

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

OCT. 28 and NOV. 4, 1932.*

I.—GENERAL; PLANT; MACHINERY.

Effect of finely-ground substances on boiler-scale formation. N. A. GELID and O. N. GRIGOROV (J. Appl. Chem., Russia, 1931, 4, 983—993).—Preferential deposition occurs on the particles of graphite, soot, talc, kaolin, zeolites, etc.; finely-ground scale is particularly active. Up to a limit, deposition increases with decrease in particle size. CH. ABS.

Conditioning of boiler-feed water. V. B. HARLEY-MASON (J. Inst. Fuel, 1932, 5, 353—357).—The cause of hardness of the H_2O is discussed and methods of removal of "sol." and "insol." salts, oil, and dissolved gases are described. H. E. B.

Determination and calculation of the viscosity of gas mixtures. L. ZIPPERER and G. MÜLLER (Ges.-u. Wasserfach, 1932, 75, 623—627, 641—644, 660—664).—The mean val. of η_0 for air and for the constituents of coal gas obtained by a large no. of workers are tabulated. The variation in the kinematic viscosity ν ($=\eta/d$) with temp. between 0° and 30° is expressed with sufficient accuracy by the linear relation $\nu_t = \nu_0 \times (1 + kt)$, and a similar one in the case of η . Vals. of η and ν for the gases considered at temp. intervals of 10° are calc. The alteration with pressure up to 10 atm. is in all cases negligible. The formulæ of Thiessen and Puluji for η for 2-component mixtures agree well with experiment, but are too complicated for application to a complex mixture such as coal gas. It is therefore necessary to obtain an empirical formula. The rate of flow of moist air and moist coal gas through capillaries was measured. The relation is $\eta_1/\eta_2 = t_1(l + L_2)/t_2(l + L_1)$, where l is the length and L a correction for the end effect. This correction is determined by varying l , a min. length relative to the diam. being necessary for const. results. The apparatus is described. Taking the val. of η_{20} for air as 1827×10^{-7} g.cm.⁻¹s.⁻¹ the val. for a coal gas of stated analysis was found to be 1351×10^{-7} g.cm.⁻¹s.⁻¹ A further series of determinations was made with altered apparatus using N_2 , H_2 , CO_2 , CO , and CH_4 and various mixtures thereof. The vals. for more complex mixtures of these gases can be calc. with sufficient accuracy from vals. of binary mixtures with H_2 , but this is not the case with coal gas. In this case Mann's reciprocal formula and Zipperer's formula give good agreement, as also with water-gas etc. For these gases the temp. factor is given with good accuracy by the formula $\nu_t = \nu_{20} \times (1 + 0.006\Delta_t)$, where $\Delta_t = t - 20$. C. I.

Circulatory pumps for gases compressed to 1000 atm. D. R. W. MÜLLER (Chem. Fabr., 1932, 318—320).—An electrically driven two-cylinder pump is described. H. F. G.

Methods of dust removal from power-station flue gases. J. MAYER (J. Inst. Fuel, 1932, 5, 375—381).—Methods are reviewed and the measurement of the efficiency of suitable plant is discussed. Washing systems with rotary continuous vac. filters, for dust disposal, are advocated. H. E. B.

Possibility of detecting ash suspended in the air. H. W. GONELL (Mitt. Materialprüf., 1932, 206).—Suspended ash from coal-dust firing contains a large proportion of microscopic spherical particles which are more or less fused to a glass, whereas that from grate firing contains relatively few of these particles; both types of ash contain also minute hackly particles of coke. Flying wood ash contains unmistakable particles of wood charcoal with a fibrous splintery structure. A. R. P.

Physical methods in the chemical laboratory. XIX. Industrial automatic gas analysis by means of heat-conductivity measurements. F. LIENEWEG (Angew. Chem., 1932, 45, 531—535, 546—548).—A detailed account is given of the method and apparatus employed, and of applications such as the determination of CO_2 and SO_2 in mixtures, detection of traces of gases, control of NH_3 synthesis and oxidation, and the automatic control of the composition of gaseous mixtures. H. F. G.

Transmission of light in diffusing media. R. F. HANSTOCK (Trans. Optical Soc., 1932, 33, 137—149).—The transmission by thin films has been investigated, using a flicker photometer, with a view of finding the hiding power of paints and papers. C. W. G.

Hiding power of diffusing media. T. SMITH (Trans. Optical Soc., 1932, 33, 150—158).—Theoretical, with special reference to thin sheets. C. W. G.

Basic principles for selection of furnaces. R. J. SARJANT (Metallurgia, 1932, 6, 147).

Filtering etc. pottery slip.—See VIII. **Heat exchangers. Gas purification.**—See XI. **Manometry of disperse systems.**—See XVI.

PATENTS.

[Proportioning valves for] gas-heated furnaces. BRAYSHAW FURNACES & TOOLS, LTD., and S. N. BRAYSHAW (B.P. 378,072, 6.5. and 21.8.31).—A single-taper plug is formed with two passages, or separate air- and gas-cocks are coupled together. [Stat. ref.] B. M. V.

Retort or heater for use in heating liquids. W. A. J. KREAGER, Assr. to BARQUE ROYALTY, INC. (U.S.P. 1,838,266, 29.12.31. Appl., 24.8.28).—A heater for heavy oils comprises a tubular combustion chamber (A) surrounded by a cage (B) of smaller tubes through

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

which the combustion gases pass first as inner fluid and then as outer fluid through the spaces surrounding several flat coils (*C*) situated in the base of the apparatus. The oil to be heated passes upwards through *C* and then around *B* and *A*. Provision is made for expansion between the parts. B. M. V.

Heating of drying chambers. H. BERGE (B.P. 378,339, 16.2.32).—A no. of units are disposed about the floor of the drying chamber, each comprising a heater and fan and directing warm air downwardly over the floor in all directions. In addition to the local circulations, fresh air is admitted along one side of the chamber and moist air removed from the opposite side. B. M. V.

Drying of materials. A. E. SHERMAN, E. R. JONES, and P. C. LAVENDER (B.P. 378,384, 1.5.31).—Air is circulated through a chamber and its condition is controlled by admitting external air and passing a variable proportion over a desiccating agent and/or through a heater. The desiccating agent may be regenerated by heat and re-used. B. M. V.

Cooling and drying of granular and like materials. G. PORTEOUS (B.P. 378,313, 12.1.32).—A diamond-shaped container is provided with a similarly shaped hollow centre-piece; the walls of both are louvred or perforated and air is forced through the material in the spaces between the walls. B. M. V.

Heat-exchanging apparatus. G. MERTENS (B.P. 378,439, 5.5.31. Belg., 20.5.30).—A water-heating system is described. B. M. V.

Apparatus for interchange of heat between gases. W. W. TRIGAS. From DRYING SYSTEMS, INC. (B.P. 378,646, 18.8.31).—Thin vertical heating elements are constructed of parallel plates with a gas burner at the bottom and flue outlets at the top, and midway between the walls is placed a third plate of heat-resisting metal adapted to radiate heat to the walls. A no. of these elements are placed in a casing through which the air or gas to be heated is passed. B. M. V.

Heat interchangers for heating and cooling of fluids. C. W. STANCLIFFE (B.P. 377,962, 1.4.31).—The exchanger comprises laminated plates assembled alternately left and right; the inner fluid passes zig-zag through passages formed by aligned perforations (which are maintained fluid-tight by tinning or application of insol. varnish) and the outer fluid between the laminations, also in a zig-zag course produced by baffles extending inwards from the surrounding casing. B. M. V.

Reducing mill. H. G. LYKKEN (U.S.P. 1,838,560, 29.12.31. Appl., 16.7.25).—A disintegrator of the type in which attrition takes place mainly by the particles impacting on each other is described. B. M. V.

Apparatus for grinding coal and other solid materials. E. FEUERHEERD and T. H. HENDERSON (B.P. 376,760, 5.3., 18.5., and 2.11.31).—A pulveriser with air separation comprises two (oppositely) rotating impellers which centrifugally project separate streams of the material against each other and against material accumulated on an annular shelf around the enclosing casing. A vac. may be employed to reduce the cushioning of the atm. B. M. V.

Preparation of colloidal suspensions of solids.

EINSTEIN'S ELECTRO CHEM. PROCESS, LTD., and P.G.M.A. FIGACHE (B.P. 377,995, 24.4.31).—A paste is subjected to shearing, *e.g.*, between a series of rollers running at increasing speeds and reduced spacing in succession, under such conditions that it alternately adheres to and is removed from a surface, the adhesiveness being imparted by the admixture of a colloid such as gum arabic. B. M. V.

Apparatus for measuring fineness of finely-divided materials. R. T. KNAPP, ASST. to RIVERSIDE CEMENT Co. (U.S.P. 1,838,628, 29.12.31. Appl., 23.3.29).

—The rate of settling of, *e.g.*, Portland cement in kerosene is recorded on a photographic plate by means of a beam of light deflected by a mirror which is tilted by the increase of pressure when the cement is introduced into a column of the kerosene; as the cement settles into a well, below the point at which the pressure pipe is taken off, the mirror gradually returns to zero. The sensitised plate is traversed at right angles to the motion of the beam of light at a const. rate. B. M. V.

Mixing and stirring machines. A. HENKEL (B.P. 378,841, 12.5.32. Ger., 20.2.32).—A tiltable bowl is provided with male and female oppositely rotating stirrers, both driven by shafts coming up through the bottom of the bowl, inside a tall hollow column which renders a gland unnecessary. B. M. V.

Mixer and agitator. UNITED CASTINGS, LTD., T. DUCKWORTH, and P. C. DEETH (B.P. 378,557, 21.5.31).—A rectangular box is rotated about a horizontal axis which is diagonal to the box; the shaft or stub journals run in slotted supports, the wt. and driving force being taken by a wheel built up of segments attached to the outside of the box, running on a driving wheel. B. M. V.

Treatment of tacky material [*e.g.*, plastic rubber composition]. FIRESTONE TYRE & RUBBER Co., LTD. From FIRESTONE TYRE & RUBBER Co. (B.P. 376,586, 23.10.31).—The material is strained through an extruding machine with a no. of apertures, and as it issues from these a lubricant or dusting powder is applied; the lubricated material is then cut into small pieces. D. F. T.

Means for drawing-off liquids free from sediment and scum from vessels containing them. S. W. T. PAINE, and ALUMINIUM PLANT & VESSEL Co., LTD. (B.P. 378,165, 2.7.31).—The flow is upward through a no. of small holes guarded by baffles, then outwards through a large pipe the area of which is < the aggregate of the small holes, so that the flow through the latter is free from turbulence. B. M. V.

Dissemination of solids in liquids. COWLES ENG. CORP. (B.P. 378,093, 8.5.31. U.S., 27.12.30).—The impingement of jets of liquid along the surface of a perforated plate causes rapid circulation in the vessel, and keeps the perforations clear for the passage of fine suspended material through the plate into a quiet zone whence the suspension is removed. The perforated plate may be in the form of an inner vessel. B. M. V.

Filters. R. HOGGINS (B.P. 378,192, 29.7.31).—During the cleansing of a sand-filter by upward reverse current, any film of gelatinous matter is broken up by sharp edges supported just above the sand. B. M. V.

Filter for purifying cleaning solvents, gasoline, etc. E. E. KELLEY, Assr. to KELLEY ENG. Co. (U.S.P. 1,838,263, 29.12.31. Appl. 21.2.31).—A filter of the upward-current sand type is composed of layers of, in order upwards, watered slag (*A*); *A* + sawdust (*B*); *A* + *B* + charcoal (*C*); *B* + *C*; silver sand. All layers except the last are higher at the centre than at the perimeter. A pressure plate is provided and the conical lower part forms a settling chamber for prefill.

B. M. V.

Filter presses. W. BOULTON, LTD., and H. H. HALL (B.P. 378,677, 19.9.31).—A device for moving the king plate is described.

B. M. V.

Liquid boilers. BRIT. THOMSON-HOUSTON Co., LTD., Assees. of B. P. COULSON (B.P. 378,218, 27.8.31. U.S., 28.8.30).—A concentric return-tube for a Hg boiler is described, having a hollow baffle within which the inner tube telescopes in such a way as to allow expansion while maintaining a liquid seal.

B. M. V.

Adjuster equipment for evaporators. S. F. GROVE (U.S.P. 1,838,671, 29.12.31. Appl., 1.5.29).—Counterpoised chambers are connected by flexible pipes to above and below the liquid level of a series of multiple-effects and operate the inlet or transfer valves to maintain a const. level of liquor. To the last effect is connected a chamber maintained full of the evaporated liquor and operating the outlet valve. One arm of the counterpoising lever has a variable, the other a const., leverage. In the case of conc. solutions a const. trickle of dil. liquor is passed into the suspended chambers.

B. M. V.

Apparatus for crystallising sugar and other solutions by evaporation or cooling. WERKSPOR N.V. (B.P. 378,341, 19.2.32. Holl., 28.2.31).—A stationary or rocking trough is divided into sections by vertical baffles; each section has its own vertical cooling or heating coil, but they all have a common vapour space. Liquid can flow from section to section only through ports near the bottom, and these are alternately closed and opened in odd and even sets by, e.g., sector-shaped plates mounted on a longitudinal rocking shaft.

B. M. V.

Heating of gases. RESEARCH CORP. (B.P. 377,996, 25.4.31. U.S., 6.5.30).—A regenerator or hot-blast stove is constructed with a combustion space above a refractory mass comprising fragments of road-metal size, the combustion gases being drawn downwards through the mass and the air being heated by an upward pass. The depth of the mass is < the diam., and the whole mass is withdrawable from the bottom and replaceable through the top of the casing.

B. M. V.

Apparatus for drying wet gases. A. J. BOYNTON and C. DOUGAN, Assrs. to H. A. BRASSERT & Co. (U.S.P. 1,838,737, 29.12.31. Appl., 2.1.29).—The gases are passed upwards through a baffle composed of V-shaped bars (points downwards), then through another V (points upwards) which supports fragmentary material. The bars are sloped longitudinally to effect drainage down the sides of the casing.

B. M. V.

Separation of gaseous mixtures by liquefaction. M. FRÄNKL (B.P. 378,769, 18.1.32. Austr., 16.11.31).—In a separating process utilising the cold produced by

expansion with external work of part of the incoming gases, the whole of that part is partly heated and then part of it is expanded, but the rest is heated right up to room temp., further compressed, subjected to heat exchange with various incoming gases, then expanded, and the liquid produced added at a suitable point of the rectifier.

B. M. V.

Dust collector. H. B. SMITH, Assr. to BABCOCK & WILCOX Co. (U.S.P. 1,838,331, 29.12.31. Appl., 29.11.26).—The gases from, e.g., a no. of cement kilns pass into a settling chamber for each kiln, then into a common flue which leads to a stack at the end; also, from the side of the flue, a no. of ports lead to a series of waste-heat boilers and another common flue and stack. Dampers are provided at each settling chamber, each boiler, and at other places.

B. M. V.

Operation of absorption refrigerating apparatus. ELECTROLUX, LTD., Assees. of A. J. E. MUNTERS (B.P. 379,391, 1.6.31. Swed., 31.5.30).

Treating boiler waters.—See VII. Tunnel kiln.—See VIII. Electro-osmosis of liquids.—See XI. Boilers for whale oil etc.—See XII. Masses previous to gases.—See XIV.

II.—FUEL; GAS; TAR; MINERAL OILS.

Genesis of coals. V. "Coalification" ("Inkohlung") of cellulose and lignin in alkaline medium. E. BERL and A. SCHMIDT (Annalen, 1932, 496, 283—303; cf. B., 1932, 245).—The artificial coal previously obtained (*loc. cit.*) from cellulose (I) and H₂O resembles natural coal except in the caking power of the coke prepared from it. "Coalification" of (I) (200 g.) with 0.05*N*-NaOH (1 litre) gives an artificial coal which yields a coke similar to that from natural coking coal; lignin (II) similarly affords a non-caking coke (even when 0.5*N*-NaOH is used), whilst pine wood gives a compact vitreous coke. Cokes similar to that from (I) can be obtained from the alkaline "coalification" products of glucose, rice-starch, and hydro-cellulose (provided a somewhat higher concn. of NaOH is used). It is suggested that during alkaline "coalification" of (I) the intermediate sugars are converted into saccharic acids, which subsequently rearrange into the products responsible for the caking power. The following results are quoted in confirmation of this view: (I) heated with H₂O at 250° gives a product (original crystal structure lost) which with 0.05*N*-NaOH at 340° affords a "coal" with no caking power; when the initial reaction is carried out at 200° (the resultant product retains its original structure), subsequent alkaline "coalification" gives a "coal" which yields a natural coke. "Coals" obtained from (I) and 0.05*N*-NaOH below 250° show no caking power; at 200—225°, viscous H₂O-sol. products (which give voluminous cokes) are produced. Further heating of these H₂O-sol. products (in solution) gives a viscous asphalt-like mass. The aq. solution (acid to litmus) obtained from (I) and 0.05*N*-NaOH at 200° converts (I) at 350° into the same "coal" as is obtained using alkali at 350°; the H₂O-sol. products give, therefore, the substances responsible for the caking power. The solid material formed at 200°, on further "coalification" with H₂O at

350°, gives a non-caking product; the use of alkali affords a caking "coal." "Coalification" of (I) can be accomplished by aq. $\text{Ca}(\text{OH})_2$ or suspensions of CaCO_3 or natural dolomite; similar processes probably occur naturally. Extraction of a "coal" from (I) and NaOH with C_6H_6 gives a residue which has no caking power and yields 57.7% of coke (the original gives 42.9%). Admixture of the C_6H_6 extract with the residue [or with an alkaline "coalification" product of (II)] does not restore the caking power, which is, therefore, concerned with the bituminous constituents. "Coals" from (I) and H_2O and 0.05*N*- NaOH and from glucose and 0.125*N*- NaOH contain 16.6, 48–52, and 35.6%, respectively, of C_6H_6 -sol. material, of which 86.5, 95, and 97.4%, respectively, is Et_2O -sol.; the COMe_2 -sol. part of the extracted "coals" is 16, —, and 9.8%, respectively. In the first two cases, the Et_2O -sol. material consists of approx. the same amounts of (a) phenolcarboxylic acids, (b) phenols, and (c) neutral substances; that from glucose contains less (a) and more (b). Compact cokes are obtained from (b), indicating that phenols are responsible for the caking power. In order to obtain good caking coke, the decomp. point of the bituminous constituents of the coal must be below the b.p.; when the reverse occurs, carbonisation under pressure gives compact cokes from non-caking coals. The yield of coke (40–50%) from artificial coals is relatively smaller, whilst that of the C_6H_6 extract (about 50%) is higher, than from natural coal. The behaviour (Donath test) of the artificial coals towards dil. HNO_3 and dil. NaOH resembles that of a lignite and depends on the alkali-sol. phenolic extractives; the COMe_2 extract and residue of a "coal" from (I) give 99 and 1%, respectively, of the test, whilst the corresponding vals. for a "coal" from (II) are 90 and 10%. "Re-coalification" ("Nachinkohlung") of a "coal" [from (I) and H_2O at 350°] by heating at 400° results in loss of H_2O , volatile oils, and gas (H_2 , CO , CO_2 , CH_4), an increase in the C content (from 82.3 to 86.4%), and a decrease in the COMe_2 -sol. portion (from 33 to 1.5%). "Re-coalification" products give an increased yield of coke; the caking power and the Donath test decrease. "Re-coalification" can be accomplished by long heating at lower temp. and in presence of small amounts of H_2O ; the process involves the conversion (by loss of H_2O and condensation) of the original alkali-sol. extractives into stable insol. compounds.

H. B.

Formation of bituminous coal, mineral oil, and asphalt. E. BERL (J. Inst. Fuel, 1932, 5, 382–391).—Lignin and cellulose were coalified in high-pressure bombs at 340–400° in the presence of H_2O , conc. salt solutions, and H_2O containing alkali. The small amount of bitumen from lignin coal, the large amount from cellulose coal, which is similar to bituminous coal, and the presence of OMe groups in lignin coal, which are absent in bituminous coal, indicate that brown coal, which is formed from plants rich in lignin, cannot be converted into bituminous coal. The theory is advanced that bituminous coal is produced from plants poor in lignin, resin, and wax, and thus rich in cellulose. Cellulose in the presence of conc. NaOH was converted in the bombs into a black mass (protosubstance) which

on cracking yielded oils similar to mineral oils and artificial asphalts. Protosubstance on hydrogenation yielded oils similar to petroleum, and on oxidation asphalts similar to natural asphalts. Hence it is suggested that petroleum and asphalt are produced from cellulosic materials, and not from the hydrogenation of young coal.

H. E. B.

Evaluation of fuel from the consumers' viewpoint. E. S. GRUMELL (J. Inst. Fuel, 1932, 5, 361–370).—A laboratory method for the valuation of coals for steam raising, from considerations of moisture, ash, and calorific val., is described, incidental expenses (cost of ash removal, repairs) also being considered. Fuel for pulverised-coal firing may be similarly evaluated. Experiments show that semi-bituminous coals are most easily, and high-volatile coals most difficultly, ground. Attempts made to determine the mechanism of burning coal on a chain grate are described and the burning of stoker links is discussed, temp. at various parts of the fuel bed being recorded graphically.

H. E. B.

Drying of washed fine coals and making of agglomerates. E. LEROUX (Bull. Mem. Soc. Ing. Civ. France, 1932, 85, 195–285).—The theory of horizontal and vertical rotary filters is discussed and details are given of the construction, mode of operation, costs, and performance of the principal mechanical devices for de-watering washed coals and slurries, removing adherent clay, and recovery of fines from evacuated water.

H. E. B.

Solvent extraction of coal, with particular reference to Transvaal coal. J. MENDELSON (J.S. African Chem. Inst., 1932, 15, 46–53).—Extraction of Transvaal coals with C_6H_6 yields a larger quantity of material insol. in light petroleum and EtOH , *i.e.*, of the material which Bone regards as the main cause of coking, than is obtained with other coals of similar coking properties; the initial decomp. temp. of the Transvaal coals is, however, somewhat lower. During the extraction of coking coals with C_6H_6 , H_2O is formed, whilst an apparent discrepancy between the C contents of the coal and the products of the extraction indicates that oxidation of the insol. residue takes place after removal of the solvent.

H. F. G.

Utilisation of wood bark, especially as fuel. A. S. KLEIN (Zellstoff u. Papier, 1932, 12, 326–328).—Wood bark is seldom pulped but is usually burned, preferably after drying with flue gases. Processes are reviewed.

A. G.

Application of the Haber-Löwe gas interferometer in coke-oven plants and gasworks. H. SCHILDWÄCHTER (Brennstoff-Chem., 1932, 13, 301–305).—The interferometer can be used for the rapid and accurate determination of benzol, H_2S , and NH_3 in coal gas. The gas, freed as far as possible from impurities, is passed through one chamber of the interferometer and then, after removal of the constituent to be determined by means of a suitable absorbent, through the comparison chamber. The observed reading is compared with a calibration curve obtained by the use of mixtures of known composition or by calculation from the known *n* vals. of H_2S and NH_3 . The interferometer can also be used for the analysis of liquid

mixtures, e.g., for the determination of $C_{10}H_8$ in org. solvents etc.

A. B. M.

Determination of yields of pyrolygneous products.

V. I. KOZHEVNIKOV and V. G. MALUISHEVSKI (Trans. Siberian Inst. Agric. Forestry, 1929—1930, 13, No. 1, 53—83, 85—86).—Slow distillation at 270° increases the yield of charcoal; yields of tar depend directly on the yields of distillate. Most of the AcOH was recovered at 150—200°, and the greatest yield of MeOH by slow distillation at 300—380°.

CH. ABS.

Improvement of Upper Silesian blast-furnace coke and oxidation of Upper Silesian coal.

H. H. KOPPERS (Gas World, 1932, 97, Coking Sect., 86—90).—Attempts to render coke from Upper Silesian coals more suitable for use in blast furnaces by the addition of semi-coke from non-coking coal, oxidised coal, and semi-coke made from oxidised coal have been successful. Oxidation of Silesian coals destroy the bitumens decomposed during the plastic stage. Determinations of vitrain and durain, in the case of Silesian coals, give no clue to the quality of coke produced. Microscopical examination of the Silesian cokes shows that the better coke formed by firmer stamping of the coal charge is composed of smaller cells with stronger walls than those normally obtained.

H. E. B.

Spontaneous inflammability of wood-charcoal dust from beech-wood charcoal.

E. MÖHLAU (Chem.-Ztg., 1932, 56, 581—582).—Powdered beech-wood charcoal begins to develop heat through oxidation when kept at 95—110° and ignites spontaneously between 150° and 200°. These temp. are affected little by the state of subdivision of the powder and are close to the vals. obtained for brown-coal dust. The danger of ignition increases when the product is obtained from beech wood which has not been stored for long. The temp. of stored powdered charcoal should not be allowed to exceed 50°.

E. S. H.

Humic substances. I. Hydrogenation of sugar carbon. N. A. ORLOV and V. V. TISCHTSCHENKO (J. Appl. Chem., Russia, 1931, 4, 1036—1040).—Hydrogenation of sugar-C yields substances indicating that the C has a condensed ring structure.

CH. ABS.

Theory of gas producers. Gas composition and heat balance.

J. SEIGLE (Rev. tech. Luxembourgeoise, 1931, 23, 236—249; Chem. Zentr., 1932, i, 1738).—The ideal case of the combustion of C with dry air to CO_2 , CO, or $CO_2 + CO$ is examined. Special cases considered are coal with dry air, coke with warm air and with cold air in presence of H_2O vapour, with warm air in presence of waste gases, and with air enriched with O_2 .

A. A. E.

Diffusion flames and their application.

T. E. W. SCHUMANN (J. S. African Chem. Inst., 1932, 15, 43—45).—The theory of luminous gas flames, in which the process of combustion is controlled primarily by diffusion, is discussed briefly (cf. B., 1928, 880). The yield of C black from natural gas has been increased from 2 to about 30% by the use of a closed furnace in which both air and gas supplies are controlled and the heat is conserved to aid cracking.

H. F. G.

Light neutral oils of peat tar. N. ITTOV (Brennstoff-Chem., 1932, 13, 306—308).—Tar obtained by the

distillation of peat at 360° in a rotary retort was steam-distilled, the distillate was freed from basic and acid constituents, and the neutral oil so obtained was fractionated and analysed. The neutral oil contained 47% of O compounds, 14% of saturated aliphatic, 35% of unsaturated, and 3—4% of aromatic hydrocarbons. The more volatile of the O compounds consisted of aliphatic saturated ketones, and the less volatile of cyclic ketones, the former being derived probably from the fatty acid salts of the peat and the latter from the cyclic acids occurring in the resins of the peat bitumen. The unsaturated hydrocarbons consisted of olefines and substituted alkenes.

A. B. M.

Heat-treatment of hydrocarbons with special reference to gaseous hydrocarbons. II.

A. E. DUNSTAN, E. N. HAGUE, and R. V. WHEELER (J.S.C.I., 1932, 51, 131—133 T; cf. B., 1931, 1081).—Olefines, particularly C_2H_4 , were polymerised to liquid hydrocarbons under pressure (200—2000 lb./sq. in.) at about 350—600°, the necessary temp. falling with increasing pressure. The liquids are not aromatic and are obtained in nearly theoretical yields; 86% of the total liquid boils below 200° and gives a "spirit" having antiknock val. about 80% that of C_6H_6 (engine tests). Deposition of C is negligible in the absence of materials which accelerate deposition; the effect of various materials was examined. Violent decomp. with copious deposition of C, which is produced by high pressure and temp., may be prevented by control of conditions. It is concluded that by control of temp., pressure, contact surface, and time of contact, products varying from gaseous higher olefines to synthetic lubricating oils may be produced by polymerisation of olefines.

H. E. B.

Conversion of methane.

E. HIRSCH (Bull. Mem. Soc. Ing. Civ. France, 1932, 85, 286—302).—Experimental data on the crit. temp. range, rate of flow through the reaction chamber, and the optimum H_2O -vapour ratio are given for the conversion of CH_4 in natural and coke-oven gas into H_2 or H_2-CO mixtures suitable for synthetic processes. Automatically controlled full-scale plant with modifications for the manufacture of MeOH and NH_3 are described. The difficulty of maintaining the strongly endothermic reaction at 1200° is met by the use of specially designed regenerative heat exchangers. The prolonged abnormal effects of Fe in the refractory materials and of a temporary rise of temp., and the removal of org. S by the process are discussed.

H. E. B.

Cracking of palm oil. J. C. MORRELL, G. EGLOFF, and W. F. FARAGHER (J.S.C.I., 1932, 51, 133—134 T).—The cracking of Sumatra and Niger palm oils gave respectively, motor fuel 62 and 71%, Diesel oil 11.6 and 9.5%. The free fatty acids and their glycerides present in palm oil decompose during pressure distillation to give low-b.p. hydrocarbons and H_2O , aldehydes, fatty acids and their glycerides of lower mol. wt., gas, and coke. The hydrocarbons formed are of 4 major types: olefinic, aromatic, naphthenic, and paraffinic.

H. E. B.

Progress in hydrogenation of petroleum during 1930 and 1931. E. J. GOHR and R. P. RUSSELL (J. Inst. Petroleum Tech., 1932, 18, 595—606).—Recent technological and commercial developments are reviewed.

Two large-scale American plants are described and the adaptability of the process is discussed on the basis of typical results.

H. E. B.

Use of the high-boiling oils (Kogasin II) obtained in the Fischer-Tropsch benzene synthesis as Diesel-engine fuels. R. HARTNER-SEBERICH and H. KOCH (Brennstoff-Chem., 1932, 13, 308—310; cf. B., 1932, 584).—The oil used consisted of the fraction b.p. > 220° from which the greater part of the solid paraffin had been separated; it contained about 5% of unsaturated hydrocarbons. Comparative tests were carried out in a Deutz engine, using this oil and a commercial gas oil having approx. the same b.p. curve. Under low loads both oils gave approx. the same fuel consumption per h.p. developed; under high loads the fuel consumption of the synthetic oil was lower than that of the gas oil. The latter, moreover, under high loads gave a very smoky exhaust, whereas the exhaust gases from the synthetic oil were quite clear under all loads.

A. B. M.

Ignition quality of Diesel fuels. J. J. BROEZE (J. Inst. Petroleum Tech., 1932, 18, 569—576).—Ignition delay of fuels is measured by an "inertia lagmeter" consisting essentially of a sprung inert mass (connected to a pressure indicator in communication with the cylinder) which breaks an electric contact at the moment of sudden rise of pressure, independently of the actual pressure; the delay may be directly observed or recorded. Ignition quality is expressed by comparison of the fuel with mixtures of cetene (standard of high ignition quality) and mesitylene or 1-methylnaphthalene (low ignition quality) to give "cetene nos." (cf. octane no.). Cetene nos. of commercial fuels lie between 35 and 70 and those of fuel blends have a nearly linear relationship. Discrepancies in the rating of fuels in different engines are relatively unimportant, apparent anomalies being due to engine characteristics, e.g., firing of "pocketed" fuel from the previous cycle, or influence of oil viscosity on injection rate.

H. E. B.

Spontaneous ignition temperatures of fuels. F. A. FOORD (J. Inst. Petroleum Tech., 1932, 18, 534—547).—Spontaneous ignition temp. (S.I.T.) are measured in an apparatus consisting essentially of a heated lagged vessel provided with a fuel-pressure injection valve, means of ignition, and electrical means of recording the moment of injection and of rise of pressure following explosion. The temp. of the vessel before ignition is observed by a thermocouple. The ignition delays at various temp. of 5 fuels are recorded and the results discussed with reference to the specification of ignition delay by comparison with a standard fuel, e.g., a first-grade oil or a pure substance (as hexahydronaphthalene). The reduction of the S.I.T. of a fuel by admixture of $\frac{1}{2}$ —2% of EtNO₃ is demonstrated.

H. E. B.

Comparison of spontaneous ignition temperatures and starting and ignition delay tests in engines. L. J. LE MESURIER (J. Inst. Petroleum Tech., 1932, 18, 562—569).—The relation of spontaneous ignition temp. (S.I.T.) of fuels to engine performance is briefly discussed. Four fuels were examined in the Moore and the Farnborough apparatus (cf. preceding abstract) for S.I.T., in several engines for delay angles,

and in a McLaren Benz single-cylinder engine for starting properties. Tests of several fuels of widely differing S.I.T. (Moore test) in an air-injection and a solid-injection engine indicated tendencies towards erratic running and combustion shock with increase of S.I.T. It is concluded that, whilst the Moore test gives data of little use, the Farnborough apparatus grades fuels generally in the same order as the engine in respect of starting properties, and the behaviour in each is the same; but it does not give data capable of correlation of delay angles under general running conditions.

H. E. B.

Spontaneous ignition temperatures of liquid fuels and their determination. (German investigations.) J. L. CHALONER (J. Inst. Petroleum Tech., 1932, 18, 548—562).—A historical and critical account of German methods of measuring spontaneous ignition temp. (S.I.T.) of liquid fuels is given. It is considered that there is no generally accepted evidence of the usefulness of S.I.T. in assessing behaviour of fuels in engines, e.g., fuel knock.

H. E. B.

Direct study of combustion and knocking in explosion motors. A. GREBEL (Bull. Mem. Soc. Ing. Civ. France, 1932, 85, 67—128).—The relation of exhaust-gas composition to efficiency of combustion and the effects of compression ratio on the consumption and efficiency of different fuels and fuel mixtures are studied. The results of Duchene's and Withrow's photographic investigation of flame propagation in the cylinder are critically reviewed and the laws of propagation of pressure and combustion in chambers of various types are mathematically analysed. The results of spectrographic examination of combustion products (Withrow) in the cylinder are critically discussed, and possible oscillographic methods of recording pre-ignition are reviewed.

H. E. B.

Effect of jacket and valve temperatures on knock ratings of motor fuels. F. H. GARDNER and E. M. DODDS (Engineering, 1932, 134, 45—47, 60—62).—The equiv. amounts of PbEt₄ and benzol required to produce the same antiknock val. in a reference fuel (straight-run spirit, octane no. 50) were determined on 3 engines (A, water-cooled with solid valves; B, water-cooled with water-cooled valves; C, air-cooled with solid valves) modified to permit greater control and observation of temp. of valves, jacket, or cylinder walls. The modifications are described. The PbEt₄-benzol equivs. were practically uninfluenced by temp. variations in engine A, but with B the effect of temp. was more marked and the PbEt₄ equiv. of the benzol was greater than that with A. The PbEt₄ equiv. of benzol was, in general, least with engine C. In the 3 engines PbEt₄ was relatively more effective than benzol as an antiknock agent at higher temp., and with jacket temp. of 100° the PbEt₄ equiv. of benzol increased with increasing % of benzol in the fuel. The knock ratings, in terms of the amount of PbEt₄ or benzol in the reference fuel, of 5 British commercial fuels determined in each engine were shown to be comparable at engine-jacket temp. of 100°, but differed at other temp., a highly cracked spirit being very sensitive to engine conditions. Benzol-fuel mixtures gave higher exhaust-valve temp. than did PbEt₄-fuel mixtures of equiv. knock rating. Cooling

the piston of engine *B* by an oil jet increased the rating of one fuel and reduced the change of rating due to variation of temp. of cooling liquid. H. E. B.

Use of mercury for detecting and determining corrosive sulphur in motor fuels and solvents.

H. KIEMSTEDT (Brennstoff-Chem., 1932, 13, 310—312).—The Hg method is satisfactory for the determination of free S in motor fuels; the HgS formed is treated with conc. HCl and the H₂S evolved determined in known manner by absorption in Cd acetate or I solution. Shaking the oil with Hg is unsatisfactory, however, as a qual. test for free S, since org. peroxides, which are frequently present in motor spirits, produce a coloration of the Hg similar to that due to S. The Cu test is therefore to be preferred. A. B. M.

Solvent trap for oil vacuum pumps. F. A. ASKEW and R. B. BOURDILLON (J. Sci. Instr., 1932, 9, 280—281).—A separate discharge trap is fitted so that the solvent vapours do not contaminate the main oil reservoir. C. W. G.

Possibilities of coke-oven fuel. R. A. MOTT (Gas World, 1932, 97, Coking Sect., 110—114).

Viscosity of gas mixtures. Ash in air. Automatic gas analysis.—See I. Oxidation of hydrocarbons. Solvent recovery.—See III. H₂ industry.—See VII. Solvents and waxes.—See XII. Oil vapours as germicides.—See XXIII.

PATENTS

Preparation of combustible material as fuel and delivery of same to a place of combustion. J. E. KENNEDY (B.P. 377,980, 1.5.31).—A continuous stream of coal or other solid fuel is pulverised in a ball mill (cf. B.P. 204,250; B., 1923, 1160A) whence it is withdrawn and mixed with air by means of a fan, which delivers the fuel-air mixture to a burner. Means are provided for regulating the supply of air to the mill and for supplying additional air to the fuel-air mixture after it leaves the mill. A. B. M.

Process and burner for combustion of powdered coal. ATELIERS J. HANREZ SOC. ANON. (B.P. 377,474, 29.8.31. Belg., 17.12.30).—A mixture of powdered coal and primary air passes through vanes giving it a whirl in one direction, then through a constriction, and finally through vanes giving it a whirl in the opposite direction. D. K. M.

