716, 16.10.34. Appl., 3.3.30).—Liquid lubricants are prepared by dissolving a cellulose ester of low η in esters of high b.p. (300°). Such esters are the phthalates, malates, succinates, and benzoates of Et, Bu, amyl, CH₂Ph, and glycol radicals. The η vals. may be altered by adding high-boiling aromatic solvents or petroleum distillates, and the surface tensions by adding soaps. E. H. M. B.

Production of hydrocarbon lubricating oils. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 433,061, 28.2.34).—Hydrocarbon oils poor in H (preferably freed from asphalt, *e.g.*, by liquid C₃H₈) are subjected to voltolisation, using 2000–10,000 volts and a frequency of 500–10,000 hertz. The product is hydrogenated at 250–500° (350–420°)/20–500 atm. in presence of oxides, sulphides, or halides of metals of groups IV–VIII (V–VI). C. C.

Lubricating oil process. V. VOORHEES and J. A. ANDERSON, Assr. to STANDARD OIL Co. (U.S.P. 1,980,649, 13.11.34. Appl., 30.6.32).—Lubricating oil distillates, *e.g.*, from mixed-base crudes, are diluted under pressure with liquid of high fluidity, *e.g.*, liquid C₂H₆. Asphaltic matter may be separated at 10–38°. The separated liquid is cooled, *e.g.*, to –18° to –46°, to ppt. paraffin wax, and the residual solution is further refrigerated to –46° to –130°, whereby the paraffinic oil fraction is crystallised. The latter is separated and melted to give a lubricating oil of high η index, high sludge stability, and low pour test. C. C.

Lubricating and like oils, and greases. STANDARD OIL DEVELOPMENT Co. (B.P. 433,257, 18.1.35. U.S., 7.4.34).—The addition to lubricating oils etc. of organo-metallic compounds of groups II, III, or V, *e.g.*, Hg(C₆H₅Me)₂, BiPh₃, C₁₀H₇HgI, "Cd dicresyl," "cresyl-phenyl Zn," and "trinaphthyl- α -propyl bismuthine" [0.01–0.5 (0.2)%], is claimed to retard oxidation at 200–250° and reduce sludging. H. A. P.

[Extreme-pressure] lubricants. STANDARD OIL DEVELOPMENT Co. (B.P. 434,056, 13.10.34, U.S., 21.11.33).—Lubricants particularly suitable for hypoid gears consist of a hydrocarbon base oil (η Saybolt at 99°, 50–250 sec.) containing a sol. Pb compound, *e.g.*, oleate, naphthenate, or sulphonate, or Pb salts of acids obtained by oxidation of paraffin wax, and 0.2–1.5% of corrosive S (free S, org. polysulphides, or sulphurised mineral, animal, vegetable, or marine oil) in such proportions that the ratio of Pb to corrosive S is \leq 6:1. C. C.

Separating mixed materials. Carrying out reactions with gases.—See I. Recovering fatty acids from petroleum. Halogenated hydrocarbons. Desulphurising petroleum phenols.—See III. Sheet-like composition.—See V. S.—See VII. Hydraulic binding agents. Artificial slabs.—See IX. Varnish remover.—See XIII. Rubber-asphalt dispersion.—See XIV.

III.—ORGANIC INTERMEDIATES.

Chlorination of methane. Preparation of carbon tetrachloride. A. I. KIPRIANOV and T. S. KUSNER (J. Appl. Chem. Russ., 1935, 8, 673–684).— CCl_4 is obtained in 90% yield when a 1:4:8 mixture of CH_4 , Cl_2 , and HCl is passed over active C at 250° (initially). Apparatus for continuous production is described.

R. T.

Hydrolysis of chlorobenzene in the vapour phase. D. TISCHTSCHENKO, R. GUTNER, S. FAERMAN, and M. SCHTSCHIGELSKAJA (J. Appl. Chem. Russ., 1935, 8, 685–694).—The optimum temp. of hydrolysis of PhCl (I) by H_2O in presence of Ca, Sr, Ba, Mg, or Cu chlorides is 550–600°; pyrolysis of the resulting PhOH is least when the catalyst consists of SiO_2 gel 90, MgCl_2 10%, CuCl_2 traces, and the reaction mixture contains 0.7 g. of H_2O per g. of (I), when the yields are: PhOH 47, unaltered (I) 30.7, HCl (as 24% acid) 60.6% of theory. The aq. HCl obtained contains 3–4% of PhOH, from which it is largely separable by fractional distillation.

R. T.

Determination of *m*-xylene in technical mixtures. A. V. SCHAROPOVA and I. V. PROSCHTSCHIN (Ukrain. Chem. J., 1935, 10, 176–186).—Ordinary HNO_3 , *d* 1.4, can be substituted for that recommended by Reichel (B., 1931, 1040).

R. T.

Acids from lupulin.—See II.

See also A., Sept., 1104, Dehydrating EtOH. 1105, Electrolysis of nitrate-acetate mixtures. 1107, Prep. of metacetaldehyde. 1111, Prep. of guanidine nitrate. 1113, Reduction of NO_2 -compounds. 1114, Oxidation of PhMe in solution. Prep. of *m*-xylyl chloride. Prep. of mixed halogen derivatives of xylenes. 1116, Hydrogenation of anthracene. 1123, Prep. of β - NH_2 -acids. 1180, Components of Shaohsing-Chiu.

PATENTS.

Production of olefines. G. A. PERKINS, Assr. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,982,536, 27.11.34. Appl., 20.1.32).—Conjugated hydrocarbons, *e.g.*, butadiene, isoprene, are hydrogenated at 200–300°

(250°)/1 atm. in presence of Cu or Cu-Cr on SiO_2 or other support. Negligible amounts of saturated hydrocarbons are formed.

H. A. P.

Manufacture of ethylene oxide. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 434,011, 29.3.35. Holl., 26.4.34).—Org. salts (oxalate) of Ag, decomposed by heating, *e.g.*, at 300°, and containing traces of Cu, Au, Fe, or Mn as activators if desired, are claimed as catalysts for the oxidation of C_2H_4 .

A. W. B.

Production of alcohols. H. D. ELKINGTON. From N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 433,868, 20.2.34).—An aq. solution of a Zn salt and an inorg. acid (ZnSO_4 and H_2SO_4) is claimed as a catalyst for the hydration of olefines of \leq C_3 at high temp. $>$ 1 atm., *e.g.*, at 285°/3000 lb. per sq. in. Cu or monel metal reaction chambers are suitable.

A. W. B.

Manufacture of alcohols of high mol. wt. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 433,869, 21.2.34).—Aldehydes of \leq C_2 , *e.g.*, CHMe:CH:CHO , PrCHO , $\text{C}_{17}\text{H}_{35}\text{CHO}$, are induced to undergo a type of aldol condensation at \geq 80° (20–40°) in presence of *sec.*-amines, *e.g.*, NHEt_2 , piperidine, morpholines, hydroquinolines, and oxides or hydroxides of metals of groups II and III, *e.g.*, Ca, Sr, Mg, Al, or salts having a basic action, *e.g.*, Na_2HPO_4 , NaOAc , as catalysts. The products are then hydrogenated, with the usual catalysts, *e.g.*, Cu, Ni, Co, at 100–200°. Octyl and higher mono- and poly-hydric alcohols are obtained.

A. W. B.

Processing of alcohols. J. C. WOODHOUSE, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,979,303, 6.11.34. Appl., 27.12.32).—Mixed higher alcohols of b.p. $>$ that of MeOH ($>$ 165°), as obtained by hydrogenation of oxides of (C), are decolorised by keeping over an alkali metal, *e.g.*, Na, for 3 days, decanting from unchanged Na, and distilling.

A. W. B.

Manufacture of organic esters. W. S. WILSON, Assr. to MERRIMAC CHEM. Co., INC. (U.S.P. 1,979,515–6, 6.11.34. Appl., [A] 11.1.34, [B] 9.6.34).—(A) A dialkyl sulphate, *e.g.*, Et_2SO_4 , is hydrolysed, by boiling with \leq half of its wt. of H_2O , to alkyl H sulphate, the alcohol, and H_2SO_4 . To this mixture a (Ca) salt of a fatty acid, *e.g.*, AcOH, is added, equiv. to about 80% of the total alkyl radical present, and the mixture is distilled. Yields of 94% of ester, *e.g.*, EtOAc, are claimed. (B) is confined to the manufacture of Et, Pr², and Bu acetates and covers the use of AcOH instead of a salt thereof.

A. W. B.

Manufacture of alkylsulphonic acids. IMPERIAL CHEM. INDUSTRIES, LTD., and A. DAVIDSON (B.P. 433,312, 13.2.34).—An alkyl (C_{10-18}) ester of an inorg. acid is heated in a closed vessel with an aq. solution of a sulphite at 120–150° in presence of an arylamine and a phosphate or of an arylaminophosphoric acid. *E.g.*, $\text{C}_{16}\text{H}_{33}\text{OSO}_3\text{Na}$ and Na_2SO_3 in presence of $\text{PO}(\text{NHPh})_2\text{OH}$ at 130–140° give $\text{C}_{16}\text{H}_{33}\text{SO}_3\text{Na}$ in quant. yield.

H. A. P.

Production of trialkyl esters of phosphoric acid. CONSORT. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 433,927, 22.2.35. Ger., 18.4.34).—Alcohols, *e.g.*, EtOH, BuOH, are treated with POCl_3 at \geq 50°. The mixture is then neutralised with dry NH_3 in the cold, the NH_4Cl filtered off, and the ester obtained by frac-

tional distillation. Yields of 86—95% of theory are claimed. A. W. B.

[Preparation of] sulphated condensation products of fatty acids and monoethanolamine. J. W. ORELUP (U.S.P. 1,981,792, 20.11.34. Appl., 17.6.33).—A C_{10-18} *n*-aliphatic acid, *e.g.*, the acids of coconut oil (C_{12-14} fraction), is heated with excess β - $NH_2 \cdot C_3H_7 \cdot OH$ until the acid val. falls to < 5 , and the product is heated with 100% H_2SO_4 at 30—35° until completely sol. in H_2O . A wetting agent is obtained. H. A. P.

Purification of aliphatic monocarboxylic acid esters. W. J. BANNISTER and I. J. KRCHMA, Assrs. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,980,711, 13.11.34. Appl., 15.9.30).—Esters are largely freed from unchanged alcohol, *e.g.*, BuOAc from BuOH, by extraction with H_2O . A. W. B.

Recovery of fatty acids or their salts [from oxidation of petroleum products]. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 433,780, 14.2.34).—Fatty acids (or their soaps), free from undesirable OH-acids, lactones, etc., are obtained by heating the crude products of the oxidation of, *e.g.*, paraffin wax or petroleum oils, during or after saponification under pressure at $> 200^\circ$ in presence of alkaline agents [$NaOH$, $Ca(OH)_2$] and H_2 (preferably evolved from suitable added substances in presence of the alkali). The addition of hydrogenation catalysts and of substances promoting the splitting-off of H_2O (which should be removed during the treatment) is advantageous. E. L.

Preparation of organic acids. (A, B) G. B. CARPENTER, (C, D) J. C. WOODHOUSE, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,979,449—50 and 1,979,518—9, 6.11.34. Appl., 23.2.31).—(A) Aliphatic alcohols, esters, or ethers are treated with CO (purified), which may contain an inert diluent, *e.g.*, N_2 , H_2O , at $> 300^\circ/25-900$ (350—700) atm. over activated C which may contain 5—10% of a promoter, *e.g.*, SiO_2 , Al_2O_3 , TiO_2 . The invention applies particularly to the prep. of AcOH from MeOH. (B) covers the use of inorg. polybasic acids, *e.g.*, H_3PO_4 , H_3AsO_3 , or their salts which contain replaceable H. In (c) oxides of metals of sub-groups IVa, Va, and VIa, *e.g.*, Ti, Zr, V, Cr, and in (d) acidic oxides of elements in sub-groups IVb, Vb, and VIb, *e.g.*, As, Si, P, Se, are claimed as catalyst promoters. A. W. B.

Production of carboxylic acids. G. B. CARPENTER, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,981,081, 20.11.34. Appl., 24.8.31).—CO, an olefine (C_2H_4), and steam are passed over an acid salt of the acids of P, As, W, Mo, U, Cr, V, B, Si, or Zr, *e.g.*, Zn H phosphate, $Ca(H_2PO_4)_2$, at 200—400°/25—900 atm. (325—350°/200—700 atm.). H. A. P.

Preparation of calcium lactobionate. H. S. ISBELL, Assr. to GOVT. OF UNITED STATES (U.S.P. 1,980,996, 20.11.34. Appl., 10.4.33).—Lactose is electrolytically oxidised in a solution containing Br and a suspension of $CaCO_3$, and the resulting solution of the double $CaBr_2 \cdot Ca$ lactobionate compound (I) is heated at 90° with an excess of $Ca(OH)_2$ to ppt. $Ca(C_{12}H_{21}O_{12})_2 \cdot 4CaO$, which is separated, washed with aq. $Ca(OH)_2$, and treated with a current of CO_2 . The

resulting pure solution of (I) is evaporated to a syrup and seeded to obtain crystals. A. R. P.

Production of formaldehyde from methane. W. W. TRIGGS. From GUTEHOFFNUNGSHÜTTE OBERHAUSEN A.-G. (B.P. 433,559, 20.3.34).— CH_4 and O_2 (air) together with $< 1\%$ of N oxides (calc. as NO) are passed over a catalyst containing at least one substance selected from the oxides and carbonates of Al, Cr, V, Mo, W, Mn, Ni, and Co, and at least one of the oxides or carbonates of Be, Mg, Ca, Sr, Ba, Cd, Ag, Ti, Ge, Zr, Sn, Ce, Pb, and Th (*e.g.*, BaO 52, $CaCO_3$ 12, CoO 5, ZrO_2 20, and $MgCO_3$ 11%; or $MgCO_3$ 50, Al_2O_3 40, CdO 5, and CeO_2 5%), at 600—750° (680—725°). H. A. P.

Manufacture of wetting, washing, and dispersing agents. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 433,305, 8.2.34).—The crude air-oxidation products from non-aromatic hydrocarbons, *e.g.*, paraffin wax, are dissolved in an inert org. solvent (I) (or mixture of solvents), *e.g.*, C_6H_6 , Et_2O , and the solution is extracted with an aq. alkali or org. base. The soap solution thus obtained is further purified by extraction with (I) and evaporated. H. A. P.

Apparatus [electric furnace] for producing diphenyl. W. H. WILLIAMS, Assr. to DOW CHEM. CO. (U.S.P. 1,981,015, 20.11.34. Appl., 23.12.32).—Apparatus suitable for the process of U.S.P. 1,925,784 (B., 1934, 618) is claimed. It consists of an electric furnace so designed that formation of tar and Ph_n is reduced by rapid cooling of the gaseous reaction product. A. W. B.

Manufacture of sodium diphenyl-*p*-sulphonate. W. C. STOESSER and R. F. MARSCHNER, Assrs. to DOW CHEM. CO. (U.S.P. 1,981,337, 20.11.34. Appl., 26.7.30).— Ph_2 is sulphonated with H_2SO_4 or oleum in a solvent, *e.g.*, C_6H_6 , CCl_4 , or $PhNO_2$ at 10—100° (20—70°). The mixture is poured into H_2O and Na diphenyl-4-sulphonate is pptd. by neutralising the aq. layer or salting out. The product may be recryst. from H_2O . Yields of 84—97% on reacted Ph_2 are claimed. A. W. B.

[Preparation of] halogenated hydrocarbon compounds. BRIT. THOMSON-HOUSTON CO., LTD. (B.P. 433,072, 4.4.34. U.S., 4.4.33).—Non-cryst. halogenated compounds of the CH_2Ph_2 or $CHPh_3$ series are prepared by interaction of CH_2PhCl , $CHPhCl_2$, $CPhCl_3$, etc., or their halogenated derivatives with C_6H_6 (excess) or halogenobenzenes and $AlCl_3$. The products are non-sludging, non-inflammable transformer oils, and, if sufficiently halogenated, do not give inflammable vapours in the electric arc. H. A. P.

Production of organic nitro-compounds [chloro-nitrobenzenes]. M. A. DAHLEN and W. L. FOOHEY, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,981,311, 20.11.34. Appl., 23.6.33).—A mixture of *o*- (I) and *p*- $C_6H_4Cl \cdot NO_2$ (II), *e.g.*, the eutectic mixture obtained in the prep. of (II) from $PhCl$ is subjected to partial nitration ($1HNO_3 : 2H_2SO_4$ at 60—65°); (I) is thus preferentially nitrated to 1:2:4- and 1:2:6- $C_6H_3Cl(NO_2)_2$, which are separated from (II) by distillation followed by crystallisation to remove unchanged (I). H. A. P.

Manufacture of aminoalkylated amines. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 433,625, 17.2.34).—A primary or *sec.*-amine (I) is heated with an aminoalcohol (II) in presence of acid or basic catalysts, *e.g.*, P_2O_5 , HPO_3 , BPO_4 , $ZnCl_2$, $AlCl_3$, alkali or alkaline-earth metals, Mg, or Al; alternatively, an acyl derivative of (I) is heated with a metallic derivative of (II). *E.g.*, NH_2Ph , β - $NEt_2 \cdot C_2H_4 \cdot OH$ (III), and P_2O_5 in xylene, or $NHPb \cdot CHO$ and the Na derivative of (III) in decahydronaphthalene, in both cases at the b.p., give β -diethylaminoethylamine, b.p. $145^\circ/14$ mm. (*picrate* m.p. 107 — 108°). Other examples describe the prep. of: 1- β -diethylaminoethylaminopyridine, b.p. 157 — $160^\circ/16$ mm.; 6-chloro-8- β -diethylaminoethylaminoquinoline, b.p. 183 — $185^\circ/0.3$ mm. (*hydrochloride*, m.p. 139°); 8- β -diethylaminoethylamino-, b.p. 181 — $185^\circ/0.1$ mm. (*hydrochloride*, m.p. 207°), and 8- γ -diethylaminopropylamino-6-methoxyquinoline, b.p. 195 — $200^\circ/0.1$ mm. (*hydrochloride*, m.p. 237° ; *hydriodide*, m.p. 208°); 2- α -diethylamino- δ -amylaminonaphthalene, b.p. $195^\circ/1$ mm.; 8- α -diethylamino- δ -amylamino-6-methoxyquinoline, b.p. 196 — $198^\circ/3$ mm.; *benzyl*-, b.p. $135^\circ/1.5$ mm., *butyl*-, b.p. 87 — $90^\circ/10$ mm., and *dodecyl*- β -diethylaminoethylamine, b.p. 195 — $210^\circ/3$ mm.; 4-, m.p. 78 — 79° , b.p. 183 — $186^\circ/2$ mm., and 2- γ -piperidino- β -dimethylpropylaminopyridine, b.p. 186 — $188^\circ/14$ mm.; α -diethylamino- δ -amylamine, b.p. $175^\circ/14$ mm.; *methyl*- β -diethylaminoethylamine, b.p. 145 — $146^\circ/15$ mm. (*picrate*, m.p. 113°); NN' -bis- β -diethylaminoethyl-*m*-phenylenediamine, b.p. 208 — $212^\circ/1$ mm.; bis- β -diethylaminoethyl-, b.p. $190^\circ/13$ mm., β -*n*-butylaminoethyl-, b.p. 144 — $145^\circ/5$ mm. (*picrate*, m.p. 145 — 147°), (?)bis-*n*-butylaminoethyl-, b.p. 190 — $191^\circ/5$ mm. (*picrate*, m.p. 167°), and β -aminoethyl-aniline, b.p. 153 — $155^\circ/25$ mm. (*dihydrobromide*, m.p. 198°).

H. A. P.

Desulphurisation of recovered petroleum phenols. J. C. D. OOSTERHOUT, ASSR. to TEXAS CO. (U.S.P. 1,982,120, 27.11.34. Appl., 11.5.33).—Thio-phenols are removed by passage of the vapours over weathered Pb sludge (PbS pptd. from Na plumbite) at approx. $55^\circ >$ the b.p. of the phenols (260°). Spent sludge is reactivated by exposure to air (in presence of aq. NaOH) or by blowing with air or flue gases.

H. A. P.

Preparation of phenol derivatives. F. E. STOCKELBACH, ASSR. to H. F. FRIES (U.S.P. 1,982,180, 27.11.34. Appl., 30.10.31).—4-*tert.*-Butyl-, m.p. 23.1° (stable), 34 — 35° (labile), b.p. 255 — 257° ; and 4-*tert.*-amyl-*m*-cresol, b.p. 254 — 256° , are prepared by interaction of the alcohol, *m*-cresol, and $ZnCl_2$. They have antiseptic properties.

H. A. P.

Separation of (A) *m*-cresol from *m*-cresol-*p*-cresol mixtures, (B) *p*-cresol from a liquid phenolic mixture. F. COMTE, ASSR. to MONSANTO CHEM. CO. (U.S.P. 1,980,384—5, [A, B] 13.11.34. Appl., 25.11.33).—(A) In the process of B.P. 107,961 (B., 1918, 235 A) for the separation of *m*-cresol (I) from a mixture with *p*-cresol (II) containing traces of *o*-cresol and xylenols, an inert, non-aq. solvent for (I) [petroleum naphtha of b.p. 90 — 100° (III)] is now used and, after isolation by filtration, the additive compound is boiled with further (III), the freed (I) dissolving and the ppt. of NaOAc, after washing with (III), being suitable for immediate re-use. (I),

isolated by evaporation from (III), is of 97% purity. (B) Mixtures as above, in (III), are treated with anhyd. $H_2C_2O_4$ (IV), boiling for 10 min., and filtering off the additive compound of (largely) (II) and (IV). This is heated at 70 — 80° to decompose additive compounds other than (II)–(IV), which is the most stable, filtered, and the residue of (II)–(IV) boiled with further (III). The (II), isolated from (III), is of 96—98.5% purity.

A. W. B.

[Preparation of] intermediates for rhodamine dyes. L. P. KYRIDES, ASSR. to NAT. ANILINE & CHEM. CO., INC. (U.S.P. 1,981,515, 20.11.34. Appl., 1.12.28).—The prep., as rhodamine intermediates, of *m*- (or 4-) hydroxy-*sec.*-alkyl-anilines or -*o*-toluidines is claimed. *E.g.*, *o*- $C_6H_4Me \cdot NHPr^a$, b.p. 215 — 220° , is sulphonated (31.5% oleum at 75°), and the mixed 4- and 5-sulphonic acids are fused with KOH-NaOH (13:3); 2-isopropylamino-*p*-cresol (I), m.p. 94.5° , alone is formed. Iso-Propylmetanilic acid is prepared by heating *m*- $NH_2 \cdot C_6H_4 \cdot SO_3Na$ with Pr^aCl and Na_2CO_3 in Pr^aOH at 130 — 150° , and converted by fusion with alkali into *m*-isopropylaminophenol, m.p. 99.5 — 100° . The conversion of (I) into a rhodamine base (*Me ester chloride*) is described.

H. A. P.

Production of aralkylarylcarboxylic acids. A. O. JAEGER and L. C. DANIELS, ASSRS. to AMER. CYANAMID & CHEM. CORP. (U.S.P. 1,981,360, 20.11.34. Appl., 27.2.31).—Phthalide and its derivatives are condensed ($AlCl_3$) with a C_6H_6 compound other than C_6H_6 . Examples describe the prep. of 2-methyl- and 2-*p*-chloro-benzyl-*o*-benzoic acid.

H. A. P.

Ester of hydroxybenzoic acid. L. P. KYRIDES, ASSR. to MONSANTO CHEM. CO. (U.S.P. 1,979,559, 6.11.34. Appl., 6.6.32).—The prep. of dicarboxylic acid esters of aryl, aralkyl, or alkyl esters of $OH \cdot C_6H_4 \cdot CO_2H$ by known methods is claimed. In an example *phthaloyl di(methylsalicylate)*, m.p. 116° , is prepared from *o*- $C_6H_4(COCl)_2$ and *o*- $OH \cdot C_6H_4 \cdot CO_2Me$.

A. W. B.

Wetting agents. E. LURIE (U.S.P. 1,980,543, 13.11.34. Appl., 13.6.31).— $C_{10}H_8$ is treated with alkyl or aryl chlorides in presence of $AlCl_3$, and the product is sulphonated. In examples, Bu^iCl and *tert.*- $C_5H_{11}Cl$ are used.

A. W. B.

Wetting and washing agent. H. and C. FLESCHE, and L. E. ABELMANN (B.P. 433,206, 7.2.34. Ger., 7.2.33).—The addition to textile treatment baths of partial esters of naphthenic acids with unetherified polyhydric alcohols, *e.g.*, the monoglyceride, is claimed.

H. A. P.

Manufacture of acenaphthene derivatives. IMPERIAL CHEM. INDUSTRIES, LTD., M. WYLER, and A. KERSHAW (B.P. 432,885, 5.1. and 7.5.34).—Carboxylic acids are prepared by interaction of acenaphthene or its 5-carboxyalkylanilides with a phenylalkylcarbonyl chloride and $AlCl_3$ (alone, or in a solvent, *e.g.*, light petroleum, PhCl, at 70 — 80°), and hydrolysing the product (KOH-EtOH, 60% H_2SO_4). The prep. of acenaphthene-5-carboxylic acid, m.p. 219° (*ethylamide*, m.p. 158° ; *ethyl-*o*-toluidide*, m.p. 134°), and -5:6-dicarboxylic acid, m.p. 294° (*diethylamide*, m.p. 217°), is described.

H. A. P.

Manufacture of pure 1-amino-2:3-dimethylanthraquinone. O. BAYER, Assr. to GEN. ANILINE WORKS, INC. (U.S.P. 1,980,162, 13.11.34. Appl., 22.1.34. Ger., 4.2.33).—Mixed 1:2- and 1:3-dimethylanthraquinones are nitrated with ≤ 1 mol. of HNO_3 in H_2SO_4 at $\geq 0^\circ$, the NO_2 -compound obtained is reduced (Na_2S), and the NH_2 -compound crystallised from excess of dil. aq. H_2SO_4 as its sulphate (I) at 40° . Practically pure 1-amino-2:3-dimethylanthraquinone is obtained by decomp. (I) with hot H_2O . A. W. B.

Manufacture of quaternary ammonium salts. DEUTS. HYDRIERWERKE A.-G. (B.P. 433,356, 19.11.34. Ger., 18.11.33).—Alkyl chlorides having $\leq \text{C}_8$ are condensed with piperidine (I) and the product is treated with an alkylating agent ($\geq \text{C}_6$). *E.g.*, cetyl chloride (1 mol.) is heated with (I) (2 mols.) at 100 – 120° for 8 hr., and the product filtered from (I) hydrochloride and treated with Me_2SO_4 .

Pyranthrone intermediates.—See IV. Wax-like substances.—See XII.

IV.—DYESTUFFS.

See A., Sept., 1072, Degree of dispersion of dyes. 1129, Benzopyrilium-type dyes.

PATENTS.

Manufacture of conversion products of azo dyes [for dyeing leather]. J. R. GEIGY A.-G. (B.P. 427,771, 12.9.34. Ger., 15.9.33. Addn. to B.P. 306,447; B., 1930, 316).—The process of the prior patent is extended to azo dyes of the type: NH_2Ar (I) \rightarrow middle component (II) \rightarrow resorcinol $\leftarrow \text{NH}_2\text{Ar}'$ (III), where (I) = NH_2Ph , its homologues, NO_2 -, Cl -, and SO_3H -derivatives, naphthionic acid, 3-amino-5-sulphosalicylic acid, nitroaminodiphenylaminemonosulphonic acids, or picramic acid; (II) = *m*-aminophenol-*p*-sulphonic acid, α - $\text{C}_{10}\text{H}_7\text{-NH}_2$, Cleve acid, or γ -acid; (III) = (I) or *p*-aminoazobenzene-*p'*-sulphonic acid. C. H.

Manufacture of chromiferous [azo] dyes. Soc. CHEM. IND. IN BASLE (B.P. 427,922, 3.4.34. Switz., 4.4.33).—Glyceryl chromite (I) or other complex formed from an org. OH-compound and alkaline $\text{Cr}(\text{OH})_3$ is used for chroming in substance mixtures of chromable azo dyes comprising ≤ 1 dye: *o*-aminonaphthol-mono-, di-, or tri-sulphonic acid $\rightarrow \alpha$ - (II) or β - $\text{C}_{10}\text{H}_7\text{-OH}$ (III). Examples are: 1:2:4- $\text{NH}_2\text{-C}_{10}\text{H}_5(\text{OH})\text{-SO}_3\text{H}$ (IV) \rightarrow (II) with (IV) \rightarrow (III) or phenylmethylpyrazolone, chromed with (I) (navy-blue on wool); (IV) \rightarrow (III) with *o*-aminophenol-4:6-disulphonic acid \rightarrow (III), chromed with sucrose chromite (navy-blue). C. H.

Manufacture of yellow monoazo dyes capable of being chromed. I. G. FARBENIND. A.-G. (B.P. 428,535, 15.11.33. Ger., 15.11.32).—A diazotised 3-halogenoanthranilic acid is coupled with a pyrazolone, *e.g.*, 1-*p*-sulphophenyl- or 1-(3'-sulpho-6'-phenylsulphonyl)-3-methyl-5-pyrazolone. C. H.

Production of [mono]azo dyes [pigments]. E. I. DU PONT DE NEMOURS & Co., and H. E. WOODWARD (B.P. 428,697, 17.11.33).—Reddish-yellow to orange pigments are made by coupling a diazotised nitroaniline carrying halogen or alkoxy substituents and no SO_3H

or CO_2H with acetoacetic 2:5-dialkoxyanilide. Examples are: 2:5-dimethoxyanilide \leftarrow 4-chloro-2-nitroaniline (m.p. 235.5 – 237°), 3-nitro-*p*-anisidine, or 2-chloro-4-nitroaniline. C. H.

[Preparation of] azo dyes [ice colours]. M. A. DAHLEN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,978,783, 30.10.34. Appl., 8.12.31).—The use as coupling components of bis-2:3-hydroxynaphthoyl derivatives of $\beta\beta'$ -bis(aminoaryloxyethyl) ethers (I) free from solubilising groups is claimed. Examples of (I) are $\beta\beta'$ -bis-*p*- and -*o*-aminophenoxy-, 4-chloro-2-aminophenoxy-, 3-amino-*m*-tolylloxy-, and 5-amino-*o*-anisoxy-diethyl ether. Shades varying from orange to red, blue, and bluish-black, of good fastness to light, Cl_2 , and washing, are obtained with the common diazo components. H. A. P.

Dyestuff preparations. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 428,390, 13.11.33).—Dyes, lakes, or pigments are standardised by dilution with H_2O -sol. products made by hydrolytic degradation of wood or other cellulose material with mineral acid to a degree corresponding with that of dextrin from starch. C. H.

Manufacture of [direct dis]azo dyes. I. G. FARBENIND. A.-G. (B.P. 427,973, 3.11.33. Ger., 5.11.32).—Dyes of the type: a 2:4-dihalogenoaniline-6-sulphonic acid \rightarrow *p*-coupling arylamine of the C_6H_6 series \rightarrow *N*-acyl-J-acid, are made. Examples are: 4:6-dichloro-*m*-toluidine-2-sulphonic acid \rightarrow *m*- $\text{C}_6\text{H}_4\text{Me-NH}_2$ (I) \rightarrow benzoyl-J-acid (red); 2:4-dichloroaniline-6-sulphonic acid (III) \rightarrow (II) \rightarrow J-acid urea or urea from J-acid and *p*- $\text{NH}_2\text{-C}_6\text{H}_4\text{-NHAc}$ (red); (II) \rightarrow *p*-xylylidine \rightarrow acetyl-J-acid (bluish-red). C. H.

Manufacture of trisazo dyes. I. G. FARBENIND. A.-G. (B.P. 430,252, 15.12.33. Ger., 21.12.32).—Green-to blue-black dyes of good fastness to acids for union fabrics are obtained by coupling 1:8:3:6- (I) or 1:8:4:6- $\text{NH}_2\text{-C}_{10}\text{H}_4(\text{OH})(\text{SO}_3\text{H})_2$ (II) with tetrazotised benzidine (III) (acid), followed by a diazotised arylamine (alkaline), the diazo intermediate thus obtained being finally coupled with an *o*-substituted derivative of *m*- $\text{NH}_2\text{-C}_6\text{H}_4\text{-OH}$. Examples are: NH_2Ph \rightarrow (I) [or (II)] \leftarrow (III) \rightarrow 3:6:1- $\text{NH}_2\text{-C}_6\text{H}_3\text{Cl-OH}$ or 4:1:2- $\text{NH}_2\text{-C}_6\text{H}_3\text{Me-OH}$. H. A. P.

