

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

DEC. 23 and 30, 1932.*



I.—GENERAL; PLANT; MACHINERY.

High-temperature heat insulation. A correlation of existing data. M. L. NATHAN (Trans. Inst. Chem. Eng., 1931, 9, 177—190).—Unless pore spaces are large, heat is transmitted through insulators mainly by conduction. The increase in conductivity with temp. is mainly due to the increased conductivity of air. The effect of surface resistance on losses from an insulated body is slight, as also is that of external air velocity. Surface temp. is not a measure of heat transfer; methods of determining heat transfer are described. The insulating efficiency of diatomite is reduced by burning to brick with sawdust and clay, but the strength is increased. Slag wool cannot be used at above 700°, and the air spaces are > with diatomite. Firebricks are now made which incorporate powdered Al, Ca, or other material which develops gas when mixed with H₂O and gives the required porosity. Crumpled sheets of Al foil are also used at lower temp. At high temp. insulating bricks are better than tamped diatomite powder. Impure diatomite is less resistant to high-temp. effects. High-temp. insulating materials are tested for conductivity by the hot-plate and guard-ring method. Economic thicknesses of insulation can be calc. C. I.

Theory of drying. J. FRITH and F. BUCKINGHAM (Engineering, 1932, 134, 460—463).—The methods available for drying different materials are compared. The theory of the wet-bulb thermometer is considered in detail and theoretical relationships are compared with the experimental results of Awbery and Griffiths (A., 1932, 491). Its application to the problem of drying is considered. The wet-bulb temp. is a measure of the total heat per unit mass of the wet air. D. R. D.

Preferential wetting of solids by liquids. N. S. DAVIS, JUN., and H. A. CURTIS (Ind. Eng. Chem., 1932, 24, 1137—1140).—Displacement pressures were measured with a Bartell cell (cf. B., 1928, 1) packed with S, using H₂O, C₆H₆, NH₃Ph, CCl₄, and BuⁿOH, both alone and also each org. liquid against H₂O. The data were not all in accordance with theory; it is thought that possibly the slight solubility of H₂O and of S in some of the org. liquids may account for this discrepancy. A. G.

Fractional distillation. G. O. THACKER (Trans. Inst. Chem. Eng., 1931, 9, 191—192).—The theory of plate-column stills, and McCabe and Thiele's method of computing the no. of theoretical plates required, are explained. C. I.

Fluid friction and its relation to heat transfer. C. M. WHITE (Inst. Chem. Eng., Oct. 7, 1932. Advance

proof, 17 pp.).—Equations are derived showing the relation between heat transfer and friction for fluids flowing through and laterally over the external surface of tubes, and past flat plates. D. K. M.

Production of dry air, with particular reference to the silica gel method. S. LEES (Engineering, 1932, 134, 458—460).—The drying of air is considered thermodynamically. The methods available are compared and the SiO₂ gel method is recommended. Details are given of its commercial application. D. R. D.

Materials used in chemical engineering operations. B. E. ROETHELI and H. O. FORREST (Ind. Eng. Chem., 1932, 24, 1018—1026).

Selection of ferrous materials for construction of chemical plant. K. FRASER and H. A. S. GOTHARD (Trans. Inst. Chem. Eng., 1931, 9, 193).

Flow sheets and their development. H. W. RICHARDS (Ind. Chem., 1932, 8, 399—402).

Design and use of centrifugal pumps. C. S. DARLING (Ind. Chem., 1932, 8, 384—386).

Care and maintenance of control instruments. R. GRIFFITHS (Ind. Chem., 1932, 8, 370—374).

Fluxing of ashes and slags. Graphite lubrication. Petrol boiler preheater.—See II.

PATENTS.

Heat-treatment of materials. A. P. E. BOURDET (B.P. 380,830, 17.6.31. Belg., 18.6.30).—The material is passed through two inclined rotary kilns in succession, concurrent to heating gases in the first and counter-current to a separate lot of gases in the second. Lifting blades are provided, and also means for introducing gases part-way down the kiln. B. M. V.

Tubular condensers and similar heat-exchange apparatus. CRANE PACKING, LTD., and F. C. W. WILKINSON (B.P. 381,007, 1.12.31).—A gland device for securing tubes in a tube plate is described; no parts project beyond the plate. B. M. V.

[Tubular] heat-exchange apparatus. H. H. DOW, Assr. to DOW CHEM. CO. (U.S.P. 1,846,955, 23.2.32. Appl., 26.8.26).—Leakage from one fluid to another is absolutely prevented by transmitting the heat through a third liquid which is circulated in the annular spaces between larger and smaller tubes. B. M. V.

Rotary tubular heat-exchange apparatus for fluids. MASCHINENFABR. ING. H. SIMMON (B.P. 380,992, 17.11.31. Austr., 5.12.30).—A cage of rotating, fluid-carrying tubes is provided with gills of plates cut in the form of sectors of an annulus and assembled in such a

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

way that a stiff wheel rim is formed while allowing free passage of the outer fluid. B. M. V.

Grinding and crushing machines. A. R. JAHN (B.P. 381,004, 27.11.31).—A rotating base-plate or pan is provided with co-operating members comprising loose, nested, hollow rollers, the outermost one of each set being guided (and, if desired, driven) by rollers (or pinions). B. M. V.

Mills for grinding material in a liquid condition. A. SONSTHAGEN, J. R. PACKMAN, and KEENOK Co., LTD. (B.P. 381,153, 22.6.31).—A knife or grinding block for use against a roller is of laminated construction; each lamination can be adjusted separately, and the whole by tilting so that a space is left with a stepped taper from the entering side. B. M. V.

Rotary screen. J. A. WHITE, Assr. to MOORE & WHITE Co. (U.S.P. 1,846,931, 23.2.32. Appl., 31.10.30).—A cylindrical screen for, e.g., paper stock, in which the flow is outward is provided with paddles in the filtrate tank shaped to the screen and operated in alternation to produce a pulsating flow through the meshes. B. M. V.

Centrifugal drums. G. TER MEER (B.P. 381,249, 10.7.31).—The drum, preferably having a horizontal axis, is divided into two, and to equalise the power demand the filling of one side takes place at the same time as the drying of the other, and the washing of one with the discharging by scraping of the other. B. M. V.

[Centrifugal] separation of liquids from solids. G. H. ANDERSSON, Assr. to DE LAVAL SEPARATOR Co. (U.S.P. 1,846,076, 23.2.32. Appl., 17.9.30. Swed., 5.3.30).—In a centrifuge using an auxiliary liquid to discharge solids, the rate of supply of auxiliary liquid is adjusted in accordance with the outflow of that liquid + solids by means of, e.g., equiposed tanks into which inflow and outflow are directed, the deflection of the balance beam operating a control valve in the supply. Other devices comprise floats in measuring tanks. B. M. V.

Separation of solid substances from liquids by vacuum cooling in stages. METALLGES. A.-G. (B.P. 381,439, 4.2.32. Ger., 15.7.31).—A warm solution is passed through a no. of vac. evaporators in series; no evaporator is supplied with heat, but each is provided with its own condenser, only the last of which is cooled by external means. After separation of the salt the mother-liquor is passed through the condensers (as cooling medium) in reverse order, and then to a vessel or vessels in which new solution is admixed, pptd. matter and/or gases are removed, and the temp. of the mixture is adjusted for another pass through the evaporators. B. M. V.