Coke ovens having vertical heating flues. GAS CHAMBERS & COKE OVENS, LTD. From COLLIN & Co. (B.P. 376,796, 16.1.31).—The flues of each heating wall are divided into groups in some of which the flames are downwardly directed and in the others upwardly directed. The flues of one set of groups are connected at the bottom and those of the other at the top to the same regenerator or pair of regenerators. A. B. M.

Coke ovens with vertical heating flues. GAS CHAMBERS & COKE OVENS, LTD. From COLLIN & Co. (B.P. 377,304, 16.1.31).—A system of regenerators and flues for heating coke ovens is claimed. D. K. M.

Apparatus for distillation of coal and similar carbonaceous material. LOW TEMPERATURE CARBONISATION, LTD., C. H. PARKER, and J. P. POSTLETHWAITE

(B.P. 377,201, 20.4.31).—In a retort for carrying out the distillation in two stages, the gases from the lower part are passed through a conduit extending vertically inside the upper part, and then mix with those from the latter. D. K. M.

Production of high-class coke. DR. C. OTTO & Co., G.M.B.H. (B.P. 378,281, 19.11.31. Ger., 20.11.30).—Metallurgical coke is manufactured by carbonising a coking coal blended with > 10% of a mixture of a moist fuel, e.g., coal or coke dust, with a dry fuel, e.g., anthracite slack or blast-furnace dust. The moist and dry fuels are used in such proportions that a mixture in a "trickling" condition is obtained. A. B. M.

Carbonisation and coking of coal, shales, and other carbonaceous substances. D. DE ROS and A. PATERSON (B.P. 376,772, 15.1.31).—The material (suitably subdivided) is passed through a tower (*A*) wherein it is subjected to the action of gases which have been heated and partly dissociated by electrothermal means, e.g., by passage through an electric arc. The dissociated H₂ in the gases so treated brings about hydrogenation of the unsaturated products of carbonisation. The gases used are preferably those produced in the process after condensation of the oil vapours therein. A separate arc chamber may be provided, or this may be embodied in the base of *A*. The carbonised coal is removed from the bottom of *A* and discharged from the apparatus either by means of a travelling grate or by a screw conveyor. A. B. M.

Manufacture of carbon. GEN. CARBONALPHA Co. (B.P. 377,259, 15.4.31. Fr., 16.4.30).—CO is decomposed in the presence of a powdered catalyst, e.g., Fe₂O₃ (2CO → CO₂ + C), in an externally heated reaction vessel in which the catalyst is intimately mixed with the products of reaction in the form of a cloud kept in suspension by mechanical agitation. The catalyst is introduced at a rate regulated in accordance with the rate of supply of the CO, whereby the proportion of catalyst in the reaction products leaving the vessel may be controlled to have the desired val. A. B. M.

Obtaining by-products from coal-distillation gases. C. STILL (B.P. 378,222, 29.8.31. Ger., 30.8.30).—In carbonising coal by the processes of B.P. 356,079 and 357,057 (B., 1931, 1036, 1082), the volatile products which are withdrawn by suction through ducts formed in the charge are submitted to fractional condensation, with or without additional separation by means of impact or centrifugal action. Suitable plant is described. A. B. M.

Gas producers [for motor vehicles]. J. BELLAY (B.P. 377,025, 8.10.31. Belg., 10.10.30).—A rectangular steel chamber has the lower part lined with carborundum and forms the combustion chamber (*A*). Air is injected into *A* through a narrow, horizontal, H₂O-jacketed nozzle which extends substantially across the entire width of *A*. The gases leave *A* through slots in the opposite wall and pass through channels in a heat-insulated block of carborundum, which acts as a catalyst for securing complete combustion of the tar, and thence to the gas-collecting conduit. A. B. M.

Production of gas and coal in chamber ovens. W. W. GROVES. From DR. C. OTTO & Co. G.M.B.H.

(B.P. 376,606, 9.11.31).—Groups of 5–10 ovens are connected by a common gas passage on the opposite side to the hydraulic main. Each oven in the group is kept in a different stage of carbonisation, so that the pressure in the group is equalised. This prevents leakage in a freshly charged oven, and overcracking of distillation gases at the end of the coking period.

R. N. B.

Improving the gases evolved in chamber ovens for production of gas and coke. W. W. GROVES. From DR. C. OTTO & Co. G.M.B.H. (B.P. 377,860, 5.11.31).—Tar, alone or mixed with steam, is sprayed on to the incandescent charge towards the end of the carbonising period, and the gases are withdrawn in such a manner that the tar vapours must traverse a considerable path through the charge. Thus the gases may be withdrawn through tubes inserted in the charge, or a partition may be provided to project to a suitable depth in the charge, the tar being sprayed on to the surface of the coke on one side of the partition and the gas being withdrawn from the collecting space above the charge on the other side.

A. B. M.

Manufacture of carburetted water-gas. HUMPHREYS & GLASGOW, LTD., Asses. of E. L. HALL (B.P. 378,252, 8.10.31. U.S., 5.3.31. Cf. U.S.P. 1,493,458; B., 1924, 664).—During the air blast secondary air is introduced around the circumference of the water-gas generator adjacent to the top of the fuel bed, and during the run heavy oil is sprayed on to the highly heated ring of fuel so produced. The secondary air is introduced in a downward direction so as to reduce the quantity of fuel blown out of the generator.

A. B. M.

Manufacture of enriched water-gas. HUMPHREYS & GLASGOW, LTD., and A. R. GRIGGS (B.P. 377,492 and 377,819, [A] 17.9.31, [B] 7.8.31).—(A) The apparatus comprises a water-gas generator with superposed carbonising chamber (*A*), the blast gases emerging from the marginal surface of the coke at the junction of the two zones, whilst the hot water-gas and excess steam from the up-run pass up through *A*. The gas is enriched by injecting tar or other heavy oil, preferably by means of the steam used for the down-run, on to the hot marginal coke surface and through it into the body of the coke. (B) After the fuel bed (*A*) of the water-gas generator has been upwardly blasted with air, tar is sprayed on to the hot marginal portion of *A* so that during the down-run, which may be a back-run with superheated steam, the vapours and gases distilled from the tar are cracked within *A* in the presence of water-gas and excess steam.

A. B. M.

Purification of coal gas from hydrogen sulphide. G. H. HULTMAN (B.P. 377,886, 22.12.31).—The gas is washed with an aq. solution of an alkaline carbonate, the spent solution being regenerated by evacuating the H_2S under low pressure, e.g., 30 mm., at a temp., e.g., 30°, suitable for recirculation of the regenerated solution. The recovered H_2S may be converted into S or otherwise utilised in known manner.

A. B. M.

Dehydration of coal gas and other gases. WHESSOE FOUNDRY & ENG. Co., LTD., and A. G. GRANT (B.P. 376,257, 27.3.31).—Gas is dehydrated by direct contact with a spray of cooled brine solution, which

may be regenerated in an evaporator after passage through a $C_{10}H_8$ extractor. The gas is then heated by steam in an external chamber.

R. N. B.

Dehydration of fuel gas. F. H. FOSTER, and HASLAM & NEWTON, LTD. (B.P. 376,418, 14.5.31).—Gas passing through a horizontal chamber meets a curtain of cooled liquid, e.g., brine. This is ejected at right angles from a series of nozzles having helically vaned end-covers, which rotate under the liquid pressure, are spring-loaded, and open under pressure to allow passage of solid obstructions.

R. N. B.

Removal of ammonia and hydrogen sulphide from gases. I. G. FARBERIND, A.-G., and F. OVERDICK (B.P. 377,300, 25.4.31. Addn. to B.P. 292,669; B., 1928, 632).—Regeneration of the washing liquid (cf. the prior patent, *loc. cit.*) is effected by withdrawing part of the solution from an initial washing stage in which there is an excess of H_2S over NH_3 , treating it with SO_2 , returning it to an intermediate stage for washing gas which is free from NH_3 , and, after further use in the last washing stage, returning it to the initial stage, so that it is passed continuously through a complete cycle. The circulation of the solution is so adjusted that the polythionate : thiosulphate ratio in the excess solution withdrawn from the washer is suitable for further working up to $(NH_4)_2SO_4$ and S.

A. B. M.

Burning of gas. W. W. TRIGGS. From CALDWELL EXPERIMENTAL CORP. (B.P. 376,739, 30.12.30).—A refractory chamber is supplied with gas and air in such a manner that combustion is substantially completed within the chamber. A form of burner is described.

A. B. M.

Distillation and cracking of tar, tar oils, etc. K. COX and A. E. WATERS (B.P. 376,449, 5.6.31).—A fire bed (*A*), filter bed, and heat-exchange bed (*B*) all composed of lump coke are spaced above each other in a cylindrical chamber. Tar is sprayed on *B* at such a rate that light oils distil off while pitch is burned on *A* by a stream of air so regulated that there is no free O_2 in the outlet gas. The centre bed prevents any C being carried away in the gas.

R. N. B.

Conversion of soda-treated tars and similar petroleum residues into light products. COMP. INTERNAT. POUR LA FABR. DES ESSENCES ET PÉTROLES (B.P. 376,611, 12.11.31. Fr., 14.11.30).—Soda-treated liquids which are vaporised over a porous substance and cracked catalytically (as described in B.P. 320,287 and 367,679; B., 1929, 970; 1932, 458) are liable to leave a deposit of Na_2SO_4 . This is removed by injecting H_2O into the centre of the porous and catalyst masses by suitably placed pipes.

R. N. B.

Burning of substances of low combustibility, such as asphaltum, tar, acid resin, pitch, masout, or the like. METALLGES. A.-G. (B.P. 376,491, 2.7.31. Ger., 12.7.30).—The furnace consists of a rotary tube divided into 3 sections (*A*–*C*). In *A* the substance is distilled and coked by the radiant heat from *B*, into which the solid and gaseous products pass and in which they are burned with admission of air; *C* forms a secondary combustion zone. The tube discharges into a hot gas chamber in which the combustion of any unburnt gas is

completed and any unburnt coke is collected and burned on a stepped grate. D. K. M.

Cracking of oil. R. T. POLLOCK, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,835,809, 8.12.31. Appl., 2.12.20. Renewed 21.11.27).—Vapours from a cracking operation are passed to a dephlegmator (*A*) having upper and lower compartments divided by partition members to form a closed chamber (*B*) between the partitions, with closed passageways which connect the partition elements. The vapours are introduced into *B* and incoming charging stock is separately introduced to mingle with the vapours and condense the heavier portions thereof. The raw oil and reflux condensate is withdrawn from *B* and a second cooling medium, e.g., H₂O, introduced and withdrawn from *A* out of direct contact with the vapours and incoming charging stock. H. S. G.

Cracking of oil. C. P. DUBBS, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,020, 29.12.31. Appl., 9.3.23. Renewed 15.3.28).—Oil, raised to cracking temp. by passage under pressure through a heating coil, is delivered to an enlarged conversion zone. The evolved vapours are passed to a dephlegmating column (*A*) and the unvaporised oil is passed to a second enlarged zone where it is allowed to remain quiescent for sufficient time for substantial quantities of free C to settle out. The unvaporised oil is then united with a larger quantity of incoming charging stock and returned to *A* to flow countercurrent to the vapours passing through. The mixed oils and condensate are then passed to the heating zone. H. S. G.

Cracking of oils. H. J. HALLE, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,835,774, 8.12.31. Appl., 22.9.24).—Oil is subjected to cracking conditions in a series of separate stills in each of which a stream of oil is continuously advanced through a heating zone and thence admitted to an enlarged reaction zone. Vapours are removed from each reaction zone and subjected to reflux condensation in separate dephlegmating zones from which the condensate is collected in a common receiver. The condensate is then merged with the stream of oil undergoing conversion in each cracking still. H. S. G.

Cracking of oils. E. T. EARNEST, Assr. to TEXAS Co. (U.S.P. 1,836,910, 15.12.31. Appl., 31.5.28).—The residue from the conversion zone is passed intermittently into a zone of reduced pressure (*A*) wherein a wide variation in pressure is encountered. The released vapours are passed to a dephlegmator wherein a substantially const. pressure is maintained which is below the min. pressure in *A* until a predetermined max. is exceeded, after which it is maintained higher than the previous min. so long as the pressure in *A* exceeds the max. H. S. G.

Cracking of oils. L. J. GARY, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,024, 29.12.31. Appl., 21.10.20. Renewed 23.11.28).—Oil is passed successively through a series of separate interconnected heating elements maintained at cracking temp., the first being at a predetermined raised pressure while the succeeding ones are at successively reduced pressures. The heated oil is passed to a vaporising zone. Alternatively, oil is

passed to the first of the heating elements and only the vapours are passed to succeeding heating elements. H. S. G.

Cracking of hydrocarbons. GASOLINE PRODUCTS Co., INC. (B.P. 377,510, 21.10.31. U.S., 21.10.30).—Petroleum oil at 426—524°/500 (preferably 700—1200) lb. per sq. in. pressure is passed into a separating drum from which the liquid passes with reduction of pressure into a fractionating column (*A*); the vapours after reheating are passed into a digester, and thence the liquid and vapour pass through a common pipe into a fractionating column (*B*). From the top of *A* light hydrocarbons, and of *B* gasoline vapours, pass; from about the middle of *A* and *B* intermediate cuts, e.g., gas oil, are taken and may be returned to the liquid-heating coil; residues are withdrawn from the bottom of *A* and *B*. D. K. M.

Apparatus for cracking of hydrocarbon oils. D. A. DEAN (U.S.P. 1,835,383, 8.12.31. Appl., 20.9.27).—Oil is heated in a retort and the vapours therefrom are refluxed with raw oil to form a reflux oil. This is then heated and passed into a zone within the retort (but separated from the main body of oil) so that vaporised portions of the heated reflux oil pass directly to the vapour space of the retort, whilst liquid portions simultaneously pass beneath the surface of the oil in this zone to a substantially quiescent pool where separation of any solid material takes place prior to the reflux oil being united with the main body of oil in the retort. H. S. G.

Apparatus for cracking of hydrocarbon oils. G. EGLOFF and H. P. BENNER, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,835,765, 8.12.31. Appl., 6.7.20. Renewed 15.3.28).—A furnace setting contains a lower (*A*) and an upper (*B*) shell still having numerous communications (*C*) between. Raw oil is supplied to *A* and vapours pass through *C* to *B* to be superheated therein. Unvaporised oil is discharged from *A* to a settling zone wherein the free C is pptd. and the C-free oil is delivered to *B* to make contact with the ascending vapours during its passage to *A*. H. S. G.

Cracking of vegetable and mineral oils. Soc. ANON. LE CARBONE (B.P. 377,909, 22.2.32. Fr., 22.1.32. Addn. to B.P. 290,060; B., 1928, 472).—The catalyst for the prior process is prepared by carbonising fabric or cotton wool. D. K. M.

Cracking of vapours evolved in the distillation of carbonaceous substances. P. LETOURNER (B.P. 378,588, 15.6.31. Fr., 18.6.30).—The vapours are passed through an externally heated chamber containing a large no. of metal elements in motion relative to each other. These become coated with semi-coke carried over as dust or with deposited C, and so act catalytically. These elements may be in the form of rotating wire brushes or short pieces of wire attached to freely suspended vertical cables kept in motion by agitation of the reaction vessel. Excess C drops off and is removed. [Stat. ref.] R. N. B.

Treatment [cracking] of oils. R. T. POLLOCK, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,049, 29.12.31. Appl., 9.5.21. Renewed 15.3.28).—Oil is passed through a heating zone (*A*) where it is raised

to cracking temp. under pressure. Heat is generated from C collected in alternate chambers used successively as vaporising and combustion chambers in communication with A. The heated oil is permitted to vaporise in one of these chambers and C to ppt. therein while consuming C that has pptd. in an alternate chamber, thereby heating the oil to conversion temp.; thereafter the flow of oil from one chamber to the other is changed when C has accumulated to the desired degree.

H. S. G.

Apparatus for treating [cracking] oils. H. P. BENNER, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,010, 29.12.31. Appl., 17.9.23).—Hydrocarbon oil heated in a cracking coil is delivered into a vaporising chamber (A) from which the vapours pass through a dephlegmator (B) to a condenser and receiver, and from the latter the liquid is passed with reduction of pressure to the top of a second dephlegmator (C) the reflux from which flows into a vessel in which B is positioned; thence it is either withdrawn from the system or mixed with the oil from the cracking coil and returned to A. The vapours from C are condensed and yield gasoline.

D. K. M.

Conversion of oil. C. P. DUBBS, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,018, 29.12.31. Appl., 30.3.21. Renewed 15.3.28).—Oil is passed through a heating zone, where it is raised to cracking temp., successively to alternate expansion chambers from which vapours are removed and in which C is allowed to collect. Subsequently a carbonised chamber is cut out of the system and water-gas generated therein by the introduction of air and steam, whilst simultaneously cutting into the cracking system the other expansion chamber into which the oil is directed together with the gas produced from the pptd. C.

H. S. G.

Conversion of petroleum oil. C. P. DUBBS, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,019, 29.12.31. Appl., 31.7.22).—Hot oil vapours from a cracking operation are directed under pressure to a dephlegmating zone (A) through a portion of which charging oil for the cracking process is passed (out of contact with the vapours) prior to its introduction at spaced points in the travel of the vapours, whereby a portion makes physical contact with the hottest vapours while a further portion physically commingles with the coolest vapours. Unvaporised oil which has passed through A is returned to a point other than that at which it was originally introduced.

H. S. G.

Hydrocarbon oil conversion. J. C. MORRELL and W. F. FARAGHER, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,810,673, 16.6.31. Appl., 1.2.29).—Hydrocarbon oil is cracked at 441–496°/50–500 lb. per sq. in. pressure and the vapours from a flash drum (A) pass in turn through a dephlegmator and a fractionating tower, and some or all of the reflux condensates from these are cracked in a second coil and returned to A.

D. K. M.

Continuous treatment of heavy oils for conversion into light products. COMP. INTERNAT. POUR LA FABR. DES ESSENCES ET PÉTROLES (B.P. 376,613, 13.11.31. Fr., 14.11.30. Cf. B.P. 320,287; B., 1929, 970).—The passage of excess steam into the dephlegm-

ators etc. is prevented by condensing the vapours leaving the cracking chamber and separating the oil from the H₂O. The heat of condensation is utilised to preheat the raw oil and vaporise the lighter fractions from the separated oil.

D. K. M.

Production of light hydrocarbons from heavy cyclic hydrocarbons or their derivatives by destructive hydrogenation. A. J. KLING and J. M. F. D. FLORENTIN, Assees. of SOC. DES CARBURANTS SYNTHÉTIQUES (B.P. 377,452, 13.8.31. Fr., 1.9.30. Addn. to B.P. 253,507; B., 1927, 696).—In the process of the prior patent, the catalyst (AlCl₃, FeCl₃, etc.) is dissolved in the heavy oil to be treated.

A. B. M.

Apparatus for extracting oil from shale and other mineral substances. W. S. CRIPPS and J. STORMONTH (B.P. 377,435, 28.7.31. Austral., 15.9.30).—A vertical cylinder is fitted with a steam-jacket divided horizontally into sections and itself is divided into a no. of zones by fixed horizontal trays concentric with a central tubular shaft (down which steam passes) fitted with scrapers and rotating first in one direction to spread descending shale crushed to about $\frac{1}{8}$ -in. mesh evenly over the trays, and then in the other to push it through openings in the circumferential flanges of one tray into a truncated cone guiding on to the tray next below. At the bottom of the cylinder is a conical receptacle surrounded by a steam coil and in which the rotating tube is fitted with arms to prevent clogging of the residue. During its passage down the cylinder the temp. of the shale is raised from 93° to 482° (approx.) and the distillate produced in each zone is separately withdrawn.

D. K. M.

Apparatus for batch distillation of mineral oils. H. S. BELL (U.S.P. 1,836,061, 15.12.31. Appl., 20.1.27).—A pair of vaporising or separating tanks are arranged so that either can be connected to an oil heater, one being operated while the other is being filled; the feed is passed through a preheater situated in the operating tank. Means are provided for drawing off residuum from each tank.

H. S. G.

Heating of oil for distillation. R. F. GILDEHAUS, JUN. (U.S.P. 1,834,696, 1.12.31. Appl., 17.6.25).—The gaseous products of combustion are passed in contact with a heat-absorbent material while simultaneously the heat is being withdrawn therefrom by the passage of a current of preheated but relatively cool gas out of contact with the direct products of combustion. Two separate quantities of heated gas are obtained substantially below combustion temp. and are brought into contact with a vessel containing oil.

H. S. G.

Distillation of carbonaceous liquids. H. G. JENNISON (B.P. 377,582, 6.2.32).—The liquid is distilled by passing through it a current of hot furnace gases the flow of which is regulated by control of the forced draught supplying air to the furnace and of the suction in the offtake from the still. Suitable apparatus is described.

A. B. M.

Distillation and cracking of oil. W. MENDIUS, Assr. to SINCLAIR REFINING Co. (U.S.P. 1,836,181, 15.12.31. Appl., 8.6.29).—Residual oil is reduced to coke by the direct introduction of hot oil products from

a vapour-phase cracking operation. The vapours from the coking operation are used to preheat a crude stock containing lubricating oil components before condensing therefrom a gas-oil stock which is utilised in the vapour-phase cracking. The lubricating oil stock is vaporised under vac., and the residue is supplied to the coking operation.

H. S. G.

Distillation of oil. R. T. POLLOCK, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,835,810, 8.12.31. Appl., 20.12.20).—Hydrocarbon oils are cracked and the vapours passed to a reflux condenser (*A*) where high-boiling fractions are condensed. Unit *A* includes a heat exchanger (*B*) wherein charging stock is preheated out of contact with the vapours, requisite means being provided to control the rate of delivery of the charging stock in order to regulate the vapour temp. The preheated charging stock from *B* is passed through a conductor (*C*) to which unheated oil may be introduced, separate regulating means being provided to control the rate of flow of the oil through *C* irrespective of the rate of flow through *B*, and is delivered to the vapour space of *A*.

H. S. G.

Distillation of oils. P. C. KEITH, JUN., Assr. to M. W. KELLOGG Co. (U.S.P. 1,838,769, 29.12.31. Appl., 10.7.28).—Petroleum oil is heated in a pipe still and passed into a vaporising chamber (*A*) with one horizontal division plate fitted with bubbler caps and overflow pipe above and one below the entry pipe. Part of the body of oil maintained in the lower portion of *A* is continuously circulated through a heating coil. The vapour from *A* is passed into a fractionating column operating under vac. On certain of the division plates of the column are boxes fitted with bubbler caps, overflow pipes, and steam pipes. Part of the reflux from the plate above is passed on to the division plate in the box, and the lighter fractions are driven off by steam into the compartment above and the reflux is withdrawn from the column. Several intermediate cuts are obtained in this way.

D. K. M.

Distillation of petroleum residuum. F. M. ROGERS and C. P. McNEIL, Assrs. to STANDARD OIL Co. (U.S.P. 1,830,963, 10.11.31. Appl., 17.3.23).—The residue of pitch obtained by the distillation of petroleum oils is preheated to 260–371° and forced through the inner tube of a nozzle, concentric with which is a tube through which superheated steam passes. The tubes are heated and the mixture of atomised pitch and steam passes into a chamber at 427–649°, in which they react and the coke produced settles. The vapours on condensation yield a liquid, 80% of which boils at 193–399°.

D. K. M.

Production and purification of light oils by the distillation of fuel. C. STILL (B.P. 378,217, 27.8.31. Ger., 29.8.30).—The light oils obtained in the carbonisation of coal by the processes of B.P. 356,079 and 357,057 (B., 1931, 1036, 1082), wherein the volatile products are withdrawn by suction through ducts formed in the charge, are purified by treatment first with moderately conc. H₂SO₄, e.g., 80%, or similar polymerising agent, e.g., AlCl₃, NaOEt, SiO₂ gel, and then with more conc. H₂SO₄, e.g., < 90%.

A. B. M.

Treatment of emulsified hydrocarbon oil. G. EGLOFF and H. P. BENNER, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,090, 29.12.31. Appl., 25.11.27).—Emulsified oil is heated in a cracking coil (*A*) and passed into a vaporising chamber the vapours from which are passed into a dephlegmator (*B*). The vapours from *B* are cooled to above the b.p. of H₂O at the working pressure, e.g., 177°/100 lb. per sq. in., and the condensed oil is further cooled while the vapours are cooled to below the b.p. of H₂O, e.g., 15°, in another condenser (*C*). The reflux from *B* is cooled to above the b.p. of H₂O and the oil returned to *A* while the vapours pass to *C*.

D. K. M.

Separation of light oils from wash oils. C. STILL (B.P. 379,262, 3.5.32).—Two heat exchangers connected in series are situated at the top of a distillation column. Condensates, from which H₂O has been removed externally, are heated in the lower one by vapours leaving the column. The upper one serves as a reflux condenser for partial condensation of the vapours, a separator being inserted between the two to remove the reflux condensate.

R. N. B.

Recovery of oil from oily sludges. W. I. JONES, N. PERRY, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 376,756, 13.4.31).—Mixtures of oil and solid material such as those produced by the destructive hydrogenation of coal are passed while hot (250–450°) into a "flashing" chamber (*A*) where its pressure is suddenly reduced and wherein it is mixed with an inert gas and/or steam heated to about 500°. The volatile products and gases are led from *A* and fractionally condensed. Means are provided for removing the solid material from *A* to a retort wherein it may be subjected to further treatment with hot inert gases.

A. B. M.

Desulphurisation of hydrocarbons. J. L. COOLEY and L. C. McCLOUD, Assrs. to STANDARD OIL Co. OF CALIFORNIA (U.S.P. 1,839,087, 29.12.31. Appl., 30.11.27).—The pressure on cracked naphtha that has been condensed under pressure is reduced to permit the release of dissolved S compounds, sufficient pressure being maintained to prevent loss of desirable naphtha constituents. The pressure is subsequently increased and the condensed naphtha is passed to a rectifying column (*A*) in which the temp. and pressure are co-ordinated to separate additional S compounds without the loss of desirable constituents, by discharging the former from the top and the latter from the bottom of *A*.

H. S. G.

Refining of hydrocarbon liquids. ANGLO-PERSIAN OIL Co., and A. E. DUNSTAN (B.P. 378,010, 4.3.31).—Petroleum distillates are partly desulphurised and completely deodorised by treatment with 0.07N-NaOCl containing 0.04N-NaOH.

D. K. M.

Process of purifying, reducing, and/or desulphurising carbon compounds. H. ROSTIN (B.P. 378,437, 7.4.31. Ger., 4.4.30).—Liquid or gaseous carbonaceous materials, excluding C₂H₂, are passed over finely-divided, freshly reduced Fe oxide at 220–300°, alone or in the presence of H₂, gases containing H₂, or CO. Granulated oölitic Fe ore (minette) is to be preferred.

R. N. B.

Refining of petroleum oils. J. C. MORRELL, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,839,114,

29.12.31. Appl., 9.12.25. Renewed 10.11.30).—Petroleum oils, especially light oils produced by cracking, are purified by treatment with one or more S-free acids, *e.g.*, HCl, H₃PO₄, AcOH, citric acid, with or without pretreatment with H₂SO₄. D. K. M.

Purification of hydrocarbons. COMP. TECHNIQUE DES PÉTROLES (B.P. 377,480, 2.9.31. Fr., 23.9.30).—Hydrocarbon oil, *e.g.*, lubricating oil, is purified by mixing with 80–100% H₂SO₄ (1–10 wt.-%), one or both substances being atomised at the time of mixing. The sludge is removed in a centrifugal machine. D. K. M.

Removal of corrosive agents from hydrocarbon oils. R. K. STRATFORD, G. McINTYRE, and H. H. MOOR, ASSRS. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,838,031, 22.12.31. Appl., 13.12.27).—A continuous stream of mixed crude oil and alkaline solution is heated to 82–127°/40–50 lb. per sq. in. and continuously passed under a pressure of 20–30 lb. per sq. in. through enlarged zones wherein impurities are settled from the crude oil. The purified oil is subsequently distilled. H. S. G.

Heat-treatment of hydrocarbon gases. ANGLO-PERSIAN OIL CO., LTD., A. E. DUNSTAN, and R. V. WHEELER (B.P. 377,716, 26.1.31. Cf. B.P. 309,455; B., 1929, 509).—Aromatic hydrocarbons are produced from paraffins and/or olefines by heating to 450–1250° in reaction tubes (*A*) and then passing the products into a lagged vessel (*B*) the vol. of which is about 10 times that of *A*; the gases in *B* are kept at reaction temp. without the aid of external heat. Thence they pass to another vessel in which the gas is suddenly cooled. D. K. M.

Separation of unsaturated hydrocarbons from gas mixtures containing the same. J. Y. JOHNSON. FROM I. G. FARBENIND. A.-G. (B.P. 377,193, 16.4.31).—C₂H₂ and its homologues are separated from gas mixtures by washing them with liquid SO₂, CO₂, NH₃, MeCl, EtCl, or other substance of b.p. <15° which does not react chemically with C₂H₂ and is not itself composed of unsaturated hydrocarbons. The C₂H₂ may be recovered by heating and/or by releasing the pressure, and washing out the residual solvent, or the mixture of C₂H₂ and solvent vapour may be utilised directly in catalytic syntheses, *e.g.*, the formation of C₅H₅N from C₂H₂ and NH₃. A. B. M.

Extraction of gasoline from natural gas. F. PORTER, ASSR. to CONTINENTAL OIL CO. (U.S.P. 1,838,449, 29.12.31. Appl., 28.7.27).—Natural gas compressed to 40 lb. per sq. in. pressure is passed into the bottom of an evaporator (*A*) which it leaves at about 99° and, after passing through a filter to remove entrained oil, is cooled. The vapour is compressed to 250 lb. per sq. in. pressure and cooled. After separation of the gasoline, the gas is scrubbed with oil in a tower (*B*). This oil, preheated to about 177° by the effluent from *A*, which after cooling is re-used in *B*, is pumped into the top of *A*, in which the absorbed gas is expelled from the oil. D. K. M.

Returning and recovering heat from vapours produced in the decomposition of petroleum oils. A. L. STROUT, ASSR. to STANDARD OIL CO. OF CALIFORNIA (U.S.P. 1,834,228, 1.12.31. Appl., 26.9.27).—Oil to be cracked is passed through a heating coil under pressure into a vaporising chamber (*A*). The evolved vapours

flow through a dephlegmator to a water-cooled condenser and receiving tank all held under pressure. The liquid removed from *A* is permitted partly to evaporate by releasing the pressure, the residue being withdrawn from the system. The vaporised portion is passed through a closed heat exchanger and is partly condensed. The vapours then enter a chamber and are condensed by contact with a spray of cool feed-stock. Combined feed-stock and condensate are pumped through a closed passage in a heat exchanger, in contact with the opposite walls of which is hot cycle-stock vapour, and is directed back to the heating coil to be again subjected to cracking conditions. H. S. G.

Apparatus for treatment of hydrocarbonaceous liquids. W. F. BLEECKER (U.S.P. 1,837,519, 22.12.31. Appl., 14.7.28).—A closed, interiorly non-conductive container is fitted with a series of spaced bipolar electrodes dividing the lower portion thereof, the outer electrodes of the series being connected in an electric circuit. Overflow means are provided to restrict the level of an electrolyte to the lower portions of the container, leaving a superimposed oil space holding baffles for causing agitation of the oil, with a further space for gases above the oil. Pressure means are provided for maintaining a max. pressure above atm. in the gas space. H. S. G.

Production of [ozonised] fuels for internal-combustion engines. M. WOLFF & Co. G.M.B.H. (B.P. 376,286, 6.3.31. Ger., 6.11.30).—To a mixture of light hydrocarbons, *e.g.*, gas oil and C₆H₆, or of such hydrocarbons with MeOH or EtOH, is added 1 vol.-% of an O₂ carrier, *e.g.*, PhNO₂, or transmitter, *e.g.*, turpentine, and the whole is treated with O₃ at 2½ atm. pressure. A small quantity of a substance favourable to ignition, *e.g.*, EtOAc, COMe₂ saturated with C₂H₂, is added either before or after ozonisation. D. K. M.

Apparatus for manufacture of non-knocking motor fuels and very viscous oils from paraffin hydrocarbons. J. Y. JOHNSON. FROM I. G. FARBENIND. A.-G. (B.P. 376,397, 20.4.31).—Paraffins, *e.g.*, CH₄, C₂H₆, benzene, are passed through a Si tube at 400–1100° and after separation of the tar mist and of the liquids produced by compressing the gas the latter, now rich in olefines, is polymerised by passing through a Cr-Ni-steel tube containing Si bricks at 400–600°/20–300 (preferably 50–100) atm. pressure and then cooled. The liquids produced at different stages of the process and consisting of fatty and aromatic hydrocarbons are treated with a condensing agent (5%), *e.g.*, AlCl₃, in the presence of the residual gas, yielding motor fuel and lubricating oil. The gas from this operation may be used for the production of C₂H₂ or H₂. D. K. M.

Motor fuels. DEUTS. HYDRIERWERKE A.-G. (B.P. 379,231, 29.2.32. Ger., 20.3.31).—Knocking and C formation are avoided by adding to petrol etc. a small quantity (*e.g.*, 0.5%) of one or more aliphatic alcohols (C₈ or higher) dissolved in a high-boiling hydrocarbon. R. N. B.

Means for testing the products of combustion [of internal-combustion engines]. J. Y. JOHNSON. FROM MOTO METER GAUGE & EQUIPMENT CORP. (B.P.

378,425, 9.5.31).—Exhaust gases pass through a Venturi tube inside a metal case and draw in a supply of air. The mixed gases pass over a Pt wire the temp. of which is raised by the heat of combustion and measured by balancing against a non-catalytic wire in a Wheatstone bridge circuit. Means are provided for increasing the current to burn off any deposited C. A switch shuts off the current simultaneously with the supply of exhaust gas. The voltage is kept const. by an element of pure Fe wire in H₂, placed in the bridge circuit. R. N. B.

Manufacture of [fluorescent] lubricating oil.

J. C. BLACK, W. D. RIAL, and J. R. MCCONNELL, Assrs. to RICHFIELD OIL CO. OF CALIFORNIA (U.S.P. 1,839,012, 29.12.31. Appl., 6.5.27).—A green fluorescence is imparted to mineral lubricating oil by mixing it with an aromatic oil, e.g., coal-tar distillate, b.p. 204–316°, and decolorising clay, heating to < 110°, and separating the clay. D. K. M.

Reclaiming spent [lubricating] oil.

W. STUTLER, Assr. to W. STUTLER Co., INC. (U.S.P. 1,838,718, 29.12.31. Appl., 13.12.29).—The spent oil is mixed with H₂O (10–25 vol.-%) and heated by blowing in steam to about 100°. An alkaline clarifying agent, e.g., Na₂CO₃ (1–2 pts. per 6 gals.), is added and the temp. raised to 107–149°. After settling, the clear oil is heated in a vertical still fitted with an agitator for 2–3 hr. at 260–323°, steam being admitted into the bottom of the still when the temp. has reached 149°. After cooling, the oil is ready for re-use. The oil may be bleached by mixing it prior to its introduction into the still with a bleaching earth, e.g., bentonite (1 lb. per gal.), and removing this after treatment in the still by filter-pressing. D. K. M.

Apparatus for charging coke ovens and the like.

N. V. MAATS. VOOR KERAMISCHE EN CHEMISCHE INDUSTRIE "KERO-CHEMICA," Asses. of H. KOPPERS A.-G. (B.P. 379,614, 26.1.32. Ger., 26.1.31).

Apparatus for discharging the distillation products from chamber ovens. C. STILL (B.P. 380,038, 7.7.32. Ger., 10.7.31).

Heater for liquids. Grinding coal. Filter for solvents.—See I. NH₃ etc. from NaCl and coal. (NH₄)₂CO₃ and NH₄HCO₃. Ammoniacal liquors. Gases containing H₂.—See VII. Pickling baths.—See X. Improving waxes.—See XII. Preps. for killing flies.—See XVI.

III.—ORGANIC INTERMEDIATES.

Vapour-phase catalytic oxidation of hydrocarbons. T. J. WILKEN-JORDEN (J. Chem. Met. Soc. S. Africa, 1932, 32, 248–255, 283–295, 322–332).—The results of previous investigations and the theories based thereon are critically discussed. The products obtained on passing a mixture of a hydrocarbon vapour and air at 250–550° over a catalyst formed by impregnating pumice with Mn vanadate (cf. Jaeger, B., 1929, 83) have been examined. The time of contact was 30–60 sec. The gaseous reaction products were principally CO and CO₂. In the liquid reaction products the following compounds were identified: *p*-benzoquinone and (at 550°) Ph₂ from C₆H₆; PhCHO and

(at 500°) ditolyl from PhMe; C₆H₄Me·CHO from C₆H₄Me₂; acraldehyde from cyclohexene, cyclohexane, and CMe₂:CHMe; acraldehyde and glycol from *n*-heptane and *n*-octylene. The yields were all small in amount. The variations of the yields of CO and CO₂, and of the O₂ used with temp. and with the hydrocarbon: air ratio have been studied quantitatively. The anti-knock hydrocarbons (C₈H₆ and its homologues, cyclohexene, CMe₂:CHMe) have lower temp. coeffs. of oxidation than the pro-knock hydrocarbons (cyclohexane, *n*-heptane, *n*-octylene), and also tend to undergo complete combustion to CO, CO₂, and H₂O rather than to form intermediate products. The mechanism of the oxidations is discussed. The tendency of a hydrocarbon to knock increases with its mol. heat of formation, and therefore is a function of the mode of at. linking in the mol. A. B. M.