Manufacture of water-soluble derivatives of vat dyes and preparations containing the same, and application of the products in dyeing and printing. I. G. FARBENIND. A.-G. (B.P. 428,701, 17.11.33. Ger., 18.11.32).—Leuco-vat dye sulphuric esters are converted into amine salts with amines carrying ≤ 1 hydroxylated alkoxyalkyl group. The salts have improved solubility and are suitable for printing compositions. Examples of amines are products from $(\text{CH}_2)_2\text{O}$ and piperidine or $\text{N}(\text{C}_2\text{H}_4\text{-OH})_3$. C. H.

Manufacture of [acid] dyes of the anthraquinone series. I. G. FARBENIND. A.-G. (B.P. 427,332, 20.10.33. Ger., 21.10.32).—Halogen, OH, etc. in an anthraquinone compound is substituted by NH-Ar-SOR (Ar = arylene, R = alkyl) by reaction with *m*- or *p*-aminoaryl alkyl sulphoxide [or sulphide followed by oxidation with H_2O_2 or $\text{Pb}(\text{OAc})_4$], and a SO_3H group is introduced

at a convenient stage. Examples are: 4-bromo-1-aminoanthraquinone-2-sulphonic acid with *p*-NH₂-C₆H₄-SOMe (I) (blue); leucoquinizarin-6-sulphonic acid with (I), or with *p*-NH₂-C₆H₄-SMe, oxidised (green). C. H.

Manufacture of [pyranthrone] vat dyes and intermediates therefor. E. I. DU PONT DE NEMOURS & Co. (B.P. 427,323, 16.10.33. U.S., 15.10.32).—Pyranthrone (I) is halogenated in presence of anhyd. mild reducing agents (SO₂, HBr, S₂Br₂), preferably in a diluent (PhNO₂, C₆H₄Cl₂, C₂H₂Cl₄) at 20–60°. HBr may be produced *in situ* from Br and traces of NH₂Ph in PhNO₂ diluent. The resulting halogen additive product gives mono-, di-, and tri-halogenated (I) when heated with SO₂Cl₂ at 110–120° or with Cl₂ at 75–80°, and these may be condensed with α-aminoanthraquinones. Examples are: (I) with Br in PhNO₂ (0.17% NH₂Ph.HCl) at 55–60°, converted by SO₂Cl₂ at 65–116° into dibromo- (II) and chlorobromo-pyranthrone (orange to scarlet vat dyes), giving with 1-aminoanthraquinone (IV) an olive-green vat dye; (I) with Br and SOCl₂ in PhNO₂ etc., first at 20–22°, then at 80–115°, to give a new monobromopyranthrone, condensing with (III) to a khaki vat dye; (II) with 1-amino-4-benzamidoanthraquinone (dark green) or 1:5-diaminoanthraquinone (grey). C. H.

[Manufacture of] reduction products of the indigoid series. E. I. DU PONT DE NEMOURS & Co., and A. L. FOX (B.P. 428,690, 13.11.33).—6:6'-Diethoxyindigo is reduced with Na₂S₂O₄ or a formaldehyde-sulphoxylate in absence of added alkali and, if desired, acidified with non-oxidising acid. C. H.

Manufacture of dyes [for wool, silk, and lacquers]. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 428,468, 13.11.33).—A 3:3'-di-indolyl ketone or its chloride (formed by the action of COCl₂ or POCl₃) is condensed with a *sec.* or *tert.*-arylamine or an indole carrying in position 2 a hydrocarbon group. Examples are: 3:3'-di-(2-phenyl-1-methylindolyl) ketone (I) with 3'-ethoxy-4-methyldiphenylamine and POCl₃ in PhMe, disulphonated (blue on wool or silk); (I) with 2-phenyl-1-methylindole, trisulphonated (reddish-violet). C. H.

Manufacture of dyes of the oxazine series. I. G. FARBENIND. A.-G. (B.P. 427,977, 3.11.33. Ger., 3.11.32).—A 2:5-bis(acylaminoarylamino)benzoquinone, which may carry halogen or alkyl in positions 3 and 6, is heated in a high-boiling solvent (PhNO₂, C₆H₃Cl₃) in presence or absence of metal chloride (FeCl₃) and/or an oxidant (NaNO₂), or in presence of an acylating agent (BzCl, CPhCl₃); or is heated with a condensing agent having a sulphonating action (ClSO₃H, H₂SO₄). If necessary the products are sulphonated. Examples are: chloranil (I) condensed with *p*-aminoacetanilide, heated in PhNO₂ with BzCl or FeCl₃, sulphonated (violet on cotton); (I) with *p*-aminobenzanilide, heated as before, sulphonated (reddish-violet); (I) with 4-amino-4'-acetamidodiphenyl, heated as before, sulphonated (bluish-violet). C. H.

Production of [photosensitising] dyes. J. D. KENDALL (B.P. 426,718 and 428,359, 3.10.33).—Rhodanic acid (I) or other 5-membered ring compound containing the grouping ·CH₂·CO·NR· (R = H, alkyl,

aralkyl, or aryl) is condensed (A) with the α- or γ-methylthiol derivative of a heterocyclic quaternary salt, or (B) with a compound NPhY·[CH:CH]_n·CZ:NR'R'(X(Y=H, alkyl, or Ac; Z=H or part of a ring including R; R=Ph or part of a ring including Z; R'=H or alkyl; X=acid group), particularly with an α-anilino vinyl or α-acetanilidovinyl derivative of a heterocyclic quaternary salt. The CH₂ group reacts with (A) the ·SMe or (B) the ·NPhY group, and, by loss of HX, products of the type (A) $\begin{matrix} \text{CS} - \text{S} \\ \text{NH} \cdot \text{CO} \end{matrix} \text{C} : \text{C} \begin{matrix} \text{S} \\ \text{NR}' - \end{matrix}$ or (B) $\begin{matrix} \text{CS} - \text{S} \\ \text{NH} \cdot \text{CO} \end{matrix} \text{C} : \text{CH} : \text{CH} : \text{C} \begin{matrix} \text{S} \\ \text{NR}' - \end{matrix}$ are formed. Examples are: (A) (I) with 2-methylbenzthiazole ethiodide or methotoluene-*p*-sulphonate (II) (m.p. 300°); 2:4-dihydroxythiazole (III) with (II) (m.p. > 310°); thiohydantoin (IV) with (II) (m.p. 310°); (B) (I) with 2-acetanilidovinylbenzthiazole ethiodide (m.p. 232°); (I) with NPhMe·[CH]₅:NPhMeCl (V) (m.p. 305°); (I) with NHPH·[CH]₅:NPh.HCl (m.p. 213°); (I) with 2-acetanilidovinylindolenium iodide (VI) (m.p. 292°); (III) with the 1:3:3-Me₃ derivative of (VI) (m.p. 258°); (IV) with 2-acetanilidovinylbenzoxazole ethiodide (m.p. 305°); (IV) with (V) (m.p. 244°); (I) with NHPH·CH:NPh and quinaldine ethiodide. C. H.

Rhodamine dyes.—See III. **Sensitising dyes.**—See XXI.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Colour principle in Western hemlock ground-wood pulp. C. E. CURRAN, E. R. SCHAFER, and J. C. PEW (Paper Trade J., 1935, 101; T.A.P.P.I. Sect., 91–97).—The reddish colouring matter in the ray cells of Western hemlock (both heartwood and sapwood) is thought to be a tannin or tannin derivative (cf. B., 1934, 1006). The colour is lightened by treatment with cold dil. acids or reducing agents, and darkened by boiling acids and alkalis, boiling alkalis causing the material to swell enormously and finally to dissolve. It is more prevalent in the fine-fibred fraction of the ground pulp, and this is held to indicate that the cells containing it are more highly disintegrated in the grinding process. Bisulphites and hyposulphites are fairly effective in improving the colour of the pulp. Alkaline peroxides, and especially H₂O₂, bleach it satisfactorily, but are of doubtful commercial applicability. H. A. H.

Methods of circulating sulphite cooking liquor. W. ABELE (Papier-Fabr., 1935, 33, 277–278).—A discussion of various aspects of liquor circulation. D. A. C.

Utilisation of maize leaves and stalks for paper manufacture. K. A. DOLGOV (Mat. Centr. Paper Ind. Res. Inst. U.S.S.R., 1934, No. 4, 35–67).—Analytical data for the leaves and stalks of different varieties of maize are recorded. The material is not suitable for better-quality paper, owing to the difficulty of obtaining homogeneous pulp. Preliminary extraction with H₂O or dil. alkali is not desirable, the best cellulose being obtained by direct treatment with NaOH and Na₂SO₃ at 140°. The pulp is, in particular, suitable for manufacture of packing and parchment paper. R. T.

Steam accumulators in paper mills. D. K. DEAN and G. M. CAMERON (Paper Trade J., 1935, 101;

T.A.P.P.I. Sect., 103—109).—The advantages of steam and hot-H₂O storage systems in pulp and paper mills are discussed. H. A. H.

[Paper]-sheet formation on Fourdrinier wire. M. M. RUBIN (Paper Trade J., 1935, 101; T.A.P.P.I. Sect., 67—71).—Factors affecting the formation of paper on the wire are discussed. H. A. H.

Electricity in printing paper. J. BEKK (Papier-Fabr., 1935, 33, 265—269).—The origin and possible methods of elimination of static electricity in paper are discussed. D. A. C.

Printing half-tones on uncoated paper. R. F. SALADE (Brit. Printer, 1935, 48, No. 284, 89—91).—Practical hints are given, with special reference to the selection of inks. D. R. D.

Printing on metal-coated paper. ANON. (Brit. Printer, 1935, 48, No. 284, 88).—Practical hints are given. The ink used should have intense colour and yet be transparent, in order to utilise the lustre of the metal (except where matt effects are aimed at), must adhere well, and should contain 0.25—1 oz. of Co drier per lb. The effects of adding maize starch to increase coverage are discussed. D. R. D.

Technique of determining moisture-vapour transmission through papers and boards. D. K. TRESSLER and C. F. EVERS (Paper Trade J., 1935, 101; T.A.P.P.I. Sect., 113—115).—By modifying a no. of test conditions, including especially humidity control and moisture equilibrium between sample and atm., accurate duplication of results may be obtained with such highly H₂O-vapour-proofed materials as cellulose acetate and viscose films, and waxed papers. Tests were made at 21.1° and -14.5°. There is no const. relationship between the amount of H₂O vapour which passes through papers or boards at these two temp., but this may be due in some cases to crystallisation and/or cracking of the proofing substance at the lower temp. H. A. H.

Definition of brightness [of paper]. L. C. LEWIS (Paper Trade J., 1935, 101; T.A.P.P.I. Sect., 64—67).—A mathematical definition of "papermakers' brightness" of nearly white paper is sought. In general, good correlation is obtained between such a personal estimate of brightness and instrumental grading, especially with papers of comparatively low degree of brightness. H. A. H.

Paper-testing problems. F. T. CARSON (Paper Trade J., 1935, 101; T.A.P.P.I. Sect., 87—90).—A no. of difficulties of a general sort connected with the tests are discussed. H. A. H.

Technical chemical problems in the paper industry. P. VON EHRENTAL and A. ECKE (Chem.-Ztg., 1935, 59, 761—764).—A review.

Fibre board.—See IX. Ti pigments.—See XIII. Saccharification of wood.—See XVII. Paper-mill H₂O.—See XXIII.

See also A., Sept., 1070, Selective adsorption from soap solutions. 1110, Cellulose and its derivatives. 1146, Silk fibroin.

PATENTS.

Treating natural and artificial fibres. A. G. BOUHUYS, Assr. to AMER. ENKA CORP. (U.S.P. 1,979,188, 30.10.34. Appl., 23.3.34).—The yarn, before being knitted or wound, is treated with a protective lubricating composition which does not require to be removed before the dyeing operation. The lubricant may consist of mineral oil 60, a mineral oil sulphonate 9, K oleate 16, the N(C₂H₄·OH)₃ soap of oleic acid 9.7, O(C₂H₄·OH)₂ Et ether 5%, and a trace of NPh₂. D. A. C.

Degumming and mechanical treatment of vegetable fibres in preparation for spinning. C. E. GAGE (B.P. 433,205, 6.2.34).—The fibrous plants or semi-prepared fibres, after maceration, are treated with a solution of NaOH, linseed oil, turpentine, and NH₃ at 71—88°, then with a solution of soap and linseed oil at < 49°, neutralised with HCl, dried, and softened. F. R. E.

Preparation of [silk] insulating materials. M. C. LEWIS and A. M. LYNN, Assrs. to WESTERN ELECTRIC CO., INC. (U.S.P. 1,980,413, 13.11.34. Appl., 24.8.29).—Degummed silk is washed under pressure with H₂O, then with AcOH, and finally with H₂O, in each case at 93°, to remove ionisable impurities. F. R. E.

Treatment [sizing] of disintegrated fibrous vegetable material such as wood chips, straw, and the like. AKTIEBOLAGET DEFIBRATOR (B.P. 432,914, 6.2.34. Swed., 6.2.33).—Paraffin or petroleum jelly is added to the dry fibrous material, which is then heated at > 100° and mechanically defibrated, ground, beaten, or kneaded. F. R. E.

Treatment of yarns, filamentary bundles, and like textile materials. BRIT. CELANESE, LTD. (B.P. 433,110, 29.10.34. U.S., 27.10.33).—The materials are treated with an antistatic dressing and then sprayed with a lubricant prior to cutting into staple fibre. F. R. E.

Manufacture of composite [fabric] articles. BRIT. CELANESE, LTD., and W. H. MOSS (B.P. 433,138, 9.2.34).—Two components of different nature are caused to adhere by the medium of a mixed fabric containing threads capable of adhering to one of the components and threads capable of adhering to the other. *E.g.*, a satin fabric of cellulose acetate (I) and cotton (II) can be made to adhere by its (I) face to a film of (I), with the aid of a solvent or softening agent, *e.g.*, COMe₂ and/or triacetin, containing a plasticiser, *e.g.*, (C₆H₄Me)₃PO₄, and then, by its (II) face, to wood by means of glue. A. W. B.

Production of aliphatic cellulose ethers. E. I. DU PONT DE NEMOURS & Co. (B.P. 432,277, 24.1.34. U.S., 25.1.33).—In the manufacture of a cellulose ether (I) from alkali-cellulose and an alkyl halide having > C₄ (EtCl) in an org. medium (II), a dispersing agent (Na oleate, Turkey-red oil) and (optionally) H₂O are added to produce an emulsion before removal of (II) by steam-distillation. (I) is thus pptd. as a finely-divided, porous solid, which is easily purified by filtration and washing. H. A. P.

Saponification of (A) materials comprising cellulose esters, (B, C) cellulose esters. H. DREYFUS (B.P. 432,027—9 [A, C], 13.1.34).—(A) Cellulose acetate (etc.)

yarns and fabrics, especially those previously stretched up to 200%, are evenly hydrolysed and thereby made tenacious without being made harsh, and are given a higher safe-ironing temp. and an affinity for direct dyes, by treatment with a 10–30% solution of a non-metallic base [e.g., NH_2Et , NEt_3 , $\text{NMe}_2\cdot\text{OH}$, $(\text{CH}_2\text{NH}_2)_2$] containing 0.5–2% of a swelling agent free from OH (e.g., COMe_2 , NaCNS). (b) Hydrolysis in (a) is accelerated by the presence of an alkali-metal salt which is itself a hydrolysing agent for the ester (e.g., Na_2CO_3 , K_2S , Na_2SO_3). (c) Processes (a) and (b) are used for denitrating nitrocellulose materials. A. J. H.

Washing of nitrocellulose and the like. M. O. SCHUR, Assr. to BROWN Co. (U.S.P. 1,978,962, 30.10.34. Appl., 14.5.30).—On completion of nitration the HNO_3 is displaced by H_2O by running it into the nitrating bath at the same rate as the acid is drained off (max. 30 in. per hr.). It is claimed that when the sheets are stacked vertically in the bath no substantial dilution of HNO_3 will take place. D. A. C.

Protective cellulose hydrate foil. TRANSPARENT PAPER, LTD., Asses. of WOLFF & Co. KOMM.-GES. AUF AKT., H. I. SCHULZ, and J. APPEL (B.P. 433,011, 20.9.34. Ger., 20.9.33).—A cellulose hydrate film is treated with a coating, adhesive when warm, composed of a low- η cellulose derivative, e.g., nitrate or acetate, and a resin (natural or synthetic), with or without addition of plasticisers. F. R. E.

Manufacture of sulphite pulp. E. HOCHBERGER, Assr. to CANADIAN INTERNAT. PAPER Co. (U.S.P. 1,977,879, 23.10.34. Appl., 3.6.33. Can., 4.7.32).—Digestion takes place in two stages: (i) with liquor containing 5.2% of total SO_2 and 1.2% of combined SO_2 , the temp. being 120–155° and the digestion interrupted before the fibres are completely liberated, i.e., after 5–11 hr.; (ii) the liquor is drained without lowering the temp. or reducing the pressure, by simultaneously introducing live steam, and the digestion is completed with liquor containing 1.5–4.5% of total SO_2 and 0.08–0.67% of combined SO_2 . The whole process may take 10–14 hr. D. A. C.

Composition [derived from waste sulphite liquor] and process therefor. R. W. E. LEACH (U.S.P. 1,977,728, 23.10.34. Appl., 17.6.32).—Gum is derived from the waste liquor by concentrating it by evaporation to about 50–70% of solids, which are either dried by addition of EtOH or a solid dehydrating agent, or alternatively the lignin and resins are pptd. with H_2SO_4 , cresylic acid, or carbolic acid, washed, and dried at 93°. The gum may then be mixed with wood flour or $\text{Ca}(\text{OH})_2$, as filler, and moulded as desired by heating at 150–300°/2500–3500 lb. per sq. in. D. A. C.

Viscose-spinning solution. R. S. BLEY, Assr. to NORTH AMER. RAYON CORP. (U.S.P. 1,981,643, 20.11.34. Appl., 29.12.33).—Mono- and tri-thiocarbonic (mono-)esters, or their salts, e.g., Na , K , Ca , Sr , of alcohols or starches, particularly $\text{Bu}^t\text{O}\cdot\text{CO}\cdot\text{SH}$, are claimed as delustring agents to be added to viscose solution before spinning. A. W. B.

Spinning nozzles for production of skin or film regenerated from viscose. E. BLEIBLER (B.P.

432,880, 6.11.33).—Means for eliminating gas prior to arrival at the pouring slit and a manometer acting also as a safety valve are described. B. M. V.

Production of artificial sausage skins. O. W. BECKER (B.P. 433,245, 24.9.34).—A mash of animal or vegetable fibres is pressed in a plastic, kneadable condition through an annular nozzle, where it is rotated about the longitudinal axis of the nozzle. F. R. E.

Manufacture of artificial textiles by the viscose process. S. SORDELLI (B.P. 432,328, 8.10.34. It., 6.10.33).—Viscose rayon having reduced lustre is spun directly from viscose solution having the usual composition except for an addition of 20% (on the CS_2 used for making the cellulose xanthate present) of CS_2 , which may be diluted with an equal amount of paraffin oil or other solvent capable of retarding its tendency to evaporate or separate from the viscose solution. A. J. H.

Manufacture of artificial filaments, yarns, films, and the like. BRIT. CELANESE, LTD. (B.P. 433,249, 24.10.34. U.S., 24.10.33).—A solution of an org. derivative of cellulose containing an oil (mineral or saponifiable) and/or a precipitant (C_6H_6 , kerosene), together with a soap [e.g., of Na , K , or $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$] and/or tetrahydronaphthalene, with addition of a sulphonated oil or a Twitchell's reagent if desired, is extruded into an evaporative medium. F. R. E.

[Manufacture of] threads, ribbons, tubes, and the like [of cellulose or its organic derivatives] capable of being resorbed. CONSORT. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 431,776, 16.10.33. Ger., 17.10.32).— $\text{H}_2\text{C}_2\text{O}_4$, malic acid, or an NH_2 -acid (e.g., glycine) is incorporated in the threads etc. during manufacture. A. J. H.

Manufacture of waterlaid fibrous webs. M. O. SCHUR, Assr. to BROWN Co. (B.P. 1,980,881, 13.11.34. Appl., 25.11.31).—Compact, dry sheets of preliberated wood-pulp fibres (< 93% of α -cellulose) are mechanically disintegrated in absence of H_2O , and the liberated fibres are mixed with H_2O and deposited in an unhydrated condition as a web from the aq. suspension. F. R. E.

Treating surfaces of fibrous materials. C. M. BOYCE, Assr. to J. R. DITMARS (U.S.P. 1,978,406, 30.10.34. Appl., 20.6.31).—Paper is rendered water- and grease-proof by applying a transparent coating consisting of gelatin, glycerol phthalate (prep. described), a sulphonated oil or glycerin, CH_2O , and EtOH in aq. solution. D. A. C.

Transfer and marking composition therefor. W. S. LAWRENCE, Assr. to KAUMAGRAPH Co. (U.S.P. 1,977,680, 23.10.34. Appl., 19.4.29).—A fusible transfer vehicle is made by mixing together "Amberol" ($\text{PhOH}\cdot\text{CH}_2\text{O}$ condensation product which is rendered fusible by forming in presence of additional resin), a wax (e.g., beeswax), and a blown oil (e.g., rape-seed oil), in the proportion of 10:3:2. The resin and wax are first fused at 100° and then mixed with the oil. D. A. C.

Manufacture of and composition for forming stencil papers. L. M. FINK, Assr. to I. T. BARNES and R. W. UPTON (U.S.P. 1,978,836, 30.10.34. Appl., 16.12.29).—Yoshino paper is coated on the one side

with a solution containing 83% of $C_6H_{11}OAc$ (I) and 17% of CH_2O (II), and on the other side with a solution containing 4·2% of camphorated oil, 4·2% of glycerin, 21·3% of (I), 63·5% of colloidion, and 6·8% of (II).

D. A. C.

[Sheet-like] composition and its production. J. F. WAIT (U.S.P. 1,980,119, 6.11.34. Appl., 5.11.29).—The filter-cake obtained from the refining of, *e.g.*, heavy petroleum, fatty oils, with an adsorptive mineral such as bentonite, having particles of $< 0\cdot0005$ in average diam., is mixed with a fibrous filler, drying oils, or hardening agent, etc. in order to form a solid mass which may be slightly viscous at high temp. and can be used alone or impressed on to or between sheets of felt, cloth, paper, etc.

E. L.

Production of lamb-skin-like texture. F. BREITSCHÄDEL (B.P. 433,447, 15.5.35).

Cellulose (etc.) films.—See I. Lubricants.—See II. Fireproofing agents.—See IX. Rubber-asphalt dispersion.—See XIV. Adhesives.—See XV.

VI.—BLEACHING ; DYEING ; PRINTING ; FINISHING.

Evolution of rapid or concentrated bleaching processes. Results of the scientific study of bleaching during 1921—3. C. G. SCHWALBE and H. WENZL (Angew. Chem., 1935, 48, 557—561).—Cellulosic materials may be bleached rapidly and without damage if the concns. of both cellulose and active Cl are increased. If the concn. of cellulose in a Hollander is increased the power required rises considerably; a tower-like apparatus with vertical circulation is better, and the concn. may then be raised to 15—20%. The chief difficulty is the mixing of the cellulose paste with the bleach liquor. In a centrifuge the concn. may be 30%; the material is warmed with hot H_2O and then sprayed with liquor containing 20—30 g. of active Cl per litre for 11 min. Cellulose can also be bleached as undried paper by treatment with liquor containing 45—50 g. of active Cl per litre, and steaming for about 1 min. The first stage in bleaching is the dissolution or changing of the incrusting lignins, and for this purpose chlorination is more effective than oxidation; for the subsequent destruction of colouring matters oxidation is required.

A. G.

Azoic colours on cotton: fastness properties relative to soaping after-treatment. H. BLACKSHAW (J. Soc. Dyers and Col., 1935, 51, 309—312).—The fastness properties of 26 typical azoic combinations on unbleached limbric have been examined before and after mild (5 min. at 80°) and more severe (30 min. at the boil) treatment with a solution containing 0·3% of soap and 0·2% of Na_2CO_3 . In the majority of cases, the light-fastness of the unsoaped shade is inferior, in 12 cases much inferior, to the soaped shade, and severe soaping has a more pronounced effect than the milder treatment. All unsoaped shades are inferior in fastness to Cl (1 hr. in $NaOCl$ of d 1·05), but with 16 combinations this is restored by mild soaping. Usually, soaping has no effect on fastness to kier-boiling, but a few exceptions are discussed. In general, soaped are faster than unsoaped shades to rubbing, and a sub-normal soaping process frequently gives superior results,

but there are exceptions, *e.g.*, Brenthols AT and BN with Fast Red KB, Brenthol PA + Fast Red B, and Brenthol AS + Fast Orange GC.

S. C.

Theory of leather dyeing. G. OTTO (Collegium, 1935, 371—379).—The p_H vals. at which max. g.-equivs. of dyestuff are fixed by hide powder are different for different typical acid dyestuffs. Orange GG, Cotton Scarlet extra, Orange II, Amido Yellow E, and Diamine Fast Brown GB have approx. the same respective p_H vals. for the max. on vegetable-tanned and untanned hide powder. The order of increasing penetration of these dyestuffs into vegetable-tanned leather differed from that into chrome leather. The residual valencies in the collagen affect the reaction between the acid groups in the dyestuff and the basic collagen groups. Fresh basic groups are liberated in the collagen by acid, hence the effect of p_H on the dyeing. The residual valencies are rendered less active by vegetable tannage.

D. W.

Classification of light-fastness of dyes on vegetable fibres. C. M. WHITTAKER (J. Soc. Dyers and Col., 1935, 51, 312—314).—Standards of light-fastnesses are for specified depths of shade of dyes dyed under specified conditions, and, since they vary with different depths of shade, it is misleading to express them by a no. Dyeings exposed horizontally or at 45° fade much more severely than those exposed vertically and they are faster on viscose than on cotton. It is suggested that the light-fastness no. should be supplemented by a statement of the min. % of dyestuff for which this no. holds.

S. C.

Desizing of silks and cottons. J. E. EVANS (J. Soc. Dyers and Col., 1935, 51, 318—320).—A lecture, dealing with desizing with bacterial diastases, particularly Rapidase and Gelatase.

S. C.

Optimum temperature for desizing [cotton goods] with Diastafor. H. FRITSCH (Textilber., 1935, 26, 657).—Saccharification of starch-sized cotton yarn so that it does not give a blue colour with I is most rapidly effected at $54\text{--}56^\circ$.

A. J. H.

Inefficiency of *p*-dichlorobenzene, naphthalene, and cedar oils as repellents against clothes moths. W. S. ABBOTT and S. C. BILLINGS (J. Econ. Entom., 1935, 28, 493—495).—Earlier work (B., 1934, 958) is confirmed and recent criticisms are refuted.

A. G. P.

Does laundering impair the efficiency of moth-proofing with sodium fluosilicate? S. MARCOVITCH (J. Econ. Entom., 1935, 28, 495—496).—Washing of proofed fabric with soap and H_2O retarded, but did not destroy, the action of Na_2SiF_6 . Dry-cleaned materials retained full activity.

A. G. P.

Coating and impregnation of textiles with [rubber] latex. H. P. and W. H. STEVENS (Trans. Inst. Rubber Ind., 1935, 11, 67—88).—Contrary to statements in the patents literature, rubber latex shows no particular affinity for cotton and does not penetrate the fibre walls nor enter the lumen; it does, however, penetrate between the fibres of a thread if the latter is not twisted too tightly. Cloth padded with latex acquires a "fuller" feel; the slight tackiness which also arises can be removed by washing or by halogenation, or prevented by suitable compounding of the latex. A

mixture of vulcanised latex and wax emulsion for padding purposes has an advantage over a wax emulsion alone in that the resulting showerproof qualities of the treated fabric are more resistant to dry-cleaning. For spreading purposes it is convenient to thicken latex, *e.g.*, by addition of NH_4 caseinate, or to use flocculated latex. D. F. T.

Silk processing.—See V.

PATENTS.

Dyeing of animal fibres. SOC. CHEM. IND. IN BASLE (B.P. 433,230, 12.4.34. Hung., 12.4.33).—Dyeing with Cr compounds of sulphonated azo mordant dyes is carried out in presence of a quaternary salt derived from an *N*-alkyl- or -aralkyl-benzimidazole substituted in position 2 by an aliphatic residue of $\leq \text{C}_8$ (< 1 wt.-% of goods) (*cf.* B.P. 419,010; B., 1935, 57). Improved affinity for the dye with consequent reduction in the acid needed in the dyebath is claimed. H. A. P.

Dyeing or printing of cellulosic fibres. Soc. CHEM. IND. IN BASLE, Asses. of G. A. WIDMER and E. W. PIERCE (B.P. 433,143 and 433,210, 9.2.34. U.S., 9.2.33).—(A) The material is pretreated with a H_2O -sol. CH_2O -guanidine, -dicyandiamide, or -heat-treated urea (I) compound (and, optionally, a CH_2O -urea or -thiourea compound) which is then hardened by heating, *e.g.*, at 100° . This imparts affinity for non-substantive acid dyes and for some basic dyes (not specified). (I), prepared by heating urea at 160° , contains guanidine, biuret, $(\text{HCNO})_3$, and guanilyurea. (B) The pretreatment is carried out with a H_2O -sol. urea- CH_2O compound and an org. acid (*e.g.*, tartaric or salicylic acid) or base [*e.g.*, $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$, $\text{C}_2\text{H}_4(\text{NH}_2)_2$], applied either simultaneously or subsequently. After drying and heating to harden the resin the fibre has affinity for basic and acid dyes, respectively. H. A. P.

Colouring of cellulose ester and ether materials. E. I. DU PONT DE NEMOURS & Co. (B.P. 432,360, 25.1.34. U.S., 25.1.33).—The use of (2- or 4-)nitroacridones or their derivatives, *e.g.*, 2-, 3-, or 4-nitro- (yellow), 4-nitro-2-methoxy- (green-yellow), -6-methoxy- (orange-yellow), or -8-ethoxy-acridone (golden-orange), as dispersed dyes (for Celanese) is claimed. H. A. P.

Printing of acetate artificial silk. Soc. CHEM. IND. IN BASLE (B.P. 433,106, 18.10.34. Switz., 21.10.33).—Dyes containing metal in complex union and free from SO_3H and CO_2H groups [azo dyes containing $m\text{-C}_6\text{H}_4(\text{OH})_2$ (I) as coupling component], *e.g.*, the nickeliferous dye obtained from diazotised 2:4- $\text{Cl}_2\text{C}_6\text{H}_3(\text{NH}_2)\cdot\text{OH} \rightarrow$ (I), are claimed for printing acetate rayon. A. W. B.

Textile [resist]-printing. IMPERIAL CHEM. INDUSTRIES, LTD., S. HOWARD, and A. WORMALD (B.P. 433,865, 19.2.34).—White resist styles are produced on cellulose fabrics by printing with a resist paste containing a salt of a primary, *sec.*, or *tert.*-amine, or a quaternary NH_4 halide ($\text{NPhMe}_2\cdot\text{CH}_2\text{PhCl}$), overprinting with a H sulphate of a leuco-vat dye having cotton affinity, *e.g.*, Soledon Brilliant Purple, Orange, or Jade Green, and developing in the usual manner. H. A. P.

Discharge printing. F. B. DOWNING and R. G. CLARKSON, Asss. to E. I. DU PONT DE NEMOURS & Co.

(U.S.P. 1,981,907, 27.11.34. Appl., 15.5.31).— $\text{Zn}(\text{CNS})_2$ is claimed as a swelling agent in the discharging of prints on cellulose esters or ethers (acetate rayon). Clear white discharges are obtained. A. W. B.

Manufacture and [stretching] treatment of artificial spun yarns. BRIT. CELANESE, LTD., R. W. MONCRIEFF, and F. B. HILL (B.P. 432,280, 24.1.34).—Yarn, especially cellulose acetate yarn, is treated with a swelling or softening agent (*e.g.*, COME_2 , dioxan), then stretched 50–100%, preferably in the form of a warp (*cf.* B.P. 371,461; B., 1932, 676), and shrunk slightly to counteract partly the resulting loss of extensibility. The resulting yarn has increased strength and a decreased denier. A. J. H.