Filter. H. F. WEBB, Assr. to MINE & SMELTER SUPPLY Co. (U.S.P. 1,846,168, 23.2.32. Appl., 10.8.29).—A continuous belt of filter medium is caused to travel, at centrifugal speed, in two parallel helical paths, the prefill being supplied to the interior of the helices. B. M. V.

Production of lumps of pulverous material. A. ANDREAS (B.P. 380,987, 9.11.31. Ger., 8.11.30).—The material is passed between hollow unfluted rolls

at least one of which is provided with apertures through which the material is squeezed; if both rolls are apertured, the holes are arranged so as never to be opposite each other. Material passing through the nip is returned for re-treatment. B. M. V.

Mixer [for liquids]. J. C. EATON, L. W. DICKEY, and E. FIELD, Assrs. to STANDARD OIL Co. OF CALIFORNIA (U.S.P. 1,846,027, 23.2.32. Appl., 10.10.30).—An impeller comprising perforated cones and radial vanes and imperforate scoops is described. B. M. V.

Distilling apparatus. [Domestic or laboratory still for water.] C. C. E. KERSTEN (U.S.P. 1,847,007, 23.2.32. Appl., 25.6.29).—Both the condensing surface and the water container surrounding it are of wavy star-shaped section, with the object of providing large surface for transmission and radiation of heat, respectively. B. M. V.

Vacuum distillation. C. ARNOLD. FROM STANDARD OIL DEVELOPMENT Co. (B.P. 381,427, 15.1.32).—In a vac. still, the oil may be passed at high velocity through the heating zone, but the fractionating zone is enlarged so that the conditions for the vapours are the best to avoid entrainment on the one hand and cracking on the other. This is claimed to be when they move at a speed, V ft./sec., between $8\sqrt{p}$ and $11\sqrt{p}$, where p is the abs. pressure in in. of Hg. B. M. V.

Preparation of components or groups of components from a mixture of liquids. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 380,954, 3.10.31. Holl., 18.11.30).—In a system in which a component, A , is scrubbed from a mixture, $A + B$, by a solvent, C , which also dissolves a slight proportion of B or other undesired constituent, the separation is rendered perfect by conducting the operation under a temp. gradient in an apparatus designed to prevent mixing by eddy currents. B. M. V.

Evaporator. P. B. SADTLER, Assr. to SWENSON EVAPORATOR Co. (U.S.P. 1,846,067, 23.2.32. Appl., 1.2.29).—Horizontal heating tubes are placed across a vertical cylindrical vapour and liquid container in two intercalating and crossing bundles, so that the centre of a horizontal circle of the vessel is much occupied by criss-crossed tubes and forms the ascending zone while the bare places of the circle are used as descending zones and are defined by vertical plates adjacent the outer rows of tubes. The descending zones are four in no. if the tubes are at right angles, but may be two only if the tubes are at an acute angle. B. M. V.

[Countercurrent] treatment of liquids. G. S. WHITHAM, R. C. BOWDEN, and T. A. SMITH (B.P. 381,291, 24.8.31).—In a process such as the continuous nitration of PhMe, a no. of reaction vessels (R) and separating vessels (S) are connected in alternating countercurrent series; the latter are at a higher level than the former, are made as shallow as possible, and are provided with overflow weirs (ordinary and submerged) for the two liquids. The launders are open. Lifting means are provided to transfer the mixture of liquids from R to S . As a precaution against overflow each vessel R is provided with a direct, high-level connexion to each of its neighbours. B. M. V.

Apparatus for dispersing liquid material [e.g., salts]. W. H. LOHMANN, Assr. to GEN. CHEM. CO. (U.S.P. 1,846,884, 23.2.32. Appl., 3.6.25).—A centrifugal head suitable for the spraying of liquids, e.g., $Al_2(SO_4)_3$ solutions, to effect their solidification by cooling without much evaporation is described. B. M. V.

Filter for fluids. C. G. VOKES and H. D. FRY (B.P. 381,205, 26.6.31).—The fluid is caused to pass upwardly outside, and to filter through to the inside, of a no. of vertically placed Bowden outer casings. B. M. V.

Filtration of gases. SOC. ITAL. PIRELLI (B.P. 380,965, 16.10.31. Italy, 18.10.30).—The gas is filtered through vegetable wool, e.g., kapok or fibre derived from *Typha latifolia*, Linn, or *T. angustifolia*; finely-divided solid matter, e.g., cork dust, ebonite dust, or talc, may be admixed. B. M. V.

Apparatus for separating suspended material from gases. F. SEIPP, Assr. to INTERNAT. PRECIPITATION CO. (U.S.P. 1,846,365, 23.2.32. Appl., 27.2.30. Ger., 27.3.29).—The gases in an electrical precipitator are caused to pass in a spiral path between vertical walls which also act as the earthed electrode. Means for moistening the gases are provided. B. M. V.

Air separators. E. KRAMER, Assr. to HARTSTOFF-METALL A.-G. (HAMETAG) (U.S.P. 1,846,209—10, 23.2.32. Appl., [A] 2.6.28, [B] 29.7.29. Ger., [A] 2.6.27, [B] 3.8.28).—In (A), the air-borne stream of comminuted material from a mill is settled in a fore-separator to a greater degree than is necessary, and the deposited material is more exactly classified in another separator in which the current of air can be adjusted independently of the current from the mill. One method of effecting this is to employ a separate fan. In (B), a classifier suitable for use with an auxiliary air current at the bottom is described. B. M. V.

Mist extractor. A. F. CLARKE (U.S.P. 1,846,248, 23.2.32. Appl., 25.6.29).—Mist-laden gases are caused to pass upwardly and whirlingly inside tubular or truncated conical elements having a helical blade on the interior. B. M. V.

Production and maintenance of a constant gas pressure in closed systems [e.g., distillation plant]. DEUTS. GOLD- U. SILBER-SCHNEIDANSTALT VORM. ROESSLER (B.P. 380,887, 21.7.31. Ger., 22.7.30).—The closed system is put into communication, by a single pipe, with another system in which a current of gas is maintained against a const. pressure, e.g., the back-pressure produced by bubbling through one or more columns of H_2O . In an example, the continuous rectification of $MeCHO$ is described. B. M. V.

Apparatus for indicating the specific volume or gravity of gases or vapours. J. PINTSCH A.-G. (B.P. 381,170, 25.6.31. Ger., 25.6.30).—Various forms of extensible, sealed, hollow bodies suitable for insertion in a stream of gas and to partake of the same temp. and pressure are described, also means of connecting them to metering apparatus. The greater part of the interior of the body may be filled with solid or liquid material. B. M. V.

Indirect heating of apparatus, especially chemical apparatus. E. KOENEMANN (B.P. 382,501, 12.2.32).—See U.S.P. 1,845,289; B., 1932, 1060.

Furnace walls [especially for stoker-fed furnaces]. AMER. ENG. CO. (B.P. 382,487, 22.1.32. U.S., 6.8.31).

Apparatus for the optical examination of transparent fluids or solids. O. H. HEYHOE (B.P. 381,335, 9.10. and 7.12.31).

Gas-testing device.—See II. Heating of furnaces.—See X.

II.—FUEL; GAS; TAR; MINERAL OILS.