Modern developments in solvent recovery. E. SUTCLIFFE (Trans. Inst. Rubber Ind., 1932, 8, 66–79).—A description of methods for the production of activated C from coal and coconut shell precedes details as to the effect of granule size and friability on the working qualities. Laboratory methods are given for testing the friability and absorptive power, followed by an account of conditions necessary for economic solvent recovery illustrated by a description of an actual installation. D. F. T.

Determination of *m*- and *o*-cresols in mixtures of cresols. C. E. SAGE and H. R. FLECK (Analyst, 1932, 57, 567–569).—*o*- and *m*-Cresols are pptd. and weighed as the resin formed with CH₂O and NaOH. *o*-Cresol is determined by the f.-p. method, starting with a mixture of the sample with cineole. Results for standard mixtures are given. E. B. H.

Salts of naphthenic acids: possible applications.

A. I. KOGAN and N. I. CHURDENKO (Farben-Ztg., 1932, 37, 1664–1666).—"Salts" of Al, Pb, Zn, and Mg with varying proportions of naphthenic acid ("Azidol T," a technical product containing 20–8% of hydrocarbons) are prepared by pptn., or by melting together the base and acid. The viscosity of their solutions, particularly in turpentine, increases with increasing content of basic oxide. They reduce the oil requirements of pigments, and the Al salts afford marked protection against deposition of pigment (barytes) in a mixture of linseed oil and turpentine; the former effect decreases, and the latter increases, with increasing basic oxide content of the salt, and is parallel with the viscosity effect. H. A. P.

Conversion of CH₄. Determining S in solvents.

—See II. Determination of aldehydes and ketones. —See XX.

PATENTS.

Manufacture of tribromoethyl alcohol. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 375,358, 24.3.31).—Bromal is treated with alkoxides or alkoxide-halides of Al, e.g., Al(OEt)₃ or Al(OEt)I₂, in an org. solvent (Et₂O) and the reaction product is decomposed by H₂O or dil. acid. C. H.

Treatment [neutralisation] of [dilute] aliphatic acids [containing froth-producing substances].

BRIT. CELANESE, LTD. (B.P. 375,549, 25.6.31. U.S., 11.7.30).—Frothing trouble is avoided by neutralisation (with Na_2CO_3) above 50° , e.g., at 90 – 100° . Coagulating agents (Fe or Al salts) may be added. C. H.

Production of organic acid amides. BRIT. CELANESE, LTD. (B.P. 375,627, 21.9.31. U.S., 20.9.30).— Ac_2O , or other simple lower aliphatic acid anhydride, is treated with gaseous NH_3 (1 mol.) or primary or *sec.* lower aliphatic amines, preferably below 40° , the acid formed being distilled off. C. H.

Manufacture of emulsions. DISTILLERS CO., LTD., and H. LANGWELL (B.P. 376,252, 23.3.31).—Addition of a salting-out agent (e.g., NaCl, NaOH) to aq. emulsions of H_2O -insol. substances (e.g., Cu resinate, Turkey-red oil) dissolved in an O-containing org. liquid (BuOH, amyl alcohol, ketones, esters) reduces the solubility of the alcohol etc., and so stabilises the emulsion at high dilutions. E. L.

Manufacture of purified esters of phosphoric acid and thiophosphoric acid. MONSANTO CHEM. WORKS, ASSEES. OF E. CLEMMENSEN (B.P. 374,721, 14.9.31. U.S., 29.9.30).—Aryl phosphates etc. are obtained water-white and stable to light by stirring the crude products with aq. KMnO_4 . Excess KMnO_4 is washed out and any pptd. MnO_2 dissolved in H_2SO_4 . C. H.

Manufacture of organic intermediates useful in the manufacture of dyes. IMPERIAL CHEM. INDUSTRIES, LTD., S. COFFEY, and J. E. SCHOFIELD (B.P. 375,414, 27.3.31).—Phosgenated *o*-alkoxyanilines are nitrated substantially exclusively in the positions *para* to the NH_2 ; hydrolysis gives 4-nitro-2-alkoxyanilines. 5-Nitro-*o*-anisidine is obtained in 84% yield from di-*o*-anisylcarbamide by nitration and hydrolysis. 4-Nitro-2:5-dimethoxyaniline, m.p. 158 – 160° (carbamide, m.p. 274 – 276°), and 5-chloro-4-nitro-*o*-anisidine (carbamide, m.p. 270 – 272°) are similarly prepared. C. H.

Manufacture of disulphides from mercapto-[thiol] compounds [vulcanisation accelerators]. I. G. FARBENIND. A.-G. (B.P. 374,594, 11.5.31. Ger., 9.5.30).—Thiols of the aromatic or heterocyclic series, dithionic acids, and dithiocarbamic acids, e.g., 2-thiobenzthiazole, 2-thiophthalthiazole, Na dimethyldithiocarbamate, or thio-*p*-cresol, are converted into corresponding disulphides by treatment with air or O_2 (if desired, under pressure) in presence of nitrous or nitric oxides in neutral or acid medium. C. H.

Treatment of oxidisable organic compounds [anti-agers for rubber etc.]. IMPERIAL CHEM. INDUSTRIES, LTD., H. M. BUNBURY, J. S. H. DAVIES, and W. J. S. NAUNTON (B.P. 375,360, 24.3.31).—Compounds obtained by interaction of a phenol (β - $\text{C}_{10}\text{H}_7\text{OH}$, 4:4'-dihydroxy- β -diphenylpropane) with CH_2O and a *sec.*-alkyl-, cycloalkyl-, or aralkyl-amine (piperidine, piperazine) are used as anti-agers in rubber, unsaturated oils, etc. C. H.

Manufacture of wetting, cleaning, emulsifying, dye-dissolving, and water-softening agents. CHEM. U. SEIFENFABR. R. BAUMHEIER A.-G. (B.P. 374,866, 12.2.31. Ger., 12.2.30).—A mixture of (1) fatty oils or fats or the corresponding acids esters or anhydrides

and (2) aromatic or hydroaromatic polynuclear hydrocarbons is sulphonated and condensed with an alcohol. Examples are: tetrahydronaphthalene (I), BuOH, CH_2PhCl , and castor oil with 100% H_2SO_4 at 15° ; (I), cyclohexanol, and castor oil with ClSO_3H ; (I), oleic acid, isoamyl alcohol, and CH_2PhCl with 18% oleum. C. H.

Manufacture of 1:2-benzanthraquinones. J. Y. JOHNSON. FROM I. G. FARBENIND. A.-G. (B.P. 375,305, 16.3.30).—1:8-Phthaloyl- β -naphthol (from β - $\text{C}_{10}\text{H}_7\text{OH}$, phthalic anhydride, and AlCl_3) is converted by heating with H_2SO_4 (e.g., 96% at 120 – 125° or 78% at 150 – 155°) into 2-hydroxy-1:2-benzanthraquinone. Corresponding Cl- and NH_2 -derivatives and the parent benzanthraquinone are similarly prepared. C. H.

Hydrocarbons from gases etc.—See II. **Products from cellulose.**—See V. **Preserving oxidisable materials.**—See XIV. **Tanning substances.**—See XV. **Products from menthols.** **Camphor derivatives.**—See XX.

IV.—DYESTUFFS.

Fading of lake colours.—See XIII. **Dyes in fungicides.**—See XVI.

PATENTS.

Manufacture of triarylmethane dyes. I. G. FARBENIND. A.-G. (B.P. 374,865, 11.2.31. Ger., 14.2.30).—The usual synthetic methods are applied to arylamines, $\text{Ar}\cdot\text{NRR}'$, in which R is a hydroxyalkyl and R' an alkyl above C_4 . Examples are: *N*- β -hydroxyethyl-*N*-butylaniline with Michler's hydrol (bluer than Meviolet), PhCHO (yellower than malachite-green), benzaldehyde-2:4-disulphonic acid (green), or α -naphthaldehyde-2:4-disulphonic acid (yellower green); and the corresponding hydrol with benzyloxyethyldisulphonic acid (violet). The shades change less in artificial light than those from known analogous dyes. C. H.

Manufacture of vat dyes of the anthraquinone series. I. G. FARBENIND. A.-G. (B.P. 375,056, 4.6.31. Ger., 4.6.30).—Cyanuric chloride etc. is condensed with aminoanthraquinones in presence of phenols as diluents and in absence of acid-binding agents. Examples include: cyanuric chloride with α - and β -aminoanthraquinones (yellow), 1-amino-4-benzamidoanthraquinone (red); 2:4-dichloro-6-phenyl-1:3:5-triazine with 4-amino-1:1'-dianthraquinonylamine; 2:4-dichloro-6-methyl- (or ethyl)-1:3:5-triazine with α -aminoanthraquinone (yellow), 2:4-dichloro-8-amino-6:7-phthaloylacridone (blue); dichlorocyclohexyltriazine with 1-amino-4-benzamidoanthraquinone (red); dichlorobenzyltriazine with 1-amino-5-benzamidoanthraquinone (orange). C. H.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Structure of cellulose and lignin. D. KRÜGER (Zellstoff u. Papier, 1932, 12, 321–323, 357–359).—A review of the literature. A. G.

Determination of α -, β -, and γ -celluloses. DE FAYARD (Bull. Inst. Pin, 1932, 189–191).—Vals. for the total cellulose, equal to those obtained by Cross and

Bevan's method, are obtained more rapidly by treating wood with NaOCl at 30–35° until bleached, followed by Na₂SO₃ at 100°. After weighing the total cellulose, β- and γ-celluloses are extracted with 17.5% NaOH at 60°, and β is then pptd. by AcOH. A. G.

Uncondensable gases from cellulose cooking. H. BERGSTRÖM and K. CEDERQUIST (Iva, 1932, No. 2, 45–47).—The gases from a sulphite cook, after passage through aq. KOH, contained 2.1% of CO₂ and SO₂ and 19.5% O₂. No CO, H₂, nor CH₄ was detected. Uncondensable gases from a sulphate plant, and the gases from the vac. pump of a black-liquor evaporator, are combustible. CH. ABS.

Reduction of sulphur-containing compounds in wood-pulp and paper manufacture. T. D. BECKWITH and J. R. MOSER (J. Bact., 1932, 24, 43–52).—Blackening of pulp stock is due to the production of FeS derived from the H₂S formed by the reduction of S compounds by *Microspora desulphuricans*. The requisite Fe and S are both present in the wood. A. G. P.

Physical theory of the [paper-pulp] beating process. W. B. CAMPBELL (Paper Trade J., 1932, 95, T.A.P.P.I. Sect., 81–85).—The characteristic changes which occur during beating are considered to be purely physical, and an attempt is made to explain them solely by fibrillation, either external or internal. Surface-tension effects are also considered, particularly in relation to water-holding capacity or "wetness." H. A. H.

Transmission of light [by paper].—See I.

PATENTS

Manufacture of cellulose compounds. COURTAULDS, LTD., and R. L. WORMELL (B.P. 377,795, 27.6.31).—Cellulose is treated with a solution of conc. (>60%) H₂SO₄ in a suitable org. liquid, e.g., EtOAc, and the resulting cellulose sulphate, which remains undissolved, is separated and treated with an org. acid, e.g., AcOH, whereby the combined H₂SO₄ is replaced by Ac. The products contain up to 35% Ac (calc. as AcOH) and may be further esterified with Ac₂O, optionally in the presence of a catalyst. Alternatively, the partly esterified cellulose may be re-treated by the same process, in which case a proportion of C₆H₆ (insufficient to affect the homogeneity of the solution) should be added to the H₂SO₄-EtOAc mixture to prevent dissolution of the cellulose ester. D. J. N.

Manufacture of cellulose esters. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 378,044, 5.5.31).—Cotton linters, hydrocellulose, etc. is esterified by treatment with keten and/or a fatty acid (C₃ or above) or an aromatic carboxylic acid or halide in liquid SO₂, with or without addition of a catalyst. The esters or mixed esters so produced are very pure and do not require bleaching. B. P. R.

Manufacture of organic esters of cellulose. BRIT. CELANESE, LTD. (B.P. 377,313, 28.4.31. U.S., 29.4.30).—Cellulosic material is pretreated with lower aliphatic acids and then esterified with H₂SO₄ as catalyst in the presence of a solvent or a non-solvent for the cellulose ester. After pptn. or separation, the ester, which may be of high Ac content, is heated with H₂O at a suitable

temp. and pressure, whereby its S content is eliminated and its solubility and viscosity characteristics are modified or unaltered as desired. F. R. E.

Manufacture of nitrated cellulose. KODAK, LTD., Assees. of C. J. STAUD and J. T. FUESS (B.P. 376,646, 31.12.31. U.S., 31.12.30).—Cellulosic material is nitrated with liquid NO₂. F. R. E.

Producing thin skins or films of cellulose and cellulose derivatives. J. P. BEMBERG A.-G. (B.P. 378,342, 22.2.32. Ger., 20.2.31).—Films made by spinning a cuprammonium hydroxide solution of cellulose through a slit into an alkaline coagulating bath are stretched lengthwise by means of rollers and transversely by a tensioning frame while the material is still in a flexible condition. B. P. R.

Treatment of cellulose or cellulosic materials [to form degradation products]. BRIT. CELANESE, LTD. (B.P. 376,372, 15.1.31. U.S., 15.1.30).—Cellulosic materials are degraded by H₂SO₄ in the presence of or with subsequent addition of an org. liquid (Et₂O, EtOH, MeOH) in which the converting agent is sol. but the conversion products are insol.; the latter, after separation, may be hydrolysed with dil. acid and fermented to yield starches, sugars, alcohols, etc. F. R. E.

Viscose-casting machines. W. H. PEASE (B.P. 376,278, 28.3.31).—In the continuous production of cellulose sheet in a single machine, a spreading hopper delivers viscose through an adjustable slot on to the surface of a rotating drum immersed in a continuously circulating coagulating liquid of constantly maintained temp. and composition. The sheet passes thereafter over speed-controlled rollers through washing baths and drying chambers, all of which are sectionalised, totally enclosed, and temp. and/or humidity controlled, and finally to the stock rolls. F. R. E.

Waterproofing of sheets of regenerated cellulose. COURTAULDS, LTD., W. H. GLOVER, and E. HAZELEY (B.P. 376,415, 9.5.31).—The sheets are treated with an aq. emulsion of (paraffin) wax, which may also contain glycerin, gum, resin, cellulose ester, or plasticiser. F. R. E.

[Manufacture of colourless] artificial yarns, filaments, and similar products. BRIT. CELANESE, LTD. (B.P. 376,832, 17.4.31. U.S., 17.4.30).—0.05–1 wt.-% of H₂O₂ is added to the solution of the org. derivative of cellulose before spinning. F. R. E.

Manufacture of artificial silk. W. F. RICHTER, Assr. to CHEM. HOLDING CORP. (U.S.P. 1,839,411, 5.1.32. Appl., 27.6.29).—Cotton dust is added to wood pulp before making soda-cellulose in the production of viscose rayon. The resulting threads have increased strength and superior feel. B. P. R.

Manufacture of artificial silk of high tensile strength from viscose. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 376,768, 14.4.31).—Viscose is mixed with a small quantity of a substance which reduces its surface tension (Turkey-red oil, alkyl-naphthalenesulphonic acids) and is spun into a bath the titratable acid content of which is < 40% H₂SO₄; the resulting filaments have a strongly indented cross-section. F. R. E.

Manufacture of artificial bristles, straw, and similar products [of reduced lustre]. BRIT. CELANESE, LTD. (B.P. 376,833, 17.4.31. U.S., 17.4.30).—A suspension of a white pigment (TiO_2) in a liquid (ethylene glycol) is applied to a no. of filaments containing an org. derivative of cellulose, which are then made to coalesce by treatment with a solvent (COMe_2).

F. R. E.

Manufacture of artificial filaments and similar products [of reduced lustre]. BRIT. CELANESE, LTD. (B.P. 377,486, 11.9.31. U.S., 11.9.30).—Finely-divided Sb oxide together with olive oil or ethylene glycol is incorporated in a solution of an org. derivative of cellulose, before spinning, or in the spun filaments by means of a swelling agent.

F. R. E.

Production of artificial filaments, threads, yarns, ribbons, films, etc. BRIT. CELANESE, LTD., C. W. ADDY, and H. H. SIMS (B.P. 377,233, 22.4.31).—Filtered solutions of org. derivatives of cellulose are extruded through relatively large orifices into an evaporative atm. to effect a preliminary concn. to a point where the derivative is still in the dissolved condition, and the conc. solution is then extruded to form the desired products.

F. R. E.

Production of artificial filaments, threads, ribbons, films, etc. of cellulose esters or ethers. BRIT. CELANESE, LTD., R. P. ROBERTS, E. B. JOHNSON, and L. W. GREGORY (B.P. 377,712, 28.4.31).—Filaments with a granular core and therefore of low d and good covering power are obtained by incorporating with the spinning solution such a quantity of a non-solvent for the cellulose ester or ether that ordinary dry-spinning would give a pptd. product, and directing a stream of solvent vapour (preferably the same solvent as that used in the spinning solution) on to the filaments close to the spinning jets. The v.p. of the non-solvent at the spinning temp. should be substantially lower than that of the solvent. Suitable non-solvents (when COMe_2 is the solvent) include PhMe, xylene, kerosene, CCl_4 , and alcohols.

D. J. N.

Manufacture of artificial filaments, yarns, films, etc. BRIT. CELANESE, LTD. (B.P. 378,228, 11.9.31. U.S., 11.9.30).—Artificial silk of increased pliability is obtained by incorporating therewith 0.05–0.40% of a finely-divided (particle size $< 10 \mu$) substance (org. or inorg.) which is insol. in and unaffected by the spinning solution or other reagents subsequently used in the formation and dyeing of the silk, e.g., TiO_2 , BaSO_4 , MgCO_3 , SnO_2 , diacetylbenzidine, anthracene, natural or synthetic resins. The material may be, e.g., ground in oil and added to the (cellulose acetate) spinning solution or applied in suspension to silk in hank form in the presence of a swelling agent for the silk. The treated silk shows no substantial alteration in lustre or strength.

D. J. N.

Manufacture of artificial filaments, yarns, ribbons, etc. [of subdued lustre]. BRIT. CELANESE, LTD. (B.P. 378,319, 18.1.32. U.S., 23.1.31).—0.1–10% of a finely-divided (particle size $< 5 \mu$ diam.), H_2O -insol. compound of Bi, e.g., BiOCl , $\text{Bi}(\text{OH})_3$, Bi_2O_3 , is used as a dulling agent for regenerated cellulose or cellulose ester or ether silk. The material may be

added or applied as in B.P. 378,228 (cf. preceding abstract).

D. J. N.

[Stretching] treatment of artificial filaments and the like. H. DREYFUS (B.P. 378,074, 6.5.31).—Cellulose acetate threads, yarns, or warps are stretched between two points between which a solvent or swelling agent is applied, which is then removed either by evaporation or washing.

B. P. R.

After-treatment of cuprammonium silk spun by the stretch-spinning process. BRIT. BEMBERG, LTD. (B.P. 376,598, 3.11.31. Ger., 5.11.30).—Subsequent to after-treatment with the usual liquids, the hanks of filaments are freed from H_2O by centrifuging, mechanically loosened, re-wound if desired in order to free them still further from superficial H_2O , and finally dried.

F. R. E.

Treatment of textile materials consisting of or comprising organic derivatives of cellulose. BRIT. CELANESE, LTD., S. A. WELCH, W. I. TAYLOR, and R. H. J. RILEY (B.P. 376,785, 15.4.31).—The spun materials are treated with solutions or dispersions of alkylamines and/or their salts or soaps of aliphatic acids, e.g., in mineral oils, containing no fats or fatty oils.

F. R. E.

Treatment of products such as films, sheets, and the like of regenerated cellulose. TRANSPARENT PAPER, LTD., and D. L. PELLATT (B.P. 376,805, 7.4.31).—The films etc. are prevented from becoming brittle by treatment with plasticisers such as glucose or sugar containing in addition small quantities of hygroscopic salts (CaCl_2 , MgCl_2).

F. R. E.

Pulp digesters. E. MORTERUD (B.P. 377,505, 14.10.31. Swed., 16.3.31).—The digester has a suction sieve (A) near the middle and pressure sieves (B , C) at top and bottom, whilst an interior circulation pump is connected on its intake side to A and on its outlet side to B and C . By controlling the current of liquid to B and C and also the supply of steam to each current, a uniform digestion of the pulp is obtained.

F. R. E.

Processing of pulp. G. A. RICHTER and M. O. SCHUR, ASSRS. to BROWN Co. (U.S.P. 1,833,976, 1.12.31. Appl., 29.6.27).—Chemical wood pulp is treated with Cl_2 , digested with dil. alkali and soap in order to remove by dispersion the resinous colour-generating substances, and finally bleached.

F. R. E.

Manufacture of [rubber-treated fibrous] sheet material. R. P. ROSE and H. E. CUDE, ASSRS. to GEN. RUBBER Co. (U.S.P. 1,839,996, 5.1.32. Appl., 31.5.28).—Sheets with a high tearing strength, or which may be embossed, are made by beating scoured cotton to a pulp, incorporating therewith rubber latex in the presence of a protective colloid (glue, clay, etc.), and forming into sheets which are afterwards coated, if necessary, with a waterproof cellulosic varnish.

B. P. R.

Paper manufacture. E. SUTERMEISTER and J. A. WARREN, ASSRS. to S. D. WARREN Co. (U.S.P. 1,839,449, 5.1.32. Appl., 7.4.28).—Rosin-sized papers are filled with "lime mud" (CaCO_3) to which is added a soap emulsion which covers the CaCO_3 particles with a protective layer of lime soap.

B. P. R.

Manufacture of safety paper. A. E. REMICK, Assr. to TODD Co., INC. (U.S.P. 1,839,995, 5.1.32. Appl., 22.8.29).—Colourless guanidine substances (di- or tri-phenylguanidine or derivatives) which give insol. coloured ppts. on treatment with hypochlorites or other ink-removing substances are incorporated with paper to be used for cheques etc. B. P. R.

Fireproofing of cellulosic material. F. S. VIVAS, Assr. to INTERNAT. FIREPROOF PRODUCTS CORP. (U.S.P. 1,839,135—6, 29.12.31. Appl., 14.11.29).—Paper pulp is mixed with (A) 1.5 lb. of $MgSO_4$, 0.5 lb. of $Na_2B_4O_7$, 0.5 lb. of $(NH_4)_2SO_4$, and 1.6 lb. of dextrin, or (B) 1.5 lb. of $MgCl_2$, 0.25 lb. of H_3BO_3 , 0.25 lb. of NH_4Cl , and "alco-glycero-dextrin" (prepared by boiling starch with glycerin to yield a clear solution and then adding MeOH or EtOH), dissolved in sufficient H_2O to yield a solution of d^{38} 1.142. The surface of paper etc. made from the mixtures is impregnated with stearic acid. L. A. C.

Manufacture of [resin-sized] paper filled with alkaline filler. R. HADDAN, From RAFFOLD INTERNAT. CORP. (B.P. 378,024, 1.5.31).—Paper containing alkaline filler can be satisfactorily sized with resin if the filler, the alum, or a mixture of the two is added to the diluted pulp just before it reaches the paper machine. Alternatively, the size, alum, and filler may all be added at this point. Other variations are possible so long as the time of contact of the filler with the size-alum complex prior to sheet formation is reduced to a min. This process can be used in conjunction with that of B.P. 333,620 (B., 1930, 985).

D. J. N.

Obtaining spinning fibre from unretted plant stalks. G. A. LOWRY (B.P. 379,515, 3.9.31).—See U.S.P. 1,837,228; B., 1932, 882.

Apparatus for preparatory treatment, such as degumming, of textile fibres. M. SABNER (B.P. 379,874, 22.9.31).

Treating thread [with wax solutions]. BRIT. UNITED SHOE MACHINERY Co., LTD. From UNITED SHOE MACHINERY CORP. (B.P. 377,737, 29.4.31).

Manufacture of [continuous] artificial threads, filaments, etc. COURTAULDS, LTD., and C. F. TOPHAM (B.P. 379,880, 26.9.31).

Treatment [washing] of artificial silk [on perforated bobbins]. GLANZSTOFF-COURTAULDS GES.M.B.H. (B.P. 378,201, 5.8.31).

Felts for polishing glass.—See VIII. **Insulating material.**—See XI. **Lacquers etc.** **Thermoplastic materials.**—See XIII. **Rubber-cellulose mixtures.**—See XIV.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Bleaching of rag half-stuff. S. FOTIEV and S. BOGDANOV (Bumazhn. Prom., 1932, 11, No. 1, 37—41).—Rapid bleaching with addition of mineral acid produces a weaker half-stuff with larger consumption of $CaOCl_2$ than slow bleaching without addition of acid. Bleaching with $NaOCl$ economises Cl . Stepwise or de Vains bleaching is preferable. CH. ABS.

Methods of preparing effect yarns. H. LEDERER (Chem.-Ztg., 1932, 56, 709—712).—A review of the literature. A. G.

Determination of tin, phosphoric acid, and silicic acid in silk-weighting. A. SCHOTTE (Angew. Chem., 1932, 45, 598—599).—The silk is oxidised by a mixture of conc. HNO_3 and conc. H_2SO_4 and the product distilled with conc. HCl . $SnCl_4$ distils over, H_3PO_4 remains in solution, and SiO_2 is pptd. These are determined by the usual methods. E. S. H.

Fireproofing.—See IX.

PATENTS.

Treating [purifying] fibrous material. A. E. WHITE, From C. DIERIG A.-G. (B.P. 377,768, 12.5.31).—Textile material impregnated with bleaching or other detergent substances (e.g., $NaOCl$, Na_2CO_3 + Na_2O_2 , Cl_2 + $NaOH$, etc.), with or without the presence of protective colloids such as waste sulphite-cellulose liquor, and while in a moist condition, is subjected to an a.c. (preferably 3-phase, 220 volts). Suitable plant is described. A. J. H.

Stripper for [coloured] fabrics. W. KRITCHEVSKY and H. C. PRUTSMAN, Assrs. to RIT PRODUCTS CORP. (U.S.P. 1,810,663—5, 16.6.31. Appl., 30.4.30).—A stripping composition, for domestic use, consists of a hyposulphite or formaldehydesulphoxylate stabilised to air and moisture by admixture with (A) oils, fats, or waxes and an emulsifying agent which becomes effective when the product is used in H_2O , or (B) a saponifiable oil and an alkaline saponifying agent, or (C) a salt of a saponified oil, fat, or wax. A. J. H.

Dyeing [ice colours]. IMPERIAL CHEM. INDUSTRIES, LTD., and W. G. REID (B.P. 374,951, 19.3.31).—Cotton is dyed in green shades fast to kier-boiling by coupling on the fibre a bisacylacetyl derivative of a *s*-diamine, having 2 aryl groups connected directly or through a bridge, with a diazotised 4-*p*-aminoanilino-1-alkyl- or -dialkyl-aminoanthraquinone. Examples are: 4-*p*-aminoanilino-1-methyl- (or dimethyl-)aminoanthraquinone \rightarrow bisacetoacetyltolidine. C. H.

Coloration of materials made of or containing cellulose esters or ethers. BRIT. CELANESE, LTD., E. W. KIRK, and G. H. ELLIS (B.P. 374,839, 5.1.31).—Acetate silk etc. is dyed with anthraquinoneacridones, anthraquinonethioxanthenes, and other heterocyclic compounds containing an anthraquinonylene group, e.g., dichloroanthraquinone-1:2-thioxanthone (vatted in presence of NH_2Me , orange), anthraquinone-1:2:5:6-diacridone (vatted in presence of NH_2CH_2OH , red-violet), anthraquinone-1:2-acridone (dispersed in aq. C_5H_5N , pink). C. H.

Dyeing of materials made of or containing cellulose esters or ethers. BRIT. CELANESE, LTD., and G. H. ELLIS (B.P. 374,884, 5.1.31).—Acetate silk etc. is dyed with dispersions of indigoid dyes comprising an indole or thionaphthen group attached in position 2 or 3 to a C_6H_6 or $C_{10}H_8$ residue, e.g., dyes from isatin α -anil and α -naphthol (blue), thioisatin α -bromide and β -naphthol (red), isatin α -chloride and *m*-hydroxydiphenylamine (grey-violet), 5:7-dibromoisatin α -chloride and 5-hydroxyacenaphthene (blue). C. H.

Manufacture [and dyeing] of artificial fibres or films from cellulose esters. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 375,393, 25.3.31).—Coupling components, e.g., Naphthol AS, 1-phenyl-3-methylpyrazolone, are incorporated with the cellulose ester solutions before spinning or film formation. The fibre or film may be subsequently impregnated with an arylamine, which is diazotised on the fibre or film, and coupling is completed by neutralising the mineral acid with NaOAc. Acetate silk containing Naphthol AS is thus coupled with aminoazotoluene (blue-red), $m\text{-C}_6\text{H}_4\text{Cl}\cdot\text{NH}_2$ (orange), or 4-chloro-*o*-anisidine (scarlet). C. H.

Manufacture of azo dyes on cellulose esters. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 375,321, 19.3.31).—Acetate silk etc. is padded with a $(\text{NH}_2)_2$ -derivative of a diaryl, arylazoaryl, or arylamino-arylazoaryl free from SO_3H , CO_2H , and OH groups; the diamine is tetrazotised on the fibre and developed with an arylamide of *p*-cresotic acid. Examples are: di-anisidine \rightarrow *o*-toluidide (yellow-brown) or anilide (red-brown); 4:4'-diamino-2-methoxy-2':5'-dimethylazobenzene \rightarrow 5-methoxy-*o*-toluidide (orange-brown) or anilide (brown); 2:2'-dichlorobenzidine \rightarrow 2:5-dimethoxyanilide (yellow); 4:4'-diaminobenzene-1-azobenzene \rightarrow anilide (red-brown); 4-amino-4'-*p*-aminobenzene-5-methoxy-2-methylazobenzene \rightarrow *o*-toluidide (brown). C. H.

Production of (A) violet and blue, (B) violet, dyeings on the fibre [ice colours]. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 375,347—8, 17.3.31).—(A) A 2:3-hydroxynaphthoic arylamide is coupled on the fibre with diazotised 3:6-di-*n*-butoxy-*p*-toluidine, or (B) the *p*-toluidide or *p*-anisidine with diazotised 4-chloro-3:6-diethoxyaniline. Examples are: (A) *m*-phenetidine or -toluidide (red-violet), *m*-chloroanilide (blue), 5-chloro-*o*-toluidide (dark blue), β -naphthylamide or 2-methyl-6-quinolylamide (dark violet), 3-carbonyl-*p*-toluidide (red-violet); (B) *p*-anisidine (blue-violet), *p*-toluidide (dark violet). C. H.

Coloration or treatment of textile materials made of or containing cellulose esters or ethers. BRIT. CELANESE, LTD. From C. DREYFUS (B.P. 376,797, 11.2.31).—The textile materials are treated by printing, stencilling, padding, spraying, etc. with dyes and/or discharging agents having little affinity for the cellulose derivatives composing them, in conjunction with a solvent for the cellulose derivative of b.p. $> 100^\circ$ (Et lactate); the colour or discharge effects are fixed in the material by drying without steaming. F. R. E.

Coloration [discharge printing] of textile materials. BRIT. CELANESE, LTD., G. H. ELLIS, and J. ALLAN (B.P. 376,334, 1.4.31).—Three-coloured pattern effects are obtained on fabrics, particularly those containing cellulose ester or ether fibres (e.g., cellulose acetate), by dyeing with a ground colour dischargeable by either of two discharging agents, printing with two discharge pastes so that they overlap and each containing one of the discharging agents and a dye, the dye in the first-applied paste being dischargeable by the agent present in the other paste, and then ageing or steaming in the usual manner. Alternatively, such discharge pastes

may be used in resist styles of printing. A suitable pair of discharging agents are SnCl_2 [or $\text{SnCl}(\text{OAc})$, $\text{Sn}(\text{OAc})_2$, and $\text{Sn}(\text{CNS})_2$] and a metal (e.g., Zn) formaldehydesulphoxylate. Further variations are obtained by applying the process to fabrics containing dyed and undyed yarns, or by first printing the dyed fabric with a paste containing an oxidising agent so that the action of the reducing discharge paste printed subsequently is prevented. A. J. H.

Production of pattern effects on textile materials made of or containing organic derivatives of cellulose. BRIT. CELANESE, LTD., G. H. ELLIS, and J. ALLAN (B.P. 376,331, 31.3.31).—Cellulose acetate (etc.) fabric is printed with a resist paste containing an oxidising agent such as a chlorate, chromate, or persulphate, but preferably an org. substance, e.g., sulphurated aromatic NO_2 -compounds, and then overprinted with a paste containing a vat dye in its reduced form or together with reducing agents; fixation of the vat dye is prevented in the resist-printed parts. Suitable stable dyes may be added to the resist paste and a coloured resist pattern thereby obtained. A. J. H.

Printing of textile materials. IMPERIAL CHEM. INDUSTRIES, LTD., H. B. BRIGGS, and R. W. HARDACRE (B.P. 374,950, 19.3.31).—Solid printed shades on material containing both cellulose esters and cellulose (or regenerated cellulose) are obtained by applying a direct azo printing paste and alkali in presence of a sol. aromatic NO_2 -compound, e.g., Na *m*-nitrobenzenesulphonate. C. H.

Composition for use in the ornamentation of fabrics, yarns, solid materials, etc. F. A. H. HEYNERT and F. LUCIUS (B.P. 376,540, 31.8.31).—The composition consists of 15—60% of cellulose or cellulose esters or ethers and 85—40% of the syrupy condensation product of $\text{CO}(\text{NH}_2)_2$ or $\text{CS}(\text{NH}_2)_2$ with CH_3O ; addition of fillers (china clay, ZnO , etc.) and 1—2% of an acid such as H_3PO_4 or H_3BO_3 is optional. A. J. H.

Treatment of textile filaments and fabrics and other manufactured coherent structures formed from or containing cellulosic material. R. LANT (B.P. 376,295, 29.12.30).—The cellulosic material of the fabrics etc. is partly converted into fatty acid esters of cellulose, without destroying the physical structure of the material, by esterification with a relatively conc. solution of higher fatty acid chlorides in $\text{C}_6\text{H}_5\text{N}$ but without any other diluent. [Stat. ref.] F. R. E.

Production of rubberised fabric provided with a fibre coating. UNGARISCHE GUMMIWAARENFABRIKS-ACT.-GES. (B.P. 377,749, 4.5.31. Ger., 26.2.31).—Loose fibres are attached to a rubber layer, in order to impart a felt- or flannel-like appearance, by using as adhesive a solution or dispersion of a decomp. product of rubber or of rubber-like materials, and of the usual compounding ingredients. The rubber layer after application of the fibres, e.g., by brushing, may be conducted, prior to vulcanisation, through a smoothing calender. A suitable adhesive comprises 30—60 pts. of the product obtained by heating rubber for several hr. at 100° with a small proportion of mercaptobenzthiazole, dissolved in 70—40 pts. of C_6H_6 . D. F. T.

Treatment of fibres with [rubber] latex. DEWEY & ALMY CHEM. CO., Assees. of W. B. WESCOTT (B.P. 377,782, 4.6.31. U.S., 10.6.30).—Fibre which normally tends to coagulate latex, *e.g.*, asbestos fibre, is dispersed in latex in the presence of sufficient protective colloid, *e.g.*, hæmoglobin, casein, or Turkey-red oil, to stabilise the mixture at room temp., and, if desired, of additional dispersing or coagulating agent. On heating, *e.g.*, to $>65^\circ$, the protective colloid ceases to be effective and a slurry of uniformly intermingled fibre and rubber is obtained, the watery component of which may be removed in any desired manner. D. F. T.

Manufacture of rubber-bonded asbestos. DEWEY & ALMY CHEM. CO., Assees. of R. M. DAY (B.P. 377,785, 9.6.31. U.S., 10.6.30; cf. preceding abstract).—A mutual dispersion of asbestos fibres and aq. rubber dispersion containing a protective colloid and, if desired, a potential coagulant is heated without agitation to above 65° (approx.) so that coagulation of the rubber about the fibres occurs without substantial alteration of the relative position of the latter. By subsequently removing the H_2O without substantially disturbing the position of the fibres and then compacting, a rubber-bonded mass is obtained free from lamination or "grain." D. F. T.

Manufacture of fireproof and waterproof fibrous material, *e.g.*, fabric. F. FUCHS (B.P. 376,407, 24.4.31).—Fabric is waterproofed in the usual manner with an Al soap, wax, pitch, or asphalt and then impregnated with a mixture of the same or other waterproofing substance and a fireproofing agent such as $(NH_4)_2SO_4$, NH_4Cl , and $(NH_4)_2HPO_4$. A. J. H.