Lustreing of textile fibres in a condition preparatory to spinning. T. W. HOLT, A. S. KILPATRICK, and J. F. W. STUART (B.P. 432,483, 27.12.33).—Cotton and wool fibres in the form of laps or slivers are mercerised with aq. NaOH (*d* 1.175) and thereby given a high degree of permanent lustre and soft handle, and made easier to bleach and dye, by passage continuously on endless bands through a machine (described) where it is successively treated with the alkaline liquor, washing H_2O , dil. acid, and washing H_2O , and then dried. A. J. H.

Coated fabrics. W. H. WALE (B.P. 433,207, 8.2.34).—Fabric, *e.g.*, velvet, is coated with a mixture of Na_2SiO_3 , Fe_2O_3 , soap, soda, carnauba wax, and gum arabic. As a bottom filling for boots it gives pliability and waterproofness. A. W. B.

Treatment of textile goods. W. ROTTA (U.S.P. 1,979,121, 30.10.34. Appl., 21.9.33. Ger., 23.9.32).—Fabrics made of wool, cotton, silk, or artificial silk, or mixtures thereof, are treated, after dyeing, with a H_2O -sol., hygroscopic mol. compound of urea with a metal salt. Compounds of the type $[\text{M}(\text{CO}\cdot\text{N}_2\text{H}_4)_n]\text{X}_{1-4}$, where M may have a valency of 1–4 (*e.g.*, Cd, Na, Zn, Mg), and X is any anion, *e.g.*, Br, Cl, are claimed. D. A. C.

Liquid treatment of yarns. BRIT. CELANESE, LTD., R. W. MONCRIEFF, F. B. HILL, and T. B. FREARSON (B.P. 433,052, 8.2.34).

Wetting etc. agents.—See III. **Dyeing etc. with H_2O -sol. vat dyes.**—See IV. **Treating fibres.**—See V. **Synthetic resins [for fabric treatment].**—See XIII.

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

Platinised copper gauze for oxidation of ammonia. I. E. ADADUROV and P. D. DIDENKO (Ukrain. Chem. J., 1935, 10, 271–276).—The max. vals. for % oxidation were 51 with Cu, 34 with brass, and 74 with platinised Cu or brass gauze; in all cases, the catalysts were unsuitable for further use after making contact for 18 hr. R. T.

Countercurrent extraction of potassium and magnesium sulphates from calcined polyhalite. J. E. CONLEY, F. FRAAS, and E. P. PARTRIDGE (Ind. Eng. Chem., 1935, 27, 1087–1095).—Polyhalite, washed to remove salt and calcined, has been continuously countercurrently extracted with H_2O at 100° (approx.) in a

column consisting of a no. of compartments each fitted with scrapers and distributing devices. With material of < 10-mesh the extraction of K_2SO_4 and $MgSO_4$ was 99.1 and 98.75%, respectively, when the solution contained 10.14 g. of K_2SO_4 and 90.7 and 91.7% with 11.22 g. of K_2SO_4 per 100 g. of H_2O . D. K. M.

Argentometric determination of barium oxide and sulphide in barium aluminate. N. A. TANANAIEV and K. D. CHALAT (Ukrain. Chem. J., 1935, 10, 148—151).—1 g. of Al slag is extracted with 500 ml. of H_2O , 50 ml. of 0.1N- $AgNO_3$ are added to 50 ml. of extract, and excess of $AgNO_3$ is determined, giving the sum of BaO and BaS in the solution. BaS alone is determined by repeating the titration in presence of 10 ml. of 25% H_2SO_4 . R. T.

Estimation of the [effective] porosity of limestone. W. H. THOMAS, R. A. E. CHISHOLM, and A. B. CAMERON (J. Inst. Petroleum Tech., 1935, 21, 725—733).—Two methods are described: (a) a pycnometer method, in which the vol. of C_6H_6 which an accurately turned cylinder of known vol. will absorb after evacuation is obtained by weighing, using a calibrated glass apparatus with ground-glass cap fitted with a stop-cock; (b) the core method, which consists in measuring the fall in pressure when a known quantity of compressed air is expanded into a vessel of known vol. containing the core. In (a) and (b) the sample must be freed from moisture, and extracted with suitable solvents to remove org. matter. Both methods yielded results < the calc. total porosity. With a fairly high porosity, (b) gives the higher result. The actual size of the pores can be ascertained by impregnating a prepared surface of limestone with dyed bakelite. The excess of the latter is ground off and the coloured pores and spaces can be measured microscopically. C. C.

Swelling of bentonite and its technical application. U. HOFMANN, K. ENDELL, and W. BILKE (Z. Elektrochem., 1935, 41, 469—471).—X-Ray spectrograms show that the H_2O sorbed by bentonite is accommodated between the crystal planes of the Al silicate, which are thus forced apart. Na-bentonites (America) swell visibly, in contrast with Ca-bentonites (Germany). The relation between H_2O sorption and H_2O v.p. is the same for Na-, Ca-, and H-bentonites, hence the interchangeable bases are linked to the outer faces of the crystals. These bases nevertheless determine the extent of the visible swelling which occurs when liquid H_2O lodges between the crystal planes: the bases are thereby dissociated, and subsequent hydration of the ions causes more H_2O to move into the space between the crystal planes. An artificial bentonite of good swelling qualities has been prepared from the German minerals.

T. G. P.

Elimination of iron from zinc chloride solutions. F. I. KORTSCHEMKIN (Mat. Centr. Paper Ind. Res. Inst. U.S.S.R., 1934, No. 4, 236—241).— Fe^{II} in the solution is oxidised by Cl_2 , the solution is made neutral with ZnO , $Zn(OH)_2$, or $ZnCO_3$, and pptd. $Fe(OH)_3$ is removed by filtration. R. T.

Determination of carbon dioxide in carbonates and in baking powder. F. VOJÍČ (Chem. Listy, 1935,

29, 185—187).— CO_2 is expelled from carbonates by means of 40% H_3PO_4 . R. T.

Detector for determination of low concentrations of hydrogen sulphide. J. B. LITTLEFIELD, W. P. YANT, and L. B. BERGER (U.S. Bur. Mines, Rept. Invest., 1935, No. 3276, 1—13).—The gas is passed up a tube packed with 20—24-mesh granules of activated Al_2O_3 coated with $AgCN$ or $Pb(OAc)_2$ and either the distance the colour change travels with a standard vol. of air, or the vol. of air required to produce a standard length of travel, is measured. The detector operates satisfactorily at -22° to 25° with $[H_2S]$ of 0.0025—0.05%. CO , CO_2 , SO_2 , Cl_2 , HCl , natural gas, C_6H_6 , and $EtOH$ give no colour and do not interfere in the test, but mercaptans act like H_2S . A. R. P.

Gas analysis. II. Determination of oxygen with alkaline solutions of trihydroxybenzenes and of sodium hyposulphite in varying concentrations. H. BRÜCKNER and A. BLOCH (Gas- u. Wasserfach, 1935, 78, 645—648; cf. B., 1935, 590).—The rate of absorption and the total absorptive capacity for O_2 of alkaline solutions of pyrogallol (I), 1:2:4- $C_6H_3(OH)_3$ (II), and $Na_2S_2O_4$ (III) was investigated by both static and dynamic methods for varying proportions of absorption medium: alkali. For (I) the optimum proportion was 1 mol.:1.5 mols. of KOH, the total uptake of O_2 being 1.5 mols. per mol. of (I). NaOH gave a lower absorption rate than KOH. If the O_2 content of the gas sample was > 20—25%, CO was evolved in amounts increasing as the rate of bubbling diminished. Consequently, when determining O_2 with the Orsat apparatus, the sample must be passed through as rapidly as possible, whilst samples with > 25% O_2 cannot be determined with (I). With (II) no CO was evolved. The optimum concn. was 1 mol.:5.5 mols. of alkali, the rate of absorption and total O_2 uptake being but slightly inferior to those with (I). Alkaline (III) solutions gave a considerably lower rate of absorption, and also the lower total absorption (0.94 mol. of O_2 per mol.). S. J. G.

Uses of Na silicate. Filler for cement.—See IX. **Determining CO_2 in air.**—See XXIII.

See also A., Sept., 1073—4, **Prep. of colloidal $Fe(OH)_3$ solutions.** 1080, **Electrolysis of NaCl in liquid NH_3 .** 1086, **Prep. of $K_2S_2O_8$.** 1088, **Wet prep. of $CaCrO_4$.** 1090, **Prep. of P_3N_5 .** 1096, **Liquefaction of H_2 and O_2 .**

PATENTS.

Manufacture of sulphuric acid. D. TYRER, A. M. CLARK, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 430,092, 13.12.33).—The mixture of gases passed through the contact catalyst comprises SO_2 20—25 and air 80—75% so that only about 80% of the SO_2 is converted into SO_3 . After condensation of the latter the residual SO_2 is recovered by scrubbing with cold citrate or phosphate solutions and eventually used for enriching the roaster gas obtained from pyrites furnaces or S burners for use again in the process. A. R. P.

Recovery of sulphuric acid by condensation. METALLGES. A.-G. (B.P. 429,267, 20.11.33. Ger., 11.3.33).—Dil. gases containing SO_3 and < sufficient H_2O to form H_2SO_4 are passed up a series of vertical

ceramic tubes packed in sand or an acidproof cement inside protective Fe tubes, the outsides of which are maintained at 140° by means of superheated H₂O under pressure. In this way the gases undergo no quenching below the dew point and the condensate is relatively conc. H₂SO₄. A. R. P.

Condensation of sulphuric acid from moist gases containing sulphur trioxide. A. L. MOND. From METALLGES. A.-G. (B.P. 433,676, 1.2.35).—The gases are passed upwards through an irrigation tower maintained at 300° to condense part of the H₂SO₄, and then through an electrical-pptn. plant to recover the remainder, which is used to irrigate the tower. A. R. P.

Removal of hydrocyanic acid from mixtures containing it. N. V. DE BATAAFSCHE PETROLEUM MAATS., Asses. of R. W. MILLAR and H. P. A. GROLL (B.P. 433,398, 13.6.34. U.S., 28.6.33).—HCN is extracted from gases and vapours by means of ethers, esters, and mixed ether-esters of glycols. A. R. P.

Fireproofing compositions. R. J. WHITE and W. R. DAUNCEY (B.P. 433,645, 14.3.34).—A 1:1 mixture of K₂CO₃ and NaHCO₃ in a suitable liquid, e.g., H₂O or paint, is claimed. [Stat. ref.] A. R. P.

Manufacture of anhydrous copper sulphate containing potassium or sodium sulphate. P. LANTHIER (B.P. 430,180, 5.1.34. Fr., 5.1.33).—Mixtures of K₂SO₄ and CuO, cement Cu, or oxidised Cu ore are heated in a rotary furnace at 400–600° in a moist gas stream containing SO₂ and air. A. R. P.

Manufacture of zinc sulphide. AMER. ZINC, LEAD, & SMELTING Co. (B.P. 430,945, 30.7.34. U.S., 6.9.33).—Boiling, conc., aq. ZnSO₄ is treated slowly with boiling, conc., aq. Na₂S₂O₃, hot aq. Na₂CO₃ being added simultaneously to maintain the solution at a *p*_H > that at which H₂S₂O₃ decomposes, the Na₂CO₃ addition being controlled potentiometrically. The basic hydrated Zn sulphide pigment so obtained contains 2–5% ZnO and may be converted into pure ZnS by calcination in an inert atm. at 650° for 10 min. A. R. P.

Manufacture of manganese dioxide. L. S. E. ELLIS. From SOC. DES USINES CHIM. RHÔNE-POULENC (B.P. 430,832, 12.1.34).—An ammoniacal solution of MnSO₄ is treated with O₂ or O₂-enriched air under pressure with vigorous agitation; the presence of K₂Cr₂O₇, CuSO₄, or an NH₄ salt catalytically assists the oxidation. The ppt., generally containing 80% of MnO₂, can be purified by leaching with dil. H₂SO₄ to remove MnO. A. R. P.

Removal of iron from solutions of aluminium sulphate. W. W. GROVES. From MERRIMAC CHEM. Co. (B.P. 430,384, 18.6.34).—Neutral or basic Al₂(SO₄)₃ solution of *d* 1.26 is treated with PbO₂ on the counter-current principle, the exhausted precipitant being regenerated by digestion with H₂SO₄ on the same principle. A. R. P.

Treatment of glauconite. UNITED WATER SOFTENERS, LTD. From PERMUTIT Co. (B.P. 429,201, 30.12.33).—Washed and cleaned glauconite is dehydrated by heating at 430–730° for 1–2 hr., and then boiled in 30–40% aq. NaOH for 1–2 hr. materially to increase

its base-exchange property. Na silicate (I) may also be added to the NaOH, but preferably the treated mineral is washed with dil. aq. (I) and then with aq. Al₂(SO₄)₃. A. R. P.

Production of base-exchange water-softening material. AKTIEB. FILTRUM (B.P. 430,792, 26.9.34. Swed., 14.9.34).—In the prep. of artificial zeolites the H₂O used for washing the free alkali from the gel is continuously circulated through the gel, being rendered almost neutral by addition of HCl after each passage through the gel. A. R. P.

Stabilisation of aqueous solutions containing hydrogen peroxide. E. I. DU PONT DE NEMOURS & Co., H. N. GILBERT, and J. S. REICHERT (B.P. 433,470, 15.2.34).—Aq. H₂O₂ having a concn. < 3% and *p*_H > 6.5 is stabilised by addition of small quantities of the solution obtained by heating SnCl₂ with H₄P₂O₇ for 1 hr. at 300°. A. R. P.

Preparation of carbon disulphide and hydrogen sulphide. P. H. BODENSTEIN, Assr. to MEIGS, BASSETT, & SLAUGHTER, INC. (U.S.P. 1,981,161, 20.11.34. Appl., 11.12.31).—A mineral hydrocarbon oil is passed together with an excess of S into a cast-Fe retort packed with Al or stainless-steel turnings and heated at 450–700°, whereby it is completely converted into CS₂ and H₂S. A. R. P.

Decomposition of nitrosyl chloride. KALIFORSCHUNGS-ANSTALT G.M.B.H. (B.P. 430,386, 6.7.34. Ger., 5.8.33. Addn. to B.P. 398,187; B., 1934, 96).—NOCl is mixed with air or O₂ in presence of 90% HNO₃, which dissolves the NO₂ produced. [Stat. ref.] A. R. P.

Manufacture of sulphur. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 430,110, 5.3.34).—S containing tarry matter, e.g., that recovered from spent gas-purification masses, is leached with CH₂Cl₂, CHCl₃, or C₂H₄Cl₂ to remove the tar and then further purified by distillation. A. R. P.

Sulphur separator. R. SCHÖNFELDER (U.S.P. 1,983,313, 4.12.34. Appl., 10.1.29. Ger., 19.1.28).—For an absorption tower, a scrubbing-liquid distributing device embodying means for floating off foam containing S is described. B. M. V.

Plant for obtaining gas from the atmosphere. GEN. ELECTRIC Co., LTD., and R. E. KEELAN (B.P. 433,232, 2.5.34).—In a liquefaction process the expansion engine drives an induction generator connected to the ordinary 3-phase supply. B. M. V.

Presses for producing solid carbon dioxide. A. SCHÜTZ (G. A. SCHÜTZ) (B.P. 433,018, 13.11.34. Ger., 13.11.33 and 25.5.34).

Ca lactobionate.—See III. Multi-cell electrolyser.—See XI. Lithopone.—See XIII. Colloidal S.—See XX.

VIII.—GLASS; CERAMICS.

Annealing of Pyrex chemical-resistant glass. G. W. MOREY. X-Ray study [of the glass]. B. E. WARREN (Ind. Eng. Chem., 1935, 27, 966–971).—The annealing constns. are given, with directions for annealing apparatus made from it. For most glasses, in the

annealing process, there is an initial period of rapid release of strain followed by a slower process. The former may correspond with the time taken for chemical equilibrium to be established, and the latter with release of strain under equilibrium conditions. By annealing at low temp. (430°) the complete period for Pyrex chemical-resistant glass was lengthened to 2 years and the initial period to 6 weeks. X-Ray study of the glass after this treatment showed no crystallisation, but there was a slight increase in regularity in the at. distribution. The theory of annealing is discussed. T. W. P.

Correlation between the freezing and thawing test and the sodium sulphate test for some Iowa clays. R. ALLEN (Bull. Amer. Ceram. Soc., 1935, 14, 262—263).—The effect of alternate freezing at -14° (12-hr. period) and thawing at 100° is equiv. to that of alternate boiling in 10% Na_2SO_4 solution (2 hr.) and cooling to room temp., drying at 100° for 1 hr., cooling to 80° , and holding at that temp. for 4 hr. J. A. S.

Firing clay refractories with by-product coke-oven gas. C. E. BALES and W. T. CHRISTIAN (Bull. Amer. Ceram. Soc., 1935, 14, 245—250).—The adaptation of existing coal-fired kilns for gas-firing is described in detail together with suitable firing schedules. The mixing of air and gas and complete combustion take place in chequered fireboxes. Coke-oven gas is more economical than natural gas, and cleaner ware as well as more uniform firing are obtained than are possible with coal. J. A. S.

Silica bricks for coke ovens. K. KATO (J. Fuel Soc. Japan, 1935, 14, 32—33).—The change in the chemical composition of firebricks used at the Yawata Steel Works since 1870 is outlined. Comparison is made between the properties of Japanese-made SiO_2 bricks and those made in Germany, England, Czechoslovakia, and the United States. Japanese bricks contain less SiO_2 and more Fe_2O_3 than do those of other countries. The physical properties of Japanese SiO_2 bricks are similar to those of bricks manufactured elsewhere. G. M.

Texture of refractories. I. Non-regularity of texture of gasworks fireclay refractories and its possible effect on durability. T. F. E. RHEAD and R. E. JEFFERSON. **II. Pictorial methods of recording the texture of refractories or similar materials.** T. F. E. RHEAD, J. N. SHORROCK, and C. L. EVANS (Trans. Ceram. Soc., 1935, 34, 363—373, 373—379).—I. The occurrence of laminations and air holes and their adverse effect on the durability (slag attack and flaking) are described in detail with photographs. Irregularity in texture may be caused by (1) air blebs introduced in pugging or extruding, which cause lamination, (2) lamination due to the dragging action of the pug or extruder blade on the grog or clay particles, (3) variation in the H_2O content of the clay, (4) non-welding of successive lumps of clay in hand-moulding, (5) uneven flow of clay to the vent holes in plastic press dies, (6) "pressure cracking" at high moulding pressure, (7) drying cracks.

II. Two methods for recording texture are described. (a) The contrast between solids and voids is accentuated by impregnating (in vac. and then under pressure of N_2)

the brick with a 1:1 mixture of carnauba and paraffin waxes coloured black. A section is then cut and photographed. (b) A smooth section is inked (printers' ink) and an impression taken on a roller composition (gelatin-glycerin). A print is then taken off the composition. J. A. S.

Determination of ferrous iron in refractory silicates. H. P. ROWLEDGE (J. Roy. Soc. West. Australia, 1933—4, 20, 165—199. Reprint).—The mineral is fused for 15 min. at 950° with 5 times its wt. of $2\text{NaF}\cdot\text{B}_2\text{O}_3$ (I) (sealed in Pyrex tube), dissolved by boiling with dil. H_2SO_4 in absence of air, and titrated with KMnO_4 . (I) is prepared by fusion of the mol. constituents at 750 — 1050° , prolonged heating above 900° being avoided owing to loss of F. The prep., properties, and constitutions of the borofluorides are recorded. J. A. S.

Swelling of bentonite.—See VII.

See also A., Sept., 1085, **Thermal synthesis of Ca silicates.** 1101, **Milowite [and its applications].**

PATENTS.

Tunnel ovens. B. J. MOORE (B.P. 433,637, 19.2.34).—In a lehr or the like the zone of max. temp. is heated by combustion and a subsequent zone by electric resistors. B. M. V.

Colouring agents for glass batches. A. SILVERMAN (U.S.P. 1,983,151, 4.12.34. Appl., 18.7.34).—To the usual CdS prep. is/are added Cd, CdSe, and/or Cd sulphoselenide; in this way the use of additional reducing agents is avoided and the colour developed at once on melting. Colours available range from yellow through orange, pink, to red in various depths, up to approx. black. B. M. V.

Manufacture of cellular glass. SOC. ANON. DES MANUF. DES GLACES ET PROD. CHIM. DE ST.-GOBAIN, CHAUNY & CIREY (B.P. 433,423, 22.1.35. Fr., 27.1. and 2.5.34).—Refined glass, rendered bubbly by cooling and reheating to 1400° , is admitted to an evacuated mould whereby the glass swells to fill the mould and becomes cellular in structure. The effect may be enhanced by using an incompletely refined glass or one to which gas-releasing materials (e.g., BaSO_4) have been added. J. A. S.

Production of laminated glass. G. B. WATKINS, Assr. to LIBBEY-OWENS-FORD GLASS CO. (U.S.P. 1,982,712, 4.12.34. Appl., 17.12.29).—The safety layer is composed of rubber and gelatin, part of which mixture is dissolved in $\text{O}[\text{C}_2\text{H}_4\cdot\text{OH}]_2$ and applied as adhesive to the glass. Heat and pressure are applied to the sandwich. B. M. V.

Silvering of glass or other similar transparent or translucent materials. DURO-RAY, LTD., and A. M. BARNES (B.P. 432,587, 8.2.34).—The solutions containing (a) alkaline AgNO_3 and (b) the reducing agent (e.g., tartaric acid + sugar) are forced through separate jets so that they mingle together and strike the sheet of glass suitably placed. The solution is allowed to remain in contact with the glass only for that length of time during which it is in a condition to form the correct type of Ag deposit. The whole of the glass surface is gradually treated with a continually

renewed solution. After the Ag deposit has been built up it is electrolytically coated with a protective covering of Pb. J. A. S.

Treatment of clays. ENGLISH CLAYS, LOVERING, POCHIN & Co., LTD., and R. J. DAVIES (B.P. 433,416, 24.12.34).—Purification by settling is improved by previous deflocculation with sulphite lye, alone or with admixture of alkali (Na_2CO_3 , NaOH). J. A. S.

Production of refractory materials and bodies [e.g., linings for open-hearth furnaces]. J. A. LAW. From QUIGLEY Co., INC. (B.P. 430,036, 22.12.33).—Claim is made for a plastic mass comprising a 1 : 1 : 1 mixture of rapid-hardening hydraulic cement ($< 54\%$ Al_2O_3), calcined MgO (or a corresponding amount of calcined dolomite), and finely-ground chromite. On firing, a hard refractory product containing a large proportion of spinels is obtained. A. R. P.

Manufacture of rubber-bonded abrasive articles. D. E. WEBSTER, Assr. to NORTON Co. (U.S.P. 1,977,748, 23.10.34. Appl., 15.1.31).—S (flowers) (e.g., 16.5 pts.) is mixed with latex (1 pt.) and then milled with rubber and abrasive particles in proportions suitable for vulcanising, e.g., latex mixture + rubber 12.5%, 14-mesh alundum 87.5%. J. A. S.

Manufacture of hardened or tempered glass plates. ASSUREX LE "ROI DES VERRES DE SECURITÉ" MAGNIEN, MONNIER, & Co. (B.P. 433,748, 11.1.35. Fr., 8.6.34).

Refractory cement.—See IX. **Synthetic resins [for safety glass].**—See XIII.

IX.—BUILDING MATERIALS.

Correlation and interpretation of chemical developments in relation to building. T. S. ROGERS (Ind. Eng. Chem., 1935, 27, 883—886).—Laboratory results should be interpreted by the chemist for the architect and contractor. T. W. P.

Silicate of soda in the building industry. J. G. VAIL (Ind. Eng. Chem., 1935, 27, 888—893).—The uses of Na silicate solutions as adhesives, cements, gels, films, intumescent products, and cleansers are described. T. W. P.

Utilisation of waste products of preparation of aluminium chloride from kaolin, as filler for acid-resistant cements. P. P. BUDNIKOV and A. B. KYVINITZKI (Ukrain. Chem. J., 1935, 10, 266—270).—Satisfactory cement is obtained from waste (containing SiO_2 81, Al_2O_3 15%) 92, Na_2SiF_6 3, graphite 4, S 1, and aq. Na silicate (d 1.34) 77 pts. R. T.

Chemical and petrographic examination of hardened cement. A. BOBROVNIK (Ukrain. Chem. J., 1935, 10, 228—241).—The velocity of hydration of belite is $>$ that of alite; the process of hardening consists in hydration of Ca_2 and Ca_3 silicates with production of colloidal and cryst. hydrates of Ca silicates, and of $\text{Ca}(\text{OH})_2$, hardness being a function chiefly of the content of cryst. hydrates. R. T.

Bibliography on oil-well cement. A. REID (J. Inst. Petroleum Tech., 1935, 21, 734—740).—A summary of the literature. C. C.

Cellulated clay units. G. A. BOLE (Ind. Eng. Chem., 1935, 27, 886—887).—Light-wt. clay products, which can be cut and are good heat insulators, are described. T. W. P.

Low-temperature characteristics of bituminous paving compositions. H. W. SKIDMORE (Proc. Amer. Soc. Civ. Eng., 1935, 61, 835—850).—The shear strength of paving compositions of several bitumens, sand, and limestone has been determined over the range 29—60° and the results are plotted. For low temp. the use of mixtures relatively rich in bitumen softer than is commonly used to give high ductility at low temp. is indicated. D. K. M.

Fibre building boards. C. G. WEBER (Ind. Eng. Chem., 1935, 27, 396—398).—Their manufacture, properties, and use are described. T. W. P.

Selection, preservation, distribution, and identification of Australian pole timbers. J. E. CUMMINS and H. E. DADSWELL (Comm. Australia, Counc. Sci. Ind. Res., 1935, Pamph. 55, 79 pp.).—The factors affecting the life and methods of preservation of the timbers are discussed, and methods of identification are described. D. K. M.

Tests of the efficacy of the oxy-acetylene scouring and charring process for sterilising partly decayed poles. J. E. CUMMINS (Comm. Australia, Counc. Sci. Ind. Res., 1935, Pamph. 57, 43 pp.).—The efficacy of sterilising partly decayed timber poles by charring with O_2 - C_2H_2 , with and without treatment with creosote, has been investigated by examining sections of the treated poles for the presence of wood fungi. The use of creosote is essential for the best results. Details of the most effective treatment are given. D. K. M.

Uses of anthracite coal and slate.—See II. **Au in wood.**—See X.

See also A., Sept., 1085, **Thermal synthesis of Ca silicates.**

PATENTS.

Rotary kiln plants for manufacture of cement. J. S. FASTING (B.P. 433,224, 12.2.34).—In order that the use of heat-transmitting chains or other metallic bodies may be permitted further down the kiln, part of the raw material is admitted direct to a second drying-preheating zone below the upper end of the kiln; the other, normally fed, part of the material is by-passed around that zone. B. M. V.

Production of cements. G. S. LALIN, Assee. of AKTIEB. VALLEVIKENS CEMENTFABR. (B.P. 431,060, 29.12.33. Norw., 14.3.33).—Claim is made for a quick-setting cement consisting of a mixture of Al_2O_3 cement 75—25% with 25—75% of a gypsum-free Ca silicate cement. [Stat. ref.] A. R. P.

Manufacture of cement. SOC. DES CIMENTES FRANÇ. ET DES PORTLAND DE BOULOGNE-SUR-MER ET COMP. DES PORTLAND DE DESVRES (B.P. 431,090, 9.4.34. Fr., 25.4.33).—White cement clinker is obtained by firing the material in the usual way and removing the clinker from the hot zone into an airtight vessel in which it is cooled by H_2O to $< 400^\circ$ in absence of air. A. R. P.

Cement for acid-proof brickwork. E. LUX, Assr. to KOPPERS Co. OF DELAWARE (U.S.P. 1,983,498, 4.12.34.

Appl., 17.2.31. Ger., 19.12.29).—The cement comprises quartz sand 2, quartz dust 6, talcum 4, and water-glass solution 5 pts. by vol. B. M. V.

Building material. [Refractory hydraulic cement.] A. A. THORTON. From SOC. D'EXPLOIT. DE CIMENTS HYDRAULIQUES REFRACTAIRES S.E.C.H.Y.R. (B.P. 432,990, 8.3.34).—A refractory hydraulic cement is formed from slag cement (20–80%), chamotte, and calcined bauxite or SiO_2 . The resulting concrete may resist a temp. of 1400° . B. M. V.

Dental filling materials [cements]. E. BRILL (B.P. 430,624, 27.9.34. Ger., 28.9.33).—The use of Li compounds as binders for Zn phosphate-silicate cements is claimed. A. R. P.

Surfacing materials for building or decorative purposes. CEMENT MARKETING CO., LTD., and F. J. BURREN (B.P. 433,120, 3.1.34).—A mixture is made of cement and/or whitening, a solution of gelatin or glue, and a cellulose derivative, e.g., a nitro-lacquer, usually together with a hardening material, e.g., alum. B. M. V.

Artificial slabs. UNITED LIMMER & VORWOLLE ROCK ASPHALTE CO., LTD., Asses. of R. LATTORF (B.P. 433,017, 9.11.34. Ger., 13.4. and 12.10.34).—A composite slab is composed of an upper wearing layer of granular stone and Portland or other hydraulic cement and a lower layer of asphaltic material preferably with a large proportion of sound- and heat-insulating filling. B. M. V.

Production of a pulverulent hydraulic binding medium. "STRABA" STRASSENBAUBEDARFS-A.-G., and A. SOMMER (B.P. 430,184, 1.2.34. Addn. to B.P. 394,122; B., 1933, 671).—Cement and hot asphalt diluted with glycerin are blown simultaneously as mists into a closed chamber to produce a bitumenised cement. A. R. P.

Dry kiln [for timber]. J. F. COBB (U.S.P. 1,982,980, 4.12.34. Appl., 28.5.29).—A kiln in which the stock is advanced stepwise on trucks, in which the transverse circulation of air is by convection aided by one or more fans, and in which the used air is exhausted only at the green end is described. B. M. V.

Fireproofing agents [for wood etc.]. G. SCHWEDLER and H. SCHWETZER (B.P. 432,819, 20.3.34. Ger., 20.3.33).—Sulphite-cellulose liquor or an org. compound containing SO_2 is treated with more SO_2 , the latter being evolved at high temp. $\text{NaNH}_4\text{HPO}_4$, borax, or other glass-forming substance may be incorporated. S. M.

Impregnating timber etc.—See I. Composite articles.—See V. Fireproofing composition.—See VII. Adhesives.—See XV.

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

Hydromechanics of the Bessemer converter in relation to the attrition of the fireproof lining. B. J. PINES (Physikal. Z. Sovietunion, 1935, 7, 189–212).—Vals. for the relative fluid velocities on the sides and bottom of the converter have been calc. with the aid of models and the theory of liquid vortices. Good agreement is obtained with data relative to the effective

life of the linings of converters in the U.S.S.R., whence it is inferred that mechanical abrasion is the chief destructive factor. Recommendations as to the most economical construction are given. R. S.

Determination of magnetite in iron ores, and control of magnetic concentration of ores. A. T. TSCHERNI (J. Appl. Chem. Russ., 1935, 8, 727–732).— Fe_3O_4 is separated from the wet powdered ore (320–350-mesh) by an electromagnet (600–700 gauss field), and hence the magnetite content is approx. calc. R. T.

Minerals and metallurgy in Sardinia. C. BERTHELOT (Rev. Mét., 1935, 32, 342–350).—A review.

Distribution of phosphorus between metal and slag in the basic process of steel manufacture. E. MAURER and W. BISCHOF (Iron & Steel Inst., Oct., 1935. Advance copy, 30 pp.).—The ratio of P_2O_5 in the slag to P in the metal for pure Fe phosphate slags is 3.55 at 1550° ; addition of SiO_2 to the slag reduces the val. An increase of Mn in the metal, if the slag composition remains const., causes an increase of P in the steel. The val. of $\text{P}_2\text{O}_5/\text{P}$ increases with additions of CaO to the slag. MnO and MgO appear to have very little influence on the P distribution, but Al_2O_3 tends to cause rephosphorisation of the steel. W. P. R.