Spores of certain American coals. G. C. SPRUNK and R. THIESSEN (Fuel, 1932, 11, 360—370).—The nature of spores and spore-exines is briefly discussed and the spores occurring in 9 American coal beds have been catalogued and classified. Spores are important oil- or tar-yielding constituents of coal. They often form a criterion by means of which a bed may be identified; thus the Pittsburgh bed is unique in containing only one characteristic type of microspore and one megaspore, the former not being found in any other bed. The splint microspore and the large splint megaspore were found in Virginia, West Virginia, Eastern Kentucky, and Alabama, and were present in more different coal beds than any other type of spore. The various types are illustrated by photomicrographs. A. B. M.

Relative oxidisability of the constituents of coal. W. FRANCIS and R. V. WHEELER (Fuel, 1932, 11, 356—359).—Examination of the fractions obtained by the action of solvents on three bituminous coals (a vitrain, a clarain, and a durain, respectively) before and after treatment with moist O_2 at 100° for one month has shown that the β fraction (sol. in C_5H_5N , insol. in $CHCl_3$) was more readily and more completely oxidised (increase in O content 60—70%) than either the α (insol. in C_5H_5N) or γ fraction (sol. in $CHCl_3$); the increase in O content of the two latter fractions did not exceed about 20%. The solid products of oxidation either by O_2 or H_2O_2 of the α and β fractions were alkali-sol. ulmins. Part of the oxidised γ fraction was sol. in alkali, but on addition of acid yielded a white or pale yellow ppt. which appeared to be a resin acid. The γ fraction contained no dispersed ulmins, but consisted largely of hydrocarbons resistant to oxidation. A. B. M.

Modern practice in coal cleaning. V. Upward-current washers. H. E. WALLSOM (Fuel Econ., 1932, 8, 63—66; cf. B., 1932, 708).—The design and operation of Robinson and Draper washers are discussed. A. B. M.

Some aspects of the [coal-washery] slurry problem. D. T. DAVIES and E. T. WILKINS (Fuel Econ., 1932, 8, 68—70).—An increase in the efficiency of dealing with coal-washery slurries in settling tanks would, in general, necessitate an uneconomic increase in the size or no. of tanks employed. The attempts that have been made to increase the rate of settling by the addition of flocculating agents, to filter the slurry, or to simplify the problem by de-dusting the coal have not yet been completely successful (cf. B., 1930, 646). The

rate of settling of a slurry has been increased by fitting the tank with a series of inclined baffles, the convection currents so set up greatly accelerating the settling. The relative increase in the rate of settling is greater the more conc. is the slurry.

A. B. M.

Disperse fuel: its technical and commercial possibilities. J. L. STREVEN (Fuel Econ., 1932, 8, 70—72).—The grindability of coal, the method of prep. of disperse coal-in-oil fuel, the production of a higher degree of dispersion by subjecting the suspension to heat treatment under pressure (cf. B.P. 323,773; B., 1930, 312), and the cracking and coking of such dispersions are briefly discussed.

A. B. M.

Mechanism of combustion of pulverised coal. A. GREBEL (Proc. III Int. Conf. Bit. Coal, 1932, 2, 420—447).—Reactions are discussed. For lighting pulverised fuel burners an oil burner is preferable, since the liquid fuel, by cracking at a relatively low temp., remedies the H_2 deficiency which occurs before the coal flame is self-propagating. The effects of fineness, d , ash, volatile matter, excess of air, and velocity of the particle in air on the time of combustion are discussed.

CH. ABS.

Pressures occurring in the plastic layer of a coking coal during carbonisation. G. E. FOXWELL (Fuel, 1932, 11, 370—377).—By comparing the vol. of gas evolved from a column of compressed coal in a heated Fe tube with that from a column of mixed coal and coke in a similar tube, the vol. of gas imprisoned in the compressed coal, and hence the pressure of the gas, has been calc. as a function of the temp. The form of the pressure curve varied with the size of the coal and the density of the charge; max. pressures as high as 90—120 atm. were observed with a Durham coal. The bearing of the results on the choice of the optimum conditions to be observed in carbonising poor coking coals is discussed.

A. B. M.

Effect of atmosphere on desulphurisation of coal during carbonisation. T. A. MANGELSDORF and F. B. BROUGHTON (Ind. Eng. Chem., 1932, 24, 1136—1137).—The elimination of S from coal when heated in CO , steam, illuminating gas, H_2 , and H_2O has been determined by measuring the H_2S in the exit gases and plotting % S eliminated as H_2S against time. The results do not agree with those of Snow (B., 1932, 871); this divergence is attributed to the different coals used.

D. K. M.

Fluxing of [coal] ashes and slags as related to the slagging-type furnace. P. NICHOLLS and W. T. REID (Fuel, 1932, 11, 320—339, 377—386).—A laboratory study has been made of the effect of adding various fluxing agents on the "flow temp." of coal ashes and slags. The flow temp. was taken as the temp. at which the molten ash had a viscosity of approx. 5 poises, and was determined by melting the ash in a Pt crucible supported within an electric furnace and comparing the ease of stirring with that of a fluid of the desired viscosity, e.g., castor oil at 28°. The "penetration point" of some of the slags, i.e., the temp. at which the Pt stirring rod would just penetrate the softened slag under a pressure of 6 oz., was also noted. No simple relation was observed between the flow temp. and the standard ash-fusion

temp. of the slags. Apart from its high cost borax was too volatile for use as a flux in a furnace. Felspar was ineffective. Fluorspar was a rapid and efficient flux; it lowered the flow temp. of coal ashes by approx. 12° for each 1% added for ashes having a $SiO_2:Al_2O_3$ ratio of 2, and by 16° when the ratio was 3. Mixtures of $CaCO_3$ with Na_2SO_4 (saltcake) or with Fe_2O_3 were effective fluxes when used in suitable proportions; the relations between the proportions of the two fluxes added, the composition of the ash or slag, and the lowering of the flow temp. are complex; some of the results are illustrated diagrammatically. Over the ranges of temp. and ash composition tested, dolomite was more effective than $CaCO_3$ as a flux. The fluxing effect of SiO_2 was limited; it proved useful in lowering the flow temp. of slags having a low $SiO_2:Al_2O_3$ ratio and high Fe_2O_3 content. Steel slag ("tapping slag") was effective as a flux for coal ashes. A slag containing Fe in a reduced form had a higher flow temp. than one in which the Fe was largely oxidised; the first addition of $CaCO_3$ to the former type caused oxidation of the Fe and resulted in a greater fall in flow temp. than occurred when the Fe was initially in the oxidised state. All the experiments were carried out in an atm. of air. The time taken to attain the desired fluidity when the mixture of ash and flux was heated up to but not above the pre-determined flow temp. varied from 15 min. to 2½ hr. Tests which have been carried out in a large gas-fired furnace (slag hearth 2½ × 3 ft.) have, in general, confirmed the results of the small-scale tests. $CaCO_3$ or dolomite placed on the top of the bed of slag ultimately distributed itself in such a manner that its concn. in the lower layers was > in the top layers; the reason for this was not clear, but the phenomenon was an advantage from the viewpoint of fluxing. From the economic viewpoint, for slagging-bottom furnaces, the only fluxes that need be considered are $CaCO_3$, dolomite, and Fe ore, or their equivs. in waste products. The calculation of the most economic mixture to be used is discussed.

A. B. M.

Comparative softening and m.p. determinations on coal ash. H. A. J. PIETERS and G. SMEETS (Het Gas, 1932, 52, 171—172; Chem. Zentr., 1932, ii, 481).—Bunte's and Baum's methods are criticised and compared.