Centrifugal hydro-extractors [for laundries]. BAKER PERKINS, LTD., W. G. MILLIGAN, and H. SIMPSON (B.P. 377,982, 1.5.31).

Filter for solvents.—See I. Wetting etc. agents.—See III.

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

Presence of nitrites in commercial nitrates. LENGLEN and MILHET (Compt. rend. Acad. Agric. France, 1932, 18, 772—774).—Nitrites occurred in a no. of samples of $NaNO_3$, the proportion being relatively high (up to 0.15%) in certain American samples. In the ordinary recrystallisation of $NaNO_3$, nitrite accumulates in the mother-liquor, but during slow crystallisation much is retained in the crystals. A. G. P.

Hydrogen industry from the economic viewpoint. H. PINCESS (Chem. Fabr., 1932, 5, 265—266).—The effect of various items in the cost of production of H_2 by the Fe-steam and the electrolytic methods is discussed. In the Fe method, coke for generating CO for the reduction of the Fe_3O_4 accounts for 45% and coal for steam-raising for 30% of the total cost, hence the process is economical only when the cost of coal and coke is low. In the electrolytic process, power is the chief cost and the method is economical only when the power costs less than 1 pf. per unit and the apparatus used gives the max. efficiency. A. R. P.

Solid carbon dioxide and its use in brewing and bottling. A. J. C. COSBIE (J. Inst. Brew., 1932, 38, 427—439).—The construction of steam-jacketed cylinders for use with solid CO_2 is described and the pressures of gas obtained under varying circumstances are recorded. C. R.

Automatic gas analysis.—See I. Conversion of CH_4 .—See II. Dead-burnt magnesite.—See VIII. Fireproofing.—See IX. Fertiliser CaO .—See XVI.

PATENTS.

Manufacture of nitric acid from ammonia. H. FRISCHER (B.P. 378,011, 23.3.31. Addn. to B.P. 363,436; B., 1932, 260).—The oxidation chamber in the prior process is constructed of Al joined by riveting and hammering and has a capacity of 2—10 cu. m. for an output of 700—5000 kg. per 24 hr. [Stat. ref.] L. A. C.

Manufacture of nitric acid. G. B. TAYLOR, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,840,063, 5.1.32. Appl., 6.3.26).—The mixture of steam and N oxides obtained in the NH_3 oxidation process is passed to a condenser, from which the separated HNO_3 is conducted to the centre portion of an absorption tower, uncondensed gases passing to an oxidation chamber and thence to the bottom of the tower. By means of a series of trays with perforated caps and overflows, pools of HNO_3 are collected, the N oxides being partly absorbed by these, and then undergoing oxidation before absorption in successively more dil. HNO_3 . The process is carried out under pressure. W. J. W.

Concentration of nitric acid. APPAREILS ET EVAPORATEURS KESTNER (B.P. 376,583, 20.10.31. Fr., 4.11.30).—The HNO_3 is distilled in the presence of H_2SO_4 by means of steam or vapour derived from concn. of the residual H_2SO_4 , through which hot oil, initially heated by a boiler, is circulated, the heating of the H_2SO_4 being controlled by appropriate devices so as to regulate the amount of heat supplied to the distillation column. Suitable apparatus is described. F. Y.

Manufacture of nitric acid of high concentration. LONZA ELEKTRIZITÄTSWERKE U. CHEM. FABR. A.-G., and E. LÜSCHER (B.P. 378,894, 13.5.31. Switz., 13.5.30).—Interaction between N oxides and O_2 in presence of dil. HNO_3 is accelerated by introducing the O_2 through a finely-porous sieve-plate, the reaction being effected at elevated pressure and temp. With O_2 at 15 atm. and a mixture of 50% HNO_3 and N_2O_4 at 80° , 95% HNO_3 is obtainable after 30 min. W. J. W.

Manufacture of phosphoric acid. V. HARMS, Assr. to DORR Co. (U.S.P. 1,839,478, 5.1.32. Appl., 24.11.30. Ger., 8.5.30).—Pulp from the treatment of phosphate rock with H_2SO_4 , containing a mixture of H_3PO_4 , $CaSO_4$, and org. matter, is fed into a settling tank from which the $CaSO_4$ sludge is continuously withdrawn at the bottom. To prevent contamination of this $CaSO_4$ with org. matter, which is held in suspension at a higher level, the clear liquid at the top is allowed to overflow into another vessel, whence it is returned to the tank to cause the org. matter to overflow. W. J. W.

Production of orthophosphoric acid and/or conversion products thereof. C. H. MILLIGAN, Assr. to AMER. AGRICULTURAL CHEM. CO. (U.S.P. 1,838,431, 29.12.31. Appl., 26.8.30).—Crude phosphates are heated at about 75° with sufficient H₂SO₄ (e.g., 75% concn.) to interact with the phosphates but not with other constituents of the material, and the product is treated with, e.g., amyl alcohol to extract H₃PO₄, which is subsequently extracted with H₂O from the solution. A liquid immiscible with H₂O and H₃PO₄, e.g., C₆H₆, may be added to the amyl alcohol.

L. A. C.

Production of ammonia or ammonium salts, soda, caustic soda, and tar or oil from common salt and coal. A. MENTZEL (B.P. 376,426, 19.5.31. Ger., 19.5.30).—The carbonaceous residue from the low-temp. carbonisation of coal, especially lignite, is mixed with NaHCO₃, obtained from NaCl by the NH₃-soda process (utilising the CO₂ from the carbonisation step), and treated with N₂ at high temp. to form NaCN, which is converted into Na₂CO₃ (or NaOH) and NH₃ by reaction with H₂O vapour. Modifications of the process are claimed.

F. Y.

Production of ammonia, potassium carbonate, and potassium hydroxide. A. MENTZEL (B.P. 379,549, 14.10.31. Ger., 24.10.30).—MgCO₃.KHCO₃.4H₂O obtained in Engel's magnesia process is cyanidised by heating with C at about 950° in a current of N₂, and the product is hydrolysed by treatment with steam at 350–500° to yield KOH or K₂CO₃ as desired and also NH₃ which, by treatment with Cl₂ or HCl obtained from the MgCl₂ formed in Engel's process, may be converted into NH₄Cl.

L. A. C.

Manufacture of ammonium carbonate and bicarbonate. P. PARRISH (B.P. 379,319, 25.2.31).—Conc. gas liquor is treated with waste gases containing CO₂ to yield a supersaturated (NH₄)₂CO₃ or NH₄HCO₃ solution, or the liquor is distilled in a current of the gases to obtain (NH₄)₂CO₃ etc. by condensation. Suitable waste gases are obtained from by-product (NH₄)₂SO₄ plants, from superphosphate plants, and from boiler flues; these before use are purified to remove H₂S, F compounds, and SO₂, respectively.

L. A. C.

Distillation of ammoniacal liquors. F. W. SPERR, JUN., Assr. to KOPPERS Co. (U.S.P. 1,838,587, 29.12.31. Appl., 23.2.27).—The liquors are distilled at < 20 lb. pressure (above 1 atm.) in the presence of, e.g., CaCO₃, MgCO₃, or ZnCO₃ in quantity exceeding that required to decompose the NH₄Cl.

L. A. C.

Production of potassium nitrate. KALI-FORSCHUNGS-ANSTALT G.M.B.H. (B.P. 377,131, 29.2.32. Ger., 1.9.31).—A solution of KNO₃, K₂SO₄, and K Mg sulphate saturated at high temp., is cooled to ppt. KNO₃. The mother-liquor is heated with sufficient Mg(NO₃)₂ and K₂SO₄, so as to cause the separation of K Mg sulphate equiv. to the KNO₃ obtained, and the solution is re-utilised. In another process, the Mg(NO₃)₂ and K₂SO₄ are added to the hot solution, which is then cooled to form KNO₃ by decomp. of the salts, the mother-liquor being saturated with KNO₃ and with K Mg sulphate. The Mg(NO₃)₂ may be produced in

solution in the liquors from MgO, Mg(OH)₂, MgCO₃, and HNO₃ or nitrous gases.

W. J. W.

Production of alkali phosphates. METALLGES. A.-G. (B.P. 377,931, 22.4.32. Ger., 17.12.31).—The process described in B.P. 342,358 (B., 1931, 393) is effected in the presence of air admitted at several points into the reaction chamber in quantities such that the exhaust gases contain < 5% (preferably < 9%) of free O₂.

L. A. C.

Manufacture of mixtures of sodium phosphates for treating boiler waters and other aqueous liquors. R. HADDAN. FROM FEDERAL PHOSPHORUS Co. (B.P. 378,345, 4.3.32).—Mixtures of Na₂CO₃ and H₃PO₄ or of NaH₂PO₄ and Na₂HPO₄ in proportions such as to yield a mixture of Na₂P₂O₇ and NaPO₃ of desired *p*_H (6.4–10) are heated to fusion and the products are cooled rapidly.

L. A. C.

Oxidation of ammonium sulphite in aqueous solution. W. C. HOLMES & Co., LTD., and H. J. HODSMAN (B.P. 377,959, 31.3.31).—(NH₄)₂SO₃ formed in aq. solution by the interaction of NH₃ and SO₂ is oxidised by air or O₂ at a temp. > 50° in the presence of (NH₄)₂SO₄ and a Fe⁺⁺ salt under conditions such that the *p*_H is > 6 but is high enough to prevent evolution of SO₂. The Fe⁺⁺ is pptd. as FeS and (NH₄)₂SO₄ recovered by crystallisation.

L. A. C.

Production of sulphates. METALLGES. A.-G. (B.P. 377,504, 13.10.31. Ger., 20.1.31).—O₂ gas, finely divided by passage through a microporous slab, is introduced into an aq. liquid (of *p*_H 4–5.5) containing H₂SO₃ in the presence of the required cations for the production of the desired sulphates (the cations of which are added simultaneously); the state of subdivision and rate of supply of the O₂ are regulated so that some of the liquid is transformed into a foam which remains stationary in the reaction vessel while constantly changing internally. Methods for the production of (NH₄)₂SO₄ and Na₂SO₄ are given.

F. Y.

Production of alkali cyanamides. J. MARGOLES (B.P. 376,392, 17.4.31. Fr., 17.4.30).—CaCN₂ and an alkali phosphate react in conc. or dil. aq. solution, producing mono- or di-alkali cyanamide, which can be used for the manufacture of NH₃ and an alkali carbonate; the ppt. of CaHPO₄ or Ca₃(PO₄)₂ is suitable for use as a fertiliser.

F. Y.

Manufacture of lime-nitrogen [calcium cyanamide]. N. CARO and A. R. FRANK (B.P. 379,493, 6.8.31).—A mixture of C containing a min. of easily fusible compounds (peat C, forge coal, anthracite) with Ca₃(PO₄)₂, CaCO₃, or CaO is heated to 1600° to yield CaC₂ and the product is heated at 1600–1900° in a current of N₂ and then for a time at 900–1200° to yield CaCN₂.

L. A. C.

Manufacture of calcium nitrate from dolomite with simultaneous recovery of magnesia. KLÖCKNER-WERKE A.-G., and O. KIPPE (B.P. 376,683, 4.3.32).—Dolomite is dissolved in HNO₃ and milk-of-lime or milk-of-dolomite, prepared in claimed manner, is added to ppt. Mg(OH)₂, the temp. being kept at < 50°. The Ca(NO₃)₂ solution is then conc. by known means.

F. Y.

Manufacture of calcium hypochlorite. IMPERIAL CHEM. INDUSTRIES, LTD., and F. N. KITCHEN (B.P. 378,847, 16.5.31).—CaO, or a mixture of CaO and basic hypochlorite, is chlorinated to produce a basic hypochlorite. After separation, this is agitated with H₂O and chlorinated to give a sludge containing normal hypochlorite, which is separated. CaO is added to the liquor to ppt. basic hypochlorite, this being returned, either with or without separation from the liquor, to the first step of the cycle. W. J. W.

Treatment of magnesite for production of fertilisers. C. A. A. and A. A. J. VILAIN, and Soc. VILAIN FRÈRES (B.P. 377,720, 28.2.31. Fr., 28.2.30).—Magnesite calcined at 600–1200° and finely ground is treated with 50–70% H₃PO₄ in the presence, if desired, of NH₃ or (NH₄)₃PO₄. Alternatively, sufficient calcined magnesite [and, if desired, NH₃ or (NH₄)₃PO₄] is added in the manufacture of superphosphate to yield a product containing 3–8% of Mg phosphate or Mg NH₄ phosphate. L. A. C.

Concentration of phosphate-bearing material. J. W. LITTLEWOOD and F. F. JOHNSTON, Assrs. to MINERALS SEPARATION NORTH AMER. CORP. (U.S.P. 1,838,422, 29.12.31. Appl., 2.10.30).—A thick pulp of the material is treated with a sulphide (H₂S) and, if desired, CuSO₄; after thinning the pulp, Fe and Al compounds are partly removed by a froth-flotation process. The remaining pulp, after dewatering and thinning again with fresh H₂O with the addition of NaOH, oleic acid, and fuel oil, is again conc. to yield a phosphate-bearing float. L. A. C.

Production of iron phosphate [from the sludge of rust-proofing baths]. W. H. ALLEN, Assr. to PARKER RUST PROOF Co. (U.S.P. 1,839,523, 5.1.32. Appl., 28.4.28).—The sludge is treated with sufficient H₃PO₄ to yield a solution of acid Fe⁺⁺ and Fe⁺⁺⁺ phosphates and, after filtration, the solution is treated with more H₃PO₄ and with Fe to yield an acid Fe⁺⁺ phosphate solution for re-use in the rust-proofing process. L. A. C.

Manufacture of deoxidising material [for use, e.g., in transformers]. C. A. STYER, Assr. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,838,968, 29.12.31. Appl., 5.4.28).—The material consists of blocks formed from granular charcoal pretreated with Cl₂ to remove most of the H₂ and ash-forming constituents, a carbonaceous binder (partly carbonised sugar), and a catalyst, e.g., Co, Mn, or Ni salts, NaCl, Na₂SO₄, NaOH, or KI. L. A. C.

Preparation of natural base-exchange silicates. A. S. BEHRMAN, Assr. to PERMUTIT Co. (U.S.P. 1,838,171, 29.12.31. Appl., 11.4.27).—Clay, e.g., bentonite, is baked and treated successively with solutions of a neutral salt (NaCl) and of Na₂SiO₃, and is then washed. The clay may be treated with dil. HCl or H₂SO₄ before baking, and Na₂B₄O₇, NaOH, or Na₂CO₃ may also be present in the Na₂SiO₃ solution. L. A. C.

Production of fumed zinc oxide from zinc sulphate solution. F. A. BRINKER (U.S.P. 1,838,359, 29.12.31. Appl., 21.10.26).—Conc. aq. ZnSO₄ is sprayed into a reducing chamber containing a carbonaceous fuel at 1000–1200°, whereby Zn, SO₂, and CO are

formed; the gases pass to an oxidising chamber to which air is admitted to burn the CO to CO₂ and the Zn to ZnO, then through a heat interchanger, and finally through a bag-house to collect the ZnO. A. R. P.

Obtaining zinc sulphide from its ore. T. A. MITCHELL, Assr. to L. M. HUGHES (U.S.P. 1,838,857, 29.12.31. Appl., 6.4.27).—The ore is chlorinated in a solution containing CaCl₂ and FeCl₃ under such conditions that the FeS₂ is unattacked and the S prevented from agglomerating into large clots. The filtered solution is agitated with roasted Zn ore to ppt. Fe and Mn, further Cl₂ being added if necessary, the ppt. is dissolved in HCl and returned to the first stage, and the solution treated with CaCO₃ to ppt. ZnCO₃, the final CaCl₂ filtrate being partly returned to the first stage. The FeS₂-S residue is extracted with CCl₄ to remove S and the ZnCO₃ heated with the recovered S in an electric furnace to form ZnS. A. R. P.

Production of lead compounds. P. GAMICHON (B.P. 377,381, 15.6.31. Fr., 19.6.30).—Pb oxychloride is pptd. by adding an alkali or alkaline-earth base to a solution of Pb in brine, then dechlorinated by contact with H₂O and a base, and the resulting mass is (a) roasted direct to produce PbO or Pb₃O₄, or (b) dissolved in an acid, the sol. basic salt obtained being converted either into Pb(OH)₂ by treatment with NH₃, or into PbCO₃ or other Pb salt by treatment with CO₂ or other acid. The NH₃ or acid is recoverable. F. Y.

[Preparation of] thorium dioxide sols [for radiographic purposes]. W. W. GROVES, From CHEM. FABR. VON HEYDEN A.-G. (B.P. 379,133, 15.10.31).—The sols are rendered insensitive to flocculation by adding a colloidal or semi-colloidal carbohydrate, e.g., amylose. W. J. W.

Preparation of titanium compounds. P. SPENCE & SONS, LTD., and S. F. W. CRUNDALL (B.P. 378,906, 14.4.31).—A basic solution of Ti in a mineral acid, e.g., Ti₂(SO₄)₃, is pptd. with H₂C₂O₄ or an alkali or alkaline-earth oxalate, at <50°, the basic oxalate of Ti being subsequently dissolved in acids or treated with a suitable alkali. W. J. W.

Production of [artificial] diamonds. (COUNT) M. ESTERHAZY, H. KARABACEK, G. WEGERER, W. F. HEVESY, and H. SCHÖNFELDT (B.P. 377,239, 21.1.31. Austr., 21.1.30).—C compounds which are gaseous at the working temp. and give off nascent C, e.g., CO₂ and CO, are added in solid or liquid form to a melt (especially one containing Fe, Ni, Co, or their oxides), which is subjected to alternate increases and decreases of pressure; the decreases are effected more rapidly than the increases, thus preventing dissolution in the melt of the diamonds formed during increase in pressure. F. Y.

Apparatus for detection, indication, and determination of carbon monoxide or the like. G. LÜNGGREN (B.P. 379,304, 26.2.31).—A reel of PdCl₂-impregnated test-paper is placed in a container from which it can be fed through a slot in a rubber seal to the top surface of a window, illuminated from below, a standard colour paper being provided for comparison (cf. B.P. 341,269; B., 1931, 349). W. J. W.

Apparatus for purification of [fermentation] carbon dioxide. MASCHINENFABR. ESSLINGEN, and J. STOFFELS (B.P. 377,903, 29.1.32).—A secondary container capable of receiving all the purifying liquid when fluctuations of pressure occur is situated above the main container. L. A. C.

Evaporation of solid carbon dioxide. E. LUKÁCS (B.P. 376,863, 28.4.31. Hung., 22.5.30).—The solid CO_2 is placed in a container, having an exit pipe leading to a heat exchanger and gas holder, this pipe having a branch leading to a Roots blower and thence to the container. The solid CO_2 is thereby vaporised by means of heat from the surrounding atm. without the presence of air or the intervention of a liquid phase. W. J. W.

Catalytic manufacture of gases containing hydrogen and preparation of catalysts therefor. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 376,358, 10.4.31).— H_2 is catalytically produced from gaseous hydrocarbons of mol. wt. $>$ that of CH_4 by interaction at 400–1000° with a gas, e.g., free O_2 or steam, capable of converting C into CO. The catalyst may be obtained by making up into an aq. paste, with a hydraulic binding cement, a mixture of the hydroxides pptd. by aq. NH_3 from a solution of a salt of a metal of the Fe group or of groups II–VI, the oxide of which is not reduced by H_2 at $<$ 1000°. The paste is allowed to set. F. Y.

Recovery of sulphur from sulphur dioxide. R. F. BACON (U.S.P. 1,840,076, 5.1.32. Appl., 6.4.27).— SO_2 is treated with H_2 at about 250° in the presence of S and Cu_2S . L. A. C.

Purification of sulphur. J. S. DUNN, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 379,313, 26.5.31).—Molten S is digested under pressure at 120–130° with a solution of NH_3 , $(\text{NH}_4)_2\text{CO}_3$, or $(\text{NH}_4)_2\text{S}$, introduced in countercurrent, to remove As. The residual liquor is treated with CaO and distilled. W. J. W.

NH_3 and H_2S from gases.—See II. Electro-osmosis of H_2O . Electrolysing salt solutions. O_3 generator.—See XI. Fertilisers.—See XVI.

VIII.—GLASS; CERAMICS.

Calcium fluoride as a refining agent for glass and its influence on the acidity of certain phial glasses. F. DE CARLI (Annali Chim. Appl., 1932, 22, 479–483).—Decomp. of some pharmaceutical liquids kept in sealed phials is traced to SiF_4 evolved, during the sealing, from glass which contains CaF_2 ; the latter should be replaced by NH_4NO_3 as a refining agent for glass for such phials. E. W. W.

Continuous filtering and drying of pottery slip. L. A. MITCHELL (Trans. Ceram. Soc., 1932, 31, 288–294).—A rotary vac. filter, in which the filtering medium is an endless belt of cotton cloth passing over a vac. drum half immersed in the slip, is described. H. H. M.

Souring of dead-burned magnesite. J. H. CHESTERS and W. WEYL (Trans. Ceram. Soc., 1932, 31, 295–316).—The reactions which occur during the "souring" period of a magnesite brick batch and during the drying of the bricks have been investigated by means of an apparatus in which a sample of soured magnesite is

heated *in vacuo* and measurement made of the H_2O and CO_2 evolved. The factors governing the rate of hydration of the magnesite are enumerated, whilst the results suggest that cracking of bricks is due to excessive hydration produced by the use of too wet a batch, excess of fine grain material, or too high a temp. in the dryer. H. H. M.

PATENTS.

Tunnel kiln. W. L. HANLEY, JUN. (U.S.P. 1,838,672, 29.12.31. Appl., 7.6.29).—The preheating of the goods and removal of noxious gases is effected by currents of air which are circulated by fans through both the ingoing and outgoing goods with admission of a proportion of clean air. Kilns are described for a single line of goods (in which case longitudinal flues are necessary), a double line of goods moving in opposite directions in a common chamber, and two lines separated by a partition wall. B. M. V.

Manufacture of glass. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 378,012, 26.3.31).—The glass contains basic components (e.g., alkali or alkaline-earth oxides, PbO) and 35–75% of AlPO_4 ; SiO_2 and \geq 40% of B_2O_3 may also be present. L. A. C.

Avoiding the formation of bubbles or striæ on the surface of molten glass when in contact with hot metal walls. L. S. VELLO (B.P. 379,216, 22.1.32. Fr., 26.1.31).—Metal nozzles etc. for discharging molten glass are constructed in the form of a double envelope, the inner space being maintained under vac. L. A. C.

Manufacture of non-shatter glass. H. A. GARDNER (U.S.P. 1,836,914, 15.12.31. Appl., 28.5.30).—A composite glass sheet is cemented together with a non-brittle composition containing chlorinated Ph_2 and a resinous adhesive, with or without nitrocellulose. C. A. K.

Treatment of felts for polishing glass. SOC. ANON. DES MANUF. DES GLACES ET PROD. CHIM. DE ST.-GOBAIN, CHAUNY & CIREY (B.P. 379,184, 22.12.31. Fr., 30.7.31).—The polishing surface of the felt is impregnated with melted petroleum pitch which, when it has solidified, is charged with abrasives (cf. B.P. 366,872; B., 1932, 423). L. A. C.

Sealing of metal to glass. BRIT. THOMSON-HOUSTON CO., LTD., Assees. of D. K. WRIGHT and A. GREINER (B.P. 377,602, 25.2.32. U.S., 28.2.31).—A glass flare is mounted on the tapered thin edge of a metal tube, and is heated to form a collar, which is then united to a glass tube. C. A. K.

Fixing of substances to vitreous articles. BRIT. THOMSON-HOUSTON CO., LTD., Assees. of W. J. WINNINGHOFF (B.P. 377,573, 26.1.32. U.S., 26.1.31).—The interior of a hollow article is coated with a thin slip of powdered glass of low m.p. suspended in a volatile liquid, and while still moist the interior is coated with a powdered or granular material. After drying, the article is heated to sinter the glass. C. A. K.

Manufacture of refractory product [for furnace linings etc.]. W. J. MCCAUGHEY, Assr. to BASIC DOLOMITE, INC. (U.S.P. 1,839,982, 5.1.32. Appl., 11.1.27).—A mixture of dolomite and glauconite is passed through a rotary kiln at $>$ 1150°. L. A. C.

Manufacture of [basic] refractory materials [for lining furnaces]. DWIGHT & LLOYD METALLURG. CO., ASSEES. OF R. W. HYDE (B.P. 379,268, 8.7.32. U.S., 25.7.31).—A mixture of crushed dolomite, limestone, etc. with 5–15% of flux (Fe_2O_3 and Al_2O_3), coke or anthracite, fines from a previous batch, and sufficient H_2O to form an adherent mass is ignited on the surface and air-blown to ensure rapid combustion of the fuel. The product may be crushed, mixed with more fuel, and moistened, and the process repeated. L. A. C.

Manufacture of bonded articles containing silicon carbide. CARBORUNDUM CO., LTD. FROM CARBORUNDUM CO. (B.P. 377,090, 31.12.31).—The bonded refractory materials are heated at 600–900° to oxidise carbonaceous material and are then sintered at approx. 1350°. C. A. K.

Manufacture of an abrasive article. CARBORUNDUM CO., LTD., ASSEES. OF R. C. BENNER (B.P. 377,291, 24.4.31. U.S., 7.7.30).—Abrasive grains are bonded together with a mixture which contains a less unsaturated isomeride of rubber than normal rubber. The product may be vulcanised. *E.g.*, a mixture may contain 17 pts. of rubber isomeride of 40% unsaturation, 5 pts. of rubber, 6 pts. of S, and 72 pts. of C_6H_6 . 500 pts. of this solution are mixed with 1000 pts. of abrasive grain and 100 pts. of powdered flint, and the product is moulded, dried, and vulcanised. C. A. K.

Machine for fabricating laminated glass. W. C. BULL (B.P. 379,324, 27.4.31).

Compound glass and the like [with projecting intermediate layer]. F. B. DEHN. FROM RÖHM & HAAS A.-G. (B.P. 379,006, 4.6.31).

[Continuous] production of glass threads. O. KRÖGER and O. OSWALD (O. OSWALD & Co.) (B.P. 379,274–5, 19.5.31. Ger., [A] 27.5.30, [B] 25.11.30).

Glass for luminous tubes.—See XI.

IX.—BUILDING MATERIALS.

Preparing asbestos-cement for general purposes. F. FERRARI (L'Ind. Chimica, 1932, 7, 890–892).—Results obtained with fibro-cement prepared by Morbelli's process (Ital. Pat. 295,144) are described. Tubes were made from 4 pts. by wt. of binder (3 of siliceous material + 1 of basic cement) and 0.76 of asbestos (mixture of various qualities, as used for making eternite tubes); 12–24 hr. after moulding they were kept for 8 hr. in an autoclave under 8–9 atm. steam pressure. Sheets were made from 4 pts. of the binder and 0.6 of the asbestos. Both showed satisfactory strength and resistance to acid, H_2O , SO_4 , etc. T. H. P.

Decomposition of mortars. E. MARCOTTE (Bull. Mem. Soc. Ing. Civ. France, 1932, 85, 129–143).—The theories of decomp. of mortars used in structures immersed in H_2O containing dissolved salts are discussed, and processes of preservation (*e.g.*, superficial carbonation, additions of pozzuolana, use of special cements, and waterproofing of the cements by bitumen products) are detailed. The testing of cements for use in sea-water or H_2O containing dissolved salts is described. H. E. B.

Shear strength of concrete in various types of joints. ANON. (Mitt. Materialprüf., 1932, 204–205).—With decreasing H_2O content of the cement-ballast mixture the compression strength σ_B and shear strength τ_B of the concrete increase, the former at a much greater rate than the latter; in the case of high-grade Portland cement the ratio σ_B/τ_B increases from 6.2 with a H_2O :cement factor of 0.88 to 9.5 with a 0.44 factor, and with ordinary Portland cement the increase is from 5.5 with a 0.92 factor to 9.0 with a 0.42 factor, the shear strength being measured in the direction of packing. With the lowest H_2O factors the σ_B/τ_B ratios with τ_B perpendicular to this direction are 12.3 and 10.2 respectively. The shear strength of joints or fillings in old concrete is considerably increased by covering the surfaces with a 1:2.5 cement-sand mortar prior to filling with concrete. A. R. P.

Pressure elasticity of natural stones and blast-furnace slag with especial reference to their mineralogical composition and structural properties. SAENGER and STÖCKE (Mitt. Materialprüf., 1932, 203).—The plastic and elastic behaviour of natural stones under repeated compression depends on the nature of their constituents and of the bond between the grains, on the type of structure, and, above all, on the state of preservation. It is shown that the cause of the different elastic and plastic behaviours of individual constituents of stones can be established, and the magnitude of the modulus of elasticity of the stone as a whole approx. estimated, from the results of petrographic examination. A. R. P.

Behaviour of natural stones on heating. K. STÖCKE (Mitt. Materialprüf., 1932, 203–204).—Most natural stones resist repeated heating to 200° and boiling in oil at this temp. After heating stones used for road metal to 500° and subjecting them to a pressure of 40 tons only relatively little fine material is obtained, but acid stones readily break down after heating at 700° owing to the quartz transformation which occurs at 575°; quenching the hot stones causes deep-seated fractures. Dense basalt and quartzitic graywacke split up into large pieces at 500° owing to the presence of internal stress, and granite is completely broken up by heating at >700°. A. R. P.

Fireproofing by impregnation. H. STADLINGER (Allgem. Oel- u. Fett-Ztg., 1932, 29, 437–442).—Requirements for fireproofing materials are discussed: Eichengrün's "Cellon-Feuerschutz" (a mixture of NH_4Br with NH_4 and Mg salts [cf. G.P. 390,840; B., 1924, 506]) is very effective for proofing wood, fabrics, etc., and evolves vapours which check the spreading of fire. E. L.

PATENTS.

Apparatus for treatment of raw cement sludge. F. KRUPP GRUSONWERK A.-G. (B.P. 378,555, 20.5.31. Ger., 25.6.30).—The H_2O content of the sludge is reduced by a filter and the sludge is then passed through a preheater and a dryer before being charged into a rotary kiln. Waste gases from the latter heat the dryer. C. A. K.

Water-setting cements and compositions and their application. W. SINGLETON (B.P. 377,203,

20.4.21).—A magnesite cement paint is made from $MgCO_3$ calcined to give a colloiddally fine oxide of high sp. gr. but not dead-burnt. Fillers, *e.g.*, $CaCO_3$, SiO_2 , or pigments, and a stabiliser, *e.g.*, Cd oleate, may be incorporated and the suspension sprayed on to a surface with or without first treating the surface with a solution of CaF_2 , Na silicate, MgO , or clay. C. A. K.

Plastic magnesia [cement] mixture. H. S. LUKENS and N. H. SMITH, Assrs. to SOLIDON PRODUCTS, INC. (U.S.P. 1,838,147, 29.12.31. Appl., 18.6.31).—Expansion of the cement produced as described in U.S.P. 1,811,799 (B., 1932, 345) is prevented by replacing part of the $MgCl_2$ by $MgSO_4$ and adding 1.5–2% of soap to the mixture. L. A. C.

Cold cement glaze compositions. A. J. LAGAS (B.P. 379,320, 27.2.31).—A dil. aq. emulsion containing, *e.g.*, linseed oil soap, $Ca(OH)_2$, $MgSiF_6$, and/or $CaCl_2$, and cream of tartar (or, *e.g.*, citric acid or $H_2C_2O_4$) is mixed with Portland cement. L. A. C.

Production of nailable light bricks. H. MAYR (B.P. 377,561, 9.1.32).—Turf treated with a solution of collodion and H_2O is mixed with loam, moulded into bricks, and burned. H. R.-D.

Building materials. D. H. SWEET (B.P. 376,977, 10.8.31).—Molten blast-furnace slag is granulated by such a vol. of H_2O that the temp. of the H_2O is raised only about 20° . C. A. K.

Production of waterproof substances [for buildings etc.]. F. T. LAKIN, J. LEACH, and H. CARLIDGE (B.P. 377,862, 6.11.31).—Compositions for surfacing roads, roofs, etc., or for moulding into slabs, comprise 5–85% of coal tar, 1–25% of rubber (which is dissolved in the boiling tar), and 5–85% of granite dust. L. A. C.

Production of road-making material, applicable to other purposes. W. GRIFFITHS (B.P. 376,792, 13.1.31).—A consolidated agglomerate of earthy aggregate and bitumen produced as in B.P. 351,385 (B., 1932, 184) is pulverised and subjected to both heat and pressure when forming the roadway. C. A. K.

Conditioning of wood for impregnation with preservatives. W. P. ARNOLD, Assr. to WOOD PRESERVING CORP. (U.S.P. 1,838,291, 29.12.31. Appl., 11.7.29).—Wood is subjected to air under high pressure, then to steam at < 30 lb./sq. in., and finally the chamber is evacuated by means of a pump to withdraw moisture. C. A. K.

Preservation of wood and the like so that the preserving substances cannot be washed out. R. FALCK (B.P. 377,441, 4.8.32).—Wood is impregnated in Fe or steel pressure cylinders with a solution containing arsenic acid 1 pt., $K_2Cr_2O_7$ 1.25–1.75 pts., H_2O 100 pts.; 1–2% of NH_4 phosphate may be added to the bath to render the wood fireproof. H. R.-D.

Manufacture of building bricks, tiles, and like articles from plastic clay. T. S. BLYTHE (B.P. 379,603, 9.1.32).

Measuring particle fineness. Dust collector.—See I.

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

Electric furnaces in the iron and steel industry.

R. GROSS (Z. Elektrochem., 1932, 38, 689–702).—A review. E. S. H.

Course of reduction of iron ore. ANON. (Iva, 1931, No. 2, 33–37).—Fe ore of particle diam. < 5 mm. was reduced at 900 – 1000° by CO , H_2 , and H_2 - CO mixtures, and the progress of the change $Fe_2O_3 \rightarrow Fe_3O_4 + FeO \rightarrow Fe$ observed. Concentric layers of the different phases can be observed microscopically. Reaction velocity, not diffusion velocity, defines the reduction time. Pptn. of C or cementation on reduction with CO or CO - H_2 occurs chiefly at a high degree of reduction, and is at first superficial. Reduction with H_2 or H_2 - CO is more rapid than with CO owing to the diffusion coeff. of the system H_2O - H_2 being $>$ that of CO_2 - CO . Reduction time increases with particle size, but for very small ore is relatively long. On reduction, both reaction and diffusion velocities fall. CH. ABS.

Ratio of pig iron to scrap in open-hearth practice. S. O. LIFSHITZ (Domez, 1931, No. 8, 55–66).—Delay of 1–2 hr. in pouring liquid pig Fe on to the scrap Fe was advantageous. CH. ABS.

Effect of time, temperature, gas velocity, and atmosphere on the scaling of iron. W. SCHROEDER (Arch. Eisenhüttenw., 1932–3, 6, 47–54).—In heating Fe ingots prior to hot-rolling, loss of Fe by scaling is small up to 900° but at higher temp. becomes very serious unless a reducing atm. is maintained around the ingot. The use of fuels which form H_2O on combustion increases the scale formation in neutral or oxidising atm. owing to the oxidising action of the steam; CO_2 has a very much less powerful oxidising action. On the other hand, coal gas in a reducing atm. (*i.e.*, with insufficient O_2 for its complete combustion) acts as a powerful restrainer to scaling owing to its H_2 content. Hence coal gas is preferred to coke for heating the furnace, and the principal burners should be supplied with a slight deficiency of air which is compensated for by supplying an excess of air to the auxiliary burners at the far end of the furnace so as to complete the combustion; in this way the ingots become covered with only a thin loosely adherent scale which does not deleteriously affect the surface of the sheets obtained in rolling. Curves are given showing the effect of time and temp. of heating with different gas velocities and atm. on the loss by scaling. A. R. P.

Growth of cast iron. E. SCHEL (Arch. Eisenhüttenw., 1932–3, 6, 61–67).—During the growth of cast Fe at 600° the cementite in zones to which oxidising gases cannot penetrate decomposes into Fe and C along the graphite plates and veins, but in the outer zones where O_2 can diffuse along the graphite veins the decomp. of Fe_3C is accompanied by the oxidation of the Si dissolved in the ferrite with the formation of a silicate which is finely distributed throughout the ferrite. On more prolonged heating the graphite in the outer layers is slowly burned away with a simultaneous formation of Fe oxides, but if oxidation is rapid the graphite veins

become coated with an oxide film which greatly retards the decomp. of cementite. The amount of growth decreases with increasing cross-sectional area, but the middle of thick sections grows faster than the outer zones so that the metal bulges outwards. These results show that measurements of the change in length of cast-Fe rods during growth give vals. which may be much too high; the growth of thin specimens is also much greater than that of thick specimens, so that length measurements can give only comparative results when specimens of standard dimensions are used. The increase in vol. caused by decomp. of Fe_3C into Fe and C is about 12.8%.