Morphology of the inclusions in siderurgical products. A. M. PORTEVIN and R. CASTRO (Iron & Steel Inst., Oct., 1935. Advance copy, 38 pp.).—The identity of non-metallic inclusions in Fe and steel has been established by microscopical examination of material of known history. Microscopical methods employed included examination by normal and oblique reflected light, dark-ground illumination, comparison made with dry and immersion objectives, and illumination by polarised light. O and S are the chief elements which promote inclusions, and a no. of plain C steels containing varying proportions of Mn and Si have been studied. FeO occurs as rounded grains. FeS is light yellow-ochre in colour and forms a network at the grain-boundaries. Very small Mn additions alter the character of both FeO and FeS. With low Mn, high Si, and high O the inclusions are SiO_2 , which is not ductile, but addition of Mn confers some ductility to the silicate inclusions. The paper is illustrated by a large no. of photomicrographs. W. P. R.

Behaviour of mild steel under prolonged stress at 300° . II. Concentrated stress in notched and drilled specimens. C. H. M. JENKINS (Iron & Steel Inst., Oct., 1935. Advance copy, 7 pp.).—No cracking had occurred in mild-steel specimens subjected to stress locally conc. at holes and notches for 5 years (cf. B., 1927, 968), although severe local deformation had occurred. W. P. R.

Behaviour of metals under deformation at high temperatures. I. Structural changes in mild steel and commercial irons during creep. C. H. M. JENKINS and G. A. MELLOR (Iron & Steel Inst., Oct., 1935. Advance copy, 49 pp.).—The mechanism of deformation at high temp. (creep) of two mild steels, two Swedish irons, two ingot irons, and a very pure carbonyl Fe has been studied by the microscopical examination of stressed specimens. The test-pieces were protected from

oxidation by stressing in vac. Spheroidisation of Fe_3C is an important factor in the creep of mild steels below the crit. range. Examination of the polished surfaces of test-pieces would suggest that the materials were prone to intercryst. brittleness, but examination of polished sections showed that this was not the case, although the ingot irons were the more susceptible to intercryst. fracture. At low temp. (450°) initial deformation of a polycryst. material occurs by slip, followed by recrystallisation of the strained areas which causes redistribution of stress and further slip. In this way extensions $> 100\%$ sometimes occur. The facility of recrystallisation prevents a material from becoming unduly work-hardened, but in the ingot irons this property is not so marked and failure by intercryst. cracking more readily occurs. W. P. R.

Colorimetric determination of titanium in cast iron and steel. G. A. PANTSCHENKO and M. V. RAETZKI (J. Appl. Chem. Russ., 1935, 8, 718—721).—5—10 ml. of solution (previously reduced with Hg—Zn) are diluted to 50 ml., 2 ml. of 2% aq. chromotropic acid are added, and the coloration is compared with that given by 0.001N-Ti solution. The method involves an error of 0.03% for concns. of 5—20 mg. of Ti per 100 ml. R. T.

Colorimetric determination of molybdenum in special steels. G. A. PANTSCHENKO (J. Appl. Chem. Russ., 1935, 8, 722—726).—The steel is dissolved in aqua regia, Fe is pptd. by Na_2CO_3 , Na_2O_2 , and aq. NH_3 , and the intensity of coloration given by the feebly acidified filtrate with aq. Na ethylxanthate is compared with that given by 0.01N-Mo solution. Cr, Ni, Mn, and V do not interfere. R. T.

Protective films on ferrous alloys. Influence of chloride ion on electromotive behaviour. F. FENWICK (Ind. Eng. Chem., 1935, 27, 1095—1099).—A ferrous metal has been immersed in 0.01—0.4M- K_2CrO_4 and the solution was titrated electrometrically with (a) N-HCl, (b) M-KCl. Generally, e.g., for wrought and ingot Fe, low-C open-hearth rimming pipe (C 0.18, Cr 1.4, Mo 0.7%), and 5% Cr steel the graphs of potential against titration show a sharp change of potential which is regarded as the point at which $[\text{Cl}^-]$ destroys the oxide film on the metal. With Cu-bearing steels the change is less regular; with stainless steel it is gradual and relatively small, and occurs at higher $[\text{Cl}^-]$ than for other ferrous material. Using 0.0004—0.0008 M- K_2CrO_4 it is possible to distinguish between different stainless steels, and in view of the parallelism between general resistance to corrosion and relative quantities of Cl⁻ required to cause the change of potential this is suggested as an accelerated corrosion test. D. K. M.

Study of oxide films on metal surfaces with cathode-ray diffraction. I. Copper and its alloys. S. MIYAKE (Bull. Inst. Phys. Chem. Res., Japan, 1935, 14, 704—713).—Cathode-ray diffraction measurements confirm that the resistance of Al-bronze to high-temp. oxidation is due to a superficial Al_2O_3 film. The similar property of brass (Zn 30, Cu 70%) is due to a ZnO film. J. W. S.

Metal losses in melting brass and other copper alloys. M. COOK (J. Inst. Metals, 1935, 57. Advance

copy, 249—264).—Detailed figures are given for the metal losses which occur in melting brass, gilding metal, and cupronickel in coke-fired pit furnaces and in Ajax-Wyatt induction furnaces as the result of large-scale tests made over several years. With good-quality brass and clean scrap the losses in coke-fired furnaces should be $\geq 2.5\%$, and for 80:20 cupronickel $\geq 0.5\%$. The losses in electric melting are much smaller, especially when a charcoal or anthracite cover is used. NaCl flux causes higher losses than borax flux, but the latter is much the more corrosive on the refractories. A. R. P.

Porosity and segregation of two bronze ingots [with 10% tin]. N. P. ALLEN and S. M. PUDDEPHAT (J. Inst. Metals, 1935, 57. Advance copy, 211—220).—The distribution of cavities and of Cu in chill-cast bronze ingots is determined by the flow of heat away from the casting in such a way that those parts which solidify last are the most porous and the richest in Cu. This can be explained by the assumption that, during solidification, a Sn-rich liquid travels towards the outside of the ingot, due to contraction of the primary solidified shell. A. R. P.

Properties of some special bronzes. D. HANSON and M. A. WHEELER (J. Inst. Metals, 1935, 57. Advance copy, 265—284).—Al-Sn bronzes can be readily hot- or cold-rolled when the structure is homogeneous, but are difficult to work when the structure is duplex; all alloys with $\geq 9\%$ Sn + Al can be rendered homogeneous by prolonged annealing at 750° . The max. tensile strength attainable in annealed alloys is 30 tons per sq. in. with the 4% Al-5% Sn alloy, which also has an elongation of 75%. Polished alloys have a good resistance to atm. tarnishing, and alloys containing $> 2\%$ Al resist scaling at high temp. if the casting skin is intact. Addition of Mn to Sn-bronzes raises the annealing temp. but otherwise has little effect; brittleness becomes apparent with $> 6\%$ Mn. Addition of Al to Mn-bronzes makes them difficult to work unless they are subjected to a prolonged anneal to obtain homogeneity; the Al ($\geq 3\%$) increases the strength without impairing the ductility. Bronzes with 5% Sn and $\geq 4\%$ Fe can be rolled, but $> 2\%$ Fe tends to reduce the ductility and increase the strength; the Fe remains distributed throughout the alloy in fine particles and tends to refine the grain structure. Si greatly increases the strength of Sn-bronze, but with $> 3\%$ Si the 5% Sn alloy can be cold-worked only after annealing at 800° for 4 hr.; with 4% Si the alloy is unworkable either hot or cold. A. R. P.

Interrelation of age-hardening and creep performance. I. Age-hardening of nickel-silicon-copper alloys. C. H. M. JENKINS and E. H. BUCKNALL (J. Inst. Metals, 1935, 57. Advance copy, 285—319).—Alloys of Cu with 3—5% Ni_2Si can be age-hardened by quenching from 900° and reheating at 300— 750° ; with the 3% alloy the time required for max. hardness decreases with rise in ageing temp. from 64 days at 400° to < 1 min. at 700° , but the val. obtained is higher the lower is the ageing temp. The reciprocal of the abs. temp. of attainment of max. hardness is a linear function of the log. of the time required. The Brinell hardness of the quenched 3% alloy is about 60; this increases to

150—180 after ageing, but rapidly decreases again if the treatment is prolonged. Microscopical examination during the stages of hardening shows that a progressive change in etching properties occurs and that the pptd. constituent is a ternary phase of variable composition. In the appendix the phenomena observed in the age-hardening of Ni-Si-Cu alloys are compared with those given in the literature for other age-hardenable alloys and the above time-temp. relation is shown to be generally applicable. A similar relationship applies to the attainment of max. resistivity during ageing. These relationships are shown to confirm the commonly accepted theory of age-hardening. A. R. P.

Some effects of diluting a flotation pulp. O. C. RALSTON and C. R. KING (*Min. & Met.*, 1935, 16, 332—333).—In cleaning reground, rougher Zn concentrates from a complex massive sulphide ore recovery is at a max. when the feed contains 20—30% of solids; with < 15 or > 45% of solids in the pulp the grade of the concentrate reaches a max., but the recovery is not so good. It is, however, better to operate with 40—50% of solids than with the usual 5—10%, and this applies also to re-cleaning of the Cu concentrates. A. R. P.

Reducibility of zinc oxide and Matignon's law of volatility. M. REY (*Chim. et Ind.*, 1935, 34, 267—272).—Comparison of published work on the reduction of ZnO with that of oxides of Cu, Ni, Co, Fe, and Mn at elevated temp. shows that the reduction of ZnO is facilitated by the superior volatility of Zn. E. S. H.

Auriferous black sands of the Pacific Coast. E. S. LEAVER (*U.S. Bur. Mines, Rept. Invest. No. 3275*, 1935, 51—54).—A review of the literature. A. R. P.

Southern gold ores. B. W. GANDRUD and R. E. EVANS (*U.S. Bur. Mines, Rept. Invest. No. 3275*, 1935, 47—50).—Slaty ore from North Carolina gave a recovery of 93.6% of its Au content by crushing, desliming, and tabling, and cyanidation of the concentrates extracted about 96% of the Au content; flotation also gave good recoveries. Au ores from Georgia and South Carolina gave extractions of > 97 and > 94%, respectively, by cyanide leaching with a low CN' consumption. A. R. P.

Amalgamation during fine grinding of gold ores. E. S. LEAVER and M. B. ROYER (*U.S. Bur. Mines, Rept. Invest. No. 3275*, 1935, 15—21).—By crushing Au ores through 65-mesh in presence of Hg a better Au recovery is obtained than by ordinary plate amalgamation, but still better extractions are obtained by the use of a rotating-cylinder amalgamator, with less loss of Hg. Very fine grinding in presence of Hg results in a low Au recovery and excessive flouing of the Hg; the presence of As, Sb, Pb, Zn, and Cu sulphides and of carbonaceous matter also causes excessive loss of Hg. A. R. P.

Amalgamation and cyanidation [of gold ores]. E. S. LEAVER (*U.S. Bur. Mines, Rept. Invest. No. 3275*, 1935, 7—14).—A review of the principles governing the extraction of Au by these processes, with especial reference to the effects of impurities on the Au surface and means for removing them. A. R. P.

Flotation of gold: effect of sodium sulphide. E. S. LEAVER and J. A. WOOLF (*U.S. Bur. Mines, Rept.*

Invest. No. 3275, 1935, 23—38).—Na₂S is an active depressant of clean metallic Au, particularly when the gangue is essentially silicious and free from slime-forming minerals, and does not assist in the flotation of coated Au. Prolonged conditioning of the pulp with Na₂S prior to flotation reduces the inhibiting effect of the Na₂S. In the treatment of complex ores containing oxidised Cu and Pb minerals, the flotation of which is favoured by addition of Na₂S, it is advisable to float as much of the values as possible before adding Na₂S to activate the oxidised minerals. A. R. P.

Form and occurrence of gold in pyrite from a metallurgical viewpoint—coated gold. R. E. HEAD (*U.S. Bur. Mines, Rept. Invest. No. 3275*, 1935, 39—46).—Au often occurs as minute flakes on the crystallographic planes of pyrite, the flakes sometimes having a diam. of < 5 μ. Some varieties of Au found in pyritic ores are slightly magnetic; this appears to be due to the presence of a film of Fe or a magnetic Fe compound. Ag, Pb, Mn, Al, and Ti have also been found in films on Au by spectrographic analysis. The surface of contaminated Au particles picked out from various ores and tailings was found to be blackened by 1% aq. Na₂S, but addition of this reagent to the pulp reduced the recovery of Au by flotation. A. R. P.

Recovering gold from copper-mill tailing. E. W. ENGELMANN (*Min. & Met.*, 1935, 16, 331—332).—Au is recovered from the flotation tailings of the Magna mill of the Utah Copper Co. by passing the tailings over common 10-oz. burlap placed at the bottom of launders 80 in. wide and 2000 ft. long with a fall of 375 ft. The recovered Au is so coated with impurities that it fails to respond to cyanidation or flotation; every 40 days the burlap is removed and burned and the ashes are smelted to obtain the Au. A. R. P.

Gold in petrified wood. W. S. PALMER (*Min. & Met.*, 1935, 16, 335).—Au occurs in logs of petrified wood buried in a volcanic tuff in Churchill County, Nevada. The logs now consist of cryst. and chalcedonic SiO₂, C, and calcite containing the Au as irregular grains or crystals in the spaces between the quartz crystals. Apparently the Au has been deposited by contact of auriferous H₂O with the C of the wood. A. R. P.

Failure of a gold fuse in contact with nickel-chromium alloy. M. C. CAPLAN (*J. Inst. Metals*, 1935, 57, Advance copy, 331—332).—The failure of Au fuses to operate at the correct temp. in contact with a 80:20 Ni-Cr furnace winding is due to diffusion taking place between the Au link and the winding at 950—1000° with the formation of an alloy of low m.p. which oxidises rapidly so that the Au link is rapidly converted into a cindery residue. A. R. P.

Floatability of lead and silver jarosites. R. E. HEAD and F. E. THACKWELL (*U.S. Bur. Mines, Rept. Invest. No. 3275*, 1935, 55—65).—Plumbo- (I) and argentojarosite (II) occur frequently in oxidised Pb ores in the form of very fine grains with a low *d*; they readily slime on crushing and are very slow to respond to the reagents usually used in floating oxidised ores. (I) floats best in a neutral or very slightly acid circuit and is blackened by Na₂S only after 3 hr. and by H₂S

after 1 hr., but both treatments reduce its floatability except with oleic acid. The best reagents for (I) are the unsaturated and, in warm solutions, the saturated fatty acids, but these reagents will also float calcite. (II) floats under similar conditions to (I), but, owing to its greater vol., less care is necessary in depressing accompanying gangue minerals. The higher xanthates are good collectors of both (I) and (II). A. R. P.

Effect of interrupted straining on the elongation of lead. J. C. CHASTON (J. Inst. Metals, 1935, 57. Advance copy, 163—172).—Interrupted straining during a tensile test produces abnormally high vals. for the elongation of pure Pb, max. vals. being obtained when the specimen is rapidly strained in increments of 15% of the original length with an interval of 10 min. between successive loadings. In these intervals a crit. change in structure occurs after 4—5 min. and is accompanied by a rapid increase in elongation and by the formation of long flow-lines parallel to the axis. Two possible explanations for the observed phenomena are put forward and critically discussed. Hardened Pb alloys do not behave abnormally under interrupted straining at room temp. A. R. P.

Spectral analytical determination of lead in commercial tin. H. KRINGSTAD (Angew. Chem., 1935, 48, 565—566).—Determination of small amounts of Pb by quant. spectroscopy, using a condensed spark between the specimen and a Au electrode, gives results agreeing with those obtained chemically. With tinfoil a rotating electrode is used to present fresh surfaces, so suppressing the Fe spectrum. J. S. A.

Examination of the surface of tinfoil by an optical method. W. E. HOARE and B. CHALMERS (Iron & Steel Inst., Oct., 1935. Advance copy, 8 pp.).—Surface defects in tinfoil may either be minute hollows or raised areas, and their character can be ascertained by observing the interference fringes formed between an optically flat surface and the metal surface under vertical illumination by monochromatic light. W. P. R.

Production of powdered alloys of low m.p. R. W. REES (J. Inst. Metals, 1935, 57. Advance copy, 335—337).—Alloys with a wide freezing range, e.g., alloys of Pb 50, Sn 16—20, Cd 10—30, Bi 0—50, and Sb 0—10%, can be powdered by feeding the pasty metal into an impeller-type disintegrator maintained at about 10° below the solidus; the impeller is belt-driven at 1500 r.p.m. and the mill has a screen with $\frac{3}{4}$ -in. perforations. Under these conditions 80% of the metal passing the screen will pass through 100-mesh and 30% through 200-mesh. A. R. P.

Colloidalisation and cold-working of metals. S. R. RAO (Current Sci., 1935, 4, 24—25).—The view that the magnetic susceptibility of a metal is the sum of the susceptibilities of the lattice ions and of the valency electrons of the individual atoms accounts for the increased diamagnetism which accompanies colloidalisation and cold-working. Colloidalisation of Cu is accompanied by increased diamagnetism. W. R. A.

Nature of creep under stresses produced by pure flexure. H. J. TAPSELL and A. E. JOHNSON (J. Inst. Metals, 1935, 57. Advance copy, 387—405).—When a

Pb beam creeps under pure flexural stresses plane sections remain plane, the redistribution of stress due to creep is complete within 12 min. after application of a bending moment and the stresses remain unaltered with time, and the behaviour of the beam under flexure may be calc. from the relations between tensile stress and rate of strain corresponding to any period of tensile creep testing on the material of the beam. A. R. P.

Properties of latex-insulated wire. J. MCGAVACK (Ind. Eng. Chem., 1935, 27, 894—896).—Use of modern latex gives high insulation and perfect centring with a reduction in costs. Physical consts. are tabulated. T. W. P.

New conceptions on the chemical elements and the reciprocal action between bearing metal and lubricant. H. HERBST (Chem.-Ztg., 1935, 59, 777—778).—A discussion.

Tarnishing of liquid metals as studied by X-rays. H. O'NEILL and G. S. FARNHAM (J. Inst. Metals, 1935, 57. Advance copy, 407—412).—An apparatus is described for the X-ray study of liquid metals up to 700° by surface reflexion. Spectrograms taken with Cu X-radiation in H₂ at just above the m.p. of Pb, Sn, and SnSb showed the presence of surface-tarnish films which gradually disappeared as the temp. was raised. Purification of the H₂ over Pt-black at 700° and subsequent drying failed to prevent film formation. A. R. P.

Creep tests on supersaturated solid-solution [alloys] of magnesium. W. SCHMIDT and H. VOSS-KÜHLER (Z. Metallk., 1935, 27, 179—181).—The creep of homogenised electron (Al 8, Zn 0.5, and Mn 0.2%) under load at 140° is, like that of the cast alloy, relatively small, whereas that of the forged alloy and of the decomposed solid solution are relatively high. Since the forged alloy recrystallises at 140° under load and the supersaturated solid-solution alloy decomposes on prolonged heating at 140°, recrystallisation and the presence of a duplex structure are equally objectionable in alloys required to withstand loads at elevated temp. A. R. P.

Corrosion below discontinuous oxide coatings, with special reference to magnesium. K. G. LEWIS and U. R. EVANS (J. Inst. Metals, 1935, 57. Advance copy, 221—238).—Time-corrosion curves and perforation periods have been obtained for uncoated Mg and for Mg coated with oxide films, using a circulating NaCl solution. The results suggest that oxide coats on Mg belong to the "safe" class, where insufficient treatment or incomplete covering at least gives better results than no covering. The most protective film was obtained in a solution of ZnSO₄ and NH₄NO₃ after fine abrasion of the surface. A. R. P.

Protection of magnesium alloys against corrosion. H. SUTTON and L. F. LE BROCCQ (J. Inst. Metals, 1935, 57. Advance copy, 343—364).—Immersion of Mg alloys for 45 min. in a boiling solution of K₂Cr₂O₇ (I) 0.75, (NH₄)₂Cr₂O₇ 0.65, (NH₄)₂SO₄ 3%, and aq. NH₃ 0.33 vol.-% affords protection against corrosion almost as that obtained in 6 hr. in a hot solution containing (I) 1.5, K alum 1, and NaOH 0.5%. If the film is subsequently enamelled the protection afforded by the first bath is better than that afforded by the second and that

obtained by the selenite treatment. The best enamels are ZnO-pigmented nitrocellulose varnishes applied above an undercoat of oil-base, air-drying paint pigmented with $ZnCrO_4$ or $SrCrO_4$. The best degreasing treatment before the oxidising treatment comprises immersion in a hot bath containing 5% of a mixture of Na_2CO_3 , $10H_2O$ 74.5, Na_2SiO_3 24.5, and Na oleate 1%. Numerous results obtained by the intermittent salt-spray test and the beach-exposure test on several alloys after different protective treatments are tabulated and discussed.

A. R. P.

Electron-diffraction examination of protective films deposited on magnesium and magnesium alloys by the R.A.E. [Royal Aircraft Establishment] dichromate process. H. G. HOPKINS (J. Inst. Metals, 1935, 57. Advance copy, 365—368).—The results indicate that the films consist of small crystals of hexagonal (?) MgO, the protective quality being due to the small crystal size and random orientation.

A. R. P.

Recrystallisation of aluminium in the cast state. H. RÖHRIG (Z. Metallk., 1935, 27, 175—178).—On prolonged annealing of cast 99.95% Al at 610° the dendritic casting structure disappears and is replaced by the polygonal structure characteristic of completely recryst. Al. Alloys of Al with 2% Cu or $\gtrsim 0.15\%$ Si behave similarly since the Cu and Si remain in solid solution, but ordinary commercial Al castings do not recrystallise without having previously been worked since the Fe and Si inclusions prevent grain growth.

A. R. P.

Effect of heat-treatment on resistance of plated duralumin to corrosion. P. BRENNER (Z. Metallk., 1935, 27, 169—173).—Too prolonged annealing of thin sheets of Al-coated duralumin at 500° results in diffusion of the Cu from the duralumin into the Al and consequent reduction in the resistance to corrosion; this occurs with sheets 0.5 mm. thick (0.03 mm. of Al on each side) after > 10 min. at 500° , but sheets 1.5 mm. thick (0.05 mm. of Al on each side) can be heated for $\gtrsim 3$ hr. at 500° without deterioration of their corrosion-resistance. Correctly treated duralumin has an extraordinarily good resistance to sea- H_2O corrosion.

A. R. P.

Corrosion-resisting non-ferrous alloys. H. MOORE and E. A. G. LIDDARD (Chem. & Ind., 1935, 786—795).—Factors causing corrosion and methods of protecting light alloys are discussed, and recent developments in corrosion-resistant alloys of Cu, Ni, Pb, and Al are reviewed.

A. R. P.

Modern methods in electroplating. ANON. (Ind. Chem., 1935, 11, 343—352).—A description of Cr-plating operations.

Electrolytic determination of (A) tin, (B) lead, in ores. V. A. UNKOVSKAJA (J. Appl. Chem. Russ., 1935, 8, 712—715, 716—717).—(A) The ore is treated with aqua regia and with aq. HF, the residue is made into a paste with aq. $H_2C_2O_4$ and $(NH_4)_2C_2O_4$, the paste is electrolysed for 16 hr. (0.4 amp./1.8—3 volts) in a coppered Pt crucible (cathode), and the deposit of Sn is weighed.

(B) The powdered ore is heated at 100° with conc. HNO_3 , Pb is pptd. as $PbSO_4$, which is collected, washed, heated with conc. aq. NH_3 , and dissolved in excess of

conc. HNO_3 . The diluted solution is electrolysed, and the PbO_2 deposited on the anode is weighed. R. T.

Conditions governing the formation of highly-insulating anodic layers on aluminium. J. E. LILLENFELD, J. K. NIEH, and S. GOLDMAN (Trans. Electrochem. Soc., 1935, 68, 67—80).—For any given electrolyte there is a crit. c.d. at the Al anode above which "formation" of the anode takes place; the crit. val. is independent of the voltage to which the anode has already been "formed." With alkali hydroxide "forming" solutions, containing anions of weak acids, the $[OH^-]$ is the most important factor controlling the magnitude of the "formation current." The dielectric layer is supposed to consist of a type of Al_2O_3 which is permeable to OH^- , but not to other ions. E. S. H.

Blast-furnace coke. Anthracite coal [for ore sintering].—See II.

See also A., Sept., 1060, **Recrystallisation of Ag. Microstructure of Pt. X-Ray study of special steels.** 1065, **Structure of Ni-Co alloys. Binary alloys of Sn. System Pd-Cu. Cubic Na W-bronzes. Binary [Cu-Pb] alloys.** 1066, **Systems Cu-Sn-Be and Fe-Co-Sn. X-Ray study of α -Fe magnet alloys. Austenite transformation.** 1077, **System Fe-P-O.** 1096, **Determining traces of metals.** 1098, **Soldering Al-brass joints.**

PATENTS.

[Tuyère for] blast furnaces. W. W. TRIGGS. From R. C. BUTLER, J. M. HUGHES, and J. H. CARTER (B.P. 429,236, 27.8.34).—Claim is made for an all-Cu tuyère having a cooling jacket at the end remote from that entering the furnace, which is made of heavy Cu containing an annular cavity at the end nearest the jacket.

A. R. P.

Sintering of fine ores. F. KRUPP A.-G. (B.P. 430,145, 28.12.34. Ger., 9.1.34).—Instead of the usual limestone, part of the fines is moistened with H_2O and formed into small rolls or balls which are used to form the bedding layer on the sintering grate.

A. R. P.

Preparation and roasting of [fine] sulphide ores [e.g., flotation concentrates]. H. W. K. JENNINGS. From VER. F. CHEM. U. MET. PROD. (B.P. 430,304, 28.12.34).—Sufficient H_2O is added to make the material plastic, and the mass is forced through a perforated plate to convert it into a vermicular form which is charged directly, without drying, into the hot zone of the roasting furnace.

A. R. P.

[Bright-]annealing processes and furnaces. J. L. PEARSON, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 429,940, 8.12.33).—The gases are passed into the furnace at the middle and withdrawn from both ends, the O_2 is removed by combustion with coal gas, hydrocarbons, H_2 , or preferably cracked NH_3 , with or without the aid of a catalyst, and the resulting gas used for further bright annealing.

A. R. P.

Production of protective or work-enveloping gases for use in the heat-treatment [bright-annealing] of metals. BIRMINGHAM ELECTRIC FURNACES, LTD., and A. G. LOBLEY (B.P. 429,402, 27.4.34).—The S is removed from hydrocarbon gases for use in bright-

annealing furnaces by treating the gases with sufficient air to convert all the S into SO_2 and H_2S , cooling to condense the S formed by reaction of these gases, and then passing the partly purified gases over an absorbent for the excess of H_2S or SO_2 . A. R. P.

Purification of metals and alloys. COMP. GÉN. D'ÉLECTROMÉTALL., Assees. of H. LEPP (B.P. 429,440, 28.11.33. Holl., 28.11.32).—Reducing gases, *e.g.*, H_2 or CO, are eliminated by treating the molten metal or alloy with its oxide in an amount insufficient to form the metal-oxide eutectic. S may be eliminated simultaneously by treatment with Na_2CO_3 and BaCO_3 . A. R. P.

Metallurgical slag reactions [for refining iron]. HERAEUS VACUUMSCHMELZE A.-G., and W. ROHN (B.P. 429,926, 4.12.33. Ger., 6.12.32 and 8.7.33).—The refining slag is caused to form an emulsion with the molten metal by turbulent motion induced in the metal by melting it in an induction furnace such as is described in B.P. 382,002 (B., 1933, 25). With suitable slags the C may be reduced to < 0.02 and the P and the S to $< 0.003\%$. A. R. P.

Malleable iron castings. ELECTRO METALLURG. CO., Assees. of R. C. GOOD (B.P. 430,213, 4.7.34. U.S., 5.7.33).—The alloy contains C 1.5–3.5, Si 0.53–4, Cr 0.15–2.0, Mn 0.18–0.7, P 0.05–0.3, and S ∇ 0.2%; it is cast under conditions which produce white Fe, and then annealed at 700–1100° to render it malleable. A. R. P.

Surface-hardening of metallic [e.g., steel] objects. LINDE AIR PRODUCTS CO., Assees. of A. B. KINZEL (B.P. 428,995, 31.8.34. U.S., 16.9.33).—The object is rotated while under the heating action of a reciprocating blow-pipe until the desired temp. is reached, and then quenched by rotating it in a moving stream of fluid, *e.g.*, H_2O or an air blast. A. R. P.

Manufacture of magnetic [nickel-iron] alloys. TELEGRAPH CONSTRUCTION & MAINTENANCE CO., LTD., W. F. RANDALL, and F. H. SMITH (B.P. 430,987, 21.12.33).—Constancy of permeability in small magnetic fields may be induced in Ni-Fe alloys containing 30–90% Ni by addition of one or more elements which produce pptn.-hardening on suitable heat-treatment. The added metals may be Cr 1.5 and Mn 0.5% with Ag 1.5 or Cu 10%; homogenising is produced by annealing at 900° and quenching, and pptn.-hardening by reheating at 300°. A. R. P.

Working up cement copper. NORDDEUTS. AFFINERIE (B.P. 430,563, 7.12.34. Ger., 26.10.34).—The pptd. Cu is dried to $< 6\%$ H_2O , then moistened to 6–15% H_2O , and charged directly into a hot, rotary, internally-fired furnace in which it is melted and refined as usual. A. R. P.

(A, B) **Deoxidation and purification of copper.** (A) SOC. D'ÉLECTROCHIM., D'ÉLECTROMÉT., ET DES ACIÉRIES ELECTR. D'UGINE. (B) W. P. WILLIAMS. From (A) (B.P. 430,526 and 430,869, [A, B] 13.3.34. It., [A] 13.3.33).—(A) In the process of removing Cu_2O from Cu by violent intermixing of the molten metal with a molten, oxide-absorbing slag, part of the Cu_2O is reduced to Cu between successive treatments by addition of a small quantity of a metal, *e.g.*, Mn, Zn, Cr, Fe, Sn, Pb,

Ni, Co, or Mg, which has a greater affinity for O than has Cu and forms an oxide more readily absorbed by the slag. (B) Molten Cu is first violently agitated with a slag containing SiO_2 70, Na_2O 17, CaO 10, $\text{MgO} + \text{Al}_2\text{O}_3$ 3%, which reduces the O content to 0.06%, then deoxidised with Si, and finally agitated with a 60:40 mixture of CaO and Na_2O to remove the resulting SiO_2 . A. R. P.

Manufacture of metallic powders. E. KRAMER (B.P. 430,777, 9.8.34. Ger., 9.8.33).—Bronze powder, produced by pounding the metal in a suitable machine, is removed continuously by a wind stream to a screening device which returns the oversize and then through a cyclone fan and polishing drum which collects and polishes the powder, respectively. A. R. P.

Zinc alloys. H. C. ANSTEY, W. E. ALKINS, and T. BOLTON & SONS, LTD. (B.P. 429,021, 21.10.33).—Zn alloys capable of being worked hot or cold and possessing a fine-grained structure contain ∇ 99% Zn with 0.05–0.6% Ni and/or Co (0.1–0.18% Ni) and Si ∇ is sufficient to form a silicide with the Ni or Co (0.001–0.03%). A. R. P.

Manufacture of compositions for preventing metals [e.g., silver] from tarnishing. I. S. KLEINER (B.P. 430,795, 31.10.34).—To prevent tarnishing of Ag ware in showcases etc. a jar containing a mixture of granular anhyd. CaCl_2 (88–94.9), powdered anhyd. CuSO_4 (5–10), and talc (0.1–2%) is placed near the ware to absorb moisture and H_2S from the enclosed atm. A. R. P.

Lead-alloy bearing metal. S. & T. METAL CO. (B.P. 433,653, 27.4.34. U.S., 1.2.34).—The alloy consists of Pb with Sn 0.5–5 (1), Ca 0.6–2 (0.6), Al 0.02–0.1 (0.05), and Hg 0.1–1 (0.25)%. Small amounts of the following may be added to produce increased hardness: Ag 0.5–2 (1), Ba 0.02–0.1 (0.05), Sr 0.02–0.5 (0.25), Cu 0.05–0.5 (0.25), Mn 0.05–0.5%. A. R. P.