A. A. E.

Artificial carbonisation of lignites. II. I. UBALDINI and C. SINIRAMED (Annali Chim. Appl., 1932, 22, 578—593; cf. B., 1932, 664).—Carbonisation of Italian lignites under pressure at 320—325° for periods varying from ½ hr. to 6 hr. gives the same results. The artificial coals obtained are similar and are independent of the nature of the lignite employed. The calorific val. is 7700—7900 g.-cal. They possess a high content of bituminous substances sol. in $EtOH-C_6H_6$, and when distilled at low temp. supply much more tar than the original lignite. In the case of Spoleto lignite the tar yield is increased by 120%. The bitumen from carbonised products differs from that present in lignite and is rich in phenolic substances.

O. F. L.

Colloidal graphite lubrication. T. RUEMELE (Petroleum, 1932, 28, No. 41; Motorenber., 5, 6—7).—Colloidal graphite fills up unevennesses in the surfaces

to be lubricated, forming a "graphite mirror" and lowering the dry friction of metal surfaces to 25% of the former val. The graphitised surface has a higher adsorptive capacity for oil and can therefore give efficient lubrication with lower-quality oils. Moreover, graphite is heat-resistant. The useful field of application of colloidal graphite as a lubricant is briefly indicated.

A. B. M.

Chemical basis of the production of water-gas from coke and coal. P. DOLCH (Gas- u. Wasserfach, 1932, 75, 807—811).—The water-gas const. $[\text{CO}][\text{H}_2\text{O}]/[\text{CO}_2][\text{H}_2]$ has been determined experimentally at 800° for cokes from a brown and a bituminous coal. The former was const. at 1.13 and the latter increased from 5.45 to 20.7 over 6 hr., compared with the theoretical val. 0.92. It is concluded that the reactivity of the coke is of more importance than the reaction velocity of steam on C in actual water-gas production.

R. N. B.

Rational utilisation of exhausted olive husks: gasification and by-products. A. MANGINI (L'Ind. Chimica, 1932, 7, 1200—1205).—20 samples gave the mean % figures: H_2O 21.56, ash 8.62, C 35.71, H 3.72, O 29.94, org. matter 71.48; mean calorific val. 3096 kg.-cal. per kg. The yields on distillation were: carbonaceous residue 40, combustible gases 12, MeOH 0.8, AcOH 2, tar 3.5, NH_3 1.3; and on gasification: combustible gases 20, MeOH 0.85, CO_2 0.65, AcOH 2.5, tar 2—3. The use of a special generator, in which the H_2O is expelled, pyroigneous acid distilled, and gasification effected consecutively, is described. The olive husks (*sanse*) available in the Apulian region alone would furnish (quintals): AcOH 42,500, MeOH 14,500, CO_2 11,000, tar 43,500, ash (30—32% K_2O) 147,000, besides 85,000,000 kw., of the total val. 80—90 million lire. The crude tar yielded (%): acids 0.87, phenols 9.89, bases 1.81, neutral oil 26.83, pitch 40.26.

T. H. P.

Gum deposits in gas-distribution systems. I. Liquid-phase gum. A. L. WARD, C. W. JORDAN, and W. H. FULWEILER (Ind. Eng. Chem., 1932, 24, 969—977).—Two kinds of gum which cause blockages of pipes, meters, etc. have been found in gas-distribution systems, viz., (1) a neutral or slightly acid alkali-sol. material low in N, formed only in carburetted water-gas by polymerisation and oxidation of unsaturated hydrocarbons in the liquid phase, (2) a strongly acid alkali-sol. material containing < 5% N, formed by the action of oxides of N on unsaturated hydrocarbons in the vapour phase and important only in the case of coke-oven and coal gas. In the condensate formed by cooling water-gas to -78° the chief unsaturated compounds are styrene, indene, butadiene, and cyclopentadiene. For the determination of condensable hydrocarbons in gas, the condensation method is preferred to either the oil-scrubbing or picrate-formation method. After fractionation and removal of phenols and S, if necessary, the degree of unsaturation was determined by Br, and this corresponded with the quantity of gum formed on treatment of the fractions with a little 95% H_2SO_4 . SnCl_4 and SbCl_5 offer a possibility of separating the gum-forming hydrocarbons. Tests of the condensable hydrocarbons in different types of gas are given. D. K. M.

Hydrogenation of constituents of tar oils (1) in presence of sodium hydride as catalyst, (2) at high pressure and temperature. G. HUGEL and J. FRIESS (Ann. Office Nat. Combust. liq., 1932, 6, 1109—1147; Chem. Zentr., 1932, ii, 477).—(1) The velocity of formation of NaH from Na and H_2 (in the autoclave to be employed for hydrogenation) was greatest at 300—310°. A hydride (? Na_2H) appears to be formed at higher temp. of formation, which lead also to diminution of the catalytic activity of the NaH. C_6H_6 was not markedly hydrogenated at 440°; C_{10}H_8 was slowly converted at 250—350°/20 atm. into $\text{C}_{10}\text{H}_{12}$, whilst above 350° oils of high b.p. (250—350°) were obtained. Anthracene was readily hydrogenated at 120° to tetrahydroanthracene (50%), 5:10-dihydroanthracene, and small quantities of hexa- and octa-hydroanthracene. Dibenzyl was not hydrogenated at 300°, whilst stilbene above 270° gave dibenzyl. Intermediate Na compounds could not be isolated. A. A. E.

Interfacial tension between asphaltic materials and various aqueous solutions. R. N. TRAXLER and C. U. PITTMAN (Ind. Eng. Chem., 1932, 24, 1003—1005).—Using the tensiometer method at 85°, the interfacial tension between a Venezuelan and a Trinidad asphaltic flux and aq. NaOH was found to decrease with increase of NaOH concn., emulsions being formed at a concn. of 0.05N with the former and 0.005N with the latter. For the systems Venezuelan flux-0.005N-NaOH and Trinidad flux-0.0025N-NaOH, the addition of NaCl first decreased the tension to a min. when the NaCl concn. was 0.125N, after which it rose to const. vals.: at NaCl concns. of 0.52N in the former case and 1.0N in the latter. The addition of CaCl_2 to the systems Venezuelan flux-0.01N-NaCl and Trinidad flux-0.005N-NaCl increased the tension to practically a const. val. at a CaCl_2 concn. of 0.0025 mols. per litre. The effect of the addition of CaCl_2 to the systems Venezuelan flux-0.005N-NaOH plus 0.125N-NaCl and Trinidad flux-0.0025N-NaOH plus 0.125N-NaCl was partly overcome by the NaCl for a CaCl_2 concn. of < 0.0025 mol. per litre; the NaCl and CaCl_2 neutralise each other when the ratio $\text{CaCl}_2/\text{NaCl}$ lies between 1/50 and 1/100. In practice, other factors complicate the problem of asphalt emulsion manufacture. D. K. M.

Better utilisation of the petrol boiler preheater. R. FUSSTEIG (Chem.-Ztg., 1932, 56, 870—871).—An arrangement of boiler, preheater, and fractionating column for the distillation of crude oil is described, by means of which 30% of each fraction is distilled by the heat recovered from the distillate. The preheater consists of two superimposed, horizontal, cylindrical vessels, the upper one being surmounted by a fractionating column containing horizontal plates arranged stepwise, and the lower one being connected through a pump with the boiler. The oil from the boiler passes upwards through a coiled pipe in a dome surmounting the boiler into the fractionating column through a spraying device, while the vapours produced in the boiler pass around the coil in the dome, then back through the preheater in which they are condensed, and the heat is utilised in removing the most volatile constituents from the crude oil. A. R. P.