Undissolved graphite nuclei in cast iron and the effect thereon of lead and zinc. W. BADING, E. SCHEIL, and E. H. SCHULZ (Arch. Eisenhüttenw., 1932—3, 6, 69—73).—On remelting cast Fe with 3.48% C (3.06% graphite), 1.69% Si, 0.58% Mn, 0.404% P, and 0.082% S the no. of undissolved nuclei diminishes with the temp. of overheating above the m.p. according to the expression $\log N = -3.53(T - T_s)/T + 2.60$, where T_s is the m.p. and T the temp. to which the metal is heated. Prolonged heating at low temp. has the same effect as a short heating at high temp.; thus at 1300° the graphite is completely dissolved in 4 hr. Vigorous agitation such as that produced by melting in a high-frequency induction furnace dissolves the graphite at 1250° in a few sec. Addition of white pig Fe or of 0.5% Pb appreciably reduces the quantity of undissolved graphite nuclei, whereas addition of small quantities of Zn tends to inhibit dissolution. When equal quantities of Zn and Pb are added the effect of Zn predominates. A. R. P.

Application of the chlorine-residue method to [determination of silica in] pig and cast iron. E. MAURER (Arch. Eisenhüttenw., 1932—3, 6, 39—42).—Low results for SiO_2 are obtained if the metal is treated in Cl_2 at $> 600^\circ$, owing to the reaction $\text{SiO}_2 + 2\text{C} + 2\text{Cl}_2 = \text{SiCl}_4 + 2\text{CO}$. At lower temp. there is danger of obtaining high results as the result of the Si in the Fe reducing part of the FeO and MnO present. The extent to which this may occur depends solely on the relative proportions in which Si and (Fe,Mn)O are present, and not on their abs. percentages. Tests on mixtures of 27 and 2.7% Si-Fe alloys with sufficient FeO or MnO to oxidise the greater part of the Si have shown that as much as 30—40% of the total Si may be oxidised at 400°. Hence, the method should be applied with caution to the analysis of pig and cast Fe. A. R. P.

Shape of the stress-elongation curve of mild steel as modified by ageing. W. KÖSTER, H. VON KÖCKRITZ, and E. H. SCHULZ (Arch. Eisenhüttenw., 1932—3, 6, 55—60).—Stress-elongation curves for open-hearth steel with 0.1% C have been constructed from the results of tensile tests made on specimens annealed for 30 min. at 930°, aged at 100° for 14 days, stretched by 5, 10, or 18%, and aged at 20—350° for periods up to 3 months. The yield point and tensile strength increase and the elongation and reduction in area decrease the more rapidly the higher is the ageing temp.; when this temp. is $> 100^\circ$ the strength rises to a max., then

falls slightly; the ductility falls to a min., then rises slightly with time of ageing. The changes in tensile strength during ageing follow closely those in the ductility, but the yield point rises more rapidly than the tensile strength; the ratio yield point:tensile strength in specimens stretched 10% rises with ageing at 20° to 100%, then falls slowly to 82%, and in specimens stretched 18% it rises well above 100% after ageing for 30 min. at 20°, but rapidly falls to 100% in 3 hr. In all these cases there is a very large field of plastic flow which disappears at higher ageing temp. A. R. P.

Structure of heat-treated low-carbon steel. W. J. CROOK and E. C. BABSON (Met. & Alloys, 1932, 3, 183—184).—Observations on the structure of 0.2% C steel when quenched from 700—790° showed that the conventional theories of heat-treatment apply to low-C steels similarly to eutectoid and hypereutectoid steels. This steel gave martensitic areas when quenched between Ac_1 and 725° and areas of troostite-martensite and troostite at 725—900°. When such a troostitic steel is drawn up to 480° its structure is not changed except by the growth of cementite and the elimination of the acicular structure. The martensitic areas will, however, draw in the usual manner, \rightarrow troostite \rightarrow sorbite, to a spheroidised condition. C. A. K.

Heat-treatment of chromium magnet steel. W. S. MESSKIN and E. S. TOVPENJEZ (Arch. Eisenhüttenw., 1932—3, 6, 75—78).—The best magnetic properties of steel with 1.3% C and 2.1% Cr are obtained by annealing at 850° and quenching in oil; prolonged heating at 750—850° causes a serious drop in the remanence and coercivity vals. owing to changes which occur in the double Cr Fe carbide. Material which has been hardened at too low a temp. should be reheated for 30—60 min. at 950—1000°, then allowed to cool in air before hardening under the correct conditions. If the normalising is carried out at $> 1000^\circ$ tempering at 150—250° is necessary before hardening. No relation between the hardness of the steel and the coercivity during the various heat-treatments could be established. A. R. P.

Hardenability and annealing stability of steels containing difficultly soluble carbides. E. HOUDREMONT, H. BENNEK, and H. SCHRADER (Arch. Eisenhüttenw., 1932—3, 6, 24—32).—Addition of W or V to steel decreases the max. hardness obtained at the ordinary hardening temp. as part of the C is converted into carbides of W or V, which are more difficultly sol. than Fe_3C ; on the other hand, the presence of these finely-divided carbides in the metal restrains crystal growth, and hence renders the steel less sensitive to overheating. With rising annealing temp. the quantity of these carbides which enters into solid solution increases, the hardening effect is increased, and the crit. rate of cooling is lowered; on subsequent tempering, the dissolved carbides are reprecipitated from the α -solid solution at relatively high temp. and give rise to pptn.-hardening effects which are greater than is the decrease in hardness produced by decomp. of the martensite, hence the temp.-hardness curve shows a second max. at 500—600°. In high-speed steels the pptn. of carbides of the alloying elements after air-cooling from the second high annealing temp. is the cause of their stability

and hardness at high cutting temp. Pptn. of V_4C_3 from V steels confers on them their high strength at elevated temp. but tends to reduce their resistance in the notched-bar impact test.

A. R. P.

Solidification and crystallisation of the steel ingot and the effect thereon of casting temperature and the tendency of the steel to supercooling. B. MATUSCHKA (Arch. Eisenhüttenw., 1932—3, 6, 1—8).—The solidification and crystallisation of steel in chill moulds obeys certain well-defined laws, being controlled externally by the rate at which heat passes through the mould walls and internally by the casting temp. and the tendency of the steel to undergo supercooling, the relative importance of these two factors depending on the composition and the physical and crystallographic properties of the steel. In all cases the fine-grained primary crystallisation and low degree of segregation indicative of the max. degree of homogeneity are obtained by low casting temp. and max. deoxidation, degasification, freedom from slag inclusions, and correct content of alloying constituents.

A. R. P.

Reagents for etching steel and cast iron. V. N. SVETCHNIKOV (Trans. Centr. Board Lab. Met. Ind., U.S.S.R., 1930, 1, 31—33).—For pearlite salicylic acid in EtOH is recommended. 25% aq. pyrogallol (1 pt.) and 35% NaOH (2 pts.) coloured cementite orange to blue after several hr. Lactic acid (30% in EtOH) revealed dendrites and pearlite in cast Fe.

CH. ABS.

Thermal treatment of chrome-nickel steels. M. S. ARANOVICH, G. L. BIZER, and B. N. MESHCHANINOV (Domez, 1931, No. 12, 70—84).—Hardness tests are recorded.

CH. ABS.

Mechanical and magnetic precipitation hardening of iron-cobalt-tungsten and iron-cobalt-molybdenum alloys. W. KÖSTER (Arch. Eisenhüttenw., 1932—3, 6, 17—23).—The changes in hardness during annealing of quenched Fe-Co alloys containing W or Mo depend on the nature of the original structure; in ferritic and austenitic alloys the changes which occur in the d , electrical conductivity, and magnetic saturation during annealing indicate that the hardening is due to separation of excess Fe_3W_2 -CoW or Fe_3Mo_2 -CoMo solid solution from the ternary solid solution. In martensitic alloys this hardening effect is preceded at a lower temp. by that due to the decomp. of the residual austenite. Hardening of ferritic alloys is accelerated if the supersaturated α -phase has been obtained by quenching from above the $\gamma \rightarrow \alpha$ transformation point. In all three cases the max. pptn. hardness obtainable increases with increase in the Co and the W or Mo contents. Brinell hardness nos. of > 700 may be obtained by annealing at 600° after quenching from 1200 — 1300° alloys containing 15% W and 30—45% Co, or 28% W and 20—35% Co. The magnetic hardening of α -alloys takes place at temp. only slightly above those at which mechanical hardening occurs; max. coercivity of 350 oersted with a remanence of 7300 gauss is obtained with a pptn.-hardened alloy containing 12% Co and 18% Mo. The coercivity increases with increasing Co and Mo or W, whereas the remanence decreases with increasing Mo or W and increases with increase of Co.

Pptn.-hardened martensitic alloys are useful for cutting tools and ferritic alloys for permanent magnets.

A. R. P.

Recovery [of metals] from cold-working, determined by changes in hardness and velocity of dissolution. G. TAMMANN and F. NEUBERT (Z. anorg. Chem., 1932, 207, 87—92).—Both factors are increased by cold-working. Recovery to the normal vals. for the soft metal occurs on heating to a temp. which is characteristic for each metal. This phenomenon has been followed for Mg, Al, Ce, Zn, and Fe.

J. W. S.

Assay of copper ores. M. LAPPING (J. S. African Chem. Inst., 1932, 15, 60—61).—A brief review of available methods.

H. F. G.

Properties of commercial varieties of copper at high temperatures. T. G. BAMFORD (Inst. Metals, Sept., 1932. Advance copy, 9 pp.).—Impact, hardness, and alternating-stress tests have been made on five varieties of Cu at temp. between 0° and 325° and sometimes up to 900° . Results are plotted as curves, from which it is concluded that there is a decline in resistance to alternating stresses ($>$ fatigue range) at 200 — 300° , but no corresponding brittle range. Cu containing Ni had an exceptionally good endurance at 560° .

E. H. B.

Open-air corrosion of copper. III. Artificial production of green patina. W. H. J. VERNON (Inst. Metals, Sept., 1932. Advance copy, 9 pp.; cf. B., 1930, 992).—The formation of green patina consisting essentially of basic $CuSO_4$ ceases at relatively long distances from a town and at shorter distances from the sea. Lanoline and linseed oil protect the underlying metal but do not prevent discoloration. A green patina may be produced rapidly by treating a metal with $(NH_4)_2SO_4$ solution followed by a mixture in which basic Cu sulphate is suspended. A more stable patina is produced by anodic treatment for 15 min. in a suitable electrolyte. On exposure its formula approximates to $CuSO_4 \cdot 3Cu(OH)_2$, i.e., that of natural patina.

C. A. K.

Effect of different elements on the annealing and grain-growth characteristics of α -brass. M. COOK and H. J. MILLER (Inst. Metals, Sept., 1932. Advance copy, 10 pp.).—When any of the following additions, Fe, P, Mn, Al, Al + Ni, Al + Si, is made to α -brass and the alloy annealed for 30 min., after a 50% reduction by cold-rolling, the resulting hardness vals. are, in general, higher over the range 400 — 600° than those for the pure material. The increased resistance to softening at these temp. is accompanied by a decreased rate of grain growth.

E. H. B.

Modified impingement corrosion apparatus. H. W. BROWNSDON and L. C. BANNISTER (Inst. Metals, Sept., 1932. Advance copy, 8 pp.).—Compressed air, filtered through wood straw and cotton wool, is bubbled through H_2O and then forced at a pressure of 20 in. Hg through a capillary tube drawn to a jet (0.35 mm. diam.) so that a stream of air bubbles impinges vertically downwards through a solution on to the surface of a specimen under test. The jet allows 2220 c.c. of air to pass per min.; the correct diam. of jet is important. The type of attack depends to a certain extent on the distance

of the specimen from the jet, and a clearance of 1.7 mm. gave a characteristic type of bubbling and corrosion.

C. A. K.

Two years' corrosion tests with Duralplat in the North Sea. K. L. MEISSNER (Inst. Metals, Sept., 1932. Advance copy, 11 pp.).—Specimens consisting of strips, drawn profiles, and riveted sheets of Duralplat (duralumin coated with a Cu-free Al-Mg-Mn alloy) have been exposed at ebb-and-flow tides and also usually to const. immersion in sea-water. The coating affords electrochemical protection and no corrosion of the base metal occurred until the coating had entirely disappeared. Corrosion is limited in the riveted specimens to attack on the underside of the rivet head.

E. H. B.

Atmospheric action as a factor in fatigue of metals. H. J. GOUGH and D. G. SOPWITH (Inst. Metals, Sept., 1932. Advance copy, 20 pp.).—The atm. conditions directly affect the fatigue-resistance of metals, which has been determined under room conditions and *in vacuo*. The effect was negligible with cupro-Ni, but a max. improvement of 5% for steel and up to 26% for Cu and brass was obtained *in vacuo*. A coating of lanoline did not give any protection against fatigue corrosion.

C. A. K.

Mechanical properties of nickel wires. C. E. RANSLEY and C. J. SMITHELLS (Inst. Metals, Sept., 1932. Advance copy, 12 pp.).—The annealing temp. (approx. 640°) of commercial Ni wire which has been reduced 75% by cold-drawing is independent of the diam. Addition of Fe, Mn, or Mg increases the tensile strength, due to the development of large crystals. An inflexion in the strength, absent in pure Ni, was shown by commercial wires at 300–450°. A simple form of creep test has been devised.

C. A. K.

Testing of [dental] amalgams. H. SIEGLER-SCHMIDT and H. ARNDT (Mitt. Materialprüf., 1932, 200–202).—Compression, flow, and cutting tests and determinations of the change in length on ageing of Ag-Sn amalgams containing 68% Ag indicate that these properties are subject to considerable variation according to the treatment used in grinding and mixing the constituents and in preparing the test-piece. By the application of sufficient pressure in forming the specimen the expansion which occurs on hardening may be completely suppressed, and with very heavy pressures a contraction may occur. Max. strength is obtained after grinding for 6 min. With a high forming pressure higher strength and a smaller flow under const. pressure are obtained. Expansion tests beginning 15 min. after amalgamation show that at first the amalgam contracts, generally for 30–60 min., and then expands during the following 24 hr.; occasionally a small contraction takes place afterwards.

A. R. P.

Utilisation of Ural titanomagnetites. E. V. BRITZKE, I. V. SCHMANENKO, and K. K. TAGIROV (Min. Suir., 1931, 6, 626–630).—The difficulties of processing high-melting ores with a high % of Ti were overcome by addition of NaCl to the coal before coking, then smelting in blast furnaces, whereby 90% V passes into the Fe (0.4–5.2% V), producing steel containing 0.2% V. TiO₂ and V are recovered from the slags. HCl caused little damage to the furnace lining.

CH. ABS.

Reduction of ilmenite in the gaseous phase. V. S. SUIROKOMSKI, E. V. SNOPOVA, and N. I. ROTKOV (Min. Suir., 1931, 6, 522–527).—Fe₂O₃ in oxidised Doeltera ilmenite or titanomagnetite is reduced with H₂ for separation of Fe from TiO₂.

CH. ABS.

Rapid method of dissolving lead alloys preparatory to determination of tin and antimony. B. S. EVANS (Analyst, 1932, 57, 554–559).—Pb-Sn alloys are dissolved with HClO₄ and H₃PO₄ under reflux condenser, the Sn being determined by reduction with hypophosphite and titration with I. Sb is determined in Pb-Sb alloys by dissolution in HClO₄, reduction with SO₂ and HCl, and titration with bromate solution.

E. H. B.

Beryllium. H. A. SLOMAN (Inst. Metals, Sept., 1932. Advance copy, 24 pp.).—Efforts which have been made in the National Physical Laboratory to produce pure Be in sufficient quantity to determine its properties are described, including attempts to eliminate BeO which forms with Be a brittle eutectic in grain boundaries. By sublimation *in vacuo* thin films containing >99.9% Be have been produced. These have Brinell hardness 55–60. Metal of this purity undergoes a transformation at room temp.

E. H. B.

Making beryllium-magnesium alloys. R. J. M. PAYNE and J. L. HAUGHTON (Inst. Metals, Sept., 1932. Advance copy, 2 pp.).—Attempts to form an alloy by mixing Be and Mg *in vacuo* and then annealing the casting were unsuccessful. Other methods, *e.g.*, electrolytically depositing Be on a cathode of molten Mg, and the reduction of BeF₂ by Mg, also proved abortive.

C. A. K.

Binary alloys of magnesium. A. DUMAS and F. ROCKAERT (Rev. l'Aluminium, 1932, 9, 1717–1728).—The constitution, structure, and properties of the binary alloys of Mg with Al, Zn, Cu, Ce, Cd, Mn, and Ca are reviewed and the mechanical properties of 12 French alloys of Mg in the sand-cast, chill-cast, forged, and extruded states tabulated.

A. R. P.

Light aluminium alloys and aluminium bronzes [for coinage]. C. MATIGNON (Chim. et Ind., 1932, 27, 1259–1273; 28, 23–36).—The hardness and resistance to wear and to corrosion of numerous light Al alloys and of 7–10% Al bronzes have been compared with the corresponding properties of Ag and bronze coinage alloys with a view of finding suitable non-tarnishing substitutes for these. None of the light alloys tested has as high a resistance to wear as have Ag coinage alloys, whereas bronze with 7% Al is as resistant as coinage bronze and that with 9% Al much superior. All the Al alloys are more or less readily corroded by salt water, the most resistant being that with 5–10% Mn; 7% Al bronze is slightly attacked and 9% Al bronze practically completely resistant. The last-named alloy appears to be suitable in every way as a coinage alloy. Owing to its hardness coins much thinner than those of ordinary bronze can be stamped from it and, in addition, the sp. gr. is 15% less.

A. R. P.

Removal of gases from aluminium alloys by mixtures of nitrogen and volatile chlorides. J. D. GROGAN and T. H. SCHOFIELD (Inst. Metals, Sept., 1932. Advance copy, 9 pp.).—Gases are readily

removed from molten Al, "Y" alloy, and "2L5" alloy by bubbling through the metal a mixture of cylinder N_2 and $TiCl_4$ or CCl_4 ; purification of the N_2 by removing moisture and O_2 is unnecessary. The best results are obtained at 700–760° with about 4 litres of N_2 and 0.25 c.c. of $TiCl_4$ or CCl_4 per lb. of metal; with these small amounts of chloride no grain refinement takes place and no contamination of the metal with Ti or C occurs. The function of the chlorides appears to be to remove the oxide films which prevent free diffusion of the occluded gases. A. R. P.

Mould materials for non-ferrous strip ingot casting. G. L. BAILEY (Inst. Metals, Sept., 1932. Advance copy, 24 pp.).—"Blowing," which results from reaction between graphitic C in cast-Fe moulds and oxide films, may be prevented by using low-C steel and certain non-ferrous metals. The former is not suitable owing to deformation, but a metal of high thermal conductivity, e.g., Cu, is suitable provided the temp. is not allowed to rise sufficiently to weld it on to the ingot. This may be prevented by a suitable thickness of mould or by H_2O -cooling. C. A. K.

Corrosion-testing of materials for construction of chemical apparatus. F. HILDEBRANDT (Chem.-Ztg., 1932, 56, 689–690).—A plea for uniformity in procedure and statement of results is made. E. S. H.

The Rockwell superficial hardness tester. V. E. LYSAGHT (Met. & Alloys, 1932, 3, 185–188).—The principle is similar to the regular Rockwell machine, but the minor load is 3 kg. and the major load 15, 30, or 45 kg. Measurement of the indentation is more sensitive. C. A. K.

Determination of the value of some metallic powders for industrial use. P. GALIMBERTI [with E. MORO] (Annali Chim. Appl., 1932, 22, 497–500).—Apparatus of the Schrotter type is described in which the vol. of H_2 evolved by the action of a reagent on the powder is measured. E. W. W.

Some reactions occurring in "hot-dipping" processes. E. J. DANIELS (Inst. Metals, Sept., 1932. Advance copy, 14 pp.).—From a study of reactions in flux baths used in galvanising, the conclusion is reached that the flux reacts with Fe or Fe_2O_3 to form $FeCl_3$ which, in turn, reacts with Zn, giving rise to "dross." This theory is shown to apply to other coatings produced by hot-dipping. It is also shown that in coating Fe with Cd and Pb the compounds $FeCd_2$ and $FePb_2$ are formed on the steel surface. The action of molten Sn on 8% Al-bronze is shown to be anomalous (cf. B., 1931, 1013). E. H. B.

Cold baths for chromium-plating. O. MACCHIA (L'Ind. Chimica, 1932, 7, 879–882).—The requirements to be satisfied by cold Cr-plating baths in order that the deposit formed may compete with those given by the ordinary warm baths are discussed. T. H. P.

Determination of sulphuric acid in chromium [plating] baths. K. W. FRÖHLICH (Angew. Chem., 1932, 45, 508–510).—Large errors (50%) occur under certain conditions when $CrO_3-H_2SO_4$ baths are analysed by reduction of the CrO_3 with EtOH and pptn. of the SO_4^{2-} as $BaSO_4$, as a result of the formation of complex

chromisulphates. The stability in solution of chromi-acetate complexes enables this difficulty to be overcome. In the method recommended, to 5–10 c.c. of the bath are added, in the order given, conc. HCl 10 c.c., EtOH 5 c.c., glacial AcOH 10 c.c., and NaOAc 3 g. The mixture is heated carefully nearly to the b.p. for at least 30 min., diluted to 250 c.c., and treated with 20 c.c. of hot 5% $BaCl_2$ solution. After 2 hr. (in the cold) the ppt. is removed, ignited, and weighed. H. F. G.

Electrolytic cadmium plating. F. PIETRAFESA and C. LUCIANI (Met. Ital., 1932, 24, 1–9; Chem. Zentr., 1932, i, 1709–1710).—In a $Na_2Cd(CN)_4$ bath the cathodic yield and the particle size increase with the Cd concn. The cathodic yield increases with increase in the NaCN concn. and on addition of NaOH or Na_2CO_3 . The anodic yield slowly diminishes with increasing [CN⁻]. Addition of gelatin has a favourable effect on the character of the ppt. Sn, Pb, Ag, and Sb are undesirable. A. A. E.

PATENTS.

Smelting furnace. A. JONES, Assr. to U.S. SMELTING FURNACE Co. (U.S.P. 1,838,145, 29.12.31. Appl., 11.8.30).—A rotary, horizontal tubular furnace has a tilting movement for the discharge of metal and a stationary burner the nozzle of which is inclined upwardly at about 10° to prevent slag being blown off the surface of the metal. C. A. K.

[Reversible regenerative] open-hearth furnace. G. E. ROSE (U.S.P. 1,838,452, 29.12.31. Appl., 20.1.30).—The waste gas down-take and the fuel gas up-take flue from the regenerator are separate, the latter terminating outside the furnace and registering with the furnace only by means of a movable port. This port is drawn away at each reversal to prevent corrosion, and the respective flues are closed by dampers. C. A. K.

Roasting of ores and the like. A. L. MOND. From COLORADO IRON WORKS Co. (B.P. 378,903, 18.3.31).—Material graded from coarse to fine is fed successively into the line of traverse of a multiple-hearth furnace in order to subject the coarser particles to the longer roasting period. C. A. K.

Apparatus for carrying out roasting, sintering, calcining, and the like operations. METALLGES. A.-G. (B.P. 378,334, 9.2.32. Ger., 13.2.31).—The return bend in the track down which the trucks of sinter fall in a Dwight-Lloyd apparatus is caused to pivot to allow for expansion and to adjust the force of the blow of the descending truck. B. M. V.

Ore reduction. A. G. MCGREGOR (U.S.P. 1,838,427, 29.12.31. Appl., 28.3.29).—In a combined roasting and reverberatory smelting furnace, the calcined ore (especially Cu ore) is fed to different parts of the latter by two main delivery pipes and a no. of lateral branches. C. A. K.

Direct iron ore reduction. TRENT PROCESS CORP. (B.P. 378,940, 16.5.31. U.S., 3.12.30).—A vertical retort chamber is provided with horizontal tubes in which screw conveyors move a charge across and gradually down the chamber. In the uppermost tubes coal is carbonised at low temp. and ore is then added to the coke from a hopper part way down the

retort. The tubes are heated externally by combustion of the gas produced, and the gases evolved from the mixture of coke and ore are recirculated during the reduction process. C. A. K.

Treatment of carbonaceous residues derived from metal-volatilising processes in rotary-drum furnaces. METALLGES. A.-G. (B.P. 377,451, 12.8.31. Ger., 13.8.30).—Products containing volatilisable metals are mixed with carbonaceous material and heated in a rotary tube furnace. The residue is treated in gas producers and the gas is utilised for heating the furnace. C. A. K.

Manufacture of iron or steel. J. R. C. MARSH (U.S.P. 1,838,425, 29.12.31. Appl., 10.1.20).—An alloy of Fe with 0.3—1.5 (0.85)% Cu, 0.3—3 (0.85)% Cr, 0.6—6 (1.7)% Ni, and about 0.15% Si, 0.25% Mn, 0.03% S, 0.03% P, and 0.35% C is claimed. A. R. P.

Welding of iron, steel, and their alloys. F. KRUPP A.-G. (B.P. 377,576, 28.1.32. Ger., 6.2.31).—One or more layers of a weld, e.g., the surface layer, consists of non-corrosive Cr-Ni steel. C. A. K.

Bath for pickling metals [iron and steel]. V. VOORHEES, ASSR. to STANDARD OIL Co. (U.S.P. 1,838,338, 29.12.31. Appl., 18.1.28).—An inhibitor for H_2SO_4 pickling baths is prepared by agitating the distillate obtained by the cracking of petroleum at 385—405°/4 atm. with 0.04 lb. of 50% H_2SO_4 per gal., and treating the acid layer with an excess of NaOH to isolate the org. bases. A. R. P.

Non-ferrous alloy. SCOVILL MANUFG. Co. (B.P. 376,906, 30.5.31. U.S., 4.6.30).—An alloy containing 80—85 (80)% Cu, 1—2.5 (2)% Al, 1—2.5 (1)% Ni, 1—2.5 (1)% Sn, and the remainder Zn is improved by working and annealing. C. A. K.

[Copper] alloy [resembling gold]. V. WYLDEN (U.S.P. 1,838,126, 29.12.31. Appl., 5.12.29).—Molten Cu (90 oz.) is treated at 1200° with the following, added successively: fuller's earth (3 oz.), borax (7 oz.), white ppt. (3 oz.), Sn (12 oz.), MgO (3 oz.), and EtOH (1 oz.). The constituents are mixed for 35 min. and boiled for 45 min. before casting. A. R. P.

Zinc-base die-casting alloy. NEW JERSEY ZINC Co., ASSCS. of E. A. ANDERSON and G. L. WERLEY (B.P. 376,988, 19.8.31. U.S., 21.8.30).—Alloys containing Al 2—10 (4)%, Cu 0.05—2 (1)%, and the remainder Zn (of at least 99.98% purity) are claimed. C. A. K.

Production of highly soluble basic slag. A. SÜLLWALD (B.P. 377,328, 7.5.31).—Molten basic slag of equiv. SiO_2/P_2O_5 ratio is enriched with SiO_2 to give a content of 1.5 $SiO_2 \cdot 1P_2O_5$. The slag is then cooled quickly and pulverised. C. A. K.

Soldering flux. R. S. DEAN and R. V. WILSON, ASSCS. to WESTERN ELECTRIC Co., INC. (U.S.P. 1,838,370, 29.12.31. Appl., 26.11.26. Renewed 27.3.31).—A paste of glycerin or petroleum jelly and tetrachloronaphthalene, "perchloropentene," or glycollonitrile is claimed. A. R. P.

Production of chromium-plated tools. B. V. MCBRIDE, ASSR. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,838,273, 29.12.31. Appl., 24.12.27).—

After plating with Cr in the usual way, the tools are heated at 150—350° for 1—24 hr. according to the size of the tool and the thickness of the plate; this treatment removes occluded H_2 without affecting the hardness of the tool. A. R. P.

[Production of alkali metal by] electrolysis of fused [halide] bath. J. J. GREBE and R. H. BOUNDY, ASSCS. to DOW CHEM. Co. (U.S.P. 1,839,756, 5.1.32. Appl., 30.1.29).—A fused bath of NaCl is electrolysed so that (1) a temp. above that of volatilisation of Na is maintained at the cathode, (2) anode and cathode products are separately distilled, (3) the cathode product is fractionally condensed in N_2 , whereby Na vapour is separated from NaCl vapours, and (4) fresh NaCl is supplied to the bath in countercurrent to the anode gases withdrawn from the cell. J. S. G. T.

Rust-proofing baths. ZnS.—See VII. **Metal-glass joints.**—See VIII. **Heat-treatment furnace.**—See XI. **Retarding rust formation.**—See XIII.

XI.—ELECTROTECHNICS.

Electric heat exchangers. F. A. M. WÜLFINGHOFF (Chem. Fabr., 1932, 5, 245—248).—Numerous types of electric heaters for boilers and distillation apparatus and for heating gases and vapours to high temp. are illustrated and briefly described. A. R. P.

Physical phenomena in the so-called electrical gas purification. III. R. LADENBURG (Ann. Physik, 1932, [v], 14, 510—520).—The connexion between particle size, charge, and velocity is discussed. A. J. M.

Technical applications of electro-osmosis and electrophoresis. N. SCHÖNFELDT (Z. Elektrochem., 1932, 38, 744—754).—A review of patent literature covering the dehydration of peat, pptn. of caoutchouc, clay, and kaolin, purification of H_2O , sugar, glycerol, glue, gelatin, serum, gases, impregnation and preservation of wood etc., tanning, separation of oil- H_2O emulsions. E. S. H.

Pocket-lamp batteries. F. KAINZ (Chem.-Ztg., 1932, 56, 690—691).—A survey of modern practice. E. S. H.

H_2 industry.—See VII. **Furnaces for Fe and steel.** **Magnet steel.** **Cr-plate.**—See X. **Salinity of water etc.**—See XVI.

PATENTS.

Electric furnace [for heat-treatment of metal wire etc.]. H. O. SWOBODA and W. F. METZGER (U.S.P. 1,839,613, 5.1.32. Appl., 14.9.29).—A furnace chamber having open ends for the continuous passage therethrough of material to be treated, refractory supports for the chamber spaced axially and circumferentially, and heating means between the supports is claimed. J. S. G. T.

Electric induction furnace. G. H. CLAMER, ASSR. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,838,527, 29.12.31. Appl., 7.12.28).—A combination of core-type and coreless furnace arranged to produce efficient heating and mixing of the charge is claimed. J. S. G. T.

Electric induction furnaces. E. F. NORTHRUP, ASSR. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,839,801—2, 5.1.32. Appl., [A, B] 26.3.30).—(A) A coreless inductor

furnace has an inductor coil comprising a metallic conductor having the same cross-sectional metal content per unit length with variant width of metal per turn measured along the coil axis. (B) Stirring of the furnace charge is increased by progressively increasing or decreasing the distance between the turns of the inductor coil made of H₂O-cooled tubing surrounding the charge. J. S. G. T.

[Coreless] electric induction furnaces. ELECTRIC FURNACE CO., LTD., Assecs. of E. F. NORTHRUP (B.P. 378,448, 8.5.31. U.S., 22.5.30).—Magnetic supporting members each protected from the stray magnetic field due to the induction coil by separate flat sheets of non-magnetic material, *e.g.*, Cu, are arranged on opposite sides of the furnace. J. S. G. T.

[Coreless] induction furnaces. M. H. KRAEMER (B.P. 378,396, 4.2.31).—Spaced zones of metal, graphite, or other material of high electrical conductivity are arranged in the lining or wall of a crucible surrounded by an induction coil. J. S. G. T.

[Cooling device for] induction electric furnace. E. F. NORTHRUP, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,840,247, 5.1.32. Appl., 13.7.29).—A vaporisable liquid, *e.g.*, H₂O, is sprayed and distributed over the waterproofed, insulated surface of the inductor coil. J. S. G. T.

Recuperator or regenerator use of gases from high-frequency furnaces. H. NEUHAUSS, Assr. to AJAX METAL CO. (U.S.P. 1,839,927, 5.1.32. Appl., 19.9.28).—A blast of air, heated by the furnace inductor coil, is applied to the surface of the furnace pool of molten metal, *e.g.*, Fe or steel, and the products of combustion of the blast and impurities, *e.g.*, C, contained in the bath are used to preheat the air supply. J. S. G. T.

[Electrical] heating element. W. HUDSON, Assr. to BURDICK CORP. (U.S.P. 1,838,680, 29.12.31. Appl., 25.7.27).—A resistance heater entirely embedded in refractory material is described; provision is made for expansion. B. M. V.

[Separators for] electric accumulators. CHLORIDE ELECTRICAL STORAGE CO., LTD. (B.P. 377,257, 15.4.31. U.S., 2.1.31).—A mixture of diatomaceous earth with a small proportion, *e.g.*, 25%, of vulcanised rubber latex, together with, if desired, PhOH condensation products, pitch, asphalt, or other binder, is shaped and the latex vulcanised in the discontinuous phase while fluid in the continuous phase is removed. J. S. G. T.

Electrolyte for galvanic dry cells of the manganese dioxide type. J. J. PALA (B.P. 379,141, 26.10.31).—A gelatinous mass formed by the interaction of an alkali hydroxide, *e.g.*, NaOH, and a solution of a salt of a metal of the alkaline-earth or Mg group, *e.g.*, MgCl₂, together with a small proportion of a Hg salt of an org. acid, *e.g.*, HCN, and, if desired, gluten and Al₂O₃, is used. J. S. G. T.

[Electrolyte for] dry [Leclanché] cell. H. W. PORTH, Assr. to BURGESS BATTERY CO. (U.S.P. 1,839,498, 5.1.32. Appl., 21.5.29).—A paste containing 0.25–0.1% of Hg in the form of a Hg salt and 0.025–0.25% of CrO₃ radical is used. J. S. G. T.

[Glass for] luminous electric-discharge tubes. GEN. ELECTRIC CO., LTD., Assecs. of PATENT-TREUHAND GEN. F. ELEKTR. GLÜHLAMPEN M.B.H. (B.P. 377,098, 13.1.32. Ger., 18.2.31. Addn. to B.P. 351,245; B., 1931, 815).—Discoloration of the envelope is prevented by using borosilicate glass containing <0.1% Fe oxide. Alternatively, NaCl may be added to the melt. J. S. G. T.

[Clean-up of] electric glow-discharge tubes [containing nitrogen]. MARCONI'S WIRELESS TELEGRAPH CO., LTD., and G. F. BRETT (B.P. 377,234, 22.4.31).—Powdered NaN₃ or BaN₆, arranged in the tube before exhaustion, is heated so that N₂ is evolved. J. S. G. T.

[Cathode for] vacuum tube. L. McCULLOCH, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING CO. (U.S.P. 1,840,121, 5.1.32. Appl., 20.5.26).—A mixture of Cs and Ba trinitrides and granular, inert, refractory material is heated at 200–500° in an evacuated tube. J. S. G. T.

Thermionic device [filament]. N. RASHEVSKY, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING CO. (U.S.P. 1,840,130, 5.1.32. Appl., 27.5.26).—A thin film of Ni is deposited from vapour upon a thoriated W filament. J. S. G. T.

Electron-discharge device. S. W. CROWLEY, Assr. to DE FOREST RADIO TELEPHONE & TELEGRAPH CO. (U.S.P. 1,840,284, 5.1.32. Appl., 1.3.24).—A filament-activating flash material, *e.g.*, Mg, and a clean-up agent containing P are applied to a plate arranged in an evacuated vessel containing a thoriated filament. J. S. G. T.

Electron-discharge devices of the type in which visible rays are emitted from an electron-collecting surface. BRIT. THOMSON-HOUSTON CO., LTD., R. C. CLINKER, and L. J. DAVIES (B.P. 378,397, 4.2.31).—The arrangement includes an anode coated with a spongy deposit of finely-divided C. J. S. G. T.

Manufacture of electron-emission devices. J. W. MARDEN, Assr. to WESTINGHOUSE LAMP CO. (U.S.P. 1,838,776, 29.12.31. Appl., 1.12.27).—An electrode upon which BaO₂, Cs, and misch metal have been deposited is heated, *in vacuo*, to successive temp. so that (1) O₂ is liberated from the BaO₂, (2) Cs is distilled, and (3) misch metal is evaporated to "clean up" the tube. J. S. G. T.

Manufacture of thermionic cathodes for electric-discharge devices. M.-O. VALVE CO., LTD., W. H. ALDOUS, and J. F. JACKSON (B.P. 378,651, 25.8.31).—The mean size of particles of alkaline-earth carbonates, *e.g.*, a mixture of BaCO₃ and SrCO₃, from which the oxide coating is produced is increased by sintering in an inert gas, *e.g.*, CO₂. J. S. G. T.

(A) Production of highly emissive thermionic cathodes. (B) Introduction of metallic vapours into electric-discharge vessels. RADIO-A.-G. D. S. LOEWE, and (A) H. BENJAMIN and E. EHRIG, (B) H. BENJAMIN (B.P. 379,432, 379,499, [A] 17.6.31, [B] 15.8.31. Ger., [A] 18.6.30, [B] 15.8.30).—(A) A Ba prep. is applied to a core, *e.g.*, of Pt, Ni, or Ni-Cr, which has been coated with an aq. suspension or paste containing a stable W compound, *e.g.*, Ba tungstate, and heated. (B) Material to be

vaporised in the discharge tube, *e.g.*, a Ba prep., mixed with a reducing agent, is wrapped under oil in metal foil, *e.g.*, Al, coated with collodion or other protecting material. J. S. G. T.