Treatment of extruded metals [lead]. STANDARD TELEPHONES & CABLES, LTD., Assees. of H. F. CARTER (B.P. 433,553, 16.2.34. U.S., 1.6.33).—The metal as it leaves the die of the extrusion press is subjected to the action of a steam jet moving at 2000–4000 ft. per sec. at 95°, whereby impurities are removed from the surface and from below the die opening so that the extruded metal, *e.g.*, cable sheathing, is free from scratches. A. R. P.

Treatment of non-ferrous alloy castings. ARMSTRONG-SIDDELEY MOTORS, LTD., HIGH DUTY ALLOYS, LTD., W. C. DEVEREUX, and C. S. OLIVER (B.P. 430,772, 18.6.34).—The porosity of castings of Mg alloys is removed by immersing the casting under pressure in a bath of molten eutectic alloy having a low η , *e.g.*, at 160° in an alloy of Bi 42, Pb 24.5, Sn 23, and Cd 10.5%. The alloy fills up the cracks and pores, and subsequently the Sn and Cd alloy with the Mg and thus prevent exudation of the alloy on subsequent heating. A. R. P.

Production of anticorrosive films on aluminium and its alloys. PEINTAL SOC. ANON. (B.P. 433,367, 24.4.35. Switz., 25.4.34).—The metal is first superficially oxidised by chemical or electrochemical processes

and the resulting film of Al_2O_3 is impregnated with chlorinated rubber. A. R. P.

Improvement of aluminium-magnesium alloys. I. G. FARBENIND. A.-G. (B.P. 431,054, 22.12.33. Ger., 24.12.32).—Cold-worked Al or Mg alloys free from Si and containing $\gt 1.5\%$ of other metals are rendered more resistant to corrosion by a relief anneal below the recrystallising temp., e.g., at 150–200°. A. R. P.

[Electrodes for] electrolysis furnaces for production of aluminium. SIEMENS-PLANIAWERKE A.-G. F. KOHLEFABRIKATE (B.P. 433,508, 11.10.34. Ger., 24.10.33).—The use of continuously working, large, preburnt C electrodes in Al production is rendered economical by using unmachined rods of graphite which are automatically machined by being turned against a widia-metal tool by the feeding mechanism, the tool being placed just above the contact plates. A. R. P.

Production of bright [reflective] aluminium surfaces [e.g., mirrors]. ALUMINUM CO. OF AMERICA, Assees. of R. B. MASON (B.P. 433,484, 5.4.34. U.S., 2.8.33).—The polished Al mirror is treated anodically in 2.5% aq. HBF_4 , using 20 amp. per sq. ft. at 31–33°, washed, and anodically oxidised in 7% H_2SO_4 at 25–26°, using 12 amp. per sq. ft. After drying, the surface is buffed with a polishing cream. A. R. P.

Anodic treatment of aluminium and its alloys. S. R. SHEPPARD (B.P. 429,344, 24.11.33).—The metal is treated anodically at 15–25° with 18–24 amp. per sq. ft. in 2% aq. NaOH containing an alcohol, glucoside, sugar, or aldehyde, or mixtures thereof, e.g., lactose 90 g., barbaloin 50 g., glycerin 150 c.c. or 40% aq. CH_2O 75 c.c. per litre. A. R. P.

Electrolytic production of sodium and other light metals. E. I. DU PONT DE NEMOURS & Co. (B.P. 433,633, 19.2.34. U.S., 17.2.33).—In the production of Na by electrolysis of a fused mixture of $CaCl_2$ and NaCl the accumulation of Ca on the cathode is prevented by using a hollow cylindrical Fe cathode; this surrounds the graphite anode and is provided with numerous perforations the sides of which are upwardly inclined at 45° to the anode. By a suitable arrangement of gas-lift pumps the electrolyte is induced to circulate rapidly downwards through the space between the electrodes and through the holes in the cathode. A. R. P.

Apparatus for electrical heat-treatment of [strip] metals. W. E. BURNAND (B.P. 433,212, 10.2.34).

Erratum. On p. 810, col. 1, line 4 from the bottom, for U.S.P. read B.P.

Manufacture of silicon steels. E. M. FREELAND (B.P. 429,995, 8.9.33. U.S., 13.9.32).—See U.S.P. 1,932,307; B., 1934, 679.

Baths for melting metals.—See I. **Silvering glass.**—See VIII. **Contact material.**—See XI.

XI.—ELECTROTECHNICS.

Parallel employment of low- and high-frequency transformers for feeding the electrofilter. S. P. ZEBROVSKI (Physikal. Z. Sovietunion, 1935, 7, 213–225).—The effect of a high-frequency corona discharge in the electrofilter has been studied at different electrode potentials. An increase in the pptn. velocity results.

The particulate velocity and the particulate current have been calc. R. S.

Physico-chemical investigation of solid rectifiers. A. N. SISOEV (Ukrain. Chem. J., 1935, 10, 193–209).—The conditions of formation of Cu– Cu_2O –Cu and Se layers for rectifying a.c., and the crystal structure and conductivity of the layers have been determined. Of other combinations studied, the best results were given by $Tl-Tl_2O-Pb(Al)$. R. T.

Measuring mechanical stresses at higher frequencies. A. BLOCH (Nature, 1935, 136, 223–224).—Two new electrical methods are outlined. L. S. T.

Electrical properties of certain bakelite materials. W. A. ZINZOW and T. HAZEN (Ind. Eng. Chem., 1935, 27, 899–902).—Tests for dielectric strength, d.c. resistance, and power factor or a.c. losses are discussed. Curves showing the variation of these with temp. are given. T. W. P.

Application of the dielectric constant in chemical industry. B. VAN STEENBERGEN (Chem. Weekblad, 1935, 32, 466–478).—The measurement of ϵ , especially with the Ebert-Stoll apparatus, is described. Its chief application lies in the rapid and accurate determination of very small quantities of H_2O in liquids and solids. The latter are extracted, sometimes in a special mill, with dioxan (I) and ϵ of the extract is measured. Details are given for active C, dextrin, starch, tobacco, marmalade, spinach, malt, clay, cement, chalk, $Ca(OH)_2$, ZnO, and S. Other applications are described, including the determination of the porosity of films for H_2O , the drying properties of pulp, the fractional distillation of mixtures, the control of essential oils, the polymerisation of oils, the rate of sedimentation of powders, and the degree of hydration of CaO. Mixtures of H_2O ($\epsilon = 80$) and (I) (2.225) make very satisfactory standards for measuring ϵ . S. C.

Current-producing reaction of the Leclanché cell. M. DE K. THOMPSON (Trans. Electrochem. Soc., 1935, 68, 81–88).—A crit. review of published work. E.m.f. data corresponding to air depolarisation and to the reduction of MnO_2 to Mn_2O_3 , Mn_3O_4 , and MnO are re-calc. E. S. H.

Magnetic concn. of ores. Oxide films on metals. Failure of Au fuse. Determining Pb in Sn. Tarnishing of liquid metals. Electroplating. Determining Sn and Pb in ores. Insulating layers on Al.—See X.

See also A., Sept., 1066, α -Fe magnet alloys. 1073, Prep. of emulsions and colloidal solutions. 1080, Electrolysis of NaCl in liquid NH_3 . 1086, Prep. of $K_2S_2O_8$. 1091, Determination of p_{H_2} , and of halogens. 1096, Determining traces of metals. 1097, Photoelectric colorimeters. 1105, Electrolysis of nitrate-acetate mixtures. 1114, Oxidation of PhMe in solution.

PATENTS.

Induction electric furnaces. G. A. JUHLIN, and ASSOCIATED ELECTRICAL INDUSTRIES, LTD. (B.P. 433,339, 1.6.34).—The metal bath is surrounded (1) by a single-phase winding producing a vertical flux, and (2), at a greater diam., by a laminated ring having downwardly

extending poles wound with polyphase coils producing horizontally rotating flux mainly in the upper part of the metal.

B. M. V.

[Contact] device for fixing the heating elements in electric resistance furnaces. KERAMISCHE INDUSTRIE-BEDARFS A.-G. (B.P. 433,425, 30.1.35. Ger., 14.3. and 4.7.34).—A disc of heat-resisting metal of different character from both the heating element and the supporting contact is inserted between those parts.

B. M. V.

[Arc-]welding electrodes. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 430,464, 4.10.34. U.S., 5.10.33).—A metal core with fin-like projections is wound helically with a fibrous (asbestos) coating impregnated with a flux; the coating may also be applied so that the fibres are parallel to the longitudinal axis of the core.

A. R. P.

Electric - welding fluxes. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 430,722, 27.2.35. U.S., 27.2.34).—Arc-welding fluxes consisting of a 1:1:1 mixture of felspar, TiO_2 , and water-glass with 2–3% of ferromanganese are claimed.

A. R. P.

Arrangement in multi-cell electrolyzers. L. LACHER and H. NIEDERREITHER, Assrs. to LAWACZEK GES.M.B.H. (U.S.P. 1,983,296, 4.12.34. Appl., 23.7.32. Ger., 28.8.31).—A gas-producing battery connected in multiple is placed on a slope of $\leq 5^\circ$ and the emitted gas used to effect rapid circulation by means of a gas-lift outlet pipe, a gas-liquid separator, and an electrolyte return pipe.

B. M. V.

Introducing luminescent materials into electric [discharge] lamps. GEN. ELECTRIC Co., LTD., Assecs. of PATENT-TREUHAND GES. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 430,717, 28.1.35. Ger., 16.3.34).—A thin coat of a transparent enamel which softens at a lower temp. than the glass is applied to the inner surface of the lamp; this is then coated with a mixture of the luminescent compound with a volatile binder, and the tube is heated to expel the binder and cause the compound to adhere to the softened enamel.

A. R. P.

Manufacture of electron-emitting electrodes for electron-discharge tubes. N. V. PHILIPS' GLOEI-LAMPENFABR. (B.P. 430,224, 3.12.34. Ger., 26.3.34).—In a photoelectric cell having a Ag-block cathode and a Ni-rod anode, a current is passed between the two in an atm. of O_2 at 0.1 mm., whereby Ag_2O is deposited on the inside of the glass bulb; the O_2 is pumped out and a small quantity of Cs introduced, whereby the Ag_2O is reduced to Ag and a composite layer of Ag, Cs, and Cs_2O formed on the inside of the bulb.

A. R. P.

Manufacture of electron emitters [radio-valves]. STANDARD TELEPHONES & CABLES, LTD., Assecs. of J. R. WILSON, J. T. ACKER, and C. D. HARTMAN (B.P. 430,169, 14.12.33. U.S., 30.6.33).—The filaments are coated with a mixture of $BaCO_3$, $SrCO_3$, $NiCO_3$, and $Ba(NO_3)_2$ or $Sr(NO_3)_2$ suspended in a solution of cellulose nitrate in $C_5H_{11}OAc$, heated to decompose the org. matter and convert the metals into oxides, and then treated first at a low and then at a high temp. with CO at very low pressure to form a Ba-Ni alloy within the filament coating.

A. R. P.

Electric batteries. H. D. HENRY (B.P. 429,179, 21.11.33).—Undue corrosion of the negative Zn element of cells comprising Zn and PbO_2 electrodes in dil. H_2SO_4 is obtained by coating the amalgamated Zn with an animal, vegetable, or fish grease, e.g., lanoline. The Zn element may be hollow and perforated, the interior being packed with glass or cotton wool etc. soaked in the grease to provide a const. supply for coating the exterior.

A. R. P.

Electric batteries. COMP. GÉN. D'ÉLECTRICITÉ (B.P. 430,897, 21.2.35. Ger., 19.3.34).—Claim is made for cells having a pure Mg negative electrode, a positive electrode depolarised with an insol. Pb salt, and a neutral salt solution as electrolyte.

A. R. P.

Galvanic cells, particularly electric accumulators. ACCUMULATEUREN-FABR. A.-G. (B.P. 433,809, 25.4.34. Ger., 18.5.33).—Gases generated during use of the cells etc. are absorbed by electrodes, e.g., of Pt-black, suitably polarised by connexion with the main electrodes.

J. S. G. T.

[Electrical] contact material. C. V. IREDELL, Assr. to WESTINGHOUSE LAMP Co. (U.S.P. 1,982,812, 4.12.34. Appl., 2.9.31).—A metal contact is composed of Mo (60%) in the form of individual particles completely surrounded by Ag (40%).

B. M. V.

Sterilisation of liquids, especially milk. P. FEREMUTSCH and O. VIELI (B.P. 433,005, 24.7.34. Ger., 24.7.33).—A thin film of liquid, preferably saturated with CO_2 under pressure, is passed between oligodynamically-active metal electrodes, e.g., of Cu or Ag, connected with a d.c. supply which is periodically reversed in direction.

J. S. G. T.

Lubricating oils.—See II. Halogenated hydrocarbons. Ca lactobionate. Furnace for producing Ph_2 .—See III. Silk insulation.—See V. Condensing H_2SO_4 from gases. Obtaining gas from the atm.—See VII. Silvering glass.—See VIII. Magnetic alloys. Extruded Pb. Electrolysis furnaces for Al. Al mirrors. Treating Al. Light metals.—See X. Treating plant juices.—See XVII. Vitamin-D.—See XIX.

XII.—FATS; OILS; WAXES.

Bleaching of technical fats and oils. R. STRAUSS (Chem.-Ztg., 1935, 54, 721–723).—A review.

Decoloration of beeswax by adsorbent clays of the Voronezh district. V. G. JAKOVLEV (J. Appl. Chem. Russ., 1935, 8, 707–711).—The decolorising properties of different clays have been determined.

R. T.

Germicidal detergents.—See XXIII.

See also A., Sept., 1105, Unsaturated acids of sardine oil. 1144, Hydrogenated sardine oil. Whale-shark-liver oil. Shark-liver oils. Marine-animal oils. Oil of eggs of *Bombyx mori*. 1180, Seeds of *Plantago ovata*. Seed kernels of *Cæsalpinia bonducella*.

PATENTS.

Degreasing apparatus. R. A. EASTWOOD, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 433,472, 15.2.34).—During degreasing by condensing vapours of high mol.

wt., movable jets of the liquid are brought into play to detach insol. matter. B. M. V.

Extraction of vitamin-containing unsaponifiable components of fatty matters. A./S. FERROSAN (B.P. 433,930, 28.2.35. Denm., 5.3.34).—After saponifying the (cod-liver) oil with a solution of NH_3 , NaOH , or KOH in, e.g., EtOH or MeOH , the bulk of the soap formed is settled and strained off; by treating the filtrate (which contains all the unsaponifiable matter of the oil, and a small amount of soap) with H_2SO_4 , the fatty acids are liberated and separate as a layer entraining all the unsaponifiable matter in the liquor. E. L.

Mixed synthetic oil and product derived therefrom. C. G. GAUERKE, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,979,260, 6.11.34. Appl., 8.4.32).—Glycerol or other polyhydric alcohol is partly esterified with a "frosting" oil (tung, oiticica) and then with fatty oil (linseed etc.) acids. The product may be (a) used directly for making varnishes, (b) heated with a natural or synthetic resin, (c) heated with more glycerol and the new OH groups esterified with $\text{o-C}_6\text{H}_4(\text{CO})_2\text{O}$ or other polybasic acid. S. M.

Freeing from fat or oil substances containing fat or oil, such as meat, fish, fruits. W. KELLE and F. CARLSSON (B.P. 432,771, 7.9.34).—The grease is liberated from meat or other fatty materials, or waste waters containing such substances can be deodorised (in about $\frac{1}{2}$ hr.), by treatment in a water-bath at 25–29.5° with fungi of the *Saccharomyces* type (especially *Cryptococcus* fungi) together with such bacteria as are contained in wheat or rye flour. E. L.

Preparation of wax-like substances. D. K. TRESSLER, Assr. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,979,586, 6.11.34. Appl., 11.9.29).—Higher unsaturated fatty ketones are subjected to partial hydrogenation. E.g., crude oleone is purified by heating with $\text{CuO} \cdot n\text{H}_2\text{O}$ at 130°, then filtered, and hydrogenated (H_2 and Ni-ThO_2 at 325°/80 lb. per sq. in.); the product after crystallisation from EtOAc or Pr^nOH has m.p. 77–78°, and is similar to beeswax, but is neutral and unsaponifiable. H. A. P.

Wax polish. M. H. ARVESON, Assr. to STANDARD OIL Co. (U.S.P. 1,979,787, 6.11.34. Appl., 22.6.31).—A mixture (9%) of hard wax, e.g., Japan or carnauba, and a plasticiser, e.g., petroleum and/or petrolatum wax, is incorporated in a light petroleum oil (b.p. 175–245°) (41%) and emulsified in approx. an equal vol. of H_2O containing an emulsifying agent, e.g., starch (0.5%)– H_2O (49.5%), and the emulsion is allowed to solidify. S. S. W.

Lubricants.—See II. **Sulphated fatty acid derivatives.**—See III. **Sheet-like composition.**—See V. **Preps. for fat-liquoring etc.**—See XV. **Activation of food products.**—See XIX. **Detergents.**—See XX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Advanced uses of rubber in paints. R. L. FINE (Amer. Paint J., 1935, 19, No. 47, 44–50).—A review. D. R. D.

[Testing] gas-meter paints. C. A. L. DE BRUYN (Verfkroniek, 1935, 8, 204–205).—A series of tests

for flexibility, hardness, and resistance to soap and soda is described. D. R. D.

Prevention of danger in the paint [manufacturing] and painting industries. C. F. H. MAAS (Verfkroniek 1935, 8, 197–200).—A review of industrial hazards. D. R. D.

Applied colloid chemistry of pigments, with special reference to zinc oxide and basic lead carbonate. F. V. EVANS (J. S. African Chem. Inst., 1935, 18, 36–41).—A discussion.

Zinc pigments in relation to southern [American] climatic conditions. S. WERTHAN (Paint, Oil, and Chem. Rev., 1935, 97, No. 16, 16–18; No. 17, 11–14).—The formulation of paints capable of withstanding a hot, moist climate and suitable for application to southern pine wood is discussed. Paints containing ZnO with a Pb or Ti pigment or ZnS , heat-thickened linseed oil, tung oil, and a fungicide (e.g., a Hg compound) are recommended. D. R. D.

Manufacture of titanium pigments and their use in papermaking. I. E. WEBER and W. WOODHALL (Paper-Maker, 1935, 90, ts 140–144).—The manufacture of Ti pigments from ilmenite is described. No increase in opacity is obtained, in the manufacture of composite pigments containing Ti and Ba , by calcining or co-pptg. BaSO_4 with TiO_2 , and the blending of the two pigments in the dry state is easier to control. Details of a method of analysing Ti-Ba pigments are given. The only method of comparing pigments for brightness and opacity in paper is by making paper samples of definite substance and loading content. Opacity does not depend only on the difference in n of the cellulose and the pigment; the nature of the air-cellulose interface may also be an important factor, as in feather-weight papers. It is for this reason that Ti -white may be superior to china clay in some classes of paper, while showing little advantage in others. The relative increase in brightness using Ti pigments is invariably $>$ the increase in opacity, because the high reflexion val. decreases the light absorption. Consequently, it is possible to accentuate the opacity difference producible by TiO_2 and by clay, by the addition of black pigment to the former until its brightness is reduced to that given by the clay. Indeed, opacity vals. are only strictly comparable at equal brightness. Conditions affecting the retention of Ti pigments on the paper machine are briefly discussed, and their val. in calendered and in waxed papers is indicated. H. A. H.

Iron gallotannate inks. H. SCHWEITZER (Chem. & Ind., 1935, 767–775).—Whereas white gall-nuts underwent slow enzymic hydrolysis, $> 90\%$ of the tannin content of a cold aq. extract of black Aleppo galls was destroyed in 3–5 days although gallic acid accumulated in the solution; this decomp. could be inhibited by heating for 1 hr. at 100°. The amount of dissolved matter in a fermented lye which could be extracted with EtOAc varied with the harvest; the insol. portion was high with nuts which yielded troublesome inks, and probably consists of a substance which is attached to the glucose mol. in the tannin and is liberated by the enzyme. A review of work on the constitution of

tannin leads to the view that it is penta-*m*-digalloyl-glucose (A., 1912, i, 471); the Nierenstein formula (*ibid.*, 470) should be abandoned. The light, bluish-green sediment which appears in unexposed, bottled inks is not produced by oxidation, is free from Fe, and contains free ellagic acid. The determination of gallic acid by Mitchell's method (B., 1923, 192 A) is criticised and an electrometric method recommended; practical details are also given for the determination of ellagic acid and $H_2C_2O_4$, tannin, and residual substances in the lyes. S. M.

Chemicals for printing inks. ANON. (Chem. Trade J., 1935, 97, 221).—Recent attempts to utilise novel types of media (cellulose esters, bitumens, rubber, etc.) are reviewed. D. R. D.

Overcoming troubles with [printing] inks. R. SANDERSON (Brit. Printer, 1935, 48, No. 284, 100).—A no. of cases of actual failure of printing inks and the methods used for investigating the cause and remedying the defect are described. D. R. D.

Printing ink. G. F. JONES (J. Oil Col. Chem. Assoc., 1935, 18, 269—278).—The properties of various papers and printing processes are summarised in relation to the qualities demanded of the printing ink. G. H. C.

Relative value of several methods of determining durability [of varnishes]. A. M. MEES (Verfkroniek, 1935, 8, 205—208, 209).—The results of exposure trials in Holland and Florida under varying conditions of natural and artificial weathering show fair agreement. D. R. D.

[Relative value of several methods of determining durability of varnishes.] C. A. L. DE BRUYN (Verfkroniek, 1935, 8, 208—209).—Mees' results (cf. preceding abstract) are criticised on the ground that an insufficient no. of samples was taken. Durability has no abs. meaning, but depends on the use to which the varnish is to be put. D. R. D.

Determination of urushiol in lacquer. III, IV. S. HIRANO (J. Soc. Chem. Ind., Japan, 1935, 38, 261—262 B, 262 B; cf. B., 1935, 734).—III. Determination of Ac, OMe, I, and Br vals. of urushiol does not give concordant results.

IV. Urushiol and H_2SO_4 give an insol. substance (90% yield) and a method of determination is suggested. F. R. S.

Determination of urushiol in lacquer. V, VI. S. HIRANO (J. Soc. Chem. Ind., Japan 1935, 38, 307 B; see above).—The polymerisation of urushiol to an $EtOH-C_6H_6$ -insol. substance on treatment with H_2SO_4 -liquid paraffin is utilised in a method for the determination of urushiol in presence of perilla oil and rosin. F. N. W.

Behaviour of certain resins in some solvents. L. M. VAN DEN BERG (Pharm. Weekblad, 1935, 72, 1027—1032).—The *d* is given of various solutions of copal, mastic, dammar, guaiacum, jalapin, pine, and podophyllum resins in Et_2O , $EtOH$, C_6H_6 , $CHCl_3$, CCl_4 , CS_2 , and light petroleum. *d* shows a decrease with solutions in solvents heavier than, and an increase in those lighter than, H_2O . S. C.

Moulding properties of phenolic resins. M. KRAHL (Brit. Plastics, 1934, 6, 235—240).—Methods of measuring the fluidity, hardenability, and time of closing (in the moulding process) are described, and a summary is given of the most important factors by which the moulding properties of the resins are influenced. E. L. H.

C black.—See II. **Printing on paper.**—See V. **Electrical properties of bakelite.**—See XI.

See also A., Sept., 1101, Milowite [as pigment].

PATENTS.

Equilibrated paint and varnish remover containing petroleum hydrocarbons. C. ELLIS, Assr. to CHADELOID CHEM. Co. (U.S.P. 1,980,043, 6.11.34. Appl., 15.8.28. Cf. U.S.P. 1,884,632; B., 1933, 755).—Wax is incorporated with (a) 20—40% of a solvent > 75% of which consists of a petroleum distillate (b.p. < 115°), (b) 25—40% of a wax precipitant consisting of MeOH, EtOH, $COMe_2$, and "Lugosol" (an alkaline condensation product of $COMe_2$), (c) < 20% of an evaporation equilibrator, e.g., EtOAc, Pr^iOH . Many examples are given as well as data concerning the rates of evaporation of various solvent mixtures, with and without wax, and their action on old paint films. S. M.

High-strength lithopone. NEW JERSEY ZINC Co., Asses. of L. S. HOLSTEIN (B.P. 428,986, 24.7.34. U.S., 22.7.34).—A lithopone slurry prepared by reaction of BaS and $ZnSO_4$ is mixed with $ZnSO_4$ and treated with H_2S to ppt. all the Zn. Alternatively, BaS and H_2S may be added to aq. $ZnSO_4$. The ppt. obtained is filtered, washed, and calcined in the usual way. A. R. P.

Cellulose organic ester composition containing an ester of tetrahydrofurfuryl alcohol. E. R. TAYLOR and H. B. SMITH, Assrs. to EASTMAN KODAK Co. (U.S.P. 1,981,398, 20.11.34. Appl., 21.11.32).—Esters, < C_{10} , e.g., acetate, benzoate, or hexoate, of tetrahydrofurfuryl alcohol are claimed as plasticisers for org. esters (acetate) of cellulose. A. W. B.

Production of synthetic resins. E. I. DU PONT DE NEMOURS & Co. (B.P. 433,452, 10.1.34. U.S., 13.1.33).—An aliphatic dihalide (I) and a dihydroxydiphenylmethane compound (II) are caused to interact in the mol. ratios 2:1—1:2 (1:1). (II) may be partly replaced by a dihydroxydiarylsulphone or one or more monohydric phenols (< 50 mol-%), and (I) by a monohalide (< 50 mol-%). E.g., 4:4'- $CH_2(C_6H_4 \cdot OH)_2$ (456 pts.), $\beta\beta'$ - $O(C_2H_4Cl)_2$ (III) (286 pts.), 50% aq. NaOH (326 pts.), and H_2O (450 pts.) are heated at the b.p. in N_2 for 10—15 hr., the H_2O is distilled off, and the residue heated at 225—230° for 12 hr.; the product is washed with H_2O , followed by dil. HCl until acid, and finally washed acid-free and dried at 120—125°. A clear, pale, tough resin, fast to acids, alkalis, and light, and compatible with benzylcellulose, is obtained. Similar resins are obtained from 4:4'- $CMe_2(C_6H_4 \cdot OH)_2$ and its homologues with (III), *s*- $C_2H_4Cl_2$, or mixed amylene dichlorides. Their use as interlayers for safety glass, moulding compositions, and impregnating or waterproofing agents (for textiles) is claimed. H. A. P.

Production of lithographic printing. V. F. FEENEY. From MIEHLE PRINTING PRESS & MANUF. Co. (B.P. 429,210, 12.2.34).—To maintain a moist film on the forme during the printing process the forme is cooled below the dew point and moist air is passed over it, the process being controlled by a combination of thermostat and hygrometer to prevent excessive deposition of H_2O .
A. R. P.

Method of coating [regenerated cellulose etc.]. O. HERRMANN, Assr. to DU PONT CELLOPHANE Co., INC. (U.S.P. 1,979,936, 6.11.34. Appl., 22.6.31. Ger., 30.6.30).—The loss of flexibility which results when films of regenerated cellulose or other moisture-containing material are dried by heating is prevented by initial treatment with $HCO\cdot NH_2$, which may, alternatively, be incorporated [5–20 (10)%] with the coating composition.
S. M.

Production of rosin esters. D. C. BUTTS, Assr. to HERCULES POWDER Co. (U.S.P. 1,979,671, 6.11.34. Appl., 6.1.32).—Abietic esters are directly prepared, in absence of catalysts and at lower temp. and pressures than heretofore, by forcing a solution of rosin in the appropriate alcohol through a heated reaction chamber, under pressure, whereby the abietic acid is esterified and subsequently separating ester from excess alcohol. Preferred conditions for mono- and poly-hydric alcohols, respectively, are: esterification temp. 260–290°, 260–280°; pressure 1200–2000 lb./sq. in., slightly < 1 atm.—200 lb./sq. in.; reaction time 5–30, 15–60 min.
S. S. W.

Production of condensation products [synthetic resins]. W. KRAUS (B.P. 432,637, 25.1.34. Ger., 4. and 27.4.33).— $PhOH$ (1 mol.), urea (I) (1–2 mols.), and aq. CH_2O of $p_H < 3$ are condensed with a quantity of $(CH_2)_6N_4$ (II) such that the reaction mixture is acid from the start or becomes acid on heating. (II) is preferably added gradually as reaction proceeds, and (I) may be partly replaced by other reactive compounds (except phenols), e.g., $CS(NH_2)_2$, urethane, $HCO\cdot NH_2$. Light-coloured, thermo-hardening resins are formed.
H. A. P.

[Manufacture of] resinous metal compounds. P. L. SALZBERG, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,980,441, 13.11.34. Appl., 19.11.30).—A partial ester of a polyhydric alcohol (a mono- or di-glyceride prepared from a fatty oil) is converted into its H ester with a polybasic acid [$o-C_6H_4(CO_2H)_2$], the alkali salt of which is then treated in H_2O with a heavy-metal salt (and a H_2O -immiscible org. solvent). E.g., the diglyceride from tung oil and glycerol (677 pts.) is heated with $o-C_6H_4(CO_2O)$ at 140–150° for 2 hr., and the acid resin thus produced converted into Fe^{III} and Ce salts. The products are sol. in oils and org. solvents and are compatible with nitrocellulose and protect it against the action of ultra-violet light.
H. A. P.

Manufacture of lacquers and plastic masses. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 432,762, 14.6.34).—The usual oils, resins, etc. are used together with chlorinated products of aromatic hydrocarbons containing at least one CH_2 in the ring, e.g., acenaphthene, fluorene, indene.
S. M.

Tempering of cellulose acetate plastics. A. F. CAPRIO, Assr. to CELLULOID CORP. (U.S.P. 1,979,672, 6.11.34. Appl., 12.4.29).—The hard, brittle mass obtained by drying out the volatile portions of cellulose acetate-plasticiser-solvent mixtures is soaked in H_2O substantially free from solvent, to give strong, non-brittle thermoplastics.
S. S. W.

[Thermoplastic] composition [containing rubber] and its manufacture. H. GRAY, Assr. to B. F. GOODRICH Co. (U.S.P. 1,978,839, 30.10.34. Appl., 9.6.31).—A soft, adhesive, plastic material is obtained by dispersing S_2Cl_2 , either directly or after previously mixing with a rubber softener such as a drying oil, into a mass of solid rubber and heating, e.g., at 155°.
D. F. T.

Sealing compositions for cans, jars, and other containers. CROSSE & BLACKWELL, LTD., W. CLAYTON, and R. I. JOHNSON (B.P. 432,571, 30.1.34).—Mixtures of an alkali, alkaline-earth, or org. silicate in solution or aq. dispersion, turgescient colloidal material(s), e.g., starch, casein, gums, methylcellulose, and an org. hygroscopic substance, e.g., sugar, glycerin, together with non-hygroscopic filling materials and, if desired, aq. NH_3 , NH_4 salts, or soaps as emulsifying agents to increase spreading, are claimed.
S. S. W.

Testing of thermo-setting plastic materials. BAKELITE, LTD. From BAKELITE CORP. (B.P. 432,646, 31.1.34).—A predetermined quantity of material is, at a definite temp., subjected to a pressure (P) in a mould which is provided with a small outlet in which is a follower which offers a resistance to the flow of the material (slight compared with P) and indicates the extent of the flow. Flow distance is plotted against time for several different vals. of P .
B. M. V.

Plastic films. Brake lining.—See I. Azo pigments. **Lacquer dyes.**—See IV. **[Plastic from] sulphite liquor.**—See V. **Fireproofing composition.**—See VII. **Products from synthetic oil.**—See XII. **Adhesives.**—See XV.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

[Rubber] latex in the boot and shoe industries. H. BRADLEY (Trans. Inst. Rubber Ind., 1935, 11, 107–118).—A description is given of the prep. of the upper and bottom part of the shoe, and of their subsequent union, with an indication of the application of latex in these processes.
D. F. T.

Determination of the colour of [rubber] latex. F. H. COTTON (Trans. Inst. Rubber Ind., 1935, 11, 89–106).—A new method for measuring the colour of latex is based on a comparison with the colour of a block of salt illuminated by the same lamp. For latex showing colour other than a neutral greyness, the inspecting collimator is fitted with a Wratten orange (series 22) or blue (series 48) filter. On account of the unequal sensitivity of the upper and lower halves of the retina it is essential to take an equal no. of readings with and without an inverting prism in position. The colour index of a latex is given by dividing the readings obtained with the blue filter by that registered with the orange filter.
D. F. T.