Magnesium hydroxide in the petroleum industry.

F. T. GARDNER and E. C. HIGGINS, JUN. (Ind. Eng. Chem., 1932, 24, 1141—1146).—MgO used for preparing Mg(OH)₂ for use in the petroleum industry should not be "dead-burnt," should contain 90—95% of MgO and < 2.5% of insol. matter, and have an ignition loss of < 3.0%. PhOH, H₂S, and H₂SO₄ may be removed from gasoline by treatment with granular or aq. suspensions of Mg(OH)₂. The Mg(OH)₂ can be revived by boiling with H₂O. Mercaptans may be removed by adding S and then passing the mixture through granular Mg(OH)₂. If too much S is used the product is corrosive to Cu; if too little the sweetening is incomplete. It is thought that Mg(OH)SR, sol. in gasoline, is first formed and that this acts on S to form Mg(OH)₂, MgS, and org. disulphides; contact with Mg(OH)₂ is necessary. MgS can be reconverted into Mg(OH)₂ by boiling with H₂O; in practice, the spent Mg(OH)₂ is boiled with H₂O, and then with aq. NaOH (2%), washed twice with H₂O, and dried *in situ*. D. K. M.

Vapour-liquid equilibrium curves of petroleum fractions. S. N. OBYRADCHAKOFF (Ind. Eng. Chem., 1932, 24, 1155—1160).—Curves are given and discussed. D. K. M.

Probable presence of ββ-dimethylpentane in a mid-continent petroleum.

J. H. BRUUN and M. M. HICKS-BRUUN (Bur. Stand. J. Res., 1932, 9, 53—59).—Fractionation by equilibrium melting of a cyclohexane fraction isolated from Oklahoma petroleum yielded a small quantity of a fraction which showed all the physical characteristics of a 46 : 54 molar mixture of cyclohexane and ββ-dimethylpentane. A. R. P.

Mineral oil sulphonic acids. W. SCHAEFER (Allgem. Oel- u. Fett-Ztg., 1932, 29, 505—507).—The properties of the sulphonic acids obtained by the refining of mineral oils with H₂SO₄ or SO₃ are briefly considered. Decomposition during the determination of H₂O by the xylene method is shortly discussed. (Cf. B., 1931, 727.) E. L.

Recent progress in hydrogenation of petroleum.

P. J. BYRNE, JUN., E. J. GOHR, and R. T. HASLAM (Ind. Eng. Chem., 1932, 24, 1129—1135).—The plant at Baton Rouge, La., is described. Natural gas and exhaust steam are passed through tubes containing a catalyst and heated to 871°, H₂ and CO being formed. Additional steam is added and the mixture passed through tubes containing a second catalyst at 454°. The resulting gas, containing H₂ 78%, CO₂ 20%, unconverted hydrocarbons and other gases 2%, is cooled with H₂O in coke-packed towers, compressed to 250 lb. per sq. in. pressure, and freed from CO₂ by scrubbing in bubbler towers with triethanolamine. The CO₂ is stripped from the scrubbing medium with steam and the liquid cooled and re-used. The gas, containing 97% H₂, is compressed (3600 lb. per sq. in.) and delivered with oil after preheating by the products of the reaction chamber to a coil in which the temp. of the mixture is raised to 371—454°, and thence to reaction drums (40 ft. long, 3 ft. internal diam.) lined with a non-corrosive alloy, filled with S-resistant catalyst, and mounted vertically with 3 or 4 in series. From these the hydrogenated mixture passes through heat exchangers and a cooling coil and thence to a separator from which

the liquid is withdrawn and the gas still under pressure is scrubbed, boosted to 3600 lb. per sq. in. pressure, and recycled. Automatic alarms indicate when the O₂ in the H₂ due to infiltration of air is > 0.2%, and provision is made for sweeping out any leakages of H₂ from the system. The plant has operated unceasingly for a year. The physical properties of the various products are given. D. K. M.

Analysis and standardisation of crude and "soluble" carbolineum.

L. A. and J. DESHUSSES (Helv. Chim. Acta, 1932, 15, 1030—1048).—The determination of hydrocarbons, phenols, and bases in crude and "sol." carbolineums, and of H₂O in the latter, is modified to give an accuracy of about 0.5%; various technical products are analysed and the hydrocarbons fractionated. Current views regarding the requisites of efficient carbolineums are summarised and proposals for standardisation are made. "Sol." oils consist mainly of either anthracene or middle oils. R. S. C.

Changes in physical and electrical properties of a mineral insulating oil, heated in contact with air.

H. H. RACE (J. Physical Chem., 1932, 36, 1928—1941).—Oils used for insulating cables change during service owing to oxidation. The conductivity increases, the more so the higher is the temp. Dielectric losses for high frequencies increase, indicating that there is no motion of the mol. as a whole, but only of the polar group. The ability to spread on H₂O is increased, although changes in the acid val. are very small. No appreciable changes in viscosity or *n* were observed. The determination of acid val. is not a suitable means for detecting changes in an oil. J. H. R. (c)

Extracting phenols.—See III. **Palm-oil [residues as fuel].**—See XII. **Synthetic resins from petroleum.**—See XIII.

PATENTS.

Manufacture of coal fuel. COMP. DES MINES DE BRUAY (B.P. 380,993, 19.9.31. Fr., 2.10.30).—Finely-ground caking coal, of 30—35% volatile matter content, is mixed with an approx. equal wt. of finely-ground non-caking coal or semi-coke (volatile matter 15%), and the mixture is carbonised at 650—700° in an ordinary, preferably narrow, coke oven. The product is a hard, easily ignitable fuel, particularly suitable for domestic heating. A. B. M.

Destructive distillation of wood waste. J. D. HOWARD, Assr. to A. W. GRUBB (U.S.P. 1,845,917, 16.2.32. Appl. 12.9.29).—The comminuted wood is mixed with 15—30% of diatomaceous earth and carbonised in a suitable retort. A. B. M.

Manufacture of carbon and hydrogen. N. GRÜNSTEIN (B.P. 380,893, 27.7.31. Ger., 25.7.30. Addn. to B.P. 363,735; B., 1932, 248).—In carrying out the process of the prior patent an undiluted catalyst, e.g., metallic Fe, is used at first and is then diluted by the freshly formed C black until the optimum ratio of C to catalyst is reached; this ratio is thereafter maintained by the periodic or continuous introduction of fresh catalyst into the reaction vessel. A. B. M.

Manufacture of decolorising carbon. R. N. RIDDLE, ASSR. to RIDDLE PROCESS CO. (U.S.P. 1,845,815, 16.2.32. Appl., 7.2.27).—Finely-pulverised coal is impregnated with Na_2CO_3 or similar alkaline salt, and heated in air, with stirring and under conditions which prevent sintering together of the particles, to a temp. at which partial combustion occurs. The product may be further heated in the absence of air and finally in the presence of steam. A. B. M.

Gas producer. F. H. WAITE and G. W. DAVEY (U.S.P. 1,845,064, 16.2.32. Appl., 18.2.25).—A gas producer (*A*) is provided with a lining built up of superimposed blocks constructed and arranged to provide a continuous system of passages throughout the entire lining, which is maintained at a comparatively even temp. below its fusion point by a const. flow of air, or air and steam, through the passages. The air (etc.) so preheated is then supplied to the fuel bed of *A*. A. B. M.