Indirectly heated thermionic cathode. S. LOEWE and B. WIENECKE (B.P. 379,334, 26.5.31. Ger., 28.5.30).—Highly emissive material, *e.g.*, Ba, is applied to a helix of W wound on a Ni jacket surrounding a porcelain tube enclosing a W heating element. J. S. G. T.

Photoelectric devices. N. V. PHILIPS' GLOEILAMPEN-FABR. (B.P. [A] 378,451 and [B] 378,457, 9.5.31. Holl., 10.5.30).—An electrode, consisting, at least in part, of photoelectric material, *e.g.*, a unimol. layer of an alkali metal or alkaline-earth metal (*e.g.*, Cs or Ba), is separated from an electrode composed of electrically conducting material, *e.g.*, Zr, by (A) a layer < 1 mm. thick containing solid insulating materials, *e.g.*, CaF₂, and, if desired, metallic particles, *e.g.*, of W, and photoelectric material, or (B) a layer consisting of one or more solid semi-conductors, *e.g.*, AgI or Cu oxide. [Stat. ref. to (B).] J. S. G. T.

[Arc-lamp] electrode. J. W. D. CHESNEY, Assr. to ULTRA VIOLET GENERATOR CORP. (U.S.P. 1,838,471, 29.12.31. Appl., 2.9.26).—An electrode composed of C, Fe carbide, and at least two carbides of the metals of groups IV—VI is used for producing ultra-violet radiation. J. S. G. T.

Electric gaseous [arc-]discharge apparatus. CLAUDE-LUMIÈRE SOC. ANON. POUR LES APPLICATIONS DES GAZ RARES À LA LUMIÈRE PROC. G. CLAUDE (B.P. 377,218, 17.3.31. Fr., 5.11.30).—An arc discharge is produced between an anode and cathode of special forms in an atm. containing He (1000 pts.) and Ne (1—200 pts.) at a pressure of 0.05—3 mm., the electrodes and walls of the discharge vessel containing an occluded mixture of the same gases. J. S. G. T.

Apparatus for generating ozone. BAMAG-MEGUIN A.-G. (B.P. 378,934, 11.5.31. Ger., 25.10.30).—The effective ozonising surfaces of ozonising units distributed across the air stream near the ventilating fan increase towards their peripheries. J. S. G. T.

[Liquid] electrolytic electric condensers. INTERNAT. GEN. ELECTRIC CO., INC., Assees. of ELEKTRIZITÄTS A.-G. HYDRAWERK (B.P. 377,618, 22.3.32. Ger., 24.3.31).—The electrolyte consists of mineral oils emulsified by means of a solution of salts of fatty acids, *e.g.*, Na stearate. H. R.-D.

Electrolyte cells. AEROVOX WIRELESS CORP., Assees. of A. GEORGIEV (B.P. 379,299, 22.4.31. U.S., 18.10.30).—An electrolytic condenser comprising spirally-wound cathode and anode foils and a thin dielectric film adherent to the anode is claimed. J. S. G. T.

Electrolyte cell [for electrolysing salt solutions]. R. B. ROBERTSON, Assr. to CHAMPION FIBRE CO. (U.S.P. 1,838,572, 29.12.31. Appl., 13.6.29).—Anodes are suspended within an annular chamber containing electrolyte and bounded by vertical, continuous, co-axial, foraminous inner and outer cathodes resting upon an impervious base and carrying diaphragms. The cover of the annular chamber forms a gas-collecting chamber. J. S. G. T.

Liquid [e.g., water] purification [by electro-osmosis]. R. H. KEAN, Assr. to GEN. ZEOLITE CO. (U.S.P. 1,840,105, 5.1.32. 15.3.28).—The average concn. of OH' in all the cathodic compartments of a series of electro-osmotic cells is maintained at a val. > 3 times the initial concn. of electrolytes in the liquid, *e.g.*, H₂O, to be purified. A total vol. of wash-H₂O = 0.25—1.75 times the vol. of H₂O being treated is employed, and the [OH'] of the cathodic wash-H₂O and the [H'] of the anodic wash-H₂O are increased by addition of suitable materials. J. S. G. T.

Apparatus for electro-osmotic purification of liquids, in particular of water, placed in a centre space separated by means of diaphragms from the electrodes. SIEMENS-ELEKTRO-OSMOSE G.M.B.H. (B.P. 377,826, 24.8.31. Ger., 23.8.30. Addn. to B.P. 339,673; B., 1931, 258).—An arrangement enabling the pipes for supplying liquid to the centre and electrode spaces to be made straight and short, and thereby reducing the possibility of their becoming obstructed, is claimed. J. S. G. T.

Apparatus for irradiating liquids. G. TIXIER (B.P. 376,996, 29.8.31. Fr., 30.8.30. Addn. to B.P. 356,083; B., 1931, 1016).—Means are provided whereby delivery of liquid from the const.-level device is more precisely regulated and the liquid more uniformly submitted to the action of the rays. J. S. G. T.

Treatment of impregnated insulation. F. L. DAMARIN and D. A. HARPER, Assrs. to BROWN & CAINE (CHICAGO DIVISION) OF TUNG-SOL LAMP WORKS, INC. (U.S.P. 1,839,868, 5.1.32. Appl., 16.12.29).—Paper or other insulating material is impregnated with a wax-like compound, *e.g.*, hexachloronaphthalene, saturated with oil heated at 129—157°. J. S. G. T.

Manufacture of flexible electrical insulating materials. D. TRAILL, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 377,688, 27.4.31).—Cellulose ethers which are insol. and do not swell in H₂O are worked up with known plasticisers (aromatic polyethers of polyhydric alcohols); fillers and volatile solvents may be added. J. S. G. T.

Pressure-equalising material and insulating adhesive for submarine electric-signalling cables. ELECTRICAL RESEARCH PRODUCTS, INC., Assees. of A. R. KEMP (B.P. 378,502, 13.5.31. U.S., 14.5.30).—Cables are covered or impregnated with a mixture containing a polymerised terpene hydrocarbon, more especially a dipolymeride, *e.g.*, polymerised turpentine or pine oil, and a gum composed largely of hydrocarbon of the type (C₅H₈)_n, *e.g.*, balata or rubber. J. S. G. T.

Negative electrodes for electric accumulators. A. POUCHAIN (B.P. 379,468, 16.7.31. It., 16.7.30. Addn. to B.P. 282,449).

Gaseous-conduction electric lamps. BRIT. THOMSON HOUSTON CO., LTD., Assees. of D. MCF. MOORE (B.P. 377,726, 27.3.31. U.S., 31.3.30).

Electric-discharge devices. BRIT. THOMSON-HOUSTON CO., LTD., Assees. of G. K. KALLENBACH (B.P. 379,889, 8.10.31. U.S., 8.10.30).

Cathodes for electric-discharge devices. C. STANSBURY (B.P. 379,823, 22.7.31. U.S., 8.8.30).

[Electrical] light-sensitive device [cell]. F. H. CONSTABLE, and RADIOVISOR PARENT, LTD. (B.P. 379,398, 2.6.31).

Electrolytic condensers. N. V. PHILIPS' GLOEI-LAMPENFABR. (B.P. 379,613, 26.1.32. Ger., 13.2.31).

Treatment of hydrocarbons. Testing products of combustion.—See II. Treating fibres.—See VI. Deoxidiser for transformers. ThO_2 sols.—See VII. Alkali metal by electrolysis. Cr-plate.—See X.

XII.—FATS; OILS; WAXES.

Fractional saponification of fats. III. Detection of the adulterants of lard. IV. Detection of the adulterants of butter. E. DE'CONNO and L. FINELLI (Annali Chim. Appl., 1932, 22, 407—416, 417—426; cf. B., 1931, 849).—III. By fractional saponification it is possible to detect the presence of vegetable oils in lard. From the saturation equiv. the mol. wt. of the insol. non-volatile fatty acids from the saponified and unsaponified glycerides is calc. and the difference of the vals. is taken. The difference is < 60 in presence of adulterants. The presence of coconut oil can be substantiated by taking the difference of the I vals. determined on the insol. non-volatile acids obtained from the saponified and unsaponified fraction. The difference for genuine lard is about 17.

IV. The above test cannot be applied to the detection of margarine in butter. If the adulterant is coconut oil, the difference between the average mol. wts. of the non-volatile insol. fatty acids from the saponified and unsaponified fraction is < 22 . Coconut fat gives a difference of about 1. O. F. L.

Amidic saponification of fats. II. E. DE'CONNO and L. TARSITANO (Annali Chim. Appl., 1932, 22, 433—440).—Fats heated at 230° in an evacuated Carius tube with *m*-xylydine, *p*-anisidine, or *p*-phenetidine become partly hydrolysed. Glycerides of saturated acids react more easily as is shown by the low I val. of the mixture of the acids obtained by the hydrolysis of the purified product of the reaction. For the different bases used, the greater is the mol. wt. the greater is the amount of fat escaping hydrolysis, and, correspondingly, the lower is the I val. of the mixture of the acids obtained from the saponification of the substituted amides. O. F. L.

Application of ethylene glycol monoethyl ether [Cellosolve] to the analysis of fats. E. JAFFE (Annali Chim. Appl., 1932, 22, 426—433).—Cellosolve may be used in the prep. of reagents for the analysis of fats instead of EtOH , Et_2O , and other ordinary org. solvents. Its application to the determination of the acid val., the sap. val., and the colour reactions, and in the microscopical examination of fat crystals is described. O. F. L.

Determining the viscosity of oils. A. C. GALLETI (L'Ind. Chimica, 1932, 7, 874—876).—Strips of specially thick filter-paper, 20×1 cm., are immersed to a depth of 1 cm. in the oil in a test-tube in the dark, the air in the tube having been displaced by CO_2 . The height to which the oil rises gives a measure of the viscosity. Adulteration of olive oil is thus detectable. T. H. P.

Retention of solvents [by waxes]. L. IVANOVSKY (Chem. Listy, 1932, 26, 331—332).—The retardation of velocity of evaporation of solvents is a function of the concn. and nature of the wax dissolved in them. R. T.

Retention of solvents as a characteristic of waxes. L. IVANOVSKY (Chem. Listy, 1932, 26, 332—335).—The curves representing rate of evaporation of petrol (b.p. 150 — 195°) solutions of paraffin wax (*A*), beeswax (*B*), carnauba wax (*C*), and ozokerite (*D*) are characteristic for a given wax. For mixtures of *A* with *B* or *D* a min. exists on the curves; in the case of *D* this phenomenon can be applied to the evaluation of its degree of purity. For mixtures of *A* with lignocere or *C* no minima are found, the vals. being the sum of those for each constituent separately. R. T.

Cracking of palm oil.—See II. Oil vapours as germicides.—See XXIII.

PATENTS.

Rotary boilers or the like in which whale, fish, or other animals are treated in connexion with the production therefrom of oil or other products. A./S. KVÆRNER BRUG (B.P. 376,515—6, 28.7.31. Norw., 29.7.30).—(A) The cover of the feed-opening of the outer boiler casing is mounted internally in a dome, so as to slide horizontally to open. The cover of the inner drum is mounted so as to swing up into the dome on opening and thus act as a guide for the material during charging. (B) Driving mechanism for the drum is claimed. E. L.

Liquid halogenated esters of fatty acids. N. A. HANSEN and D. L. TABERN, ASSTS. to ABBOTT LABORATORIES (U.S.P. 1,840,034, 5.1.32. Appl., 13.8.28).—Brominated or iodised alkyl (Et, allyl, etc.) esters of fatty acids from cottonseed or lard oil have a low η and are opaque to X-rays, and hence are useful for therapeutic purposes. Methods of prep. are given. E. L.

Manufacture of soap. K. LÖFFL (B.P. 376,287, 27.3.31).—Saponification is performed under pressure (8 atm.) in a vessel fitted with an inclined bottom and agitating gear; the soap is separated from the lye in another vessel, and heated under pressure before spraying into a specially designed 2-stage air-drying chamber. E. L.

Separation of impurities from vegetable and animal fatty oils. J. Y. JOHNSON. From I. G. FARBERIND. A.-G. (B.P. 377,336, 11.5.31. Addn. to B.P. 341,390; B., 1931, 355).—The oils are emulsified with aq. H_3PO_4 (about 1% of 10—65% acid) at 15 — 45° and are rapidly heated to between 55° and 120° , with or without the addition of H_2O or of alkali ($<$ the equiv. of the acid). Any acid or mucilage remaining in the cleared oil after settling may be removed by treatment with aq. NH_3 . E. L.

Saponification of spermaceti and spermaceti oil. F. B. DEHN. From DEUTS. HYDRIERWERKE A.-G. (B.P. 377,536, 13.11.31).—Spermaceti (oil), after saponification with about 30% of H_2SO_4 , is readily saponified by boiling with caustic lye; the resultant soap mixture is used for toilet soaps, solvent soaps, etc. E. L.

Improvement of waxes and substances of waxy consistency. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 377,776, 26.5.31).—The melted wax is distributed over a chilled revolving roller (20—70° below the m.p. of the wax), the cooled wax being thus obtained as thin scales or leaflets. E. L.

Bleaching of oils, fats, and waxes. J. E. RUTZLER, JUN., V. R. KOKATNUR, and P. E. ROLLHAUS, Assrs. to PILOT LABORATORY, INC. (U.S.P. 1,838,707, 29.12.31. Appl., 9.4.28).—Fatty oils (etc.) are treated at 60—125° with an org. (fatty acid, Bz) peroxide in the presence of Ca(OH)₂, which promotes the evolution of O₂ from the peroxide. E. L.

Machines for extraction of oil from seeds, nuts, and the like. C. T. GRENON (B.P. 379,294, 22.5.31).

Oxidisable org. compounds. Wetting etc. agents. Emulsions.—See III. [Oil from] edible products.—See XIX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

"Livering" of paints. M. H. FISCHER and W. J. SUER (Kolloid-Z., 1932, 60, 71—77).—The increase in viscosity and tendency to solidify ("livering") is due to a colloid-chemical change involving solvation; it depends on the availability of fatty acids and on the reactivity of the pigment bases towards them, with the formation of heavy-metal soaps. A little stearate has more influence than a large amount of oleate; among bases, Al has the greatest influence in view of the high solvation capacity of Al soaps. E. S. H.

Problem of pigment extenders. H. WOLFF and G. ZEIDLER (Farbe u. Lack, 1932, 437—438, 451—452).—Addition of inert pigments and extenders may considerably influence the properties of a paint, since the particles affect the % of "free oil," thereby producing a smaller or greater divergence from the optimal crit. oil val. (B., 1932, 194). Paints made from 2 samples of Sb-white showed min. oil absorption and max. rust protection with generally about 20% of barytes. The figure varies with the light and other conditions of exposure, because in some cases the rust-protective effect increased up to 60% of barytes. The behaviour of a third sample of Sb-white was not, however, affected by barytes. S. M.

Earth colours. W. A. STOREY (J. Oil Col. Chem. Assoc., 1932, 15, 33—54).—Various methods of formation of sedimentary rocks containing Fe are described. An account is given of the geographical distribution, prep., and chemical constitution of ochres, red Fe oxides, and umbers. Typical analyses are included as well as details for the determination of Pb, Cu, Mn, staining power, and oil absorption. S. M.

Influence of humidity in the fading of lake colours. A. HANCOCK (J. Oil Col. Chem. Assoc., 1932, 15, 207—229).—A no. of lakes pptd. on Al(OH)₃ and/or BaSO₄ were applied as aq. pastes on glass slides (preferably without any added adhesive) and after drying were subjected to the fading action of a quartz-Hg arc lamp, using various heat screens, in dry and humid atm., and also with small amounts of acid and alkali in the atm. The results are fully detailed and graphed.

The behaviour as to effects of moisture, acidity, alkalinity, and substratum is shown to be characteristic of the dyes used, no generalisations being possible.

S. S. W.

Bloom-free varnishes. H. NOLTE (Farbe u. Lack, 1932, 413—414, 425—426, 439—440).—The blooming of varnishes is discussed and distinguished from other factors which produce loss of gloss. Whilst the causes of blooming are not yet understood, experiments show that it is promoted by: moisture and foul atm., especially those containing NH₃ or SO₂; damp surfaces; thick films (several thin films gave less blooming than one thick film of same depth); incompletely oxidised undercoats; the presence of albuminous matter or free acids in the oil; acidic resins (esterified resins have greater effect than Ca-hardened resins); excess of driers; tung oil (in linseed oil-tung oil mixtures the effect is approx. proportional to the tung oil content and is not influenced by the cooking temp.); summer exposures. Details are given for the prep. of non-blooming oil varnishes from kauri and Sierra Leone copals, pontianak, and Albertols. S. M.

Testing and evaluation of nitrocellulose lacquers. L. IVANOVSKY (Farbe u. Lack, 1932, 448—450).—The analysis and testing of nitrocellulose lacquers is discussed; simple apparatus is described for preparing uniform films and for determining their elongation, elasticity, breaking load, flexibility, and hardness. S. M.

Accelerated ageing tests for furniture finishes. I. R. BURNS. II. G. G. SWARD (Amer. Paint Varnish Mfrs. Assoc. Circ., 1932, No. 408, 104—112, 113—119).—Test cycles are specified. CH. ABS.

Synthetic resins. New methods of preparation. A. BRESSER (Brit. Plastics, 1932, 4, 105, 112).—Existing views on the mode of formation of PhOH-CH₂O-type resins are summarised. The disadvantage of earlier methods of prep., that colloidal particles of resin coalesce, absorbing solvent, PhOH, and/or CH₂O, which are difficultly removed, is overcome by the modern use of protective colloids which prevent undesired increase of particle size in the disperse phase while maintaining the resin in emulsion form for an indefinite period. S. S. W.

Aluminium powder and colour bronzes in the paint industry. H. RABATÉ (Rev. Aluminium, 1932, 9, 1789—1820, and Peint., Fig., Ver., 1932, 9, 40—50, 61—71, 79—84, 97—105, 114—116, 134—138, 154—159).

Transmission of light [by paints].—See I. **Salts of naphthenic acids.**—See III.

PATENTS.

Retarding the formation of rust on iron surfaces. R. J. KNIGHT (B.P. 377,484, 9.9.31).—The surfaces are coated with a paint comprising KOH (10 oz.) dissolved in EtOH (1 gal.) and added to an asphaltic-base paint (30 gals.). H. R.-D.

Printing inks. N. DREY and I. FREDLAND (B.P. 376,413, 5.5.31).—A natural resin, e.g., shellac, manila, rosin, is dissolved in EtOH (industrial), an alkyl hydroxy-amine, e.g., triethanolamine, is added, suitable

pigments or dyes and, if desired, a thickener, *e.g.*, casein, are incorporated, and the whole is diluted with H_2O .
S. S. W.

Stamping ink for wood pads. J. EHRLICH (B.P. 376,612, 12.11.31. Austr., 27.11.30).—Such inks contain one or more liquid non-hygroscopic substances other than oils or fats, *e.g.*, Et phthalate or other cellulose ester softeners, and do not soften rubber nor warp wood.
S. S. W.

Preparation of pigmented bases of nitrocellulose, cellulose acetate, and the like. W. BUTLER & Co. (BRISTOL), LTD., and ROBINSON BROS., LTD. (B.P. 376,989, 20.8.31. U.S., 13.10.30).—A non-aq. mixture of a relatively large amount of pigment, a relatively small amount of a fibrous cellulose derivative, and a solvent therefor, *e.g.*, EtOAc, with or without a diluent, *e.g.*, EtOH, is kneaded for prolonged periods, the viscosity of the mixture being such that the pigment is dispersed and flocculation prevented. The ingredients may be admixed in one or more stages.
S. S. W.

Manufacture of lacquers, films, plastics, etc. DEUTS. HYDRIERWERKE A.-G. (B.P. 375,067, 10.6.31. Ger., 18.6.30).—Dihydrodioxoles carrying hydroxylated substituents are used as plasticisers for cellulose derivatives. They assist the incorporation of caoutchouc with cellulose esters. Suitable dioxoles are 3:3-pentamethylene-5-hydroxymethyldioxole (from cyclohexanone and glycerol) and its Me homologue. C. H.

Production of artificial resins. W. W. TRIGGS, From TOLEDO SYNTHETIC PRODUCTS, INC. (B.P. 376,807, 8.4.31).—A mixture of $CO(NH_2)_2$ (1 mol.) and CH_2O (1.05—1.55 mols.) in aq. acid solution is maintained at p_H 4—7 at 30° until reaction is completed, when the solution is evaporated at 60° to obtain the dry reaction product, fillers, plasticisers, and colouring materials being introduced if desired, and the product moulded under heat and pressure.
S. S. W.

Synthetic resin compositions. BRIT. THOMSON-HOUSTON Co., LTD., Assees. of R. H. KIENLE (B.P. 376,332, 31.3.31. U.S., 1.4.30).—Cellulose esters or ethers, *e.g.*, nitrocellulose, are mixed with the drying, or semi-drying oil-modified "alkyd" resins described in B.P. 370,440 (B., 1932, 614).
S. S. W.

Production of synthetic resins from alcoholamines and organic acids. CHEM. FABR. DR. K. ALBERT GES.M.B.H. (B.P. 376,929, 23.6.31. Ger., 19.9.30).—One or more alcoholamines, *e.g.*, mono-, di-, or tri-ethanolamine, together with polyhydric alcohols, *e.g.*, glycerol, if desired, are heated with polybasic carboxylic acids or anhydrides, *e.g.*, adipic acid, phthalic anhydride. The products may be used as softening agents for artificial or natural resins, accelerators for vulcanisation, etc.
S. S. W.

Manufacture of synthetic resins. BRIT. CELANESE, LTD. (B.P. 376,839, 7.11.30. U.S., 7.11.29).—A dihydroxybenzophenone (preferably with one OH group in each C_6H_5 nucleus) is condensed with CH_2O or other aldehydic substance, *e.g.*, hexamethylenetetramine, in the presence of a (preferably acid) catalyst, *e.g.*, HCl, H_2SO_4 , or H_3PO_4 . The resin obtained may be incorporated with cellulose derivatives, *e.g.*, the acetate,

plasticisers, solvents, diluents, colouring materials, etc., particularly for use in reinforced glass.
S. S. W.

Resinous condensation products and coating compositions. H. D. ELKINGTON. From COOK PAINT & VARNISH Co. (B.P. 377,587, 11.2.32).—A mixture of oxidised drying oil (1 pt.), *e.g.*, oxidised linseed, tung, or fish oils, with a phenol (approx. 1 pt.), *e.g.*, PhOH, cresol, cyclohexanol, an alkaline catalyst, *e.g.*, aq. NH_3 , Na_2CO_3 , an aldehyde (1— $\frac{1}{2}$ pt.), *e.g.*, CH_2O , PhCHO, and a natural resin ($\frac{1}{2}$ — $\frac{1}{8}$ pt.), *e.g.*, rosin, manila, is heated at 90—100° and H_2O is removed. The condensation product is sol. in drying oils, hydrocarbons, etc. to give varnishes.
S. S. W.

Manufacture of resinous polymerisation products. I. G. FARBENIND. A.-G. (B.P. 376,479 and Addn. B.P. 376,481, [A] 25.6.31, [B] 26.6.31. Ger., [A] 25.6.30, [B] 26.7.30).—(A) Mixtures of a non-resinous polymerisable compound containing a non-conjugated olefinic linking, *e.g.*, vinyl esters, styrene, acrylic esters, with an ethylenic $\alpha\beta$ -dicarboxylic acid or its anhydride or other derivative, *e.g.*, maleic anhydride, are polymerised by known methods, *e.g.*, by heating at 50—150° in the presence of a trace of Bz_2O_2 . (B) The products from (A) are caused to react further with compounds capable of reacting with CO_2H or anhydride groups, *e.g.*, alkylating or amidating agents, polyhydric or polymeric alcohols, phenols, etc.
S. S. W.

Coating of resinous products with metal. INTERNAT. GEN. ELECTRIC Co., INC., Assees. of ALLGEM. ELEKTRICITÄTS-GES. (B.P. 377,556, 17.12.31. Ger., 17.12.30).—Hardened, artificial resinous substances are treated with a flexible intermediate layer comprising vinyl polymerides, loaded with fillers, and metal is applied, preferably by the Schoop process.
S. S. W.

Manufacture of plastic materials. DEUTS. GAS-GLÜHLICHT-AUER-GES.M.B.H. (B.P. 377,265, 17.4.31. Ger., 17.4.30).—Oils containing glycerides of unsaturated acids, *e.g.*, olive or linseed oil, are oxidised, *e.g.*, by $KMnO_4$, HNO_3 , O_3 , and the oxidation products, saponified if desired during or after the oxidation, are condensed with polyhydric alcohols, *e.g.*, glycerol, after removal of monocarboxylic acids by known methods.
S. S. W.

Plastic product. SOC. DES. BREVETS ÉTRANGERS DE LA NEOXYLE (B.P. 377,830, 4.9.31. Fr., 24.1.31).—Cellulosic filling materials are introduced into a mixture of dil. H_2SO_4 , dil. HCl, and a colloid, preferably a jellyfied carbohydrate, *e.g.*, starch; CaO and ZnO mixed with Al powder (as catalyst) are then incorporated. A compound, $Ca_4O_3H_2Cl_5Zn_3SO_4$, is formed in the filler, to which, if desired, 10—20% of pectic acid may be added to increase the plasticity of the mass.
S. S. W.

Manufacture of thermoplastic materials or articles comprising a cellulose derivative. GRAMOPHONE Co., LTD., S. WHYTE, and W. E. LORD (B.P. 377,809, 15.7.31).—A resin, *e.g.*, red acaroid, and a cellulose derivative, *e.g.*, the acetate, are mixed while hot, the mass is cooled and finely ground, and plastifier and, if desired, fillers, pigments, dyes, etc. are incorporated. The mixture is ground and "hot-rolled" at 260—320°.
S. S. W.

Manufacture of cold-moulding compositions. BAKELITE CORP., Assees. of C. A. NASH and R. S. DANIELS (B.P. 376,825, 16.4.31. U.S., 17.4.30).—Mixtures of a filler, e.g., an abradant grit, a potentially reactive phenolic resinoid in the A-stage, and a non-reactive high-b.p. solvent, e.g., "Cellosolve," are claimed for use where cold-moulding is required, e.g., in the manufacture of grinding wheels. S. S. W.

Manufacture of shaped masses. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 376,276, 27.3 and 5.9.31).—Moulded mixtures of montan wax (bleached with $\text{CrO}_3\text{-H}_2\text{SO}_4$, and esterified with ethylene glycol) and, if desired, other hard waxes, e.g., carnauba, candelilla, or shellac wax, with 10—1000 wt.-% of inert, finely-divided, inorg. or org. fillers, e.g., pptd. CaCO_3 or BaSO_4 , quartz powder, cotton waste, wood meal, sugars, etc., are claimed. S. S. W.

Accelerating the thorough hardening of masses made of casein and other protein substances. INTERNAT. GALALITH-GES. HOFF & Co. (B.P. 377,205, 20.4.31. Ger., 8.9.30).—"Proteinoplasts" are hardened by the action of an alkali-metal (including NH_4) salt, preferably a chloride, together with or followed by CH_2O . S. S. W.

Esters of H_3PO_4 , etc.—See III. Ti compounds.—See VII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Latex-like dispersions of reclaimed and masticated rubber. P. D. PATTERSON (Trans. Inst. Rubber Ind., 1932, 8, 80—99).—Details are given of various processes for effecting the dispersion of crude or reclaimed rubber in H_2O , particular attention being given to the use of alkaline dispersing agents, e.g., oleic acid and casein conjointly with NH_3 . The use of reclaim dispersions for various purposes such as for addition to latex, compounding mill mixings, and prep. of moulding powders and their prep. as a stage in the separation of rubber from scrap rubber fabric or in the refining of reclaimed rubber are indicated. D. F. T.

Heat-treatment and polymorphism of gutta-percha and balata. J. N. DEAN (Trans. Inst. Rubber Ind., 1932, 8, 25—37).—The hydrocarbon of balata or gutta-percha is polymorphic, the common β -form being metastable and convertible into the stable α -modification by heat-treatment. For this reason the curve for the change in sp. gr. on heating does not coincide with the cooling curve, and, below 52° (the β softening point), a sudden rise of temp. causes an initial abnormal expansion which subsequently decreases. The two modifications differ in hardness, d , n , solubility, and X-ray pattern, but the tensile qualities are similar. The heat-treatment which effects the $\beta \rightarrow \alpha$ conversion also reduces the tendency of additions, e.g., of petroleum jelly, to exude and permits the improvement of electrical qualities by such additions. Practical methods of heat-treatment are described. D. F. T.

Refractometry of the hydrocarbons and rubber and gutta-percha. F. KIRCHHOF (Kautschuk, 1932, 8, 137—142).—The n_D of natural rubbers is influenced

by the non-caoutchouc constituents, the val. for *Hevea* rubber being raised by COMe_2 extraction whereas that of Congo rubber is depressed. After extraction, the n_D of different types of rubber shows slight variations, e.g., 1.5215—1.5238, caused probably by insol. non-caoutchouc impurities and by differences in degree of polymerisation; the gel constituent of *Hevea* or Congo rubber also has a higher n_D than the corresponding sol constituent, the vals. for the latter being the more uniform. Prolonged mastication of rubber causes a distinct reduction in n_D , as also does heating at 120° , but heating of purified gutta-percha effects an increase. The reduction in viscosity of a rubber solution after heating is accompanied by a decrease in n_D , but any gelatinised portion which separates during the heating is more refractive than the dissolved rubber. The divergence in n_D between *Hevea* and Congo rubber is attributed in part to constitutive difference, the latter being more prone to cyclisation. D. F. T.

Specific gravity of rubber before and after vulcanisation. B. S. KREPS (India-Rubber J., 1932, 84, 293—294).—Results are cited demonstrating that hot vulcanisation of rubber in a hand press is invariably accompanied by contraction and consequent increase in sp. gr. This increase does not depend on the fillers present, but is proportional to the amount of rubber present and to the degree of vulcanisation; ingredients such as ZnO which promote vulcanisation may in that manner influence the change in sp. gr. D. F. T.

Reinforcing action and other properties of titanium fillers in rubber stocks. W. H. BODGER and F. H. COTTON (Trans. Inst. Rubber Ind., 1932, 8, 16—24).—Ti-white, containing 74% BaSO_4 in intimate association with TiO_2 , is superior to TiO_2 itself in its reinforcing effect in rubber whether vulcanised with the aid of diphenylguanidine or of mercaptobenzthiazole, but TiO_2 confers better pigmentary and H_2O -resisting properties. The Ti fillers do not activate org. accelerators; in their influence on the ageing properties of the products they are approx. comparable with ZnO. D. F. T.

Baling of raw rubber. B. J. EATON (J. Rubber Res. Inst. Malaya, 1932, 4, 76—80).—Hessian (treated with a paste of Na silicate and starch) or "grass" matting are quite suitable baling materials. A latex-treated hessian would also have advantages. D. F. T.

Determination of hardness of rubber articles. A. GOTTSCHALK (Kautschuk, 1932, 8, 144—145).—Three recognised methods for the measurement of hardness of rubber, based on the degree of penetration of a steel sphere bearing a load, are reviewed. A diagram is given showing the relation between the results with two of the methods. D. F. T.

The most economic steam pressure for vulcanisation. E. PRAETORIUS (Gummi-Ztg., 1932, 46, 1521—1522, 1551—1552).—Various factors influencing the practical effectiveness and uniformity of steam-vulcanisation, e.g., rate of flow, pressure fluctuation, superheat, wetness of steam, and heat yield at various pressures, are considered. No unqualified statement as to the best pressure, regardless of works' conditions, is possible. D. F. T.

Influence of temperature on evolution of hydrogen sulphide from vulcanised rubber. A. D. CUMMINGS (Bur. Stand. J. Res., 1932, 9, 163—174).—Samples of vulcanised rubber containing from 8 to 32% S were heated step by step from 105° to 265°; also samples containing 4, 10, 18, and 32% S were heated for 200 days at 136° and for the same period at 220°. The rate of evolution of H₂S increases with rise in temp., except in the case of compounds rich in S, when it passes through a max.; on prolonged heating rubbers having the higher S content gave off relatively the more H₂S. The characteristics of the rubber after heating are discussed. W. R. A.

Chlorinated rubber and its applications. J. G. FOL and A. B. BJEL (Chem. Weekblad, 1932, 29, 448—449).—A sample of torresite heated in a current of N₂ at 130° yielded a distillate of almost pure CCl₄ and 8.6% HCl. The sample contained 67.9% Cl, and on heating at 240—250° 46.3% was evolved as HCl. H. F. G.

PATENTS.

Manufacture of sheet rubber. P. SCHIDROWITZ, M. W. PHILPOTT, and R. M. UNGAR (B.P. 376,318, 9.1.31).—A light, rigid, and non-crackable rubber sheet for flooring and similar purposes comprises rubber (*e.g.*, 120 pts.), a light filler, *e.g.*, ground cork or jute (150—260 pts.), and a mineral filler (*e.g.*, 24—80 pts.), including ZnO (10—40 pts.). The mixture is vulcanised and then cooled under pressure, or may be successively shaped, vulcanised, and pressed (*cf.* B.P. 370,578; B., 1932, 615). D. F. T.

Manufacture of threads or strips of rubber or the like. U. PESTALOZZA, and SOC. ITAL. PIRELLI (B.P. 376,973, 4.8.31).—Sheets of rubber obtained from rubber latex or similar aq. dispersion and still retaining in the coagulated condition a high proportion of H₂O, *e.g.*, 20—60%, are cut on a rotating cylinder, the freshly-cut threads or strips being so supported during their relative movement away from the circular cutting knives that the light adhesion of the cut surfaces temporarily reunites the material and renders it capable of being handled as a unitary sheet during subsequent operations, *e.g.*, dehydration and vulcanisation, but permits the individual strips or threads to be separated when required. During or immediately after cutting, the new surfaces may be wetted with a liquid adapted to reduce their possible excessive mutual adherence, *e.g.*, with a conc. sol. of glucose or dextrin. D. F. T.

Manufacture of [porous or micro-porous] rubber or similar material. DUNLOP RUBBER CO., LTD., ANODE RUBBER CO., LTD., and E. W. MADGE (B.P. 377,751, 4.5.31).—Natural or artificial aq. dispersions of rubber or similar material are coagulated or gelled by addition of one or more aromatic disubstituted guanidines, *e.g.*, NH₂C(NHPh)₂, and then heating, subsequent vulcanisation being effected under such conditions as to prevent evaporation of the liquid in the pores or micro-pores. D. F. T.

Manufacture of goods of or containing rubber. DUNLOP RUBBER CO., LTD., ANODE RUBBER CO., LTD., E. A. MURPHY, A. NIVEN, and D. F. TWISS (B.P. 379,311,

26.5.31).—The flocculent or granular ppt. obtained by suitable coagulation of a diluted aq. rubber dispersion is consolidated by filtration or felting operations, the compact mass being subsequently moulded before or after drying. The granular ppt. may be used for bonding fibrous or divided material, *e.g.*, leather fibre or cork. D. F. T.

Compounding of rubber. GOODYEAR TIRE & RUBBER CO., Assees. of E. C. GAGNON (B.P. 378,197, 30.7.31. U.S., 29.10.30).—A plasticising agent is first incorporated with the rubber and pigments, inorg. reinforcing agents, etc. are subsequently added. Alternatively, a stock prepared by adding, *e.g.*, 40 pts. of C black to a mixture of 55 pts. of rubber and 5 pts. of pine tar is mixed with more rubber, fillers, and vulcanisers. L. A. C.

Composite [rubber] product and its manufacture. B. S. GARVEY, Assr. to B. F. GOODRICH CO. (U.S.P. 1,810,560, 16.6.31. Appl., 9.2.29).—Rubber is rendered resistant to oxidising agents and to oils if protected with rubber chloride. The surface is chlorinated by exposure to Cl₂, preferably in the presence of C₆H₆ vapour or other rubber solvent to assist penetration; alternatively, HCl may be applied, *e.g.*, in solution in H₂O or in an org. solvent. A coating of rubber chloride, containing any desired plasticising agent, *e.g.*, *o*-nitrodiphenyl ether, is then affixed either as sheet (the treated surface being further prepared, if desired, by coating with a solution of rubber chloride or wetting with a solvent), or in the form of solution. Coatings so applied are adherent and resistant to mechanical stresses. D. F. T.

Preparation [containing rubber] for sealing punctures in pneumatic tyres. J. W. WADE (B.P. 376,844, 21.4.31).—There is introduced into the inner tube a mixture of rubber (*e.g.*, 4 pts.) and coal-tar naphtha (*e.g.*, 4 pts.) with comminuted vulcanised rubber (*e.g.*, 2 pts.) containing a high % of rubber, such as ground inner tubes, similar crumb containing a high % of fillers (*e.g.*, ground tyre-treads, 4 pts.), and H₂O (10 pts.). D. F. T.