Organic accelerators [of vulcanisation of rubber] and problems connected with their use in the factory. M. JONES (Trans. Inst. Rubber Ind., 1935, 11, 37—54).—The choice of an org. accelerator will be influenced by considerations of the desired temp. and times, of the sp. qualities desired in the vulcanisate, and of cost. Various mechanical and compounding methods for preventing premature vulcanisation are indicated. Pre-vulcanisation occurs more frequently than is commonly realised from the behaviour of the mixed rubber on a mill. Accelerators with a delayed time effect are of val., especially in the vulcanisation of thick articles in which the low heat-conductivity of the rubber is an obstacle to uniform heating, but are undesirable for un moulded articles. Modified effects can be obtained by the use of two or more accelerators, e.g., a thiuram sulphide or diphenylguanidine (or its salts) with mercaptobenzthiazole or with the corresponding di- or mono-sulphide. Some accelerators, e.g., certain dithiocarbamate and thiuram compounds, lose efficiency at higher temp., e.g., at 90 lb. steam pressure. Production of good physical qualities over a wide range of vulcanisation periods is an important possibility which can be gained by suitable compounding, e.g., with appropriate accelerators and low S. D. F. T.

Thixotropy and plasticity in the rubber industry. H. FREUNDLICH (Trans. Inst. Rubber Ind., 1935, 11, 55—66).—The isothermal, reversible sol-gel transformation designated thixotropy is observable not only with typical sols such as of gelatin but also with aq. suspensions of mineral powders such as clays or bentonite. Plasticity and thixotropy both involve loose packing, the former being favoured by higher concns. of the disperse phase and the latter by lower concns. Rubber latex does not become thixotropic spontaneously, but is transformable into a thixotropic system by careful addition of Li_2SO_4 or $\text{Al}_2(\text{SO}_4)_3$ or admixture with bentonite. It is doubtful if the recovery of rubber from the effects of mastication is a thixotropic change, but thixotropy is probably involved in the softening effect of lecithin on rubber and in the influence of the addition of milled or oxidised rubber to paints. A thixotropic bentonite- H_2O mixture has found technical application as a lubricant medium in petroleum-boring. D. F. T.

C black.—See II. Rubber-coating textiles.—See VI. Latex-insulated wire.—See X. Uses of rubber in paints.—See XIII. Rubber hydrocarbon and the living plant.—See XVI.

See also A., Sept., 1101, Milowite [as filler]. 1180, Latex of *Asclepias cornuti*.

PATENTS.

Anticoagulation and preservation of liquid rubber latex. A. T. B. KELL (B.P. 433,116, 11.11.33 and 11.12.34).—An aq. solution of K (or Na) silicate and K_2CO_3 is added, or a similar mixture containing also HCl, in which latter case certain types of filler such as CaCO_3 and Mg silicate are also incorporated. D. F. T.

Manufacture of articles from [rubber] latex. H. L. TRUMBULL, Assr. to B. F. GOODRICH CO. (U.S.P. 1,978,848, 30.10.34. Appl., 12.7.33).—Surface blemishes arising from film formation in a dipping process are

avoided by altering the surface tension of the latex, at the parts of the form liable to produce undesired films, by applying to the fresh deposit, e.g., by spraying, a volatile org. liquid (Et_2O) desirably containing in solution a less volatile higher alcohol, e.g., BuOH, carvacrol, or terpeneol. D. F. T.

Manufacture of rubber thread [from latex]. E. HAZELL, Assr. to NAT. INDIA RUBBER CO. (U.S.P. 1,978,796—7, 30.10.34. Appl., [A, B] 8.11.32. Renewed [B] 8.9.34).—(A) Latex is caused to stream down the surface of a rotating disc so that it flows to the edge, which at its lower portion dips in a coagulant bath; the coagulum is removed as a continuous length. (B) Suitable apparatus is described. D. F. T.

Manufacture of rubber thread. N. G. MADGE and A. W. KEEN, Assrs. to NAT. INDIA RUBBER CO. (U.S.P. 1,978,803, 30.10.34. Appl., 18.11.32).—A laterally unconfined stream of latex flows by gravity down the surface of a rod into a bath of coagulant in which the lower end of the rod is immersed, and the resulting continuous length of coagulum is removed. D. F. T.

Rubber-asphalt dispersion. L. KIRSCHBRAUN, Assr. to PATENT & LICENSING CORP. (U.S.P. 1,978,022, 23.10.34. Appl., 15.11.30).—A pasty, artificial aq. dispersion of rubber formed in presence of a hydrophilic colloid or colloidal clay, e.g., bentonite, is used as a medium for the formation of a dispersion of a normally non-fluid bitumen or asphalt. The resulting dispersion is mixed with fibrous pulp and run on a paper-making machine. D. F. T.

Manufacture of sec. aromatic amines. [Rubber antioxidants.] W. L. SEMON, Assr. to B. F. GOODRICH CO. (U.S.P. 1,980,102, 6.11.34. Appl., 15.2.29).— $\text{NH}_2\text{Ph}\cdot\text{HCl}$ [0.5—5 (\leq 4) mols.] is heated with $p\text{-OH}\cdot\text{C}_6\text{H}_4\cdot\text{NH}_2\cdot\text{HCl}$ (1 mol.) at 200—300° (250°). The main product is $p\text{-C}_6\text{H}_4(\text{NHP})_2$. H. A. P.

Preservation of rubber. I. WILLIAMS, W. A. DOUGLASS, and A. M. NEAL, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,978,444, 30.10.34. Appl., 11.10.33).—A compound of the type 2:6-NHR \cdot C $_6$ H $_4$ ·NHR', where R and R' are alkyl, aralkyl, or aryl groups (e.g., 2:6-diphenyl- or -diethyl- or 6-*p*-hydroxyphenyl-2-benzyl-naphthylenediamine), is incorporated as antioxidant. D. F. T.

Rendering india-rubber and like material fire-proof. J. TALBOT (B.P. 432,551, 6.3.34).—To the rubber is added 5—15% of Ph_3PO_4 , $(\text{C}_6\text{H}_4\text{Me})_3\text{PO}_4$, or Ph_3BO_3 . D. F. T.

Treatment of rubber. RUBBER PRODUCERS RES. ASSOC., G. F. BLOOMFIELD, and E. H. FARMER (B.P. 433,082, 8.5.34).—Dissolved rubber is treated with an org. hypochlorite (I) such as MeOCl or EtOCl in an inert solvent. The (I) solution may be formed by mixing aq. HOCl with C_6H_6 containing EtOH and drying, e.g., with CaCl_2 . The final solution may be evaporated at $\geq 40^\circ$. The dry product consists mainly of an additive compound of rubber and (I). D. F. T.

Production of reaction product of butadiene derivatives with hydrogen halides. E. GEBAUER-FÜLNEGG and E. W. MOFFETT, Assrs. to MARSENE CORP.

OF AMERICA (U.S.P. 1,980,396, 13.11.34. Appl., 23.12.33).—A compound of the butadiene class, *e.g.*, rubber, is submitted to the direct action of a dry H halide, either liquid or gaseous. The product has superior heat-resistance. D. F. T.

Manufacture of chlorinated rubber products. K. S. JACKSON, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 433,196, 11.12.33).—A product of improved stability is obtained by pptn. of chlorinated rubber from solution by addition of MeOH, separating the ppt., and bringing it in intimate contact with further MeOH. The solution before pptn. may be treated with Na₂CO₃ and filtered; also the ppt. may be re-dissolved and repptd. prior to contact with MeOH. The product yields films stable towards light. D. F. T.

Chlorinated [rubber] product. J. G. MOORE, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 432,905, 5.2.34).—Compositions with enhanced stability to light are obtained from chlorinated rubber (I), which may contain suitable stabilisers such as Bu₂ phthalate, by adding an org. peroxide, *e.g.*, > 10% of Bz₂O₂ or > 6% of BzO₂H, sol. in (I). The addition to (I) is preferably effected in solution. D. F. T.

Producing chlorinated rubber. INTERNAT. LATEX PROCESSES, LTD. (B.P. 433,252, 10.12.34. U.S., 2.3.34).—Cl₂ is introduced into previously vulcanised latex, at least until pptn. of discrete particles of chlorinated rubber takes place. The separated particles may be further chlorinated after removal from the liquid. D. F. T.

Producing chlorination products of caoutchouc. THURM & BESCHKE KOMM.-GES. (B.P. 433,246, 11.10.34. Czechoslov., 9.11.33).—Chlorination of dissolved caoutchouc is effected in presence of I. D. F. T.

Manufacture of chlorinated rubber in the form of films. J. G. MOORE, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 432,803, 2.2.34).—A solution of chlorinated rubber is dried on a surface coated with an easily removable substratum, *e.g.*, of gelatin or Na₂SiO₃. D. F. T.

Manufacture of glossy ebonite articles. Soc. ITAL. PIRELLI (B.P. 432,680, 28.11.34. Italy, 2.12.33).—The raw ebonite stock is pressure-moulded (and vulcanised simultaneously) in specular surfaced moulds, the operation being effected in two stages in which the interior space of the mould is successively reduced, so as finally to give the desired vol. D. F. T.

Abrasives.—See VIII. Thermoplastic composition.—See XIII.

XV.—LEATHER; GLUE.

***Saxifraga crassifolia* as an industrial plant.** P. A. JAKIMOV, N. B. KOJALOVITSCH, and O. V. KRUSSE (J. Appl. Chem. Russ., 1935, 8, 654—672).—The leaves contain 13—20% of tannin and 10—18% of arbutin. The tannin content is unaffected by storing in silos, whilst the arbutin undergoes complete hydrolysis under these conditions. R. T.

Critical consideration of the present state of tannin analysis. J. VON SCHROEDER (Collegium, 1935, 360—371).—Vegetable tanning materials consist of

tannins, half-tannins, and non-tans. Tannins are pptd. by gelatin, strongly and irreversibly adsorbed by pelt, alone responsible for tannage, and identical with the Wilson-Kern irreversibly combined tannin. Half-tannins are feebly adsorbed by pelt, not pptd. by gelatin, possess no tanning properties, and are easily washed out of pelt or leather which has adsorbed them. Non-tans are practically unadsorbed by pelt. Tannins and half-tannins are determined in the filter-bell method of analysis; some of the half-tannins are included in the "tannin" val. given by the shake method of analysis. Methods are suggested for the determination of the tannins and half-tannins, respectively. D. W.

Reaction of [quebracho-tanned] leather to oxygen. I. W. GRASSMANN and F. FÖHR (Collegium, 1935, 379—385).—The rate of O₂ absorption by quebracho-tanned leather increased progressively with the *p*_H of the leather and with its Fe content, but diminished by the removal of H₂O-sol. matter therefrom. Tannin, and not hide substance, is oxidised in the process. D. W.

Leather dyeing.—See VI. Latex and the boot etc. industry.—See XIV.

See also A., Sept., 1180, [Tannin of] bark of *Nerium odorum*.

PATENTS.

Manufacture and application of preparations suitable for use in the fat-liquoring and oiling of leather and like processes. IMPERIAL CHEM. INDUSTRIES, LTD., R. GREENHALGH, and G. S. J. WHITE (B.P. 432,636, 22.1.34).—Fish oils and/or marine-animal oils, together with other oils, *e.g.*, mineral oil, are mixed with an unsaturated fatty acid (I) (*e.g.*, hydrolysed sulphated castor oil) and NH₃ or the NH₃ soap of (I). E. H. S.

Adhesives. I. G. FARBENIND. A.-G. (B.P. 432,977, 7.2.34. Ger., 8.2.33. Addn. to B.P. 401,200; B., 1934, 29).—The use of the products of the prior patent as adhesives for, *e.g.*, wood, textiles, paper, bakelite, leather, and particularly as leather cements, is claimed. Pigments, fillers, and softening agents, *e.g.*, esters of *o*-C₆H₄(CO₂H)₂, may be added. A. W. B.

[Preparation of] dry adhesives. HENKEL & Co. G.M.B.H. (B.P. 432,486, 15.1.34. Ger., 24.2.33).—Dry, finely-powdered org. adhesives, *e.g.*, starch, dextrin, glue, are mixed with CaO-stable org. wetting agents having an alkyl residue of < C₈ or a hydroaromatic residue, solubilised by quaternary NH₄, SO₃H, CO₂H, O-SO₃H, polyhydroxy-, polyether, or similar groups, *e.g.*, Na octyl to tetradecyl sulphates, C₁₂H₂₅-S-CH₂-CO₂H, C₁₂H₂₅-SO₃H. [Stat. ref.] H. A. P.

Production of [isinglass] finings for clarifying liquids. C. F. CARPENTER, and MORRISON CARPENTER & Co., LTD. (B.P. 432,159, 13.11.34).—Pieces of isinglass are steeped in acidified H₂O for several hr. and then gently stirred continuously for 12—15 hr. The liquid, which then has the consistency of thin treacle, is strained through a fine sieve. Suitable apparatus is described. J. H. L.

Production of leather. J. R. GEIGY A.-G. (B.P. 433,815, 11.5.34. Ger., 11.5.33).—See U.S.P. 1,974,861; B., 1935, 739.

Tanning hides etc. Gelatin films.—See I. **Leather dyes.**—See IV. **Composite articles.**—See V. **Isinglass plaster.**—See XX.

XVI—AGRICULTURE.

Siallitic and alitic soils. T. SEKI (J. Sci. Soil Manure, Japan, 1934, 8, 245; Proc. Internat. Soc. Soil Sci., 1935, 10, 61—62).—The basis and val. of this system of soil classification are discussed. Five groups of soils are distinguished with reference to the $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio, dyestuff ratio, and reaction. A. G. P.

Rendzina soils. J. SPIRHZANZL (Zeměd. Archiv, 1934, 9—10; Proc. Internat. Soc. Soil Sci., 1935, 10, 61).—The classification, properties, and distribution of these soils are discussed, with special reference to Czechoslovakian types. A. G. P.

Soils of the middle Ural forest steppes. L. I. PRASOLOV and A. A. RODE (Trans. Dokučaev Soil Inst., 1934, 10, No. 7; Proc. Internat. Soc. Soil Sci., 1935, 10, 68—69).—Special attention is given to the occurrence of chernozem types in unusually northerly areas. A. G. P.

Nature and origin of black turf soils. J. J. THERON and P. VAN NIEKERK (S. Afric. J. Sci., 1934, 31, 320—346; Proc. Internat. Soc. Soil Sci., 1935, 10, 98).—These soils are considered as a climatic type, fundamentally identical with Russian chernozems but differing somewhat in morphology. A. G. P.

Soil formation on the Caucasian Black Sea coast. L. I. PRASOLOV, I. N. ANTIPOV-KARATAIEV, and V. N. PHILIPPOVA (Lenin. Acad. Agric. Sci. Ged. Inst. Fert., No. 35; Proc. Internat. Soc. Soil Sci., 1935, 10, 4).—The marked amphoteric characteristics of these yellow podzols is attributable to the presence of considerable amounts of secondary Fe and Al silicates and of limonite in the adsorptive complex. The silicates are pptd. at higher p_{H} than the corresponding humates and hence tend to accumulate near the soil surface. A. G. P.

Dynamics of Polish soils. A. MUSIEROWICZ, F. NOWOTNY, and R. JAWORSKI (Upr. rośl. nawoż., 1935, 7, No. 2; Proc. Internat. Soc. Soil Sci., 1935, 10, 91—92).—The NO_3' content of the surface layer of black humus soil was inversely related to the rainfall. In cropped soils vals. were lower and seasonal variations less marked. The proportion of NO_2' was small. The H_2O -sol. NH_3 content was similar throughout the season in cropped and fallow soils. The NO_3/NH_3 ratio in the upper 25 cm. averaged 10.6 in fallow and 4.8 in cropped areas. A. G. P.

[Report of soil chemist.] ANON. (E. Africa Agric. Res. Sta., Amani, Ann. Rept., 1933—4; Proc. Internat. Soc. Soil Sci., 1935, 10, 1—2).—Soil-survey work is recorded and the formation and classification of typical soils are discussed. The process of laterisation and the occurrence of laterite crusts are considered. A. G. P.

Chemical characteristics of soil profiles. I. Podsol. S. MATTON and Y. GUSLFFSON (Ann.

Landw. Hochsch. Schwed., 1934, 1, 33; Proc. Internat. Soc. Soil Sci., 1935, 10, 19—20).—In podzols the p_{H} of exchange neutrality and the ultimate p_{H} (i.e., after complete electro dialysis) of the horizons decrease in the order $C > B > A$. In B and C the actual p_{H} is $<$ the ultimate p_{H} . The base-combining capacity shows max. in A_0 and in B and is zero or negative in the lower horizons. A. G. P.

Genetic analysis and morphology of soil profiles. B. B. POLINOV (Arb. Bodenkn. Inst. Dokuchaev, 1930, No. 3—4; Proc. Internat. Soc. Soil Sci., 1935, 10, 2—3).—The phases of soil formation and differentiation into horizons are discussed. A. G. P.

Clay content of soil as related to climatic factors, particularly temperature. H. JENNY (Soil Sci., 1935, 40, 111—128).—The clay content of soils derived from uniform parent materials increased regularly from north to south, temp. being the dominant factor concerned. For const. H_2O conditions the clay-temp. relationship is exponential in type and approximates to Van't Hoff's temp. law. A. G. P.

Effect of annual grass fires on organic matter and other constituents of virgin long-leaf pine soils. S. W. GREENE (J. Agric. Res., 1935, 50, 809—822).—Burned-over soils contained more org. matter and N than those protected from fire. This was derived almost entirely from decaying roots of the dead plants. Plant debris burned or allowed to rot on the surfaces added little org. matter or N to the soil. Burnt areas produced greater yields of grasses and legumes (grasses having higher crude protein contents) and contained larger nos. of micro-organisms. A. G. P.

Burnt soil. H. J. HARDON and J. T. WHITE (Korte Meded. Algem. Proefstat. Landb., Java, 1934—5, No. 14, [10], 49—75; Proc. Internat. Soc. Soil Sci., 1935, 10, 35—36).—Burning of a very acid, yellow lateritic soil caused a change in p_{H} nearly to neutrality, a decrease in hydrolytic acidity, and the elimination of exchange acidity. The texture is also improved. Burnt soil may serve as a fertiliser for very poor soils. A. G. P.

Micro-organisms in profiles of certain virgin soils in Manitoba. M. I. TIMONIN (Canad. J. Res., 1935, 13, C, 32—46).—The nos. of organisms were usually highest in A and lowest in C horizons. Proportions of anaerobic bacteria and fungi increased with depth. No definite relationship was apparent between the nos. of organisms and the H_2O content of the soils. A. G. P.

Bacterial flora of wind-blown soil. VI. Death Valley, California, with summary of six soil studies. L. M. SNOW (Soil Sci., 1935, 40, 181—190; cf. B., 1935, 470).—Data for a saline soil (p_{H} 9.0) are given. Relationships between habitat conditions and bacterial activity are not clearly marked. A. G. P.

Biological decomposition of the organic matter of some farm manures in arable soils. F. KNORR (Diss., Göttingen, 1933; Bied Zentr., 1935, A, 5, 403).—The rate of nitrification of manure in soil is primarily controlled by the nature of the manure itself. Hot-fermented manure is superior to other forms of cattle manure in having a larger proportion of humified

material, a C:N ratio more closely approaching that of soil humus, and in supplying CO₂ to soil more satisfactorily. A. G. P.

Rate of decomposition of organic matter in Norfolk sand as measured by the formation of carbon dioxide and nitrates. C. E. BELL (J. Agric. Res., 1935, 50, 717—730).—The rate of evolution of CO₂ from soils treated with org. materials reached max. within 30 days in the open and within 2 months under greenhouse conditions. In all cases there was a subsequent decline to const. vals. substantially the same as those for untreated controls. In the initial period the amount of CO₂ produced in soils treated with legume matter was > that from soils receiving manure or Natal grass. The growth of citrus seedlings increased the formation of CO₂, which was further increased by application of inorg. N fertilisers. No N was lost by volatilisation. The proportion of N rendered available under greenhouse conditions was > in the open air, and the difference was maintained throughout the experiment. A. G. P.

Effect of lignin on decomposition of protein [in soils]. S. OSUGI and T. ENDO (J. Sci. Soil Manure, Japan, 1935, 9, 15; Proc. Internat. Soc. Soil Sci., 1935, 10, 78).—Lignin tends to depress protein decomp. Its influence is important in dry, but not in paddy, field conditions. A. G. P.

Machine for sub-surface treatment of soils with chloropicrin and with carbon disulphide for nematode control under field conditions. J. R. WELLER and R. V. ALLISON (Soil Sci., 1935, 40, 173—179).—The principle of the mole draining implement is adapted for the purpose. A. G. P.

Soil reaction. M. K. KRISTENSEN, S. TOVBORG-JENSEN, and N. C. NIELSEN (Jord. Grundfordb., Suppl., 1932, Ser. 4, No. 3, 59 pp.; Bied. Zentr., 1935, A, 5, 392).—Effects of various liming materials are compared. Marl produced better effects on crop yields than did CaCO₃ and had a more favourable action on the growth of white clover. Reaction between soil and liming material continued during 2—3 years with fairly heavy applications. In the electrometric determination of CaO requirements, soil suspensions in neutral salt solutions gave more const. vals. than did those in H₂O. A. G. P.

Liming of soils. I. Improvement of acid humus soils. G. TOMMASI, S. DOIMI, and L. MARIMPIETRI (Ann. R. Staz. Chim. Agrar. Sperim., Publ. 289; Proc. Internat. Soc. Soil Sci., 1935, 10, 27—29).—Complete neutralisation of these soils is reached at *p*_H 6.0. Relationships between the CaO requirement thus calc. and vals. based on exchange and hydrolytic acidities are examined. Adjustment of the reaction to *p*_H 7.0 brings the degree of saturation with bases to a *V* val. (Hissink) of 30. Finely-ground CaCO₃ gives more effective neutralisation than Ca(OH)₂. In the soils examined there is considerable nitrification and ammonification at *p*_H 5.2. The effects of drainage and aëration on *p*_H, oxidation-reduction potential, and growth of various crops are examined. A. G. P.

Phosphate content of Swedish soils. O. ARRHENIUS (Sverig. Geol. Undersökn., 1934, C, No. 383;

Proc. Internat. Soc. Soil Sci., 1935, 10, 33—34).—The distribution and origin of the PO₄^{'''} of sugar-beet soils is examined. Granite has a higher P content than gneiss, but decomp. and liberation of P are less rapid. Plants utilise very small concns. of PO₄^{'''} in the soil solution, average vals. ranging from 0.1 to 1.0 p.p.m. A. G. P.

Occurrence and importance of potash-bearing minerals in Dutch soils. F. A. VAN BAREN (Diss., Wageningen, 1934; Proc. Internat. Soc. Soil Sci., 1935, 10, 29—30).—The significance of K in the form of mineral silicates as well as in easily assimilable forms is emphasised. Mineralogical examinations of soils are recorded and discussed in relation to fertility. A. G. P.

Comparison between the suction and centrifuge methods for determining the moisture equivalent of soils. G. J. BOUYOUKOS (Soil Sci., 1935, 40, 165—171).—The two methods show general agreement, although the suction process tends to give the higher vals. (cf. B., 1929, 407). A. G. P.

Determination of carbon in soil. G. PICHARD (Rapp. Fonct. Inst. Rech. Agron. [1933], Min. Agric., Paris, 1934; Proc. Internat. Soc. Soil Sci., 1935, 10, 55).—Dennstedt's method carried out at 490° permits determination of org. C without appreciable dissociation of CaCO₃. A. G. P.

Determination of the adsorptive capacity of soils. M. M. GODLIN (Bodenchem. U.S.S.R., Soviet Sect., Moscow, 1934, A, 1, 112; Proc. Internat. Soc. Soil Sci., 1935, 10, 104).—Methods of Kelley (NH₄Cl) and Gedroiz (NaCl) are examined. Complete replacement of all other bases by Na⁺ or NH₄⁺ is not always possible in calcareous soils. Preliminary removal of CaCO₃ by three times the theoretical amount of 0.2*N*-AcOH is recommended. A. G. P.

Determination of the exchange capacity of soils by means of copper. I. J. LAVOLLAY (Ann. Chim. Analyt., 1935, [iii], 17, 229—230).—In the method of Fieger *et al.* (B., 1934, 806), some Cu is removed from the solution of Cu(NO₃)₂ placed in contact with soil, through interaction with CaCO₃. Soil, after saturation with Cu, is transferred to a Buchner funnel and washed with 80% EtOH. Adsorbed Cu is displaced by leaching with aq. NaOAc, and the Cu is determined in the leachate by 8-hydroxyquinoline. A. G. P.

Determination of exchangeable bases in soils. A. N. PURI (Soil Sci., 1935, 40, 159—161).—The method described is particularly suitable for alkali and saline soils and depends on the complete displacement of Na, K, Mg, and very little Ca from soil by leaching with (NH₄)₂CO₃ (I). The leachate is evaporated to dryness (sand-bath) and the residual carbonates are extracted with 50% EtOH to remove those of Na and K, which are determined volumetrically. The EtOH-insol. residue is treated with *N*-(NH₄)₂CO₃ at > 60° to extract MgCO₃, which is determined titrimetrically after evaporation as before. The final residue is CaCO₃, and is added to an AcOH extract of the soil remaining from the initial treatment with (I). This extract now contains all replaceable Ca. For soils containing CaCO₃, the residue after leaching with (I) is treated with 0.2*N*-KCl and

again leached with (I). The leachate is evaporated to dryness and the residue extracted with hot H_2O . The aq. solution contains base equiv. to exchangeable Ca, Mg, Na, and K. Hence Ca is determined by difference.

A. G. P.

Determination of potassium [in soils and fertilisers]. C. PENG (Trans. Sci. Soc. China, 1934, 8, No. 2; Proc. Internat. Soc. Soil Sci., 1935, 10, 105—106).—The customary cobaltinitrite ppt. (equiv. to < 20 mg. of K_2O) is filtered (paper), washed with 2% Na_2SO_4 solution, boiled (with paper) with approx. 25 c.c. of H_2O , treated with excess of 0.1N-HCl containing urea (3 g. per litre), and heated on a steam-bath (5—10 min.) till decomp. is complete. Excess of HCl is titrated with NaOH (Me-red) in the cooled liquid. For larger proportions of K the ppt. is collected in a Gooch crucible, washed with cold H_2O , dried at 110° for 2 hr., and weighed.

A. G. P.

Utility of analytical methods for determining fertiliser requirements of soils. I. Phosphate content of nitric acid extracts of soils and crop increases due to phosphate manuring. P. TUORILA and A. TERÄSVUORI (Valt. Maatalauskoet. Julkaisuga, 1933, 56, 68; Bied. Zentr., 1935, A, 5, 422—423).—Soil is extracted with dil. HNO_3 of such concn. that the extract has p_H 2.0—3.0. Reference tables are compiled relating $[PO_4^{''}]$ in extracts of given p_H to PO_4 requirements of soils of various types. With increasing $[H^+]$ the PO_4 -fixing capacity of soils increases, and the "sol." $PO_4^{''}$ declines.

A. G. P.

Meta- and pyro-phosphates as sources of phosphorus for plants. S. GLIXELLI and K. BORATYŃSKI (Rocz. nauk. roln. lésn., 1933, 30, 333—342; Bied. Zentr., 1935, A, 5, 430—431).—Plants utilise ortho-, α -meta-, β -meta-, and pyro-phosphates. The intake of P by wheat and barley was relatively smaller from meta-salts (β - $<$ α -). Differences in intake are probably related to mol. dimensions of the salts.

A. G. P.

Sorption of phosphates by non-calcareous Hawaiian soils. L. E. DAVIS (Soil Sci., 1935, 40, 129—158).—Reaction between $PO_4^{''}$ solutions and soil is slow and equilibrium may not be reached for many weeks. The amount of $PO_4^{''}$ fixed is directly related to the ratio of soil to solution used. Fixation is considerable in soils in which the replaceable bases consist entirely of alkali metals. Cations and $PO_4^{''}$ are fixed simultaneously in the approx. ratio of 3 equivs. of base per mol. of P. The extent of the fixation is determined by the p_H of the solution applied and takes place to a notable extent at p_H 0.7—0.25. Fixation is probably not due to double decomp., and in alkali metal-saturated soils is caused by adsorption and the formation of equilibrium complexes.

A. G. P.

Relationships between phosphate solubility and reaction in soils. W. KARLL (Diss., Munich, 1933; Bied. Zentr., 1935, A, 5, 397).—The $PO_4^{''}$ requirement of soils is closely related to their reaction. Liming increased and physiologically acid fertilisers decreased the availability of $PO_4^{''}$.

A. G. P.

Nutrient value of the phosphorus in calcined phosphate as determined by growth of plants in

greenhouse experiments. K. D. JACOB, R. P. BARTHOLOMEW, B. E. BROWN, W. H. PIERRE, F. R. REID, and J. W. TIDMORE (J. Agric. Res., 1935, 50, 837—848).—The nutrient val. of calcined (rock) phosphate was related to the citrate-solubility of the $PO_4^{''}$, which, in turn, depended on the amount of F lost during calcination. Where the F volatilised was $<$ that corresponding to the second F atom in the fluorapatite equiv. of the rock, the citrate-solubility and nutrient val. were $<$ that of the native material. Volatilisation of $> 64\%$ of the total F corresponded with progressive increase in fertiliser val. Calcined phosphates having $< 78\%$ citrate-solubility were as efficient as was super-phosphate.

A. G. P.

Pure and mixed sowings of peas, oats, and lupins as factors in the utilisation of phosphatic manures. M. KWINICHIDZE (Rocz. nauk. roln. lésn., 1934, 31, 421—465; Bied. Zentr., 1935, A, 5, 446).—The $PO_4^{''}$ content and dry-matter production of the plants indicate differences in intake and in the mechanism of utilisation of P between plants in pure and those in mixed culture.

A. G. P.

Unfavourable effects of iron salts on availability of potash fertilisers. K. SHIBUYA and T. TORII (J. Sci. Soil Manure, Japan, 1935, 9, 1; Proc. Internat. Soc. Soil Sci., 1935, 10, 89).—Presence of much Fe in the soil solution may lead to formation of double K and Fe salts of low dissociation. The availability of the K is thus diminished.

A. G. P.

Influence of magnesium and sodium on the action of potash fertilisers. J. MIKULOWSKI-POMORSKI and M. WOJTYŚIAKOWA (Rocz. nauk. roln. lésn., 1934, 31, 107—116; Bied. Zentr., 1935, A, 5, 427).—Mg and Na salts applied simultaneously exerted a more beneficial effect than either alone (barley).

A. G. P.

Influence of the distribution of potash fertilisers on their action in pot cultures. J. MIKULOWSKI-POMORSKI and S. POROWSKI (Rocz. nauk. roln. lésn., 1934, 31, 92—96; Bied. Zentr., 1935, A, 5, 425).—The efficiency of KCl and K_2SO_4 was greatest when mixed with the surface layer ($\frac{1}{3}$) of soil and least when mixed with the whole mass of soil in the pot. This influence of distribution varies with cultural conditions, notably with the time of sowing of the crop. The action of K salts used in conjunction with $NaNO_3$ was $<$ when used with $(NH_4)_2SO_4$.

A. G. P.

Use of sodium nitrate and ammonium sulphate in conjunction with different proportions of potash fertilisers on soil which reacts strongly to potassium. J. MIKULOWSKI-POMORSKI and J. SALCEWICZ (Rocz. nauk. roln. lésn., 1934, 31, 116—122; Bied. Zentr., 1935, A, 5, 430).— $NaNO_3$ restricts the intake of K by maize and is effective as a fertiliser only when used with heavy dressings of K.

A. G. P.

Influence of potassium on growth of plants in different stages of development. II. Absorption of potassium and sodium by plants and dry-matter production. M. KORCZEWSKI, F. MAJEWSKI, and J. WAFFLARD (Rocz. nauk. roln. lésn., 1934, 31, 22—68; Bied. Zentr., 1935, A, 5, 444—445).—The dry-matter production curve with varying $[K^+]$ in the nutrient

shows a min. in the range 12—22 mg. of K per litre. The K intake, however, is a max. in this range. Growth intensity is markedly influenced by the Na supply, although at the end of the growth period very little Na was present in roots, and none in leaves or flower spikes. (Cf. B., 1934, 595.) A. G. P.