Water-gas manufacture. HUMPHREYS & GLASGOW, LTD., and J. E. G. FRYER (B.P. 381,046, 12.1.32).—An arrangement of valves is provided in the secondary air pipe by means of which the secondary air supply is properly proportioned to the amount of combustible gases in the blast gases. A. B. M.

Gas-testing device. G. A. DAVIDSON, ASSR. to STANDARD OIL CO. OF CALIFORNIA (U.S.P. 1,845,247, 16.2.32. Appl., 7.3.27).—The quantity of condensable vapours in a gas is determined by passing the gas through a cooler immersed in a refrigerant, e.g., a mixture of solid CO_2 and Et_2O . The cooler may consist of a glass condenser so designed that the gas passes down the annular space between the outer corrugated wall and the central outlet tube before passing up the latter. The bottom of the cooler forms a graduated tube for measuring the vol. of condensate. A. B. M.

Coking of tars and hydrocarbon oil residues. G. CASH, ASSR. to STANDARD OIL CO. (U.S.P. 1,844,944, 16.2.32. Appl., 12.5.28).—The preheated tars or oils are passed through a chamber (*A*) containing a no. of superposed, horizontal, hollow, rotary cylinders, through which heating gases are passed; these cylinders are so arranged that by their rotation they crush and remove any coke that has accumulated thereon. The coke formed is withdrawn continuously or intermittently through an outlet at the bottom of *A*. A. B. M.

Cracking of petroleum hydrocarbons. W. M. CROSS, ASSR. to GASOLINE PRODUCTS CO., INC. (U.S.P. 1,845,959, 16.2.32. Appl., 22.6.28).—In the cracking of oil at 371–427°/500–1000 lb. per sq. in., steam is introduced at a mid-point of the heating coil and the mixture heated to 482–510° in a thermostatically controlled superheater and passed into a reaction chamber. The steam prevents the accumulation of C and resins in the heating coil, connecting pipes, and reaction chamber. D. K. M.

Treatment [purification] of petroleum oils. G. C. ROWDEN (U.S.P. 1,845,723, 16.2.32. Appl., 15.4.29).—Petroleum oil is continuously freed from unstable unsaturated hydrocarbons, whether containing S or not, and rendered sweet ("doctor" test) by treatment with H_2SO_4 , sedimentation of sludge (which is re-used instead

of part of the H_2SO_4), and filtration; then follow treatments with clay (twice), aq. NaOH, aq. NaOCl, and finally aq. NaOH in this order. Each treatment is followed by continuous separation of the reagent, that separated in the second treatment being re-used in the first. D. K. M.

Catalytic gas reactions. M. PIER, ASSR. to STANDARD I.-G. CO. (U.S.P. 1,845,058, 16.2.32. Appl., 23.7.27. Ger., 24.7.26).—Mineral oils are destructively hydrogenated by treatment in the vapour phase with H_2 under pressure and at raised temp., in the presence of a finely-divided solid catalyst which is held in a state of suspension and eddying motion in the upward current of vapour and gas. A. B. M.

Vac. distillation. Separating mixed liquids.—See I. **Stable emulsions.**—See III. **H_2 from hydrocarbons.**—See VII. **Heating of furnaces.**—See X. **Mineral blacks.**—See XIII.

III.—ORGANIC INTERMEDIATES.

Stability of chlorohydrocarbons. II. Trichloroethylene. P. J. CARLISLE and A. A. LEVINE (Ind. Eng. Chem., 1932, 24, 1164–1168; cf. B., 1932, 300).—Various physical consts. are given. No difference in stability was found between the pure and commercial liquids. C_2HCl_3 is stable in the dark in glass or Fe, in sunlight in the absence of O_2 , and in sunlight and O_2 if antioxidants are added. The liquid is stable up to 130° and the vapour to 200°. After heating to 150° in the presence of Fe the liquid is less stable to light. C_2HCl_3 is not readily hydrolysed when heated with H_2O , and when heated with FeCl_3 decomp. is very slow. In the presence of antioxidants C_2HCl_3 is stable in O_2 up to 90° and in air up to the b.p. Soft steel, Sn, Cu, brass, Pb, or Al do not promote decomp. of the heated liquid, wet or dry. Metals are slightly attacked when heated with C_2HCl_3 in the following order of decreasing corrosion: Pb, Cu, Sn, brass, Al, soft steel. The corrosion is due to oxidation of the C_2HCl_3 and is increased by H_2O but prevented by antioxidants. A. G.

Extraction of phenols from caustic solutions. E. B. KESTER (Ind. Eng. Chem., 1932, 24, 1121–1125).—93–99% of the PhOH, *o*-, *m*-, and *p*-cresols, *s*- and *m*-xyleneols, α - and β -naphthol, 68% of the guaiacol, and 47% of the resorcinol can be extracted by Et_2O from aq. solutions containing 0.5 mol. of the phenol and 0.5 mol. NaOH per 100 c.c., the quantity extracted being under standard conditions almost a parabolic function of the time. The use of Et_2O extraction for the recovery of tar acids from low-temp. tar distillates is indicated. D. K. M.

Use of sodium hydroxide of lower concentrations in alkali fusions. A. F. NOVOSELOV (Anilinokras. Prom., 1932, 2, No. 3, 17–21).—85% NaOH might be used in the manufacture of β -naphthol and PhOH. CH. ABS.

Products from olive husks. Hydrogenated tar oil. $\beta\beta$ -Dimethylpentane in petroleum.—See II.

PATENTS.

Manufacture of organic monocarboxylic acid chlorides. C. L. MASTERS, ASSR. to ELKO CHEM. CO. (U.S.P. 1,819,613, 18.8.31. Appl., 7.5.28).—The

acid anhydride, *e.g.*, Ac_2O , is treated with SOCl_2 at 20–25°. C. H.

Catalytic esterification. A. O. JAEGER, Assr. to SELDEN Co. (U.S.P. 1,819,818, 18.8.31. Appl., 28.3.29).—Natural or artificial base-exchange compositions are used as catalysts for vapour-phase esterifications. C. H.

Continuous manufacture of esters. F. A. F. CRAWFORD, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 379,312, 26.5.31).—The liquid mixture of alcohol and acid is circulated upwardly through a heated still and downwardly through an external side-limb re-entering the still at its base, vapours of ester and/or H_2O passing from the still-head to a condenser. Fresh mixture is added through the side-limb, and liquid is removed from time to time as necessary. The still is preferably of the vertical multitubular type. The process is especially suitable for prep. of EtNO_3 . C. H.

Manufacture of vinyl esters. E. I. DU PONT DE NEMOURS & Co. (B.P. 379,705, 2.6.31. U.S., 3.6.30).— $\text{Fe}_2(\text{SO}_4)_3$ with or without H_2SO_4 is used as catalyst in the reaction of C_2H_2 with carboxylic acids in presence of a Hg salt, a sulphocarboxylic acid, and an org. acid anhydride below 50°. *E.g.*, 86% of vinyl acetate is obtained from C_2H_2 , glacial AcOH , HgSO_4 , sulphoacetic acid, Ac_2O , and $\text{Fe}_2(\text{SO}_4)_3$ at 6–18°. C. H.