Production of masses, which are pervious to liquids and gases, from rubber and like substances. METALLGES. A.-G. (B.P. 376,432, 22.5.31. Ger., 26.5.30).—A porous mass, *e.g.*, of unworked rubber, containing granular or fibrous fillers which are separated from the binding medium by capillary inter-connecting interstitial spaces, is obtained by incorporating in a compounded aq. dispersion a disintegrated material of H₂O-repelling character, *e.g.*, SiO₂ gel or ebonite dust, and effecting delayed coagulation by adding, *e.g.*, a Zn NH₄ salt or a mixture of coagulant such as AcOH (buffered if desired) or ZnCl₂ together with a protective substance, *e.g.*, the Na salt of a complex arylsulphonic acid. The mixture is shaped or applied to a suitable base and the eventually gelled mass is vulcanised under conditions preventing the escape of H₂O. D. F. T.

Preservation of rubber and other oxidisable organic materials. GOODYEAR TIRE & RUBBER CO. (B.P. 376,818, 15.4.31. U.S., 24.5.30).—Antioxidants of the formula OH·R''·CRR'·R'''·OH, where R and R' are straight-chain hydrocarbon radicals and R'' and R'''

are benzenoid groups, obtainable by the condensation of a ketone and a phenol, are applied to the preservation of rubber and do not substantially affect light colours. The product from COMe_2 and PhOH in the presence of AcOH and conc. HCl at 50° (48 hr.) has m.p. 153—155°. D. F. T.

Reclaiming rubber [from admixture with cellulose]. RUBBER REGENERATING Co., Assees. of F. D. CHITTENDEN (B.P. 378,206, 11.8.31. U.S., 6.9.30).—The material, e.g., old tyres, is comminuted and incubated under suitable conditions with cellulose-decomposing organisms from septic tanks, river slime, etc. D. J. N.

[Apparatus for] manufacture of rubber chlorination products. NEW YORK HAMBURGER GUMMI WAAREN Co. (B.P. 378,272, 5.11.31. Ger., 10.11.30).— Cl_2 gas is injected through a no. of individually controllable nozzles into a solution of rubber in, e.g., CCl_4 , which is heated. The gaseous products are subjected to condensation, the HCl being absorbed by known means and free from Cl_2 because the gradual condensation of CCl_4 scrubs out the latter. The chlorinated rubber is recovered either by a dryer operating under vac. or by pptn. by a non-solvent, e.g., C_6H_6 . B. M. V.

Controlling kneading and mixing processes of rubber, rubber mixes, etc. CONTINENTAL GUMMI-WERKE A.-G. (B.P. 380,003, 22.3.32. Ger., 31.7.31).

Treating tacky materials.—See I. Vulcanisation accelerators. Anti-agers.—See III. Fibrous sheet.—See V. Rubberised fabric.—See VI. Abrasive article.—See VIII. Synthetic resins [for rubber etc.]. Plastics etc.—See XIII.

XV.—LEATHER; GLUE.

Ammonia method of determination of acidity in tan liquors. S. ZIABLITZKI (Vestn. Kozh. Prom. Torgov., 1931, 161).—Excess of 0.1N-NaOH is added, followed by 5 c.c. of 20% NH_4Cl , the NH_3 liberated being distilled into 0.1N-acid and the excess titrated. CH. ABS.

Hydrogenation method of determination of nitrogen in leather analysis. V. OPOTZKI and D. MIRLIS (Vestn. Kozh. Prom. Torgov., 1931, 294—297).—The method is quicker and simpler than the Kjeldahl method; the results are 2.2—2.8% higher. CH. ABS.

PATENTS.

Treatment of skins. SOC. ANON. PROGIL (B.P. 376,956, 20.7.31. Fr., 6.2.31).—Leather and skins are impregnated, before or after tanning, with a slightly alkaline emulsion of casein, to which may be added a fatty substance such as sulphuricoleic acid. D. W.

Tanning of hides. J. STARLING (B.P. 376,556, 29.9.31).—Tan liquors are circulated and heated by means of a portable apparatus comprising an elongated tubular casing provided at its lower end with a liquor inlet and at its upper end with an outlet and thermostatic control and surrounded by a heating coil. D. W.

Tanning of hides or skins. UNITED SHOE MACHINERY CORP., Assees. of M. M. MERRITT (B.P. 377,224 and 377,284, [A] 22.4.31, [B] 24.4.31. U.S., [A] 24.1.31, [B] 12.1.31. [A] Addn. to B.P. 361,344; B., 1932, 121).—(A) The hides or skins are spread on sheets of materials,

the marginal portions of which are flexible, which are supported by a travelling conveyor. (B) The hides or skins are slicked out, stretched upon a supporting surface, treated with a mineral or other tanning agent not of vegetable or animal origin, and after-treated with a conc. solution of a vegetable tanning agent. D. W.

Tanning process. ORANIENBURGER CHEM. FABR. A.-G. (B.P. 377,068, 27.11.31. Ger., 27.11.30).— CH_2O or one of its polymerides or an aldehyde of higher mol. wt. is partly combined with a nitrogenous base [NH_3 or $\text{CO}(\text{NH}_2)_2$] and the product containing a 50% excess of aldehyde is used for tanning. D. W.

Manufacture of tanning substances. J. R. GEIGY A.-G. (B.P. 375,160, 7.10.31. Ger., 10.11.30).—An arylsulphonic acid (or its condensation product with CH_2O or S_2Cl_2) is heated with CH_2O and an unsulphonated hydroxydiarylsulphone, e.g., the product from PhOH and 0.3 pt. of 60% oleum at 170 — 180° . Naphthalene-, tetrahydronaphthalene-, and crude cresol-sulphonic acids may be used. C. H.

Manufacture of a water-resistant protein adhesive. J. T. SHEVLIN (B.P. 376,748, 13.4.31).—The animal protein, e.g., casein, is dispersed in an aq. solution of alkali and mixed with a S derivative of CO_2 , e.g., CS_2 , thiocarbamide, K xanthate. D. W.

XVI.—AGRICULTURE.

Microbiological population of peat. S. A. WAKSMAN and E. R. PURVIS (Soil Sci., 1932, 34, 95—113).—Cellulose-decomposing bacteria occur in low-moor, forest, and high-moor peats. The unfavourable reaction of the latter and the resistant nature of the cellulose and hemicelluloses of sphagnum plants account for their slow disintegration in the peat. Micro-organisms, principally bacteria, are mainly responsible for formation of and transformations in peats. A. G. P.

Organic matter as a factor in the classification of soils of dry regions. C. F. SHAW (J. Amer. Soc. Agron., 1932, 24, 565—577).—In regions of periodic pptn., with hot dry summers and cool moist winters, the org. matter of soils is not a dominant factor in determining soil colour and is only of minor importance in the characterisation of soil profiles. In such soils profile development is largely controlled by the mineralogical composition of the parent material, the degree of oxidation of metals (especially Fe), the intensity and duration of leaching, and the extent of the downward migration and accumulation in subsoils of colloidal clays and cementing materials. A. G. P.

Single-value soil properties of tropical soils. J. CHARLTON (Indian J. Agric. Sci., 1932, 2, 62—85).—Interrelationships between sticky-point moisture, loss on ignition, and H_2O content of soils in equilibrium with an atm. of 50% R.H. are examined. Among these properties the correlation between the first two named is the only one relatively free from the influence of the replaceable bases present. A. G. P.

Physico-chemical changes accompanying the process of reclamation in alkali soils. D. SINGH and S. D. NIJHAWAN (Indian J. Agric. Sci., 1932, 2, 1—18).—The ratio of Na to Ca or of univalent to bivalent bases

in the exchange complex of these (*kallar*) soils is a measure of their unsatisfactory properties, and reclamation consists essentially in replacing the excessive Na present by Ca. The dispersion coeff. (Puri; B., 1931, 36) may be used for determining the relative amounts of exchangeable Na and Ca. A. G. P.

Soil respiration. F. B. SMITH and P. E. BROWN (J. Amer. Soc. Agron., 1932, 24, 577—583).—The methods of Lundegardh (B., 1927, 121) and of Humfeld (B., 1930, 876) for determining respiration rates in soil yield vals. exhibiting no apparent relationship. Evidence is advanced indicating that the downward diffusion of CO₂ in soils and the removal of CO₂ in drainage waters markedly influence respiration rates. CO₂ production was highest in surface soils and adsorption occurred in subsoils. Soil respiration is not a simple diffusion of CO₂ through soil and cannot be an accurate measure of the rate of CO₂ production. A. G. P.

Manometric apparatus for mechanical analysis of soils and other disperse systems. A. N. PURI (Soil Sci., 1932, 34, 115—121).—Apparatus based on the principle of the differential liquid manometer is described. A. G. P.

Suitability of soils for making irrigation engineering works exposed to water. J. CHARLTON (Agric. Live Stock India, 1931, 1, 119—127).—Sticky ("kyatti") soils shaken with 10 × wt. or 15 × vol. of H₂O form relatively stable suspensions as a result of the alkali which they contain. For comparative tests suspensions are decanted into graduated tubes and the depth of settled soil is measured after 8 hr. at 4 in. depth. The use of a 1:1 mixture of H₂O and 1% phenolphthalein solution in EtOH for preparing suspensions does not markedly affect the rate of sedimentation and gives an approx. indication of the alkali contents of the soils. A. G. P.

Suitability of soils for making irrigation works exposed to water. J. CHARLTON (Agric. Live Stock India, 1932, 2, 290—296).—The field method for determining the tendency to stickiness in soils (cf. preceding abstract) is elaborated for more detailed investigations. The "coeff. of dispersion" is represented as $100 \times (\text{dispersion of silt and clay in natural soil}) / (\text{dispersion of silt and clay after exhaustive treatment with NaCl})$. Dispersion is determined by shaking soil (without pretreatment) with H₂O for 24 hr. and separating silt and clay fractions by the customary method of mechanical analysis. Much of the fraction recorded as silt in the natural soil appears as clay after NaCl treatment. Soils having coeff. of dispersion < 60% do not show unsuitable stickiness. Soils presenting difficulty in irrigation works are also associated with replaceable Na contents of > 45 milliequiv. per 100 g. dry soil. The ratio replaceable Na/total replaceable bases is not a measure of this undesirable property, even in carbonate-free soils. A. G. P.

Measuring the salinity of irrigation waters and of soil solutions with the Wheatstone bridge. C. S. SCOFIELD (U.S. Dept. Agric. Circ., 1932, No. 232, 16 pp.).—Convenient apparatus and technique are described. In saturated soils having sp. conductance ($K_s \times 10^5$ at

25°) < 200, the salinity of the soil solution is generally below the limit of tolerance of crops. In productive soils the val. averages 50—100. A. G. P.

Lysimeter studies. I. Moisture percolation through the soil profile. J. S. JOFFE (Soil Sci., 1932, 34, 123—143).—Percolation of H₂O through the A₁- and A₂-horizons is controlled by the condition of the soil colloids. In the B-horizons H₂O movements are mainly in a horizontal direction. The "effective pptn." (viz., that which produces leachings) is more closely related than the total pptn. to crop production. A. G. P.

Potassium in soil solutions. G. BARBIER (Compt. rend. Acad. Agric. France, 1932, 18, 695—698).—The concn. of K in soil solutions depends on the ratio of K : Ca in the adsorptive complex and on the amount of other salts in the soil solution. In unmanured soils the ratio of K : Ca in the soil solution is less variable than in manured soils. Calculations of the K requirements of soils cannot be based on the [K] of aq. extracts of soils or the exchangeable K content of the soil alone. Use of the latter must be supplemented by determinations of the total adsorptive capacity or the exchangeable K : Ca ratio. A. G. P.

Soluble aluminium studies. I. Concentration of aluminium in the displaced soil solution of naturally acid soils. W. H. PIERRE, G. G. POHLMAN, and T. C. McILVAINE (Soil Sci., 1932, 34, 145—160).—The solubility of soil Al is influenced by factors other than reaction, e.g., by the total sol. salt concn., and % saturation with bases. High concns. of Cl', SO₄'', and NO₃' are associated with high sol. Al''' contents. Highly org. soils contain much less sol. Al than do mineral soils having the same p_H . Leaching reduces the concn. of Al in the soil solution. There is a moderately wide seasonal variation in the Al content of the soil solution, the factors controlling which are discussed. A. G. P.

Applicability of the *Azotobacter* (plaque) method for determining the fertility requirements of Arizona soils. R. A. GREENE (Soil Sci., 1932, 34, 83—93). For these calcareous soils of relatively high p_H the test is of little val. The min. K requirement of *Azotobacter* is small and its growth is not a good index of the K status of soil. For determining PO₄''' deficiency in soils the *Azotobacter* test was satisfactory only in soils of low PO₄''' content. A. G. P.

Phosphoric acid deficiency [in soils]; production and effect values. C. KRÜGEL and C. DREYSPRING (Z. Pflanz. Düng., 1932, 11B, 343—355).—A discussion of the economic use of fertilisers. A. G. P.

Titration of the basic constituents of fertiliser lime. W. LEPPER (Z. anal. Chem., 1932, 21, 354—360).—The substance is dissolved in an excess of hot 0.5N-HCl and, after cooling, the solution is titrated with 0.5N-NaOH (phenol-red) to an orange-yellow colour (a c.c.): 1 c.c. of 0.5N-HCl is added and an aliquot part of the filtered solution again titrated with the NaOH (b c.c.). The total alkalinity as CaO is then $[76 - (a + 1.6b)] \cdot 1.402\%$. The neutral solution from the second titration is treated hot with 50 c.c. of cold saturated aq. Na₂C₂O₄ containing 1 c.c. of 0.5N-HCl and, after cooling, exactly neutralised with NaOH. An

excess of NaOH is then added to ppt. $Mg(OH)_2$ and the excess determined by titrating an aliquot part of the filtrate with HCl; from the results the MgO is calc.

A. R. P.

Molasses as a fertiliser. H. W. KERR (Internat. Sugar J., 1932, 34, 314—315).—When applied in diluted form to pasture lands, its first effect is to kill the grass and other vegetation, but later a luxuriant growth of excellent pasture is obtained. On cane lands it was found that light applications of molasses in irrigation water could be made without injury to soil or cane and high yields were obtained. Very satisfactory results were obtained by distributing undiluted molasses along the lines of stools, its decomp. being effected chiefly by moulds and other fungi. Extraordinary increases of yield were obtained from volcanic soils known to be deficient in K.

J. P. O.

Soil coverings. J. O. MUSSO (Z. Pflanz. Düng., 1932, 11B, 361—374).—The effects of mulching with various papers, straw, etc. on soil temp. and plant growth are recorded and discussed.

A. G. P.

Possibility of a more persistent substitute for stall manure. P. EHRENBURG (Z. Pflanz. Düng., 1932, 11B, 337—343).—A system of combining green manuring with legumes and straw dressing minimises customary losses of N and provides org. N in forms of varying rates of availability.

A. G. P.

Influence of mineral fertilisers on photosynthesis. E. N. BAZYRINA and V. A. TSCHESNOKOV (Bull. Acad. Sci. U.S.S.R., 1932, 1317—1327).—The rate of CO_2 fixation by oats or radishes is independent of the mineral composition of the soil.

R. T.

Field method for determining nitrate, phosphate, and potassium in plants. E. M. EMMERT (Plant Physiol., 1932, 7, 315—321; cf. B., 1932, 158).—Portions of the lower mature petioles or branches near the main stem are ground in a mortar with 2% AcOH and charcoal. The filtered extract is examined for NO_3^- by the phenoldisulphonic acid test, for PO_4^{3-} by the Mo-blue method, and for K by Na cobaltinitrite. In cases in which carbohydrates interfere with the tests, clarification with $Ca(OH)_2$ and $CuSO_4$ is necessary. Data so obtained are indicative of the availability of "plant nutrients in soils."

A. G. P.

Ecology of oats. I. O. TORNAU and K. MEYER (J. Landw., 1932, 80, 161—187).—The effects of N and H_2O supplies on the growth of oats are examined. With increasing applications of N the drought-resistance of oats decreases and the crit. H_2O content at which wilting begins tends to increase.

A. G. P.

Manurial trials with phosphoric acid for cereals on soils of varying reaction. DRUCKLIEB (Z. Pflanz. Düng., 1932, 11B, 356—361).—The efficiency of P fertilisers for cereals depends more on soil reaction than on soil type.

A. G. P.

Effect of manures on the nitrogen and mineral content of the produce of contrasting pasture types. T. W. FAGAN (Welsh J. Agric., 1932, 8, 192—196).—Applications of "nitro-chalk" increased the N and, to a less extent, the Ca content of pastures and depressed that of P. Superphosphate increased the

N, P, and Ca contents chiefly as a result of the stimulated growth of clover. Kainit increased the K and Cl contents and, where clover was improved, raised the N content considerably.

A. G. P.

Yield and response to manures of contrasting pasture types. W. DAVIES (Welsh J. Agric., 1932, 8, 170—192).—Numerous field trials showing the effect of fertilisers on the botanical composition and yield of pastures are recorded.

A. G. P.

Effect of a nitrogenous manure on white clover and a comparison of the productiveness of four types of white clover under simulated pasture conditions. R. D. WILLIAMS (Welsh J. Agric., 1932, 8, 163—170).—"Nitro-chalk" considerably reduced the yield of white clover and favoured the growth of grass, especially in the second season. English and New Zealand wild white clovers were superior to stubble white and Dutch clovers, the New Zealand type being superior in the first two seasons, but the English produced best yields in the third.

A. G. P.

Permanent pastures. A. B. BEAUMONT (Mass. Agric. Exp. Sta. Bull., 1932, No. 281, 36 pp.).—Numerous fertiliser trials are recorded. The greatest changes in the type of vegetation resulted from combined applications of CaO, P, and K, whereas N produced the largest relative and abs. increases in yield. In the presence of added N white clovers were maintained in the herbage more successfully where supplies of P and K were generous. In pastures consisting mainly of grasses N fertilisers increase the gross yield of protein to a relatively greater extent than of total dry matter. The mineral content of herbage as influenced by fertiliser treatment is an important factor affecting palatability.

A. G. P.

Chemical composition of the miscellaneous herbs of pastures. T. W. FAGAN (Welsh J. Agric., 1932, 8, 144—151).—Data for numerous common weeds are recorded. Weeds most sought after by grazing stock were those of high crude protein and mineral contents.

A. G. P.

Chemical composition of various white clovers and of Italian rye grass. R. D. WILLIAMS and T. W. EVANS (Welsh J. Agric., 1932, 8, 151—162).—On soils receiving P or (P + N) white clovers contained more crude protein, Ca, SiO_2 -free ash, and less crude fibre than Italian rye grass. Small differences in the composition of various white clovers are recorded. The P contents of all the white clovers and the rye grass were very similar. Applications of "nitro-chalk" in addition to P did not affect the proportions of crude protein, crude fibre, or SiO_2 -free ash of the clovers, but slightly depressed the Ca and P contents in the second year's growth. With rye grass similar treatment reduced the P content in the first and second seasons and the crude fibre and Ca in the second season.

A. G. P.

Leaching of phosphorus compounds and proteins from grasses by the action of rain water. D. J. R. VAN WYK (J. S. African Chem. Inst., 1932, 15, 54—59).—The food val. of grasses varies greatly during the period of growth, and experiments show that heavy rain falling even on green grass may reduce very considerably

the P_2O_5 and protein contents; e.g., with a sample of *Digitaria foliosa* the P_2O_5 content fell from 0.106 to 0.073%, and the protein content from 3.94 to 3.41%. EtOH (96%) removes rather less protein, but very much more P, than does H_2O . It is suggested that the low P content of South African soils may be due to the removal of P from wilted grass during heavy thunderstorms; the greater part of the H_2O drains rapidly to the rivers and has no opportunity of penetrating into the soil. H. F. G.

Quantitative development of tops and roots in Bluegrass with an improved method of obtaining root yields. C. J. WILLARD and G. M. McCLURE (J. Amer. Soc. Agron., 1932, 24, 509—514).—In the sampling of roots for analysis, correction is made for adhering soil which escaped removal by washing. The sample is ashed and the residue extracted with 0.2N-HCl. The latter removes mineral matter originally present in plant tissue and residue is assumed to represent soil. Thus determined, an average of 20% of soil adheres to roots (max. val. 40%). The % of N in roots and tops of Bluegrass was increased by heavy applications of N fertilisers, roots being much more affected. In the early part of the growing season roots were smaller in fertilised than in unfertilised soil, but later approached similar dimensions. A. G. P.

Changes in the composition of the garden pea after harvest. H. A. JONES and C. S. BISSON (Plant Physiol., 1932, 7, 273—283).—In pea pods stored at various temp. between 0° and 35° there occurred a decrease in reducing sugars, sucrose, and starch contents and an increase in crude fibre and acid-hydrolysable polysaccharides (other than starch). In general, the rates of change increased with the temp. of storage. Similar changes occurred in the peas except that starch increased during storage and changes in the other constituents were relatively smaller. The decrease in sucrose and increase in starch were much more rapid in shelled than in unshelled peas. Peas may be stored at 0° without appreciable changes in composition or cooking qualities. A. G. P.

Flower production from gladiolus corms harvested at different stages of ripening. B. E. GILBERT and F. R. PEMBER (Plant Physiol., 1932, 7, 309—314).—Analytical data indicate that complex storage forms of carbohydrates and N compounds are produced during the ripening of corms. Differences in the storage material of early harvested and fully matured corms are insufficient to influence the productivity of the succeeding generation of plants. A. G. P.

Germination of graminaceous seeds in media of different [H⁺] and reaction changes associated therewith. F. AICHELE (Bot. Archiv., 1931, 33, 406—500).—Better germination occurred in solutions containing small amounts of unbuffered HNO_3 , HCl, H_2SO_4 , or H_3PO_4 than in H_2O . The effect is not entirely due to [H⁺] or [OH⁻], but is influenced by other ions present. In more conc. solutions H_3PO_4 is much more injurious to germinating seeds than are HCl, HNO_3 , and H_2SO_4 in the same pH range. Germinating seeds tend to change the reaction of both acid and alkaline media towards neutrality. A. G. P.

Changes in the chemical composition of potato tubers during storage, especially in reference to manuring, strain, and temperature. H. ERTEL (Landw. Jahrb., 1932, 75, 669—713).—Manuring of potatoes influenced the extent of the dormant period during subsequent storage. Complete manures induced the longest resting period as indicated by insignificant changes in the dry matter and N contents, whereas in unmanured and in K-deficient samples no definite resting stage occurred. Changes in dry-matter content depended on the relative rates of evaporation and of respiratory activity. In all cases the N content increased with the period of storage. No relationship existed between chemical composition and crop yield. A. G. P.

Dependence of [plant] transpiration and wilting on the water condition of the soil. H. GRADMAN (Jahrb. wiss. Bot., 1932, 76, 558—663).—The reduced transpiration rates of plants in H_2O -deficient soils is not the outcome of the increased suction force of soil, but arises from insufficient movement of H_2O towards the plant roots. General relationships between soil- H_2O conditions and plant growth and wilting are examined and discussed. A. G. P.

Simultaneous treatment of oidium and mildew [of vines] by permanganate and copper acetate. J. SEMICHON (Compt. rend. Acad. Agric. France, 1932, 18, 598—599).—When dissolved in distilled, well, or river H_2O (non-stagnant) $KMnO_4$ (125—300 g. per hectolitre) and Cu acetate (500—1000 g. per hectolitre) do not react until after contact for 6 hr. *Used within that period the mixed solution gives effective control of oidium and mildew. On sprayed foliage $KMnO_4$ is reduced immediately by org. matter on the leaves or by the mycelium of the fungus. A. G. P.

Seed treatments with chemical dusts and formaldehyde for smut control in oats. V. F. TAPKE (Phytopath., 1932, 22, 429—441).—Trials with numerous proprietary materials are recorded. CH_2O dips were the most effective. A. G. P.

Chemical treatment of pecan rosette. A. O. ALBEN, J. R. COLE and R. D. LEWIS (Phytopath., 1932, 22, 595—601).—Old rosetted leaves were improved by dipping in or spraying with 0.6—1% solutions of $Fe_2(SO_4)_3$ or $FeCl_3$. A. G. P.

Effect of delayed planting on the control of bunt by copper carbonate dust. H. H. FLOR (Phytopath., 1932, 22, 651—655).—Storage for > 5 weeks of seed treated with Cu carbonate considerably reduced the effectiveness of the treatment. Seed dipped in CH_2O was stored 10 weeks prior to sowing without loss of control of disease. A. G. P.

Adherence of copper dusts to foliage. L. R. STREETER, E. O. MADER, and F. J. KOKOSKI (Phytopath., 1932, 22, 645—651).—The presence of moisture on foliage is essential for good adhesion of Bordeaux dusts prepared with cryst. $CuSO_4$ and $Ca(OH)_2$. On dry foliage conversion of $Ca(OH)_2$ into $CaCO_3$ occurs too rapidly to allow of good adhesion. High R.H. of the air increases the rate of carbonation without supplying sufficient H_2O to convert the dust into an adhesive film. A. G. P.

Chlorosis of trees. E. BURKE (Plant Physiol., 1932, 7, 329—334).—Chlorosis of apple trees occurred in soils of high CaCO_3 content. Spraying with 0.5% FeSO_4 solutions and applications of FeSO_4 to soil did not improve the condition. Injection of Fe salts (both solid and in solution) was beneficial. Fe nails driven into the trunks produced effective but slower results.

A. G. P.

Jointed cactus and its eradication. C. R. VAN DER MERWE (Farming in S. Africa, Reprint, 1932, No. 30, 15 pp.).—Satisfactory results are obtained by spraying with Na_2AsO_3 (36 lb. per 100 gals.) or As_2O_5 (24 lb. per 100 gals.).

A. G. P.

Eradication of bracken. M. GRIFFITH, W. EVANS, and E. E. WILLIAMS (Welsh J. Agric., 1932, 8, 229—232).—The summer application of 1% NaClO_3 solution (80 gals. per acre) was very effective.

A. G. P.

Control of a water-cress leaf beetle. H. W. THOMPSON (Welsh J. Agric., 1932, 8, 233—236).—Late spring treatment with derris or pyrethrum controlled *Phaedon cochlearia*.

A. G. P.

Control of the Japanese beetle on fruit and shade trees. E. R. VAN LEEUWEN (U.S. Dept. Agric. Circ., 1932, No. 237, 13 pp.).—Various spray measures are recorded.

A. G. P.

Zinc-lime: a fungicide for the peach. J. W. ROBERTS and L. PIERCE (Phytopath., 1932, 8, 415—427).—Peach scab and mild cases of brown rot were satisfactorily controlled by Zn-CaO preps. ($\text{ZnSO}_4 \cdot \text{Ca}(\text{OH})_2 \cdot \text{H}_2\text{O} = 4 \text{ lb.} : 3 \text{ lb.} : 50 \text{ gals.}$ is recommended). At double concn. no injury to foliage results. Pb arsenate used in combination with Zn-CaO caused less injury than when combined with S fungicides containing CaO, or with CaO alone. Mixed sprays of Zn-CaO and wettable S retain the full efficiency of both constituents.

A. G. P.

Use of dyes as plant fungicides. A. BOUTARIC, M. DOLADILHE, and M. PIETRE (Compt. rend. Acad. Agric. France, 1932, 18, 819—824).—The flocculating action of common wetting agents on the colloidal dyes used as fungicides is discussed in relation to their adhesive properties.

A. G. P.

Use of dyes and other organic substances in the control of fungus diseases. A. MEYER (Chim. et Ind., 1932, 28, 263—266).—Hydroxyquinoline (1 in 5000—10,000) effectively controlled mildew of vines. Auramine, acridine-orange, and safranin also gave promising results.

A. G. P.

Paris-green partially adsorbed on charcoal as a larvicide for *Anopheles* mosquitoes. II. A. P. WEST and P. F. RUSSELL (Philippine J. Sci., 1932, 48, 545—559).—By evaporating to dryness a 99:1 mixture of charcoal and Paris-green suspended in 12 times its wt. of H_2O and powdering the residue a product is obtained which is much more toxic to *Anopheles* larvae than a simple mixture of charcoal and Paris-green. Addition of CaO raises the toxicity.

A. R. P.

Larvicidal effects of arsenicals other than Paris-green against *Anopheles* larvae. III. P. F. RUSSELL and A. P. WEST (Philippine J. Sci., 1932, 49, 97—103;

cf. B., 1932, 907).—The use of As_2O_3 either alone or mixed with charcoal, CaO, Na_2CO_3 , or $\text{Na}_2\text{B}_4\text{O}_7$, was less satisfactory than Paris-green. The last-named probably owes part of its larvicidal action to its Cu content.

A. G. P.

Tank-mixture method of using oil spray. R. H. SMITH (California Agric. Exp. Sta. Bull., 1932, No. 527, 86 pp.).—The technique of testing oils and of determining % of oil in a spray mixture, the efficiency of mixing and permanence of emulsions, the oil deposit, and "run off" is described. Data concerning the nature of emulsions and the influence of various wetting and spreading agents on the oil deposit on foliage are recorded and discussed. The use of blood-albumin as a spreader is recommended. Emulsions prepared by mixing the necessary materials in the actual spray tank are as effective in deposition and toxicity as proprietary emulsions.

A. G. P.

Efficiency of oiled wraps in the commercial control of apple scald. N. E. STEVENS and N. W. NANCE (Phytopath., 1932, 22, 603—607).—Data recorded show a steady decline in scald following use of (mineral) oiled wrapping papers.

A. G. P.

Nutrition of swine.—See XIX.

PATENTS.

Manufacture of fertilisers [containing ammonium nitrate]. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 376,247, 30.1.31).—Such fertilisers are prepared in the form of coarse lumps (≤ 4 —5 mm., preferably ≥ 10 cm. diam.), and free from substantial amounts of finer particles and dust. It is claimed that conglomeration and hardening may thus be prevented.

F. Y.

Manufacture of ammonium magnesium phosphatic fertilisers. E. URBAIN (B.P. 379,433 and Addn. B.P. 379,434, 17.6.31. Fr., [A] 28.6.30, [B] 15.11.30).—(A) $\text{NH}_4\text{H}_2\text{PO}_4$ or (B) a mixture containing it and produced, e.g., by the double decomp. of $\text{CaH}_4(\text{PO}_4)_2$ and $(\text{NH}_4)_2\text{SO}_4$, containing exactly 6 mols. of H_2O of crystallisation, is heated at about 80° with sufficient MgO to yield cryst. NH_4MgPO_4 . Alternatively sufficient H_2O to yield 6 mols. is added to a mixture of dry $\text{NH}_4\text{H}_2\text{PO}_4$ and MgO.

L. A. C.

Preparation of a fertiliser containing calcium phosphate and nitrogen. CHEM. FABR. KALK G.M.B.H., H. OEHME, and E. HERRMUTH (B.P. 379,431, 17.6.31. Ger., 27.6.30).—The products obtained by the decomp. of crude phosphates with acids are treated in the solid or semi-solid state with dil. NH_3 gas and then, after the addition of sufficient H_2O (or a dil. aq. solution or suspension of other fertilisers) to yield a strewable final product, with conc. gaseous, liquid, or aq. NH_3 .

L. A. C.

Production of mixed fertilisers. KALI-FORSCHUNGS-ANSTALT G.M.B.H., and O. KASELITZ (B.P. 376,934, 25.6.31).—Fertiliser salts, such as KNO_3 , K_2SO_4 , K_2SO_4 - MgSO_4 , or KCl are heated with H_3PO_4 to produce a uniform melt without decomp. of the salt; the melt is cooled and disintegrated to a granular form, and treated with gaseous NH_3 to neutralise free acid.

W. J. W.

Production of mixed manures [fertilisers]. METALLGES. A.-G., and H. LEHRECKE (B.P. 376,793, 15.1.31).—Solutions obtained by treating crude phosphates, e.g., $\text{Ca}_3(\text{PO}_4)_2$, with HNO_3 are caused to act on calcareous crude phosphate in such proportions that practically all of the H_3PO_4 is converted into CaHPO_4 . If desired, the solutions, prior to treating them with the calcareous phosphate, may be freed from reaction residues and then treated with sol. sulphates, so as to give an insol. or sparingly sol. Ca salt. W. J. W.

Manufacture of organic manure. J. KAISER and E. SAUER (B.P. 377,990, 25.2.31).—Putrefied sewage sludge from towns, obtained, e.g., in Imhoff septic tanks, is mixed with sufficient peat to neutralise the alkalis in the sludge. L. A. C.

Manufacture and use of nutrient solutions for accelerating the germination and/or growth of seeds and plants. P. SPANGENBERG (B.P. 377,857, 2.11.31. Ger., 1.11.30).— H_2O is added to a mixture of CaO and sugar to slake the CaO and caramelize the sugar, and HNO_3 is added together with other suitable substances (urea, phosphates, sol. decomp. products of albuminous material, B, Mn, Fe, Si compounds, etc.) to the mixture. The seeds are irrigated with a dil. solution of the product and growth may be stimulated by irradiation with quartz lamps before watering. L. A. C.

Combating [plant] pests. E. SACHS (B.P. 379,550, 16.10.31).— H_2O or dil. aq. glycerin is dropped on to S or, e.g., a mixture of 50% of nicotine, 20% of β -naphthol, 20% of glycerin, and 10% of Bu^nOH , heated electrically above its m.p. in a container so that the material is atomised by the rapid evaporation of the H_2O . The spray escapes into the air or is directed on to parts of plants affected by mildew etc. L. A. C.

Alkali cyanamides. Magnesite.—See VII. Sol. basic slag.—See X.

XVII.—SUGARS; STARCHES; GUMS.

Campaign experiences with pre-liming [of beet sugar juice]. O. SPENGLER (Deut. Zuckerind., 1932, 57, 279—280).—In each case the possibility of effecting a reduction in the total amount of CaO required was ascertained by gradually decreasing the amount until the purifying effect obtained by pre-liming was no greater than that obtained by the ordinary method. It was found that as little as 1.1—1.2% CaO was needed. In the majority of factories pre-liming proved to be a means not only of economising CaO , but also of reducing the colour of the thin-juice and thick-juice by half, with consequent improvement in the quality of the sugar. A method which could be applied with success to beets of all qualities consisted in pre-liming at the lowest possible temp. (35—40°), using unfiltered juice from a previous operation instead of milk-of-lime, but choosing the amount so that a sample of the cold pre-limed juice, heated to 80°, flocculates perfectly, and has the p_{H} (by thymol-blue paper) adjusted to that required for the first carbonation. As soon as the juice reaches 80°, the rest of the CaO is added and the first carbonation follows. Pre-liming at higher temp. than those stated cannot be recommended. J. P. O.

Chemical treatment of low-grade massecuites. H. L. GROGAN (Internat. Sugar J., 1932, 34, 265—266).—In blank-boiling molasses, it is preferable to add $\text{Ca}(\text{OH})_2$ as compared with Na_2CO_3 , a superior yield of sugar of paler colour being thus obtained. J. P. O.

Estimation of the comparative value of kieselguhr as a filter-aid in sugar-house practice. W. E. CALLINGHAM (Internat. Sugar J., 1932, 34, 274—275).—A vac. filtering apparatus for the above purpose is described and illustrated. It consists mainly of a special type of Buchner filter funnel provided with a jacket through which steam or hot water can be circulated. From the results obtained the "performance factor" (c.c. of filtrate per 2 min. ÷ price per ton in £) is calc. The results obtained by using 15 samples of kieselguhr of different origin and 3 different types of sugar solutions are tabulated. J. P. O.

Relation between refining quality of raw cane sugars and the way in which they have been boiled. J. C. KEANE and E. K. VENTRE (Internat. Sugar J., 1932, 34, 321).—Factors such as temp., time, and steam pressure affect the quality of the resulting sugar only to a limited extent, circulation being the most important one. The velocity of motion of the crystals not only affects the velocity of crystallisation, but also has a direct relationship to the amount of non-sugars taken up by the crystal. In consequence, the design and operation of vac. pans, whether coil or calandria, is an important consideration in the manufacture of raw sugar. J. P. O.

Inversion problem in sugar manufacture. F. G. STADLER (Internat. Sugar J., 1932, 34, 273).—Recognising that $[\text{H}^+]$ and temp. are the two principal factors influencing inversion, a table has been constructed from which the % sucrose inverted per hr. at given p_{H} val. and temp. can be estimated with an accuracy sufficient for practical purposes. Its utility has been controlled by the results of practical tests. J. P. O.

Conductivity ash determination [for sugars]. P. HONIG and P. C. NICOLA (Internat. Sugar J., 1932, 34, 272—273).—A great no. of samples of Java "hoofd-suiker" were examined for ash content by the conductivity method, using solutions (a) at 20° Brix and (b) containing 5 g. per 100 c.c., and the results are tabulated against those found by the sulphated incineration method, the D -factors found for the two dilutions being 660 and 1652, respectively. In general, satisfactorily concordant results were obtained. Advantages of the conductivity method include its rapidity and its simplicity, less skilful personnel sufficing with less chance of error arising. A disadvantage is that some sugars show quite a different conductivity from others. In general, a low D -factor is found when the concn. in inorg. ions is high. J. P. O.