Relative nutrient values [for plants] of sodium and potassium. M. KORCZEWSKI and F. MAJEWSKI (Rocz. nauk. roln. leśn., 1934, 31, 141—166; Bied. Zentr., 1935, A, 5, 445—446).—The Na requirement of oats with reference to dry-matter production varied with external conditions and with the stage of development of the plants over a range corresponding to 22—74.5% of the K requirement. A. G. P.

Influence of boron compounds on growth of certain plants. F. TERLIKOWSKI and K. MILKOWSKI (Rocz. nauk. roln. leśn., 1934, 31, 167—202; Bied. Zentr., 1935, A, 5, 445).—The presence of B is particularly necessary for the growth of tobacco and tomato, and to a smaller extent for the development of seedlings of Papilionaceae. Cereals are less affected. Insol. B compounds, e.g., enamel or glass of culture vessels, serve as a source of B for plants. In general, proportions of B > 1 p.p.m. in culture media have a toxic action. In Solanaceae a relationship exists between the N content of the plants and the level of B supply. A. G. P.

Magnesium supply of plants. A. JACOB (Chem.-Ztg., 1935, 59, 675—676).—The function and use of Mg fertilisers is discussed. In general, the Mg requirement of crops may be met by utilisation of K fertilisers containing 2—5% of MgSO₄. A. G. P.

Effect of vanadium on growth of plants. II. K. SHIBUYA and H. SAEKI (J. Soc. Trop. Agric., Japan, 1934, 6, 721; Proc. Internat. Soc. Soil Sci., 1935, 10, 90).—Vanadates had no direct nutrient effect, but stimulated plant metabolism and also the activity of *Azotobacter*. A. G. P.

Exchangeable cations in the soil and the plant. III. **Influence on crop yields of manganese, aluminium, and certain other metals introduced in varying amounts into the adsorptive complex of soils.** IV. **Adsorbed ammonium as a nitrogen source for plants, and its influence on the soil.** K. K. GEDROIZ (Mineral Manuring [Russia], 1932, 1, No. 109, 70; 1933, 2, No. 113, 3; Proc. Internat. Soc. Soil Sci., 1935, 10, 36—37, 30; cf. B., 1934, 594, 1074).—III. Small proportions of Rb, Cd, Ba, Mn, Co, Ni, and Al in the adsorptive complex stimulate plant growth. Optimum proportions and max. stimulatory effects are examined.

IV. Adsorbed NH₄ may serve as a plant nutrient. Repeated application of NH₄ fertilisers may affect the physical condition of soils. A. G. P.

Rôle of organic matter in plant nutrition. X. **Influence of different forms of manganese on the oxidation of organic matter and release of plant nutrients.** C. R. H. IYER, R. RAJAGOPALAN, and V. SUBRAHMANYAN (Proc. Indian Acad. Sci., 1935, 2, B, 108—135; cf. B., 1935, 116).—Addition of small amounts of KMnO₄ to manured or unmanured soils

increased the yields of ragi. Applications made simultaneously with org. manure were more effective than those made later. Products of interaction of KMnO₄ and soil are partly sol. in 4N-H₂SO₄ and partly insol. The transformation of MnSO₄ into insol. substances is much less rapid. With both materials there is a temporary decline followed by a rapid increase in soil bacteria. Decomp. of soil org. matter in presence of Mn compounds occurred in the decreasing order MnO₂, KMnO₄, MnCO₃, MnSO₄. Mn compounds increased the yield of tomatoes without affecting quality or vitamin content, and tended to counteract the adverse effect of CaO in certain varieties. A. G. P.

Return of mineral elements to the soil by plants. N. L. PENSTON (Nature, 1935, 136, 268—269).—A summary of recent investigations. L. S. T.

Effect of manuring on the alkalinity of plant ash. L. TSCHUMI and J. STALÉ (Landw. Jahrb. Schweiz, 1934, 48, 34—48; Bied. Zentr., 1935, A, 5, 446).—Slowly-acting P fertilisers (bone meal, sintered phosphate, microphosphate) supplemented by periodic K manuring affect the alkaline-earth content of plant ash without changing the relative proportions of the bases to P. Sol. P fertilisers increased the PO₄ intake and the ratio alkaline earths : P in the ash. A. G. P.

Influence of a single heavy application of fertilisers, and of local variations in soil composition, on the occurrence and development of *Azotobacter chroococcum*. O. GRÜNENWALD (Diss., Munich, 1933; Bied. Zentr., 1935, A, 5, 407).—Urea fertilisers have a favourable effect on *Azotobacter* and on mannitol-fermenting organisms. K stimulates protozoa. The beneficial action of P fertilisers on *Azotobacter* is influenced by the Fe content of the soil. The action of CaO on the organism is limited to its effect on soil particles immediately surrounding plant roots. A. G. P.

Effect of fertilisers, soil type, and certain climatic factors on yield and composition of oats and vetch. G. O. BAKER and S. C. VANDECAVEYE (J. Agric. Res., 1935, 50, 961—974).—The two crops responded differently (in yield) to applications of N and CaO, but similarly to those of K and P. In both cases N fertilisers lowered the P and Ca contents of the crop. These vals. were increased by treatment with P fertilisers and CaO, respectively, to levels > those of crops receiving N only, but > those of unmanured crops. The effect of soil type on the % Ca and P in crops was > on that of K and P. Humid coastal soil produced crops having a higher % P and lower % Ca than did those of the same type in semi-arid regions. The response to CaO was also greater under the latter conditions. A. G. P.

Microbiological decomposition of the constituents of lucerne hay. M. PHILLIPS, M. J. GOSS, E. A. BEAVENS, and L. H. JAMES (J. Agric. Res., 1935, 50, 761—775).—Spontaneous aerobic decomp. of lucerne hay affected principally the EtOH-C₆H₆ and H₂O extractives, pectins, polyuronides, proteins, and OMe-derivatives. Pentosans and cellulose were less affected and lignin was the most resistant. The oxidation of lignin, after the removal of associated materials, may be an important factor in the spontaneous ignition of stacks. A. G. P.

Mycorrhiza in relation to forestry. I. The genus *Pinus*. M. C. RAYNER (Forestry, 1934, 8, 96—125; Proc. Internat. Soc. Soil Sci., 1935, 10, 25).—Poor growth of seedlings associated with defective development of mycorrhiza may be corrected by inoculating soil with material containing sp. "mycorrhiza-formers." Such material produces, in soil, substances stimulating lateral root production prior to the usual stimulation caused by mycorrhiza. The occurrence of a parasite (pseudo-mycorrhiza) is associated with unfavourable soil conditions, and its inhibitory action is corrected by treatment of soil with various org. composts and inorg. nutrients. A. G. P.

Composition of organic matter and nitrogen compounds in soils of the Tatra mountains in relation to manuring and to plant associations. J. KIELPIŃSKI (Rocz. nauk. roln. leśn., 1933, 30, 281—302; Bied. Zentr., 1935, A, 5, 411).—The beneficial action of sheep manure on the N and humus contents of these soils is established. The C:N ratio of the soils depends on org. manuring, type of vegetation, and reaction (within the range pH 4.5—7.2), and not on the amount of org. matter present. No relationships were traced between soil acidity and plant associations arising from cultural practice. A. G. P.

Intake of certain mineral substances by plants of the more important mountain pastures of the Western Carpathians in relation to manuring. E. RALSKI (Rocz. nauk. roln. leśn., 1933, 30, 429—474; Bied. Zentr., 1935, A, 5, 379—380).—Effects of sheep folding on the mineral content and quality of the pastures are examined. A. G. P.

Factors governing the response to manuring of cotton in Egypt. D. S. GRACIE and F. KHALIL [with H. ENAN] (Min. Agric., Egypt, Tech. Sci. Bull., 1935, No. 152, 71 pp.).—Beneficial effects of manuring occur only in the case of N. Adequate returns from such manuring can be ensured if soil deterioration is prevented by intensive drainage. A. G. P.

Sulphuric acid treatment of mangel seed. H. P. DONALD (New Zealand J. Agric., 1935, 50, 336—345).—Improved germination followed treatment of seed with 80% H₂SO₄ for 45 min. and subsequent washing. A. G. P.

Viability of weed seeds in ordinary stall manure and in that treated by the Kranz method. W. TRZCIŃSKI (Rocz. nauk. roln. leśn., 1933, 30, 213—232; Bied. Zentr., 1935, A, 5, 434).—Hot-fermented manure contained no live seed. A considerable no. of seed of certain species survived in stall manure. A. G. P.

Function of the rubber hydrocarbon in the living plant. D. SPENCE and W. J. MCCALLUM (Trans. Inst. Rubber Ind., 1935, 11, 119—134).—Evidence is adduced against the earlier view that rubber is an excretory product of no physiological val., and on account of its chemical inertness not to be regarded as a reserve food. Rubber, whether in the form of wet sheet or as latex, is readily attacked by micro-organisms, and recent investigations have shown that it is much more sensitive to O₂ than was earlier believed. Experimental study of the Guayule shrub reveals that the rubber present is not

a fixed quantity, but disappears in measurable amount under conditions of natural development and growth during the year. Artificial stimulation such as defoliation or irrigation greatly accentuates the disappearance of the rubber hydrocarbon. D. F. T.

Chemical sterilisation as a means of eradicating wart disease from the soil. R. H. BELL (J. Econ. Entom., 1935, 28, 519—524).—Successful sterilisation is obtained by use of NH₄SCN (< 800 lb. per acre) approx. 80 days prior to planting. A. G. P.

Sulphated alcohols in insecticides. E. N. CORY and G. S. LANGFORD (J. Econ. Entom., 1935, 28, 257—260).—In comparative trials of toxicity, of efficiency as carriers for other insecticides, and as emulsifiers and wetting agents, Na lauryl sulphate and the corresponding oleyl compound proved very satisfactory, and were superior to soaps. The first-named facilitates the removal of spray residues by the acid-washing process. A. G. P.

Fluorine compounds as insecticides. I. D. DOBROSKY (J. Econ. Entom., 1935, 28, 627—637).—Natural cryolite shows no tendency to scorch foliage. Injury attributed to synthetic cryolite is probably due to small amounts of NaF present therein. The toxicity of silicofluorides and of natural cryolite is lowered by CaO, due to the formation of CaF₂. The killing of insects by F compounds results from the removal of Ca from living tissues to form CaF₂. A. G. P.

Arsenical substitutes [insecticides]. I. Chemicals tested in 1934. J. M. GINSBURG and P. GRANETT (J. Econ. Entom., 1935, 28, 292—298).—Numerous tests of org. and inorg. substances are recorded. A. G. P.

Arsenical substitutes for control of vegetable crop insects at the Virginia Truck Experimental Station. H. G. WALKER and L. D. ANDERSON (J. Econ. Entom., 1935, 28, 603—605).—Instances of successful use of derris or pyrethrum are recorded. A. G. P.

Arsenical substitutes for controlling vegetable insects. J. N. RONEY and F. L. THOMAS (J. Econ. Entom., 1935, 28, 615—617, 618—620).—For cabbage caterpillars derris-S dusts gave best results. Derris was somewhat slower in action than pyrethrum. Against the bean leaf hopper and the belted cucumber beetle, pyrethrum-S was slightly more effective than S alone. A. G. P.

Arsenical substitutes for cabbage-worm control, and limitations of arsenical treatments. W. H. WHITE (J. Econ. Entom., 1935, 28, 607—609).—The efficiency of materials examined was in the order derris > pyrethrum > Paris-green, Ca arsenate, cryolite. A. G. P.

Larvicidal efficiency of certain spray combinations against the fruit tree leaf roller. P. J. CHAPMAN and R. W. DEAN (J. Econ. Entom., 1935, 28, 376—379).—Newly hatched larvæ are readily killed by Pb arsenate. Practical efficiency depends on suitable covering properties of the spray. Best results are obtained by combination with summer-oil emulsions, although oil exerts no appreciable insecticidal action. A. G. P.

Immediate and residual effects of certain insecticides on the white apple leaf-hopper. H. M. STEINER (J. Econ. Entom., 1935, 28, 385—388).—The immediate killing effect of nicotine sulphate was fairly uniform, irrespective of the nature of the soap used in conjunction with it, but the residual action (144 hr.) varied considerably with the kind and quantity of soap applied, 0.5 lb. per 100 gals. being more effective than larger amounts. Residual kill is correlated with retention of nicotine by foliage. A. G. P.

Accumulative effect of oil sprays on apple trees. M. D. FARRAR and V. W. KELLEY (J. Econ. Entom., 1935, 28, 260—263).—Repeated use of oil sprays over 5—10-year periods did not affect appreciably the growth of young apple trees. Applications of 8% dormant sprays delayed bud-opening 3—7 days. Summer treatment (3 applications) with saturated oils (2%) injured neither fruit nor foliage. A. G. P.

Tar distillate and tar-lubricating oil sprays. F. Z. HARTZELL, S. W. HARMAN, and T. W. REED (J. Econ. Entom., 1935, 28, 263—268).—Recent records of the effect of dormant sprays on trees subjected to extreme winter temp. are discussed. The standardisation and designation of oils by manufacturers are considered. A. G. P.

Destruction of earth-nut insects [*Pachymerus acaciae*]. R. SAGOT (Bull. Mat. Grasses, 1935, 19, 179—186).—Fumigation with CS₂ or light petroleum is effective. *p*-C₆H₄Cl₂ may be used for empty stores or for nuts not required for oil extraction. A. G. P.

New spreader for nicotine [insecticide]. C. O. EDDY (J. Econ. Entom., 1935, 28, 469—472).—The spreader contains H₂O 5, KOH 7.4, pine-tar oil 44.3, OH-[C₂H₄]-OEt 10, oleic acid 33.3%, the constituents being mixed in the order named. A modified prep. includes the addition of PhOH and *iso*-C₅H₁₁-OH. A. G. P.

Catalytic elements in relation to production and burning quality of tobacco. L. DELAVIGNE and QUARTAROLI (Boll. techn., 1932, 29, No. 2, 77; Bied. Zentr., 1935, A, 5, 455—456).—The burning quality is improved by the presence of Fe. Mn favours growth, probably as an oxidase catalyst, and is essential for root respiration. In the growing plant Cu is concerned in hydrogenation processes, and during fermentation of the leaves stimulates the formation of melanin. The effects of inorg. substances are frequently obscured by the influence of org. materials (N, protein, pentosans, etc.). A. G. P.

Smouldering period of tobacco leaf. C. COOLNAAS (Proefst. Vorstenland Tabak., Med., 1934, No. 79; Bied. Zentr., 1935, A, 5, 455).—Manuring with various K salts did not increase the K content of the leaf, but K₂SO₄ increased the ratio K₂O/(CaO + MgO). Lowering the soil *p*_H increased the Cl intake of the plant and reduced "burnability." Stall manure produced adverse effects but green-manuring and the use of oil cake residues gave good results. A. G. P.

Sulphur fumigation for control of mushroom pests. A. C. DAVIS and H. D. YOUNG (J. Econ. Entom.,

1935, 28, 459—465).—Effective conditions of temp. and R.H. are established. A. G. P.

Halowax as an ovicide. E. P. BREAKEY and A. C. MILLER (J. Econ. Entom., 1935, 28, 358—365).—Comparison is made of Halowax (a chlorinated C₁₀H₈ product) and nicotine, pyrethrum, and rotenone against the Angoumis grain moth, blowfly, and Mediterranean flour-moth eggs. Halowax was more efficient when used in petroleum oil and gave more consistent results than the other materials. A. G. P.

Method for comparing the ovicidal properties of contact insecticides. E. P. BREAKEY and A. C. MILLER (J. Econ. Entom., 1935, 28, 353—358).—Eggs are steeped in the test solution, filtered off, and incubated. A. G. P.

Aëroplane dusting in relation to bee-keeping. J. E. ECKERT and H. W. ALLINGER (J. Econ. Entom., 1935, 28, 590—597).—Evidence is advanced of As poisoning of bees following use of insecticides. A. G. P.

Determining rotenone.—See XX.

See also A., Sept., 1093, **Colorimetric determination of K. 1179, Determining Ca in plant ashes, and Mo in plants and soils. 1181—2, Tobacco.**

PATENTS.

Manufacture of derris-root extracts and other plant extracts. CHEM. FABR. MARIENFELDE G.M.B.H. (B.P. 432,626, 11.1.35. Ger., 18.1.34).—Alkali-resin soaps having *p*_H > 6.8 are added to C₂H₂Cl₂ or C₂HCl₃ extracts of derris root or other plants. E. H. S.

[Plant] insecticides. E. C. BRITTON and L. E. MILLS, Assrs. to Dow CHEM. CO. (U.S.P. 1,981,219, 20.11.34. Appl., 22.9.30).—The use of emulsions of 2-C₆H₄Ph·OH or its (alkali-metal) salts is claimed. H. A. P.

Agents for combating plant diseases. I. G. FARBENIND. A. - G. (B.P. 433,944, 21.12.33. Ger., 22.12.32).—A mixture of an aromatic halogenonitro-compound [1 : 2 : 4 : 3 : 5-C₆HCl₃(NO₂)₂] with a fertiliser (except NH₄NO₃) or a soil-improving agent, e.g., peat, is claimed to impart to plants resistance to disease, particularly to "rust" and *Plasmiodophora brassicae*. H. A. P.

XVII.—SUGARS; STARCHES; GUMS.

Saccharification of wood. H. GROSSMANN (Chim. et Ind., 1935, 34, 255—266).—The Scholler-Tornesch process, using dil. acid, and the Bergius-Rheinau process, using 40% HCl, are described and their economic aspects discussed. T. H. P.

Sugar beet as feeding-stuff.—See XIX.—**Colloids in waste waters.**—See XXIII.

See also A., Sept., 1108, **Alkalimetric determination of glucose.**

PATENTS.

Production of pectin from sugar beet. W. A. BÜCHTING (B.P. 429,718, 13.8.34).—To obtain pectin extracts capable of forming gels, fresh beet slices, freed from sugar by extraction with H₂O at > 70° for > 1 hr.,

are neutralised if necessary and then boiled or heated under pressure with H_2O . The extracts obtained may be decolorised with C, or clarified by storage after addition of SO_2 , and ultimately boiled down or dried in vac. The process may be combined with beet-sugar manufacture, and methods of preserving de-sugared slices before extraction of their pectin are described; drying in the ordinary way affects the gel-forming power of the pectin. J. H. L.

[Electrolytic acidification] treatment of plant juices. U. HEUBAUM, Assr. to ILLINOIS UNIV. (U.S.P. 1,972,561, 4.9.34. Appl., 12.3.32).—Prior to the hydrolysis of sucrose or polysaccharides in plant juices or mashes, the requisite acidity is produced from the salts naturally present, without addition of acid, by cataphoresis in compartmented electrolytic cells, preferably between diaphragms having a negative charge, which favour the migration of cations. After saccharification the acidity may be neutralised with alkalis or by cataphoresis between diaphragms having a positive charge, which favour the migration of anions. J. H. L.

Purification of sugar-factory and -refinery juices. D. TEATINI (B.P. 429,691, 5.12.33. Addn. to B.P. 417,075; B., 1934, 1077).—The two stages of CaO treatment specified in the prior patent are replaced by a single stage, in which the quantity of CaO added is rather $>$ the min. quantity required to attain the isoelectric point, and sufficient to render the pptd. impurities readily removable by filtration or otherwise. The limed juice may, if necessary (cf. B.P. 394,498; B., 1933, 888), be treated with SO_2 or compressed CO_2 before filtration. The optimum quantities of CaO and SO_2 may be found by a series of trials in which rates of sedimentation or filtration are compared. The Ca content of the filtered juice can, if necessary, be reduced by treatment with Na_2CO_3 , phosphates, sulphites, etc., followed by filtration. J. H. L.

[Sugar] massecuite treating apparatus. S. S. PECK (U.S.P. 1,971,873, 28.8.34. Appl., 5.1.34).—Apparatus for warming massecuite, to reduce η before centrifuging, is claimed. It may also be used for cooling massecuites. J. H. L.

Polymerisation of monomeric aldehyde sugars [aldoses]. HOLZHYDROLYSE A.-G. (B.P. 430,876, 7.11.34. Ger., 7.11.33. Addn. to B.P. 418,481; B., 1935, 120).—The hygroscopic character of the products is minimised by carrying out the heating at 160–170° until incipient decomp. and darkening occur, and is still further reduced, without further darkening, by a subsequent heating at 100–130° for several hr. Acidity may be neutralised before the second heating. The final products may have $<$ 10% of the reducing power of the original sugars. J. H. L.

Preparation of inulin. H. S. PAINE, R. M. KINGSBURY, and E. YANOVSKY, Ded. to U.S.A. (U.S.P. 1,971,871, 28.8.34. Appl., 10.8.32).—Ground chicory roots, or other materials containing inulin (I), are extracted with hot H_2O , the extract is treated with CaO, filtered if desired, carbonated to about p_H 8–9, filtered, evaporated in vac. to 50% concn., heated to 90–95°

and cooled to room temp. for the crystallisation of (I). The (I) may be purified by dissolving in 1.5–2 pts. of hot H_2O , filtering with active C, and cooling to room temp. J. H. L.

Preparation of cold-soluble starch products. N. V. CHEM. FABR. "SERVO," and M. D. ROZENBROEK (B.P. 430,872, 17.10.34. Holl., 23.10.33).—Starch sol. in cold H_2O , obtained in flakes by drying moistened raw starch above the temp. of gelatinisation, is moistened, kneaded, and gently warmed so that its H_2O content is raised to about 12–15%. On grinding it forms a denser powder, less liable to form lumps on mixing with cold H_2O than the powdered product obtained without moistening. Borax, gelatin, rubber latex, etc. may, if desired, be incorporated during the moistening, and to improve the lustre of the final product a proportion of unmoistened cold- H_2O -sol. starch may be admixed. J. H. L.

Packing of invert sugar and the like. VALENTIN ORD & NAGLE, LTD., and J. C. NAGLE (B.P. 432,137, 24.4.34).

Ca lactobionate.—See III.

XVIII.—FERMENTATION INDUSTRIES.

Degree of solubility of malt. H. FINK (Woch. Brau., 1935, 52, 265–267).—The degree of solubility is ascertained by determining the fraction of the total pentosans which is dissolved under given conditions. This method gives results in general agreement with that of Kolbach, which involves the determination of the amount of dissolved N, although in some cases, especially of the more sol. malts, differences are sometimes found. W. O. K.

Content of assimilable nitrogen in different Munich beer worts. N. NIELSEN (Woch. Brau., 1935, 52, 259–261).—The % of N capable of utilisation by yeast in various Munich beer worts varied between 20% and 55%, and tended to be lower in dark than in light worts. W. O. K.

See also A., Sept., 1104, Dehydration of EtOH.

PATENTS.

Treatment of yeast. C. P. FRESHET (U.S.P. 1,981,225, 20.11.34. Appl., 14.1.33).—The max. surface of dried, powdered yeast, preferably after vac. treatment to remove air, is submitted to the action of smoke fumes from smouldering hickory wood. The characteristic yeast flavour is thus removed and is replaced by a pleasing smoky flavour which is permanently retained under ordinary conditions. The product is suitable for use as a condiment, flavouring material, etc. I. A. P.

Ageing and colouring of whisky. S. C. MILLER, Assr. to FRANKFORT DISTILLERY (U.S.P. 1,981,873, 27.11.34. Appl., 23.3.33).—Vapours from the whisky still are passed through wood shavings in a suitable container (A), and preferably under such conditions that partial condensation takes place, essential oils, tannin, etc. thus passing from the wood to the liquor. The condensed vapour drains from A and passes with

uncondensed vapour to a worm condenser, where condensation is completed. I. A. P.

Finings.—See XV. *Acidophilus* product.—See XX.

XIX.—FOODS.

Rapid determination of casein in buttermilk porridge. F. T. VAN VOORST (Chem. Weekblad, 1935, 32, 478—479).—50 g. of sample, 25 c.c. of H_2O , and 10 c.c. of $N-NaOH$ are heated to 40° , cooled, reheated to 40° , and made up to 500 c.c. with 1% $Na_2C_2O_4$ solution with shaking. After keeping overnight, 100 c.c. are heated in a Kjeldahl flask with 2 c.c. of 96% H_2SO_4 until charred and decolorised with 1 c.c. of 30% H_2O_2 . The solution is made up to 300 c.c., neutralised (Me-red) with $NaOH$, and NH_3 determined by titration with 0.1N- $NaOH$ after adding CH_2O . Casein % = $0.715 \times$ titration in c.c. S. C.

Vitamin-A content of eggs produced by chickens fed with viosterol and various percentages of cod-liver oil. G. M. DE VANNEY, H. W. TITUS, and R. B. NESTLER (J. Agric. Res., 1935, 50, 853—860).—Supplementary feeding of vitamin-D (viosterol) did not influence the vitamin-A content of eggs. Eggs from pullets receiving 8% of cod-liver oil contained more -A than those from birds receiving 1—2% of oil. A. G. P.

Detection of chemicals used for reddening meat. A. BEYTHIEN (Pharm. Zentr., 1935, 76, 545—547).—The P_2O_5 content of lean meat is 0.3—0.5%. A val. $> 0.5\%$ indicates addition of Na_2HPO_4 , which also increases the Na content to > 0.03 —0.5% and reduces the normal K : Na ratio of about 2.8 : 1. Addition of $NaOAc$ increases the Na content and should increase the alkalinity of the ash, which is normally acid, but in this case the issue is rather complicated. S. C.

Acidity, p_H , and colour of potato flakes. B. LAMPE and R. DEPLANQUE (Z. Spiritusind., 1935, 58, 259—260).—The coloration often observed when potato flakes (or meal) are made into a dough with H_2O depends on the p_H of the aq. extract. When a grey dough is obtained, the p_H is 5.7—5.9, the colour changing to pale yellow at p_H 5.4—5.5. Material giving a slightly yellow dough has p_H 5.8, a grey colour appearing when this is increased to 6.0—6.1. The p_H and titratable acidity of the aq. extract are not directly comparable, the relationship varying with the buffering. T. H. P.

Bacteriological and chemical properties of A.I.V. silage. W. H. PETERSON, L. S. McCLUNG, and H. R. BIRD (J. Bact., 1935, 29, 84).—A.I.V. silage prepared from lucerne in wooden barrels, examined at intervals of 7—10 days, under aerobic conditions gave successively 190, 160, 66, and 9 millions of bacteria per g. of silage and similar vals. in an anaerobic series. No yeast, mould, or common aerobes were found. One sample gave 2.72% of volatile and 2.20% of non-volatile acids (dry-matter basis). The silage contained 1.41% of H_2O -sol. N and 0.80% of NH_3 -N (about twice as much as in the green crop). NH_3 -N had increased and represented about 6% of the total N. NUTR. ABS. (m)

Trials with A.I.V. fodder. I. POIJÄRVI (Valt. Maatalousk. Julk., 1934, No. 63, 143 pp.).—In nine experiments with A.I.V. fodder containing clover, clover + timothy, and timothy alone the losses of nutritive compounds were, on the average, as follows: org. matter 8.8 ± 0.7 , ash 6.1, crude protein 6.2 ± 2.2 , pure protein 27.2 ± 3.6 , amides 129.6, raw fats and N-free extracts 13.9 ± 1.3 , and crude fibre 0.6%. With marrowstem kale the losses were considerably larger (in one experiment, org. matter 27.1 and crude protein 37.3%). The chemical composition and digestibility of the nutritive compounds in A.I.V. fodders were determined and the starch and fodder units calc. The balance of minerals, in feeding with this fodder, becomes deficient in bases, but is easily adjusted with $CaCO_3$. Feeding with A.I.V. fodder had no influence on the % of milk-fat. The economic val. of the A.I.V. method is compared with other ensilaging methods under Finnish conditions. NUTR. ABS. (m)

Ensilage of grass and lupins containing horse-tail, with special reference to the behaviour of the lupin alkaloids. B. KASPRZIK (Z. Tierzucht, 1932, B, 25, 111—145; Bied. Zentr., 1935, A, 5, 376).—The mixed silage retained the toxic alkaloids. The digestibility of hot-fermented was $<$ that of cold-fermented material. A. G. P.

Starch equivalent of maize silage. G. FINGERLING, B. HIENZSCH, and K. SCHMIDT (Futterkonserv., 1932, 3, 153—156; Bied. Zentr., 1935, A, 5, 337).—High vals. previously recorded (B., 1931, 1120) are attributed partly to the high digestibility and partly to the tender nature of the material used (weak and not highly lignified stems and much grain). (Cf. also B., 1932, 205.) A. G. P.

Fodder value of *Poa bulbosa*, var. *vivipara*, Koeller. I. CHUDJAKOV and E. GUBAREV (Trans. Saratov Univ., 1934, 11, No. 1, 47—52).—The bulbs and air-dried leaves contain, respectively, H_2O 18.5, 3.97; protein 12.15, 8.8; fat 1.39, 3.02; non-nitrogenous extractives 30.5, 48.32; cellulose 31.24, 25.86; ash 5.8, 6.03%. R. T.

Chemically treated straw as a feeding-stuff for cattle. N. N. KITAEV (Probleme der Tierzucht [Russ.], 1933, 3, 70—74; Bied. Zentr., 1935, A, 5, 372—373).—Straw, treated (cold) with $Ca(OH)_2$ for 10 days, showed a marked improvement in digestibility coeffs. for org. matter, crude fibre, and N-free extract. A. G. P.

Effect of grinding on digestibility of maize by pigs and on its content of metabolisable energy. W. P. GARRIGUS and H. H. MITCHELL (J. Agric. Res., 1935, 50, 731—735).—Grinding increased protein digestibility by approx. 13%. The digestibility of the gross energy and the metabolisable energy were improved by only 2—3%. The higher N digestibility was offset by heavier N losses in metabolism. A. G. P.

Hydrolysis products of wood as food for farm animals. M. J. DJAKOV and V. K. IVANKIN (Probleme der Tierzucht [Russia], 1933, 4, 76—79; Bied. Zentr., 1935, A, 5, 372).—In feeding-trials with sheep wood-silage (I) had a starch equiv. of 66. At the rate of

400 g. daily, (I), which contained no digestible protein, converted a negative N balance into a positive one, with animals on a poor hay ration. A. G. P.

Sugar-beet slices and leaves as feeding-stuffs for cows. V. STEENBERG (Beretn. Forsøgslab. Kopenhagen, 1933, No. 154; Bied. Zentr., 1935, A, 5, 345).—Ensilaged leaves or slices fed to cows created no digestive disturbances, but caused a decrease in fat content of the milk and adversely affected the odour and flavour. The latter may be avoided by feeding the silage immediately before or after milking. Butter flavour was unaffected. Leaves and slices are preferably ensiled together. Fresh leaves affected milk flavour < did the silage. A. G. P.

Feeding-trials with iodine for breeding sows. AHRENS (Deuts. landw. Tierz., 1933, 42, 728; Bied. Zentr., 1935, A, 5, 357).—Supplementary feeding of 0.1% I, as KI, had no beneficial effect on the health, breeding qualities, or resistance to disease of sows, except that they mated more readily. A. G. P.

Soya beans in relation to soft pork. E. F. FERRIN and D. JOHNSON (Amer. Hampshire Herdsman, 1933, 8, No. 10, 16; Bied. Zentr., 1935, A, 5, 355).—Prolonged feeding of even small proportions of soya beans involves the risk of producing soft pork. A ration of maize and soya-bean cake for grazing pigs proved satisfactory. A. G. P.

Feeding of meat and bone meal to improve the quality of lard obtained by use of rations containing large amounts of linseed cake. T. ABOL (Arb. Abt. Tierzucht West-Russ. Versuchs-Stat. Siczevka, 1931, 47—56; Bied. Zentr., 1935, A, 5, 359).—Rations containing up to 50% of linseed cake produced a soft lard of high I val. Substitution of an equiv. amount of meat and bone meal for pigs of 80 kg. wt. hardened the lard obtained from animals killed at 100 kg. wt. Excessive amounts of the mixed meal lowered the utilisation of the ration and the live-wt. increases. A. G. P.

Digestibility of the crude fibre of different kinds of barley by hens. H. STOTZ and H. BRÜGGEMANN (Arch. Geflügelk., 1933, 7, 202—215; Bied. Zentr., 1935, A, 5, 336—337).—Digestibility vals. of 10 varieties are determined and in some cases reached 20—30%. There is no regular order of differences between winter- and spring-sown varieties in this respect. A. G. P.