Manufacture of polymerisation products of vinyl ethers. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 379,674, 30.5.31. Addn. to B.P. 378,544; B., 1932, 1071).—Adsorptive substances, *e.g.*, Florida earth, tonsil, granosil, terrana, isarit, "frankonit," active C, kieselguhr, or Cu, Ag, Au, Fe, Ni, Co, Pt pptd. on SiO_2 gel, etc., are used as polymerisation catalysts, whereby undue temp. rise is avoided. C. H.

Production of guanidine thiocyanate. GES. F. KOHLENTCHNIK M.B.H. (B.P. 379,580, 7.12.31. Ger., 12.12.30).— NH_3 is led into molten NH_4CNS at 170–180°. The yield is 80–85% in 25 hr. C. H.

Manufacture of pyridine derivatives. E. KOENIGS and H. GREINER (B.P. 379,316, 26.5.31. Addn. to B.P. 346,246; B., 1931, 711).—The 4-pyridylpyridinium dichloride of the prior patent is heated with OH compounds, $\text{R}\cdot\text{OH}$, whereby pyridines containing the group OR in position 4 are produced. In the examples, R = H (product, m.p. 148°, b.p. 175–180°/1 mm.), C_6H_{11} (b.p. 240–243°; picrate, m.p. 129–130°), Ph, $p\text{-C}_6\text{H}_4\text{Me}$ (b.p. 288–290°; picrate, m.p. 179–180°; hydrochloride, m.p. 190°), $o\text{-C}_6\text{H}_4\text{Me}$ (b.p. 276–280°; picrate, m.p. 173°), $m\text{-C}_6\text{H}_4\text{Me}$ (b.p. 284–288°; picrate, m.p. 186°), cyclohexyl (b.p. 140–142°/11 mm.), *o*-hydroxyphenyl (m.p. 173°). C. H.

Production of (A, B) stable emulsions, (B) and suspensions. ERBA FABR. CHEM. PRODUKTE SPEZIALITÄTEN F. DIE TEXTILIND. (B.P. 380,065 and Addn. B.P. 380,052, [A, B] 1.6.31. Ger., [A] 17.9.30, [B] 12.1.31).—(A) Stable, positively charged emulsions, which can be diluted, are obtained by using as dispersion medium aq. glue (etc.) to which an Al salt has been added. A melted mixture of 125 pts. of petroleum jelly and 125 pts. of paraffin is emulsified in a solution of gelatin (80 pts.) and $\text{Al}(\text{OAc})_3$ (100 pts.) in H_2O (700 pts.). (B) Other electrolytes are used in place of the Al salt. C. H.

Manufacture of sulphonated condensation products [dispersing and tanning agents]. COMP. NAT. DE MAT. COL. ET MANUF. DE PROD. CHIM. DU NORD RÉUNIES, ETABL. KUHLMANN (B.P. 380,252, 17.9.31. Fr., 30.6.31).—A mixture of a phenol and a fat, oil, wax, or resin is sulphonated and then condensed with an aldehyde. Examples are: PhOH and wool fat, sulphonated, with CH_2O ; cresol and castor oil, sulphonated, with MeCHO . C. H.

Manufacture of quaternary ammonium salts [wetting, emulsifying, detergent, and dispersing agents]. IMPERIAL CHEM. INDUSTRIES, LTD., A. W. BALDWIN, and A. J. HALLWOOD (B.P. 379,396, 1.6.31).—A *tert.* heterocyclic base is combined with an alkyl halide above C_5 . The products are particularly useful for wool-scouring and silk-degumming. Examples are quaternary salts from $\text{C}_6\text{H}_5\text{N}$ and dodecyl or cetyl bromide, or octadecyl iodide, and from α -picoline and octadecyl bromide. C. H.

Manufacture of assistants in the textile and related industries and dispersing agents. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 380,431, 10.4.31).—Non-carbohydrate org. compounds containing OH or CO_2H (or its equiv.) are etherified or esterified with polyethylene glycols or their mono-ethers or esters having at least 4 ($\cdot\text{C}_2\text{H}_4\cdot\text{O}\cdot$) groups, or an equiv. quantity of ethylene oxide or chlorohydrin. Preferably the org. compound contains $\text{C}_6\text{—C}_{30}$, and the polyglycol 6–50 ($\cdot\text{C}_2\text{H}_4\cdot\text{O}\cdot$) groups. The products have wetting, foaming, cleansing, and, in the dye bath, levelling properties. Suitable org. compounds are: alcohols $\text{C}_8\text{—C}_{18}$ from catalytic reduction of oils and fats, oleic or ricinoleic acid, palmitic acid, castor oil, coconut oil acids, *N*- β -hydroxyethyloctadecylamine, octadecyl alcohol (subsequently sulphonated), alcohols from oxidised paraffin wax, wool fat, mono-olein, hydrolysed sperm oil, etc. C. H.

Manufacture of thiazole derivatives [vulcanisation accelerators]. RUBBER SERVICE LABORATORIES Co., Assees. of R. L. SIBLEY (B.P. 379,709, 2.6.31. U.S., 21.6.30).—2-Thiobenzthiazoles are condensed in aq. alkali with a chloronitrobenzene, *e.g.*, 1-chloro-2:4-dinitrobenzene. The products are used, especially with diarylguanidines, as accelerators. C. H.

Manufacture of 2-amino- and 2-substituted-amino-arylenethiazoles. E. I. DU PONT DE NEMOURS & Co. (B.P. 379,341, 27.5.31. U.S., 27.5.30).—Arylthiocarbamides are treated with halogen and SO_2Cl_2 , preferably in PhCl or other solvent. C. H.

Manufacture of chlorinated and brominated alkoxyanilines. IMPERIAL CHEM. INDUSTRIES, LTD., R. F. GOLDSTEIN, and W. A. SEXTON (B.P. 379,741, 4.6.31).—4:4'-Dialkoxydiphenylcarbamides are halogenated in 2:2'-positions and the products hydrolysed. The prep. of 3-chloro-*p*-phenetidine, m.p. 22–23° (Ac derivative, m.p. 97°; carbamide, m.p. 221–223°), 3-bromo-*p*-phenetidine, b.p. 160°/23 mm., and 3-chloro-*p*-anisidine, b.p. 165–173°/35 mm. (Ac derivative, m.p. 114°), is described. C. H.

Manufacture of ketones of the benzophenone type. G. DOUGHERTY, Assr. to E. C. KLIPSTEIN & Sons Co. (U.S.P. 1,814,025, 14.7.31. Appl., 28.6.27).—

o-Benzoylbenzoic acids are decarboxylated at 240—280° in presence of metal or metal oxide or hydroxide, *e.g.*, Cu. C. H.

Treatment of organic substances with sulphurising agents. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 380,082, 27.4.31).—Sulphurisation is accelerated, and can be effected at lower temp., in presence of metal nitrites, nitrous esters, or NO₂-compounds as oxidants. Examples are sulphurisation of PhOH, β-C₁₀H₇·OH, sulphite-cellulose waste liquor, rape-seed or other vegetable oil, 2:4-dinitrophenol, 2-*p*-hydroxyanilino-carbazole, 4-amino-4'-hydroxy-3-methyldiphenylamine, the oxidant being NaNO₂ or PhNO₂. C. H.