Determination of reducing sugars in raw sugars etc. by the pot method. H. MAIN (Internat. Sugar J., 1932, 34, 213—217).—Three or more large test-tubes (150 mm. long × 38 mm. diam., wt. 50—55 g.), containing equal vols. of Fehling's solution and 2 drops of 1% methylene-blue solution, but increasing vols. of the sugar solution under examination, are heated in a boiling water-bath for 5 min. Glass floats fitting tightly

into the tubes are used to prevent back-oxidation, and the proportions of reagents chosen are such that at the end of the time named the tubes should show mixtures still blue, with one at least showing complete reduction, the mean between the first blue and the first red being taken as the end-point. Invert sugar contents in highly refined sugars as low as 0.001% can thus be determined. Tables are given showing % invert sugar corrected for the influence of sucrose from 100 to 0.3%. For amounts below 0.3% a modified Fehling's solution containing $K_4Fe(CN)_6$ and additional NaOH is employed, greater accuracy being thus obtained in this low range. Tables are given covering the range 0.8—0.001%. Drawings give the dimensions of the special apparatus used. J. P. O.

Determination of ash in starch products. A. P. SCHULZ and G. STEINHOFF (Z. Spiritusind., 1932, 55, 178).—The time required to determine the ash in starch is very much curtailed, and the difficulty of the fused ash preventing the complete combustion of the C is overcome, by moistening the weighed quantity of starch (5—10 g.) with 10 c.c. of a 1.9885% $Mg(OAc)_2$ solution in 80% EtOH or in AcOH, before incineration, in a quartz crucible. A deduction of 50 mg. is made from the ash to allow for the residue from the $Mg(OAc)_2$. C. R.

Determination of micro-organisms in potato flours. A. P. SCHULZ and H. SEITH (Z. Spiritusind., 1932, 55, 172).—The plate-culture method is the most reliable for the determination. Optional media for the prep. of cultures from the starches consist of (1) meat extract with 2.5% of agar-agar, 1% of sol. starch, and 1% of glucose, (2) 2.0% of agar-agar, 2.5% of sol. starch, 0.5% of Na_3PO_4 , 0.025% of $Mg_3(PO_4)_2$, 0.5% of peptone or glucose. For inoculation 0.05—0.5 g. of starch is suitable, and smaller weighings necessitated by highly infected starches are avoided by pipetting aliquot parts of a suspension of a larger amount in sterile H_2O . Amounts should be < 5 c.c. to ensure setting of the agar-agar. The average no. of colonies grown from weighed and pipetted starch agree, but the individual vals. obtained by the weighed determination vary more. The plate cultures yield chiefly colonies of *B. vulgatus* and *B. megatherioides* with *B. subtilis* less frequently, whilst *B. macerans* is always present. Mould fungi are usually present, yeasts, torulae, and pediococci are rare, whilst lactic acid bacteria are absent unless the starch has been kept under damp conditions. C. R.

Recent progress in [sugar] evaporation. A. L. WEBRE (Internat. Sugar J., 1932, 34, 384—388).

Molasses as fertiliser.—See XVI. [Molasses] fermentation.—See XVIII.

PATENTS.

Crystallising sugar.—See I. **Products from cellulose.**—See V. **Pectin-sugar preps.**—See XIX.

XVIII.—FERMENTATION INDUSTRIES.

Adventitious fermentation [of molasses] versus pure yeast culture. G. L. TUMANG (Sugar News, 1932, 13, 276—277).—By adventitious fermentation the

yield of 95% EtOH was 65.14% of the theoretical (40.03 litres of EtOH per 100 kg. of total sugars), but with pure yeast culture the yields on the same basis were increased to 78% (50.32 litres of EtOH). An outline of the author's method of working, using the Magné yeast-culture apparatus, is given. J. P. O.

Relation between the arsenic content of the yeast and hops. M. LINDEMANN (Woch. Brau., 1932, 49, 257—259).—The small amount of As which is never entirely absent from hops grown under natural conditions is greatly increased when the hops are sulphured. A part of this As passes to the wort on boiling and is adsorbed by the yeast during fermentation. Hops containing 0.11 mg. As_2O_3 per 100 g. yielded a wort with 0.005—0.006 mg. As_2O_3 per litre, from which yeast was obtained containing 0.07 mg. As_2O_3 per 100 g. of dry yeast, the pitching yeast having a negligible content of As. With hops containing 0.007 mg. As_2O_3 per 100 g. no As could be detected in the wort, but the resulting yeast contained 0.002 mg. As_2O_3 per 100 g. of dry yeast. When the As content of the wort was increased to 0.07 mg. per litre by adding H_3AsO_3 , the content of As_2O_3 in the dry yeast increased to 0.88 mg. per 100 g. Wine yeasts adsorbed As to a greater extent than brewing yeasts. C. R.

Solubility of nitrogen in [malt] mashing. H. E. KELLY (J. Inst. Brew., 1932, 38, 440—446).—With a 2-hr. 30% malt mash the p_H optima for the extraction of the total sol. N in malt at the ranges of temp. 40—50°, 55—65°, and 65—70° were 4.4—4.6, 4.6—5.0, and 4.8—5.2, respectively. The corresponding vals. for the permanently sol. N were 4.4—4.6, 4.6—5.0, and 5.0—5.2, and for formol-N 4.4—5.0, 4.4—5.2, and 4.6—5.2. The temp. optima for the extraction of total sol. N at the p_H vals. 4.4, 5.0, and 6.0 were 40—50°, 50—55°, and 40—50°, respectively. The corresponding vals. for permanently sol. N were 50—55°, 50°, and 50—60°, and for formol-N were 40—45°, 40—50°, and 40—50°. The p_H optima agreed with those obtained by German mashing methods with a German malt, and the average temp. optima were fully 11° lower than those for the German malt. C. R.

Determination of dextrin in malt beer. E. ROTHENBACH and H. ANTELMANN (Woch. Brau., 1932, 49, 249—252, 260—262, 265—268).—Determinations by various methods of dextrin in a malt beer with added sugar yielded varying results which could only be explained by the inaccuracy of the method of determining sugars by their Cu-reducing power to Fehling's solution, or by divergencies from the theoretical fermentation of the various sugars by the different types of yeast. Dextrin was calc. by König's method from the contents of the various sugars determined from the Cu-reducing power of the beer and of the hydrolysed beer before and after their fermentation with *S. Ludwigi*, which does not ferment maltose. The dextrin was also obtained from the sugars determined by Fehling's solution in the beer before and after its fermentation by a highly fermentative yeast. In addition, the dextrin was hydrolysed by various types of amylase and by acid, and its content obtained from the difference between the degree of fermentation before and

after hydrolysis. The vals. obtained by pptg. the dextrin by EtOH were approx. owing to the pptd. dextrin adsorbing protein, or to dextrin being adsorbed by protein on the removal of the latter by pptn. with tannin (cf. B., 1932, 783). C. R.

Deposition of calcium oxalate in beer. I. JANENSCH (Woch. Brau., 1932, 49, 264).—An excessive deposit of CaC_2O_4 in filtered beer was due to the pressure H_2O in the filter having a high content of CaCO_3 which combined with the $\text{H}_2\text{C}_2\text{O}_4$ which is normally present in the beer and is derived from the malt and hops. In addition, too rapid filtration removed colloids which protected colloidal CaC_2O_4 and allowed its pptn. The colloidal equilibrium is similarly disturbed by mixing different beers, and CaC_2O_4 is rapidly pptd. from the filtered beer. Formation of foam and evolution of CO_2 also favour the formation of the crystals. C. R.

Beer foam. P. PETIT (Brass. Malt., 1932, 22, 129; Woch. Brau., 1932, 49, 278—279).—The factor dominating the production of foam in beer is the degree of dispersity of the protein colloids in the beer. If the colloidal particles are too small or too large the foaming capacity is deficient. Beer which had lost its foaming capacity by filtration recovered it partly on keeping owing to the gradual increase in size of the colloidal particles, whilst a similar result is obtained if the filtered beer is projected violently against a hard surface. The addition of protease to the beer diminishes the foam by decreasing the size of the ultramicros, but on occasion improved foaming may result if the particles had originally been too large. If the foam produced by pouring beer is separated and allowed to subside, the resultant opalescent liquid contains very large ultramicros. These gradually become smaller on keeping, but their final size is 2—3 times that of the particles in the original beer. The colloids which govern the production of foam are chiefly derived from the malt, and, to a smaller degree, from the yeast. C. R.

Non-sterility of cooler-wort. I. JANENSCH (Woch. Brau., 1932, 49, 262—264).—The high content of micro-organisms in turbid cooler-wort is derived chiefly from the cooler on the surface of which micro-organisms are deposited from the air and wash- H_2O during the period between cleansing and the running of the worts. The still higher degree of infection of the filtered wort may occasionally be contributed to by the non-sterility of the filter-presses, but the chief source is also the organisms from the cooler. These are adsorbed by the proteins pptd. from the cooling wort and are protected from destruction by the hot wort by further layers of protein. These aggregates are broken down in the filter-press and the bacteria etc. pass through with the filtered wort. Similar worts filtered slowly without pressure through cloths show lower degrees of infection. C. R.

Sterility of filter pulp ready for use. I. JANENSCH (Woch. Brau., 1932, 49, 283—285).—Filter pulp which was prepared by heating to various temp. and washed by different methods was tested for the presence of wild yeast by inoculation into hopped wort with added tartaric acid and incubation at 25° for 8 days. For the detection of sarcinae and lactic acid bacteria the wort

was replaced by yeast extract and the incubation period extended to 18 days. To ensure sterility of the pulp it must be heated at $< 90\text{--}95^\circ$ for $\frac{1}{2}$ —1 hr., or treated with a disinfectant (activin). In addition, the pressure and wash- H_2O must not be infected. C. R.

Solid CO_2 for brewing.—See VII.

PATENTS.

Method of ensuring that yeast will bring about fermentation in liquids to be fermented. F. LUX (B.P. 377,243, 24.2.31. Ger., 13.10.30. Addn. to B.P. 367,063; B., 1932, 444).—The fermentative power of yeast is increased by the addition to the fermenting liquid of a vitamin-containing extract produced by the destruction of yeast by the colloid mill or by irradiation with short-wave light. C. R.

Increasing the fermenting power of and economising yeast in bread-making. L. and E. ELION (B.P. 377,533, 12.11.31).—An addition is made to the flour or dough of a yeast nutrient to increase the yeast during fermentation of the dough together with a persulphate to activate the yeast. Nutrients such as diastatic malt, which have a softening action, are excluded. C. R.

Production of [fermented] beverages. E. MERTENS and B. HANACK (B.P. 376,887, 15.5.31).—A mixture of yeast and pasteurised skim milk, with or without sugar and bee honey, is fermented, preferably in closed vessels. E. H. S.

Production of ferment preparations. H. T. BÖHME A.-G. (B.P. 377,128, 22.2.32. Ger., 11.3.31. Addn. to B.P. 368,888; B., 1932, 525).—The pylorus attachments of fish are superior in activity to the remaining portions of the viscera, and preps. from this material, with or without addition of diluents, activating agents, and/or preserving agents, are specified. E. H. S.

Drawing-off liquids.—See I. **Products from cellulose.**—See V. **Purifying CO_2 .**—See VII.

XIX.—FOODS.

Effect of ageing on the activity of bakers' yeast. R. K. LARMOUR and S. F. BROCKINGTON (Canad. J. Res., 1932, 6, 614—621).—The vol. of the loaf obtained using yeast stored on ice is at first const., increases progressively after 19 days' storage, but somewhat decreases again after 30 days. The amount of CO_2 produced is const. up to 26 days, thereafter increasing to a slightly higher but irregular vol. R. S. C.

Specific gravity [of wheat] and the gluten content. P. BORG (Compt. rend. Acad. Agric. France, 1932, 18, 825—830).—No relationship exists between the d of wheat and its gluten or total N content. A. G. P.

Food. L. BERNARDINI (L'Ind. Chimica, 1932, 7, 882—889, 993—1000).—A lecture, dealing largely with the nutritive properties of grain and their preservation by suitable methods of milling and handling. H. F. G.

Food and disease. S. DIXON (Chem. and Ind., 1932, 787—795, 808—813).—A lecture.

Value of degermed maize meal (cooked) in the nutrition of swine. H. E. WOODMAN and R. E. EVANS

(J. Agric. Sci., 1932, 22, 670—675).—Steam-cooked, degermed maize has a digestibility equal to that of tapioca flour and flaked maize and superior to whole maize or barley meals. Liberal use of this product for pork and bacon pigs is suggested since its low oil content precludes the risk of detrimental effects on the quality of the fat. A. G. P.

Value of oats in the nutrition of swine. H. E. WOODMAN, R. E. EVANS, and A. W. M. KITCHIN (J. Agric. Sci., 1932, 22, 657—669).—The digestion coeff. of oats increased with the fineness of grinding, but that of the finest grade (Sussex ground oats) was somewhat lower than that of barley. The firmness of bacon fat from oat-fed pigs was not adversely affected by the oat oil. A. G. P.

Detection of reconstituted milk. D. HENVILLE (Analyst, 1932, 57, 570—572).—Reconstituted milk may be detected, by high depression of the f.p., a high solids-not-fat val., and the presence of nitrates. E. B. H.

Detection of inefficiently pasteurised milk based on a modification of the new Rothenfusser test. B. S. GOULD (J. Dairy Sci., 1932, 15, 230—241).—The original Rothenfusser test detects milk heated $> 80^{\circ}$ but does not indicate pasteurisation. The new Rothenfusser method (B., 1931, 315) shows pasteurisation but does not detect slight under-pasteurisation. A modification of the test, using 0.001N-I and 0.5 c.c. of starch solution, detects milk heated at 60° for < 30 min. or $< 60^{\circ}$ for 30 min. and, moreover, indicates 1% of raw milk or small amounts of under-pasteurised milk in pasteurised milk. A. G. P.

Bacteriological flora of spontaneously soured milk. A. D. ORLA-JENSEN and P. A. HANSEN (Zentr. Bakt. Par., 1932, II, 86, 6—29).—The principal organism in spontaneously soured milk (*Strep. lactis*) differs from that predominating in commercial "starters" (*S. cremoris*) in that, among di- and poly-saccharides, the latter ferments lactose only, whereas the former acts also on maltose and dextrin. A. G. P.

Relation of temperature of ice cream to the distribution of certain of its components between the liquid and solid phases. W. C. COLE (J. Dairy Sci., 1932, 15, 254—265).—Changes occurring during the freezing of ice cream are chiefly dependent on the distribution of H_2O between the solid and liquid phases. Max. ice separation occurs at temp. just below the f.p. of the mixture. A. G. P.

Caffeine in cereal beverages. C. H. LAWALL and J. W. E. HARRISON (Amer. J. Pharm., 1932, 104, 537—539).—Caffeine may be extracted directly by the usual methods and identified. T. McL.

Water-protein ratio of lean meat, and its bearing on analysis of sausages. F. W. JACKSON and O. JONES (Analyst, 1932, 57, 562—566).—Analyses of several samples of different cuts of meat show that the H_2O -protein ratios are 3.4 : 1 for fresh pork, 3.6 : 1 for fresh beef, and 3.5 : 1 for fresh mixed meats. Better results are obtained for the composition of sausages using these figures than by the use of those of Stubbs and More (B., 1919, 334A). E. B. H.

Freezing, storage, and transport of New Zealand lamb. E. GRIFFITHS, J. R. VICKERY, and N. E. HOLMES (Dept. Sci. Ind. Res. Food Invest., Spec. Rept., 1932, No. 41, 178 pp.).—A survey has been made of the obtaining physical conditions, temp., R.H. of the air, and air movement during the cooling, freezing, and storage of the meat in New Zealand, its transport to the ship, storage during the voyage, and cold storage in Great Britain. The effect of these conditions on the loss of wt. and loss of bloom, which may be due to desiccation of the superficial tissue, sweating, or the formation of methæmoglobin after long storage, has been examined and improvements are suggested. The air-circulation system of freezing and cold storage appears less satisfactory for preserving bloom than the direct expansion or brine-grid system; the former usually produces a lower temp. and R.H. which results, on freezing, in a greater rate of loss of wt. and consequent desiccation and loss of bloom of the superficial panniculus carnosus muscle, and, on cold storage, in greater loss of wt. and bloom. E. B. H.

Supposed toxicity of foods prepared in aluminium vessels. K. B. LEHMANN (Arch. Hyg., 1931, 106, 336—345; Chem. Zentr., 1932, i, 1726).—Injury to health is not proved. A. A. E.

Determination of aluminium in, and aluminium content of, foods. K. B. LEHMANN [with W. VON ZEJSCHWITZ and H. RUF] (Arch. Hyg., 1931, 106, 309—335; Chem. Zentr., 1932, i, 1726).—Berg's method is satisfactory; egg-white contains 0.13 and beef 7.2 mg. Al per 100 g. (dry). The Al content varies with origin and habitat. Drugs gave vals. lower than those already reported. A. A. E.

PATENTS.

Pasteurisation of milk. AKTIEB. SEPARATOR (B.P. 377,714, 24.2.31. Swed., 1.3.30).—Apparatus is described for pasteurising milk at 62 — 80° by means of steam a few degrees higher than the pasteurising temp. desired. E. B. H.

Production of crustless cheese. F. DRAISBACH, and CHEM. FABR. J. A. BENCKISER G.M.B.H. (B.P. 378,918, 19.5.31. Ger., 25.10.30).—Finely-ground cheese is melted with H_2O and $NaPO_3$ at $< 100^{\circ}$. The salt is used alone or with alkali ortho- and/or pyro-phosphates, or neutral salts of tartaric or citric acids. The mixed salts with ortho- and/or pyro-phosphates should have p_H 6.5—7.5. E. B. H.

Pectin-sugar preparation. R. M. PRESTON (B.P. 377,084, 21.12.31).—Solutions of sugar, preferably invert sugar, which may contain a trace of acid, and pectin (more than sufficient to jelly the sugar) are mixed, homogenised, and chilled to a white cream. E. H. S.

Making pectous material. H. T. LEO, C. C. TAYLOR, and F. A. BECK (U.S.P. 1,838,949, 29.12.31. Appl., 1.10.27).—A sol. pectin containing fibre of colloidal size is prepared by washing finely-divided citrus pulp, adding HCl to p_H 1.23, and heating until the pectin is dissolved. NaOAc or Na citrate solution is added to p_H 2.0—3.5 and the mass homogenised. The pectin may be pptd. with EtOH, dried, and powdered. E. B. H.

Manufacture of concentrated edible products [from animal tissue]. L. W. MAPSON, J. T. MACCURDY,

H. O. NOLAN, and CAMBIO PRODUCTS, LTD. (B.P. 378,399, 24.3. and 28.4.31).—A conc. edible nitrogenous product and an oil, both rich in vitamins, are prepared by allowing liver of fish, marine mammalian or other animals to autolyse at pH 4–5, with or without the addition of ferments or preservatives, in an O_2 -free atm. After filtering, the oily layer is clarified and the aq. layer cone. in vac. at a low temp. E. B. H.

Treatment of fish. Z. OGURA (B.P. 379,230, 29.2.32. Jap., 27.2.31).—Fish is heated at 40–70° for sufficient time to cause partial coagulation of the proteins but only negligible glue formation. The liquid which separates on pressing, after removal of the oil, is suitable for the prep. of seasonings. E. B. H.

Refrigerating apparatus particularly for cooling milk. PULSOMETER ENG. CO., LTD., and J. B. CLEWS (B.P. 379,455, 6.7.31).

Bread-making. Beverages.—See XVIII.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Titrimetric determination of pyramidone (dimethylaminophenyldimethylpyrazolone) alone or in presence of antipyrin, acetanilide, phenacetin, caffeine, etc. E. SCHULEK and P. MENYHÁRTH (Z. anal. Chem., 1932, 89, 426–439).—Any substance such as quinine, salicylic acid, sucrose, or starch which interferes with the analysis is first removed and 10 c.c. of an aq. solution of the remaining mixture, containing 30–50 mg. of pyramidone per 100 c.c., are added to 350 c.c. of H_2O with approx. as much 0.1N-NaOH as the excess vol. of 0.1N- $KMnO_4$ next added for the oxidation of pyramidone to dihydroxypyramidone. The aq. $KMnO_4$ must be run in rapidly, the solution shaken, and 1 g. KI added quickly. After addition of 10 c.c. of 50% H_2SO_4 the solution is titrated with 0.1N- $Na_2S_2O_3$ to a faint greenish-yellow colour before adding starch solution and completing the titration. By dissolving 3–5 g. of pyramidone in 100 c.c. and using 0.01N solutions this may be employed as a micro-method. The method could also be used for the determination of the pyramidone derivative, novalgin. M. S. B.

Potassium ferricyanide reaction for morphine in codeine etc. H. J. VAN GIFFEN (Pharm. Weekblad, 1932, 69, 990–993).—If carried out according to the method of the Dutch Pharmacopœia V, the test gives results not comparable with those obtained when the methods of D.A.B. VI, U.S.P. X, etc. are employed, owing to the variation of the $K_3Fe(CN)_6$ concn., to which the reaction is rather sensitive. The reagent recommended is prepared by dissolving 1 mg. of $K_3Fe(CN)_6$ and 10 mg. of $FeCl_3$ in 10 c.c. of H_2O ; the solution of the alkaloid (B.HCl) in 1 c.c. of H_2O and 1 drop of 4N-HCl are added, and the colour is observed after 5 min. H. F. G.

Hydroxylamine method for determination of aldehydes and ketones in essential oils. R. C. STILLMAN and R. M. REED (Perf. Ess. Oil Rec., 1932, 23, 278–286).—The method of determination of the CO group by boiling, alcoholic NH_2OH -KOH is modified and is then accurate for aldehydes and ketones, both

pure and in essential oils, and for keto-acids. Other substances commonly present in essential oils do not affect the result, except coumarin, which shows an apparent ketone content of 20–50%. The term “carbonyl content” is suggested for the no. of mg. of KOH which is equiv. to the $NH_2OH.HCl$ required to oximate the aldehyde or ketone in 1 g. of the sample. For a pure substance this is $56.108 \times$ no. of CO groups per mol./mol. wt. R. S. C.

Phial glasses.—See VIII. **Caffeine in cereal beverages.**—See XIX.

PATENTS.

Production of disinfectants and dentifrices. C. WEIDNER (B.P. 376,604, 7.11.31. Ger., 12.11.30).—Thiocyanates are protected from absorbing H_2O by mixing with anhyd. gypsum or coating with tragacanth, resins, gelatin, etc., and are compounded with solid H_2O -sol. acids (e.g., tartaric) or acid salts (borax), carbonates, etc., so that in the presence of H_2O (in use) free HCNS is liberated. E. L.

Manufacture of solid cosmetics. H. L. A. JAHARD (B.P. 378,000, 28.4.31).—An alkali salt of a higher fatty acid is added to an EtOH solution of a pyrazolone derivative, e.g., 1-phenyl-2:3-dimethyl-5-pyrazolone, the concn. being such that the mass is solid at room temp. E. H. S.

Bath or washing preparations. C. L. HERRMANN and L. G. STONE (B.P. 377,623, 1.4.32).—To a mixture of essential oils with natural or synthetic aromatic oils is added Turkey-red oil, together with glycerin, EtOH, and H_2O . F. R. E.

Production of radioactive preparations. DEUTS. GASGLÜHLICHT-AUER-GES.M.B.H. (B.P. 379,208, 15.1.32. Ger., 27.1.31).—A flexible container (rubber), cut to shape and provided with a hose, is filled with an adsorbent which is then loaded with any desired quantity of emanation by connecting the hose to a suitable source. The surface of the container may be provided with metal foil at suitable points. E. H. S.

Manufacture of new products from menthols. HOWARDS & SONS, LTD., J. W. BLAGDEN, and W. E. HUGGETT (B.P. 374,893, 17.3.31).—Menthol (3 mols.) or an isomeride is combined with H_3PO_4 , preferably in an org. solvent (light petroleum) or in molten condition; if aq. H_3PO_4 is used the H_2O must be expelled. Compounds from *r*-menthol (m.p. 74°), *l*-menthol (m.p. 71°), *r*-neomenthol (m.p. 86°), and *r*-isomenthol (m.p. 42°) are described. C. H. T.

Manufacture of *p*-[hydr]oxycamphor. K. TAMURA, G. KIHARA, Y. ASAHINA, and M. ISHIDATE (B.P. 375,018, 24.4.31. Jap., 25.4.30).—The campherol-glycuronic acid is pptd. as Pb salt from the urine of organisms to which camphor has been administered; the ppt. is treated with dil. H_2SO_4 and $PbSO_4$ removed. Hydrolysis of the filtrate yields *p*-hydroxycamphor, m.p. 217–218°, $[\alpha] +41.3^\circ$. C. H. T.

Manufacture of *allo-p*-ozo-[keto]-camphor. K. TAMURA, G. KIHARA, Y. ASAHINA, and M. ISHIDATE

(B.P. 375,510, 28.5.31. Jap., 7.8.30).—*allo-p*-Keto-camphor, m.p. 200—202°, $[\alpha] +70^\circ$ to $+85^\circ$, which is a stimulant for the heart and respiratory centre, is prepared by oxidation of *p*-hydroxycamphor (cf. B.P. 375,018; preceding) with CrO_3 or with $\text{Na}_2\text{Cr}_2\text{O}_7$ and H_2SO_4 below 60°. At 100° Bredt's *p*-ketocamphor, m.p. 209—210°, is obtained. C. H.

Production of hormones. PRESIDENT AND BOARD OF TRUSTEES OF ST. LOUIS UNIVERSITY (B.P. 377,991, 27.2.31. U.S., 6.10.30).—Placenta, amniotic fluid, or, preferably, the urine of pregnant animals is extracted with an org. solvent and the material extracted is subjected repeatedly to treatment with non-miscible org. solvents in the presence of aq. alkalis; *e.g.*, the residue obtained by evaporation of the solvent in a previous treatment is extracted with aq. alkali, the insol. residue is discarded, and the org. solvent added to the extract. The final solvent extract is conc., giving a cryst. hormone, α [ovarian follicular hormone (?), m.p. (corr.) 249°, mol. wt. 274, I val. 93—97, mol. wt. of Ac derivative 356, probable formula $\text{C}_{18}\text{H}_{22}(\text{OH})_2$], having an activity of 3000—4000 rat units per mg. The alkaline extracts on acidification give the cryst. β -hormone [m.p. 282°, mol. wt. 294, I val. 85—88, mol. wt. of Ac derivative 410, probable formula $\text{C}_{18}\text{H}_{21}(\text{OH})_3$] having an activity of 6000 R.U. per mg. E. H. S.

Conservation of the activity of a vaccine in a fatty and antiseptic medium. P. ANSELM (B.P. 378,198, 31.7.31).—A sterilised fatty substance (*e.g.*, anhyd. lanoline) mixed with an antiseptic is added to the vaccine. E. H. S.

Manufacture of nutrient medium suitable for producing gonococcus toxin. SCHERING-KAHLBAUM A.-G. (B.P. 377,150, 13.5.32. Ger., 26.5.31).—Single or progressive aq. extracts of human placenta (1 pt. of extract: 1½ pts. of placenta) are prepared and adjusted to suitable osmotic pressure (by addition of 0.1% aq. NaCl) and p_{H} (7.2—7.4). E. H. S.

Halogenated esters.—See XII.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

PATENTS.

Manufacture of photographic sensitisers and desensitisers. I. G. FARBENIND. A.-G. (B.P. 378,239, 21.9.31. Ger., 20.9.30).—1 mol. of a quaternary salt of a 2:6-dialkylpyridine (or homologue) is condensed at 50—100° with 2 mols. of an aromatic aldehyde. Sensitisers are formed when the aldehyde contains a basic (*e.g.*, mono- or di-alkylamino-) group; desensitisers when it contains a negative, *e.g.*, NO_2 , group. The products are sol. in H_2O or EtOH. J. L.

Light-sensitive photographic materials. I. G. FARBENIND. A.-G. (B.P. 379,158, 25.11.31. Ger., 26.11.30).—To facilitate retouching of a negative, a layer of colouring or dulling material is incorporated in the emulsion, or applied as a surface or intermediate layer, or as a backing. The material, *e.g.*, $\text{Fe}(\text{OH})_3$, CaC_2O_4 , a dye, or resin, is removed where required by

a suitable solvent, *e.g.*, $\text{H}_2\text{C}_2\text{O}_4$, dil. HCl, acid hypsulphite solution, or EtOH, respectively. J. L.

Colour photography. L. D. MANNES and L. GODOWSKY, JUN. (B.P. 376,794—5, 16.1.31. U.S., 19.3.30).—(A) Coloured photographic images are obtained by direct and single development, by incorporating in the emulsion (adsorbed on the Ag halide grains) such "colour-formers" as α -naphthol, *p*-nitrobenzyl cyanide, Et acetoacetate; on development with, *e.g.*, dimethyl-*p*-phenylenediamine, dyes of the indo-phenol etc. class are formed, of the required colours. By superimposing 2 or 3 different emulsion layers, suitably colour-sensitive and containing the corresponding "colour-formers," or by mixing such emulsions in one layer, films may be obtained on which multi-colour photographs are formable with one exposure and development (cf. Ermen, B., 1923, 202A). (B) Production of multi-layer films for colour photography as in (A) is described. J. L.

Production of colour photographs. L. D. MANNES and L. GODOWSKY, JUN. (B.P. 376,838, 16.1.31. U.S., 19.3.30).—After developing and fixing emulsions composed of several layers of different colour-sensitivity (for multi-colour photography), the different layers are bleached and redeveloped, in turn (by controlled diffusion), with colour-forming developers (*e.g.*, α -naphthol and dimethyl-*p*-phenylenediamine), each to its required colour (cf. B.P. 376,794, preceding abstract). J. L.

Preparation of coloured photographic and kinematographic pictures. L. J. DASSONVILLE (B.P. 377,411, 11.7.31. Belg., 16.7.30).—Using a 2-colour process, the "red-orange" print is made on a normal emulsion, which is developed and fixed; the gelatin emulsion is then resensitised, and the Ag image converted into AgCl, by immersion in a solution of FeCl_3 and $\text{H}_2\text{C}_2\text{O}_4$. The film is dried and the "blue-green" print made on it in correct registration, and this image is toned blue with $\text{K}_3\text{Fe}(\text{CN})_6$ or $\text{K}_4\text{Fe}(\text{CN})_6$, according as the image was printed from negative or positive film. The film is washed, and the AgCl image mordanted with KI and dyed with a suitable orange-red dye. J. L.

Preparation of kinematograph films bearing natural-colour pictures and sound records. L. J. DASSONVILLE (B.P. 379,558, 9.11.31. Belg., 13.11.30. Addn. to B.P. 377,411; preceding).—The first colour record having been printed, the whole film is developed and fixed. The gelatin is then resensitised with, *e.g.*, acid FeCl_3 , and the second colour record and the sound record are printed on and developed to an image of Turnbull's blue, which is grainless and gives no distortion by swelling. J. L.

Production of photographic multi-colour pictures. I. G. FARBENIND. A.-G. (B.P. 379,423, 15.6.31. Ger., 13.6.30).—The film base bears on each side a sensitive emulsion; the layers are dyed in component colours with dyes stable to developing solutions, and, if necessary, with sol. light-filter dyes. After exposure and development, the metallic Ag is converted into a heavy-metal salt, and wash-out reliefs are obtained

according to the process of B.P. 366,552 (B., 1932, 449). J. L.

Photographic reversal process. KODAK, LTD., Assees. of K. C. D. HICKMAN (B.P. 378,229, 12.9.31. U.S., 9.10.30).—Pptn. of MnO_2 and consequent hardening of the gelatin of the film in a reversing (bleaching) bath containing $KMnO_4$ is avoided by adding 1–2% of a polybasic acid (e.g., H_3PO_4), or about 2 g. per litre of a fluoride or its complex salt (e.g., Na_2SiF_6), in order to remove Mn^{++} (the primary reduction product) from the reaction mixture. J. L.

Multi-colour screens on paper and like supports for use in colour photography. F. PILLER (B.P. 379,290, 20.5.31. Ger., 28.5.30).

Reproduction by contact printing [with sliding registration] of colour-record images made on photographic or kinematographic [transversely-alined] lenticular films. KISLYN CORP. (B.P. 377,177, 18.3.31. Fr., 19.3.30. Addn. to B.P. 329,899).

Packings for photographic plates. I. G. FARBENIND. A.-G. (B.P. [A] 379,424 and [B] 379,665, 15.6.31. Ger., 14.6.30. [A] Addn. to B.P. 333,864).

Measuring particle fineness.—See I. ThO_2 sols.—See VII.

XXII.—EXPLOSIVES; MATCHES.

Rôle of bacteria in the match industry. L. M. HOROVITZ-VLASSOVA and G. S. FILIPPOV (Zentr. Bakt. Par., 1932, II, 86, 30–33).—Cases of unsatisfactory dipping preps. were due to the proteolytic activity of certain organisms of the *Mesentericus* group. Glue is partly decomposed and the mixture loses binding power. This effect is prevented by the addition of suitable germicides, e.g., crystal-violet (0.0006%), mianin (0.05%), $CaCl_2$ (0.1%), or $ZnSO_4$ (0.1%). A. G. P.

PATENT.

Nitrated cellulose.—See V.

XXIII.—SANITATION; WATER PURIFICATION.

Influence of [H] on the efficiency and biology of activated sludge. K. VIEHL (Zentr. Bakt. Par., 1932, II, 86, 34–43).—High alkalinity (p_H 10–11) in raw sewage does not markedly influence the activity of sludge or the composition of the effluent. Acidity ($p_H < 4.5$) depresses nitrite and nitrate production. The H_2O content of the sludge is a max. at neutrality, decreasing with rising acidity and alkalinity. In acid sludge the Ca^{++} and CO_3^{--} contents are lower and those of Fe^{++} and Al^{+++} higher than in alkaline sludge. Considerable pptn. of org. acids (as Ca salts) occurs under alkaline conditions. A. G. P.

Germicidal activity of vapours from irradiated oils. R. S. HARRIS, J. W. M. BUNKER, and N. A. MILAS (J. Bact., 1932, 23, 429–435).—The vapours of a no. of oils have a bactericidal action, and others exhibit this property only after irradiation. In general, animal oils are more active in this respect than vegetable oils. Their action is ascribed to the presence of volatile compounds containing peroxidic O_2 , the formation of which is accelerated by irradiation. A. G. P.

Purification of Snake and Clear Water Rivers. W. P. HUGHES (J. Amer. Water Works' Assoc., 1932, 24, 1173–1177).—Odours due to excessive algal growths in the raw water at Idaho were controlled by the application of Cl_2 (14 lb. per 10^6 gals.) at the entrance to the aerators, of C (0.3 grain per gal.) at the entrance to the settling tanks, and final treatment of the effluent with Cl_2 (2.0 lb. per 10^6 gals.) and NH_3 (0.7 lb. per 10^6 gals.). C. J.

Influence of the chloride content on the oxidisability (permanganate consumption) of water. H. BACH (Z. anal. Chem., 1932, 89, 439–441).—In dil. sewage- H_2O , containing only a small proportion of org. matter, a 10-fold increase in NaCl content only increased by about 12% the $KMnO_4$ required for oxidation, and in a much more conc. sewage the effect of variations in NaCl was entirely masked by other sources of error. M. S. B.

Odour determinations [in water]. C. H. SPAULDING (J. Amer. Water Works' Assoc., 1932, 24, 1111–1118).—The odour-removing efficiency of the various stages of the purification process are compared by determining the highest dilution in which the odour can be perceived and using this figure as a yardstick; e.g., if the dilution is 1 : 25, the odour no. required is 25. C. J.

PATENTS.

Preparations for killing flies. I. G. FARBENIND. A.-G. (B.P. 377,069, 27.11.31. Ger., 27.11.30).—Solutions of insecticides (pyrethrum, derris extracts, etc.) in partly or completely hydrogenated petroleum distillates are specified for the production of odourless preps. E. H. S.

Preparations for killing or eliminating flies. I. G. FARBENIND. A.-G. (B.P. 378,300, 12.12.31. Ger., 13.12.30. Addn. to B.P. 377,069; cf. preceding abstract).—The products comprise partly or completely hydrogenated mineral oils other than petroleum or its distillates (e.g., hydrogenated lignite tar oil) and insecticides, e.g., pyrethrum or derris extract and esters or ethers of $BzOH$ or its derivatives. L. A. C.

Killing of insects and preparations therefor. I. G. FARBENIND. A.-G. (B.P. 377,530, 11.11.31. Ger., 14.11.30. Addn. to B.P. 360,638; B., 1932, 130).—An aq. emulsion or suspension of a compound containing in the nucleus a CO_2H and a OH group (both being esterified or etherified), with or without other substituents, is employed. 11 examples of substituted benzoic and naphthoic acids are cited. Hydrocarbons of high b.p., other insecticides, and emulsifying, dispersing, or wetting agents may also be added. E. H. S.

Insecticides or fumigants. T. GOLDSCHMIDT A.-G. (B.P. 377,552, 11.12.31. Ger., 13.12.30. Addn. to B.P. 318,898; B., 1931, 226).—The proportions of inert substances, e.g., CO_2 or N_2 , are \geq the alkylene oxide content. E. H. S.

Respirators. C. G. VOKES (B.P. 379,381, 10.11.31).

Filters.—See I. **Electro-osmosis of H_2O .**—See XI. **Reclaiming rubber.**—See XIV. **Manure.**—See XVI. **Disinfectants.**—See XX.