Influence of different rations on the growth and wool yield of Angora rabbits. RICHTER and HUNDT (Deuts. landw. Tierz., 1934, 13, 208; Bied. Zentr., 1935, A, 5, 365).—Addition of high-protein foods to a hay-green food ration improved wool production but not the growth of the animals. Supplementary feeding of lecithin produced no appreciable effect. A. G. P.

Feeding of rhubarb leaves to rabbits, sheep, goats, and hens. H. SCHNEIDER (Diss., Leipzig, 1933; Bied. Zentr., 1935, A, 5, 371).—Fresh leaves were eaten readily by rabbits and less readily by the other animals. In no case were symptoms of poisoning observed. A. G. P.

Determining CO₂ in baking powder.—See VII.

See also A., Sept., 1106, **Vitamin-C**. 1153, **Indian vegetable foodstuffs (ragi)**. Nutritive val. of protein of cabbage and sweet potato.

PATENTS.

Treatment of wheat. W. W. LEHMAN (U.S.P. 1,981,557, 20.11.34. Appl., 20.2.32).—Smut and foreign odours are removed from wheat by applying a dry mixture of powdered "Knox" silt-loam (80), NaHCO₃ (1), finely-ground wheat straw (13), and lucerne (6%). The mixture is allowed to remain in contact with the wheat and is then removed together with the smut by beating machinery. E. B. H.

Preparation of bread and other baked cereal foodstuffs. E. I. DU PONT DE NEMOURS & Co., J. S. REICHERT, and W. J. SPARKS (B.P. 433,471, 15.2.34).—The use of yeast and baking powders in breadmaking may be obviated by employing H₂O₂ in carefully controlled amounts, such that substantially all the available O is given off during fermentation. Optimum initial and final concns. of H₂O₂ are given. Other per-salts such as NaBO₃ and the urea-H₂O₂ additive compound may also be used. E. B. H.

Preventing the deterioration of milk, cream, or other dairy products. R. L. FEAGLES (B.P. 432,894, 3.2.34).—Deterioration is prevented by holding in a closed vessel in which the pressure due to evolved gases (CO₂) is allowed to reach 4 lb. per sq. in. The CO₂ acts as a preserving agent. E. B. H.

Manufacture of aerated beverages. K. ERSLEY (B.P. 430,154, 8.11.33).—The liquid is made by the use of H₂O free from CaO, MgO, nitrates, and humus and a small quantity of pectin is added before saturating the beverage with CO₂. A. R. P.

Manufacture of pure hydratopectin. S. G. RABATÉ, A. MACÉ, and J. CLÉMENT (B.P. 434,037, 9.5.34. Fr., 13.5.33).—The pectin-containing substance is hydrolysed at < 100° in a medium having *p*_H 4—5 (tartaric or citric acid, H phosphates), the hydrolysed extract is filtered, evaporated at low temp. (approx. 50°), and the hydratopectin pptd. by careful addition of EtOH and dried at 80°. H. A. P.

Manufacture of a concentrated food product. W. W. TRIGGS. From C. WADA (B.P. 432,895, 3.2.34).—Animal protein, e.g., blood paste, casein, after extraction with Et₂O-petroleum, is hydrolysed (HCl) and the product distilled under vac., made alkaline by addition of quicklime, and filtered; the filtrate is made slightly acid with tartaric acid and the ppt. removed. This filtrate is deodorised by extraction with light petroleum and left to concentrate to a syrup. E. B. H.

Preservation of raw fish liver. H. A. WENTWORTH (B.P. 433,134, 8.2.34. Can., 9.2.33).—Fresh raw fish liver, from which the bile ducts have been removed, is reduced to a liquid state at a relatively low temp., mixed with cocoa or chocolate, and shaped into cakes. E. B. H.

Synthesis of vitamin-D. H. G. CAMPSIE (U.S.P. 1,980,971, 13.11.34. Appl., 15.2.34).—Vitamin-D is produced in provitamin-containing materials by irradi-

ation with light from a "cold-quartz" lamp, from which 92–96% is in the band 2536–2540 Å. with only a negligible amount of infra-red. If this lamp is used in a standard manner different batches of the same material develop the same activity. Milk is allowed to flow down a screen and develops 1500 A.D.M.A. units of vitamin-D per quart without objectionable odour or flavour after exposure for 14 sec. E. B. H.

Activation of materials [vitamin-D in food products, ergosterol, etc.]. G. SPERTI, Assr. to GEN. DEVELOPMENT LABORATORIES, INC. (U.S.P. 1,982,028, 27.11.34. Appl., 28.12.29).—The materials are activated by irradiation with soft X-rays of λ 2–13 Å.

E. B. H.

Manufacture of marine plant product. P. R. PARK, Assr. to P. R. PARK, INC. (U.S.P. 1,982,595, 27.11.34. Appl., 27.2.32).—Kelp is reduced to a comminuted form, pulped to a thick sludge by beating, and dried by passage through a 60-ft. long rotary dryer maintained at 871–927° at one end, falling to 110–121° at the discharge end. E. B. H.

Production of concentrated table-jelly tablets. A. W. FIELD, and A. BIRD & SONS, LTD. (B.P. 433,915, 10.11.34).

Preserving foodstuffs. Grinding machine.—See I. Artificial sausage skins.—See V. Sterilising milk.—See XI. Freeing substances from fat etc. **Extracting vitamins.**—See XII. Pectin from sugar beet.—See XVII. Yeast.—See XVIII.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Potassium guaiacolsulphonate. A. H. CLARK and E. KIRCH (J. Amer. Pharm. Assoc., 1935, 24, 564–567).—Eight commercial samples of this salt consisted of mixtures of the 4- (about 75%) and 5-sulphonate (about 25%) (OH : OMe = 1 : 2). R. S. C.

Assay of National Formulary preparations containing bismuth. G. L. JENKINS and S. MILLETT (J. Amer. Pharm. Assoc., 1935, 24, 561–563).—Bi in these preps. is accurately determined by the sulphide or, more conveniently, by Mayer's phosphate method. The Schoeller-Waterhouse phosphate method gives high results. R. S. C.

Drug extraction. III. Function of preliminary maceration in relation to the percolation of belladonna root. W. J. HUSA and S. B. YATES (J. Amer. Pharm. Assoc., 1935, 24, 538–543; cf. B., 1935, 876).—Maceration of the root (25 c.c. per 100 g. of root) prior to percolation with EtOH-H₂O (5 : 1) has no effect on the rate of extraction of the alkaloids. Larger quantities of liquid decrease this rate. Maceration with H₂O or in vac. offers no advantage. R. S. C.

Determination of rotenone in plants of the genus *Derris*. M. E. Pozzi-Escot (Ann. Chim. Analyt., 1935, [iii], 17, 233–235).—The suggested method involves extraction of the powdered root with CCl₄ and concn. of the extract to produce rotenone-CCl₄ crystals, which may be dried in air and weighed. In some cases better results are obtained by extraction with COMe₂, evaporation of the extract to dryness, re-extraction with CCl₄, and subsequent treatment as above. A. G. P.

Detection of eucalyptus oil in pine-needle extract. B. STEMPER (Pharm. Zentr., 1935, 76, 547).—A pine-needle extract (d^{20} 0.982) contained a considerable quantity of eucalyptus oil, cineole being detected by the resorcinol method of Schimmel & Co. Adulteration with sulphite-cellulose usually increases the As₂O₃ content to $> 0.1 \times 10^{-4}$ and the sulphated ash to > 0.3 – 0.4% , the val. for an unadulterated extract. S. C.

Unusual peppermint oil. (Miss) M. F. XAVIER (J. Amer. Pharm. Assoc., 1935, 24, 543–547).—A *Mentha piperata* oil is described, having d^{25} 0.9620, α_D –32° and d^{27} 0.9145, α_D –9.42°, before and after rectification, respectively. R. S. C.

Essential oil from lupulin.—See II. Tobacco.—See XVI.

See also A., Sept., 1106, Vitamin-C. 1107, Polarographic examination of aq. CH₂O. Rhodinol from rose oil. 1125, Prep. of dehydroandrosterone. 1132, Synthesis of antipyrine and pyrimidone. 5 : 5-Diphenylbarbituric acid. 1136, *d*-Nornicotine. 1136–8, Alkaloids. 1138, Prep. of As(CH₂Ph)₃. 1139, Prep. of 3 : 3'-derivatives of 4 : 4'-dihydroxyarsenobenzene. Arsenamides. 1141, Detection of cineole, coniine, nicotine, and alkaloidal salts. 1155, Thiobarbiturates. Phenylprocaine. 1157, Indian indigenous remedies. 1180, [Oil from] bark of *Nerium odorum*. Components of Shaohsing-Chiu. 1181–2, Tobacco.

PATENTS.

[Production of] antiseptic isinglass plaster. JOHNSON & JOHNSON (GT. BRITAIN), LTD. From JOHNSON & JOHNSON (B.P. 433,460, 9.2.34).—A compatible antiseptic, e.g., PhOH, is mixed with a hot, semi-liquid mixture of H₂O and isinglass and the product dried in layers. [Stat. ref.] E. H. S.

Preparation of an isotonic solution of colloidal sulphur for injection purposes. DRUG PRODUCTS CO., INC. (B.P. 433,833, 25.10.34. U.S., 3.11.33).—Pure Na₂S₉H₂O (23.5 g.) is dissolved in de-aerated, distilled H₂O (50 c.c.) and aq. dextrin (10 g. in 400 c.c. of H₂O) is added; after dilution to 1 litre, SO₂ is added slowly to p_H 7.6 and the solution of colloidal S diluted to contain 10 mg. of S per c.c. A. R. P.

Manufacture of a water-soluble organic silver compound. K. ROTH (B.P. 432,814, 20.2.34. Ger., 22.2.33).—The compound *o*-NHAc·C₆H₄·CO₂Ag·(CH₂)₆N₄ is prepared by mixing the components in H₂O and evaporating in a vac. H. A. P.

Manufacture of liquid medicinal and like preparations. I. G. FARBENIND. A.-G. (B.P. 433,938, 23.11.33. Ger., 24. and 26.11.32).—Stable, sterilisable, liquid preps. (for injection) of barbituric acids, trihalogenoethyl alcohols, urethanes, acylcarbamides, vitamins, hormones, glucosides, alkaloids, or synthetic alkaloid substitutes are made by dissolution of the active agent in polyglycols or their ethers (MeO·C₂H₄·O·C₂H₄·OH). H. A. P.

Production of alkylamines [$\alpha\omega$ -tetra-alkylalkylenediamines; amœbicides]. BOOTS PURE DRUG CO., F. L. PYMAN, and H. L. L. LEVENE (B.P. 433,086, 26.6.34).—The appropriate alkylene dibalide and *sec.*-amine are

heated together, e.g., $\alpha\kappa$ -C₁₀H₂₀Br₂ or -C₁₀H₂₀Cl₂ and *n*-NH(C₅H₁₁)₂ at 100° and the b.p., respectively, give $\alpha\kappa$ -tetra-*n*-amyl-diamino-*n*-decane, b.p. 265°/20 mm. (hydrochloride, m.p. 72°). Other examples are: $\alpha\kappa$ -tetra-*n*-butyl-, b.p. 267°/30 mm. (tartrate, m.p. 87°), -*n*-propyl-, b.p. 230—235°/30 mm., -isoamyl-, b.p. 235°/6 mm., -*n*-hexyl-, b.p. 288—292°/5 mm., and -*n*-heptyl-, b.p. 304—307°/6 mm., *s*- $\alpha\kappa$ -diethyl-, b.p. 324—328°/24 mm., and di-*n*-butyl-di-*n*-dodecyl- b.p. 350—353°/17 mm. (hydrochloride), and *s*- $\alpha\kappa$ -di-*n*-amyl-di-*n*-butyl-diamino-*n*-decane, b.p. 257—262°/17 mm.; $\alpha\eta$ -tetra-*n*-butyl-diamino-*n*-heptane, b.p. 255°/35 mm.; $\alpha\lambda$ -tetra-*n*-amyl-diamino-*n*-undecane, b.p. 272—275°/18 mm.; $\alpha\mu$ -tetra-*n*-butyl-diamino-*n*-dodecane, b.p. 245°/11 mm., and $\alpha\delta$ -tetra-*n*-butyl-diamino-*n*-tridecane, b.p. 260°/20 mm. *n*-Butyl-*n*-dodecyl-, m.p. 27°, and -*n*-amyl-amine, b.p. 178°, are prepared by hydrolysis (70% H₂SO₄) of the corresponding *p*-C₆H₄Me·SO₂ derivatives. H. A. P.

Production of [halogen]-substituted alkylphenols. [Bactericides.] F. F. BLICKE, Assr. to REGENTS of UNIV. of MICHIGAN (U.S.P. 1,980,966, 13.11.34. Appl., 28.2.33).—*p*-Alkylphenols in which the alkyl group has > C₅ are treated with SO₂Cl₂. Examples are: 2-chloro-4-*n*-hexyl-, b.p. 275—276°/740 mm. (α -naphthoate, m.p. 43—45°), and 4-*n*-heptyl-phenol, b.p. 290—291°/738 mm. (α -naphthoate, m.p. 45—47°) (PhOH coeff. 444 and 666, respectively). 2-Chloro-4-*n*-propyl-, b.p. 226—227°/741 mm., 4-*n*-butyl-, b.p. 243—244°/735 mm., and 4-*n*-amyl-phenol, b.p. 259—260°/740 mm. (α -naphthoates, m.p. 71—73°, 44—46°, and 63—65°, respectively), are also described. H. A. P.

Pharmaceutical preparations for external application. O. SILBERRAD (B.P. 433,062, 7.3.34).—Esters (C₃—C₈) of CH₂Cl·CO₂H are caused to interact with an anhyd. salt of *o*-OH·C₆H₄·CO₂H. The esters obtained are claimed to resist crystallisation and to inhibit the formation of crystals of the analogous Me and Et esters when mixed therewith. An example describes the prep. of isopropyl salicyloacetate, b.p. 154°/5 mm. A. W. B.

Manufacture of 5-pyrazolone derivatives. [Pharmaceuticals.] I. G. FARBENIND. A.-G. (B.P. 433,053, 8.2.34. Ger., 8.2.33).—The manufacture, by known methods, of pyrazolones having at least one hydrogenated or partly hydrogenated cyclic substituent, and their 4-NH₂- (or alkylated NH₂- etc.)-derivatives, is claimed; the products are said to have febrifuge and sedative properties. Examples are: 1-cyclohexyl-3-methyl-, m.p. 152° [H₂-derivative, m.p. 56° (NH₂·NH·C₆H₁₁ and CMe·CH·CO₂H)], and -2: 3-dimethyl-5-pyrazolone, m.p. 66° [4-NH₂-, m.p. 104°, 4-NO₂-, m.p. 231°, 4-NMe₂-, m.p. 77°, and 4-NHMe-derivatives, m.p. 102° (Me₂SO₄ and 4-N·CHPh compound)]; 1:2-dicyclohexyl-3-methyl-5-pyrazolone [4-NH₂- (hydrochloride, m.p. 205°), 4-NMe₂-, m.p. 83° (hydrochloride, m.p. 206°), and 4-NHMe-derivatives (·CH₂·SO₂H compound)]; 4- Δ^2 -cyclohexenyl-amino-, m.p. 93°, and -methylamino-, m.p. 84—86°, and 4-di- Δ^2 -cyclohexenylamino-1-phenyl-2:3-dimethyl-5-pyrazolone, m.p. 94—95°. H. A. P.

Manufacture of derivatives [esters] of 2-phenylquinoline-4-carboxylic acids. H. JOHN (B.P. 433,045, 6.2.34. Czechoslov., 10.11.33).—The following are pre-

pared from the acid chloride and glycerol (I) or from a salt of the acid and a halohydrin of (I): α -glyceryl, m.p. 99° (hydrochloride), $\alpha\alpha'$ -, m.p. 58°, and $\alpha\beta$ -glyceryl bis-, m.p. 65—68°, glyceryl tris-, m.p. 135°, γ -chloro- β -hydroxypropyl, m.p. 109°, γ -chloro- $\alpha\beta$ -propanediol bis-, m.p. 135°, and $\beta\beta'$ -dichloroisopropyl, m.p. 98°, 2-phenylquinoline-4-carboxylate; α -glyceryl, m.p. 167°, and $\alpha\alpha'$ -glyceryl bis-, m.p. 92—94°, 6-methoxy-2-phenylquinoline-4-carboxylate; α -glyceryl, m.p. 167°. $\alpha\alpha'$ -glyceryl bis-, m.p. 73—75°, and $\beta\beta'$ -dichloroisopropyl 2-*p*-tolylquinoline-4-carboxylate, m.p. 101°. H. A. P.

Manufacture of non-toxic germicidal, detergent, or cosmetic compositions. LEVER BROS., LTD. From LEVER BROS. Co. (B.P. 432,689, 23.1.35. Addn. to B.P. 427,324; B., 1935, 641).—Hg compounds of the type (R·Hg)_xR' (R being an aromatic nucleus, with or without side-chains; *x* is < 1), in which R' represents a radical containing an NH-group or groups, the N of which is attached to an RHg group, e.g., derivatives of all org. N compounds in which one H is attached to N, are added to the detergent. Many examples of suitable NH-compounds are given. E. H. S.

Preparation of a quinine compound. H. P. KAUFMANN (B.P. 433,261, 1.2.35. Ger., 3.2.34).—Quinine is acylated with CHEt₂·COCl (in absence of an acid-binding agent) to give diethylacetylquinine hydrochloride, +2H₂O, m.p. 114° (sinters at 96°), +1H₂O, m.p. 142°. This compound and other salts are H₂O-sol. and practically tasteless. A. W. B.

Preparation of a morphine derivative [dihydrodeoxymorphine-D]. L. F. SMALL, Assr. to GOVT. OF UNITED STATES (U.S.P. 1,980,972, 13.11.34. Appl., 19.7.34).—Dihydrodeoxymorphine-D, m.p. 188—189°, [α]_D²⁵ -76.8° in MeOH [hydrochloride; sulphate (+2H₂O)], is prepared by hydrogenation of α - or β -chloromorphine (Pd-BaSO₄), or of deoxymorphine-C or deoxycodine-C hydrochlorides (PtO₂, Pt, Pd, Ni), or by demethylation (48% HBr at the b.p.) of dihydrodeoxycodine-D. It has the physiological properties of morphine, but is less toxic. H. A. P.

Isolation of follicle hormones. SCHERING-KAHLBAUM A.-G. (B.P. 432,851, 26.1.34. Addn. to B.P. 432,435; B., 1935, 925).—After removal of volatile phenols, the residue is dissolved in a non-miscible org. solvent and the hormone extracted therefrom with alkali. A separation of neutral constituents is thus effected before acylation. E. H. S.

Preparation of a body capable of lowering the [physiological] uric acid level. H. G. JACOBSON (B.P. 433,040, 2.1.34. Ger., 2.1.33).—2-Phenylquinoline-4-carboxylic acid (I) (1 mol.) is added to aq. NH₂·C₂H₄·OH (1 mol.), followed by NH₂·CH₂·CO₂H (1 mol.); the compound obtained by evaporation in vac. (at 40°) has the physiological action of (I) towards uric acid, but is less toxic. H. A. P.

Preparation of acidophilus products. W. L. OWEN, Assr. to LACTO-YEAST Co., INC. (U.S.P. 1,980,083, 6.11.34. Appl., 16.2.32).—Lactobacillus acidophilus is propagated in a medium, e.g., malt wort acidified with lactic acid, and after development the acid wort is seeded with ordinary yeast. The yeast and bacteria

are allowed to grow with vigorous aëration and are then separated and pressed. E. H. S.

Production of whooping-cough vaccines. SCHERING-KAHLBAUM A.-G. (B.P. 433,910, 14.9.34. Ger., 14.9.33).—Cultures of whooping-cough bacilli, *e.g.*, *Bac. Bordet-Gengou*, originating in different epidemics and having const. properties after long and continuous cultivation, are combined and disintegrated, *e.g.*, by repeated freezing and thawing, and then the toxic component is separated and mixed with a non-poisonous antigen in proportions most suitable for immunisation. E. H. S.

Sulphonated oils.—See II. **Ca lactobionate.**
PhOH derivatives.—See III. **Extracting vitamins.**
—See XII. **Activation of ergosterol.**—See XIX.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

The Agfa graduated colour chart. M. BILTZ (Phot. Ind., 1935, 33, 746—748, 750).—The chart consists of colour strips, with steps of increasing darkness, correlated to neighbouring grey wedges, the whole being photographed in sunlight and the resulting negative examined for accuracy of colour reproduction. The spectral characteristics, tone of colour, and brightness of the strips are detailed, and their exactitude is discussed. The reflexion vals. by artificial light are compared. J. L.

Erratum. On p. 783, col. 1, line 26 from the bottom, for "or" read "of."

See also A., Sept., 1062, **Rendering visible ultrasonic waves.** 1081, **Explosions of CS₂-NO₂ and their applications.** 1087, **Fog formation by dyes.** 1097, **Photoelectric colorimeters.**

PATENTS.

Sensitisation of photographic silver halide emulsions. I. G. FARBENIND. A.-G. (B.P. 427,887, 25.9.33. Ger., 23.9.32).—Polymethine dyes derived from tetrahydronaphtha-thiazoles, -selenazoles, -oxazoles, or -indoles or tetrahydronaphthoquinolines are used for sensitisation. Examples are cyanines etc. from: 2-methyl-6:7-tetramethylenebenzthiazole ethiodide (I) with *p*-NMe₂-C₆H₄-CHO (m.p. 268°), or CH(OEt)₃ (II) (m.p. 287°), or CMe(OEt)₃ (III) (m.p. 232°); 2:4:5-isomeride of (I) with (III) (m.p. 269°) or CEt(OEt)₃ (m.p. 235°), or (II) (m.p. 265°); (I) with β-ethoxy-acraldehyde acetal, or NPh.₂[CH]₅-NPh.HBr. C. H.

Sensitisation of photographic silver halide emulsions and manufacture of sensitising dyes therefor. I. G. FARBENIND. A.-G. (B.P. 432,969, 7.2.34. Ger., 7.2.33).—Simple cyanine, carbocyanine, or styryl dyes containing ββ-naphthoxazole nuclei are excellent photographic sensitisers. By known methods are prepared 2:2'-dimethyl-, 2:2':8-trimethyl-, and 2:2'-dimethyl-8-ethyl-4:5:4':5'-di-benzoxacarbocyanine bromide, with sensitising maxima (*S*) at 550, 570, and 580 mμ, respectively; also 2:6'-dimethyl-1'-ethyl-4:5-benzoxa-ψ- and -iso-cyanines (*S* at 485 and 515 mμ, respectively); and 1-*p*-dimethylaminostyryl-4:5-benzoxazole methiodide (*S* indefinite). F. M. H.

Photographic films. KODAK, LTD., and R. E. CROWTHER (B.P. 433,655, 10.5.34. Addn. to B.P. 364,852; B., 1932, 322).—The colloid layer coated over the anti-halation dye layer, as in the prior patent, is provided with a matt surface by casting the layer on a matt surface, or by incorporating an inert dispersed material of different *n*, *e.g.*, levigated starch or BaO. J. L.

Metallic photographic film. SIEMENS & HALSKE A.-G. (B.P. 433,538, 12.2.34. Ger., 10.2.33. Addn. to B.P. 407,830; B., 1934, 477).—The Al films are superficially oxidised, as in the prior patent, and such layers may be modified to contain a silicate or F, and are porous. A light-sensitive substance is impregnated in this layer, which can then be exposed, developed, etc. as ordinary emulsions. Double-sided films can also be made. J. L.

Substratum for photographic elements. J. G. McNALLY, ASSR. to EASTMAN KODAK CO. (U.S.P. 1,981,425, 20.11.34. Appl., 27.9.32).—A layer increasing the adhesion between the support and emulsion is composed of mixed esters of cellulose having a free acid group, *e.g.*, cellulose acetate-phthalate, -succinate, or -diglycollate. An adhesive thin layer of gelatin is preferably coated over the above intermediate layer before coating on the emulsion layer. J. L.

Liquid hardener solutions [for photographic baths]. L. E. MUEHLER, ASSR. to EASTMAN KODAK CO. (U.S.P. 1,981,426, 20.11.34. Appl., 18.4.33).—Solutions for use with Na₂S₂O₃ fixing baths, forming acid hardening and fixing baths, comprise AlCl₃ or Al alkali chlorides, together with Na₂SO₃, Org. OH-acids, or their alkali salts, *e.g.*, Na K tartrate, may also be added. The solutions do not freeze out at low temp., and have a long "life." J. L.

Colour photography. L. D. MANNES and L. GODOWSKY, JUN. (U.S.P. 1,980,941, 13.11.34. Appl., 12.11.27).—Two photographic emulsion batches, one sensitised to red-orange (and preferably desensitised to blue light by treatment with Indian-yellow and aq. AgNO₃) and one to blue-green light, are mixed and plates made with the composite emulsion. After exposure and development, the plate is exposed to red light, and the reversal image (from the undeveloped red-sensitive emulsion) developed in a colour-developer to blue-green; the plate is then exposed to white light and developed in an orange colour-forming developer. Finally, the Ag images are removed, leaving a two-colour positive image. J. L.

Production of photographic contrasts by means of naphthalenediazonium compounds. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 433,586, 20.10.34. Ger., 27.12.33).—The *p*H of the photographic layer (containing, *e.g.*, 1-diazonium-β-naphthol-4-sulphonate) is adjusted and the H₂O content limited (to < 1%) in such manner that self-development (coupling) does not occur during exposure. Development is effected by exposure to H₂O vapour in the dark, and the image may be fixed by subsequent exposure to light which decomposes the remaining diazonium compound. H. A. P.

Photographic films [film strip]. W. W. GROVES. From POLMER GRAFLEX CORP. (B.P. 433,658, 22.5.34).

Photosensitising dyes.—See IV.

XXII.—EXPLOSIVES; MATCHES.

PATENTS.

Manufacture of waterproof safety fuse for blasting, military demolitions, etc. J. S. B. FLEMING, R. M. FREER, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 429,024, 23.10.33 and 29.1.34).—Means are claimed for enclosing the combustible material in a cold-weldable rubber cover consisting of a mixture of 30–40% of unvulcanised rubber and 70–60% of china clay containing a little Sb_2S_3 . A. R. P.

Washing nitrocellulose.—See V.

XXIII.—SANITATION; WATER PURIFICATION.

Concentrated solutions in air-conditioning. F. R. BICHOWSKY and G. A. KELLY (Ind. Eng. Chem., 1935, 27, 879–882).—Air of low humidity is produced by passing it up a packed tower countercurrently to conc. aq. LiCl which is cooled, conc. when necessary, and recycled. Graphs are given of the coeff. of heat and moisture transfer for different air and aq. LiCl velocities. It is unsafe to assume that these coeffs. are independent of the depth of packing. D. K. M.

Photocolorimetric determination of carbon dioxide in air. BYÖCHIN and LÁSKA (Chem. Listy, 1935, 29, 201–202).—The change in coloration of $10^{-4}M$ - $NaHCO_3$ containing $2 \times 10^{-5}M$ -bromothymol-blue on exposure to the air is measured photocolorimetrically (Se cell), when the p_H found = $3.94 - 0.85 \log P$, where P is the partial CO_2 pressure. R. T.

Air pollution [by smoke]. H. B. MELLER (Ind. Eng. Chem., 1935, 27, 949–952). D. K. M.

Nature and amount of colloids present in sewage. VI. **Colloids in waste waters from beet-sugar factories.** E. V. MILLS (J.S.C.I., 1935, 54, 305–312 T; cf. B., 1935, 207).—Press waters, the crude effluent, and the sedimented effluent from the beet-sugar factory at Colwick are considered. Press waters contain little suspended matter but considerable amounts of org. dispersed materials, mainly non-nitrogenous. The crude effluent contains large quantities of suspended matter which is mainly soil and is removed by detention in settling ponds in the plant. Such detention has no marked effect on the org. dispersed matter, which is small in amount, except that nitrogenous org. matter is increased in amount in the settled effluent.

Effects of chlorinated lime in lethal concentrations on *Entamoeba histolytica* cysts. E. Y. GARCIA (Philippine J. Sci., 1935, 56, 295–310).—Cysts are destroyed by aq. $CaOCl_2$ having equiv. [Cl] of 3.5 p.p.m. The action is facilitated by nitrogenous org. matter. Solutions containing 4 p.p.m. of $CaOCl_2$ and 0.5% I are also lethal. A. G. P.

Germicidal detergents. I, II. Synergistic action of soaps on the germicidal efficiency of alkalis. A. R. CADE and H. O. HALVORSON. III. H. O. HALVORSON, M. BAYLISS, E. J. ORDAL, and J. L. WILSON (Soap, 1934, 10, No. 8, 17–19, 41, 53; No. 9, 25–26, 49; 1935, 11, No. 5, 25–28, 109, 111, 113).—I, II.

Practically all types of general disinfectants (phenols etc.) are ineffective at $p_H > 11$; the results obtained suggest that these compounds show toxicity only in the non-ionised condition. Whilst ordinary soaps show very little germicidal activity, the addition of some soaps, especially Na oleate and resinate, enhances the toxicity of alkalis such as Na_3PO_4 (cf. U.S.P. 1,901,434; B., 1933, 1088). The addition of salts furnishing a common ion gives favourable results, but NH_4 salts are detrimental.

III. Whilst neither component alone may be effective, good germicidal efficiency is obtained with proper combinations of Na resinate (or laurate or oleate) and phenols at $p_H < 10$. Germicidal detergent mixtures containing, e.g., soap, phenoxides, $NaHCO_3$, with $Na_6P_6O_{18}$ (to prevent pptn. in hard H_2O) and small amounts of Na silicate (to prevent corrosion of Al vessels) are recommended for, e.g., dish- or bottle-washing. E. L.

What precautions are to be taken in transmitting disinfectants containing hydrofluoric acid for the determination of bactericidal activity? T. JANENSCH (Woch. Brau., 1935, 52, 267–269).—A discussion. W. O. K.

Treatment of water for the paper-making industry. A. H. WADDINGTON and R. CLARKE (Paper Maker, 1935, 90, ts 125–128, 134–135).—Various processes for filtering, softening, and chlorinating paper-mill H_2O supplies are reviewed. H. A. H.

Detector for H_2S .—See VII.

PATENTS.

Manufacture of cosmetic preparations. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 433,142, 9.2.34).— H_2O -insol., e.g., Mg, Zn, salts of aliphatic acids ($< C_7$) containing an odd number of C atoms, e.g., $C_8H_{17}\cdot CO_2H$, $C_{10}H_{21}\cdot CO_2H$, $C_{12}H_{25}\cdot CO_2H$, are used in cosmetic preps. on account of their pure colour and the softness and fineness of the products made therefrom. A. W. B.

Manufacture of agents for combating insects. I. G. FARBENIND. A.-G. (B.P. 432,188, 24.4.33. Ger., 25.4.32).—Carboxylic esters of cyanohydrins are mixed with solid or liquid dispersing media innocuous to human beings; in the case of liquid media other than kerosene (I) esters of unsaturated aliphatic cyanohydrins alone are claimed. E.g., $CN\cdot CMe_2\cdot OBz$ (5 pts.) in (I) (95 pts.) + $COME_2$ (5 pts.) is used as a spray against flies. The *Ac* derivative, b.p. $118^\circ/11$ mm., of cyclohexanone cyanohydrin and the *Ac*, b.p. 85 – 87° , and *Bz*, b.p. 159 – 160° , derivatives of crotonaldehyde cyanohydrin are described. H. A. P.

Removal of slimy growth accumulations from water-contact surfaces. J. P. WARREN and C. H. BEENSEN, AssTs. to WALLACE & TIERNAN PRODUCTS, INC. (U.S.P. 1,983,109, 4.12.34. Appl., 2.3.31).—15–40 pts. of Cl_2 per 10^6 of H_2O are permitted to remain in the apparatus for a sufficient length of time to loosen the growths so that the normal flow of H_2O will remove them. B. M. V.

Sedimentation tanks. Cleaning sand filters. H_2O treatment.—See I. **Glauconite. Base-exchange material.**—See VII. **Freeing substances [waste waters] from fat.**—See XII.