Manufacture of 2:3-aminonaphthol and derivatives thereof. I. G. FARBENIND. A.-G., and A. G. BLOXAM (B.P. 379,862, 8.9.31. Addn. to B.P. 304,439; B., 1929, 276).—A carboxyarylsulphonate of 2:3-hydroxynaphthamide is treated with aq. NaOCl or NaOBr; 2:3-aminonaphthols are obtained by hydrolysis of the products. The starting material may, *e.g.*, be the ester from 2:3-hydroxynaphthamide and *m*-carboxybenzenesulphonyl chloride. C. H.

Production of naphthenates of aluminium, rare-earth and acid-earth metals. I. G. FARBENIND. A.-G. (B.P. 380,360, 25.2.32. Ger., 2.3.31. Addn. to B.P. 335,863; B., 1931, 20).—The process of the prior patent is applied to production of other naphthenates, *e.g.*, vanadyl, Al, Co—Ce, Zr. C. H.

Manufacture of anthraquinone derivatives. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 380,062, 6.6.31).—A 1:4-dihydroxy-2:3-dihydroanthraquinone is oxidised in acid medium (adjusted to avoid isomerisation of the product) to the 1:4:9:10-diquinone. The product may be condensed with a primary arylamine to give, *via* the imine, a 1-arylamino-4-hydroxyanthraquinone. Dihydro-derivatives of quinizarin, purpurin, 1:4:5-tri- and 1:4:5:8-tetra-hydroxyanthraquinones are thus oxidised with MnO₂ in dil. H₂SO₄-AcOH, or Pb(OAc)₄ in AcOH. Condensations with *p*-C₆H₄Me·NH₂, *p*-aminoacetanilide, anthranilic acid, sulphanilic acid, and β-aminoanthrone are described. C. H.

Production of aminoanthraquinone derivatives. IMPERIAL CHEM. INDUSTRIES, LTD., R. J. LOVELUCK, and J. THOMAS (B.P. 375,848, 30.3.31).—A 1-benzamido-4-, -5-, or -8-arylsulphonamidoanthraquinone, obtained, *e.g.*, from a halogenoaminoanthraquinone by benzylation and condensation with an arylsulphonamide, is hydrolysed with H₂SO₄ (95% H₂SO₄—5% oleum) to remove the arylsulphonyl group. 1-Benzamido-5-*p*-toluenesulphonamidoanthraquinone, m.p. 266—268°, with 95% H₂SO₄ at 28° gives 1-amino-5-benzamidoanthraquinone, m.p. 261°. The 1:4-compound, m.p. 260—262°, and 1-benzamido-5-*o*-toluenesulphonamidoanthraquinone, m.p. 252—255° (product, m.p. 245°), are similarly hydrolysed. C. H.

Manufacture of condensation products [lake pigments] of the anthraquinone series [from methyleneanthrones]. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 379,798, 26.6.31 and 9.2.32).—The alkali-sol. conversion products of methyleneanthrones (B.P. 373,129; B., 1932, 833) are oxidised, *e.g.*, with NaOCl, KMnO₄, K₃Fe(CN)₆, or SO₂Cl₂, and

heated with alkaline condensing agents to give red-violet pigments suitable for lakes. A diluent may be present in either stage. When an alkaline oxidant is employed the starting materials may be methyleneanthrones themselves. C. H.

Distillation plant.—See I.

IV.—DYESTUFFS.

Toxicity of coal-tar dyes.—See XVI.

PATENTS.

Manufacture of acid wool dyes of the anthraquinone series. W. W. GROVES, Assee. of I. G. FARBENIND. A.-G. (B.P. 379,630, 24.2.32. Ger., 9.7.31. Addn. to B.P. 355,697; B., 1932, 58).—A 4-halogeno-1-aminoanthraquinone-2-sulphonic acid is condensed with an *ar*-tetrahydro-β-naphthylamine-4-sulphonamide carrying 1 or 2 alkyl or alicyclyl substituents in the ·SO₂·NH₂ group. Examples are: Na 4-bromo-1-aminoanthraquinone-2-sulphonate with the dimethylamide, m.p. 139°, methylamide, m.p. 166°, β-hydroxyethylamide, m.p. 108—109°, cyclohexylamide, and diethylamide, m.p. 132—133°. The products give blue shades on wool. C. H.

Preparation of [acid] dyes of the anthraquinone [pyridanthrone] series. G. B. ELLIS. From CHEM. WORKS VORM. SANDOZ (B.P. 380,078, 5.6.31).—SO₃H groups are introduced into pyridanthrones having in position 3 (*N*) H or alkyl, in position 1 an acyl or carbalkoxyl, in position 4 H, alkyl, alkoxy, or halogen, and in positions 6 and/or 9 (or 10) an arylamino- or alicyclylamino-group. Sulphonation of the following pyridanthrones is described: 4-bromo-6-anilino-1-carbethoxy- (violet-red on wool), 6-*p*-chloroanilino-1-carbethoxy-4-methyl- (blue-red), 4-bromo-6-(*m*-4-xylydino)-1-acetyl- (violet-red), 6-*p*-aminoanilino-1-carbethoxy-3-methyl- (violet). C. H.

Manufacture and use of azo dyes [for acetate silk]. BRIT. CELANESE, LTD., and G. H. ELLIS (B.P. 380,061, 6.6.31).—Couplings (free from SO₃H groups) of diazotised aminophenols with 1-aryl-3-methyl-5-pyrazolones are esterified with an org. carboxylic acid, *e.g.*, AcOH. Acetylation of *p*-aminophenol → phenylmethylpyrazolone gives pure yellow shades on acetate silk. C. H.

Manufacture of dye solutions capable of being injected for therapeutic purposes. I. G. FARBENIND. A.-G. (B.P. 379,650, 15.4.32. Ger., 16.4.31).—The salts of basic dyes with acid dyes are sol. in aq. solutions of acid dyes; a medicinal basic dye may be dissolved in excess of an aq. solution of a medicinal acid dye to give a solution suitable for injection. Examples are: 2:7-diaminoacridine methochloride with Trypan-blue and/or Trypan-red or acid-fuchsin; methylene-blue with Trypan-blue. C. H.

Lake pigments.—See III. **Azo dyes.**—See VI. **Colour lakes.**—See XIII.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Carbonisation of wool. K. AUGUSTIN (Melliand Text. Month., 1932, 8, 434—435, 496—498).—A description and discussion.

Oil for [the processing of] wool, rayon, silk, and cotton. W. F. VICKERS (Trans. Inst. Chem. Eng., 1931, 9, 86—89).—The use of oil in the spinning and carding of wool equalises the friction in either direction. Upwards of 10% is added, in modern practice by spraying the emulsion. Saponifiable oils are required which must resist oxidation. Viscose yarn is oiled before winding, mainly to prevent changes in H₂O content. Raw silk undergoes two oil treatments, viz., (a) with soap containing emulsified oil to soften the natural gum during spinning, and (b) during knitting. Compound oils are desirable for textile machine oils as splash stains are more easily removed. C. I.

Debarking and degumming ramie by chemical means. G. L. CARTER and P. M. HORTON (Ind. Eng. Chem., 1932, 24, 1162—1163).—Ramie may be debarked without injury by digesting at 60 lb. per sq. in. with a solution containing 1% each of NH₃ and Na₂SO₃. A. G.

Danger of the formation of hydrochloric acid in cooking wood with sulphite liquor. BELANI (Angew. Chem., 1932, 45, 699).—The practice of indiscriminately adding NaCl to the sulphite liquors is condemned as excess HCl results in a reduction of the strength of the paper obtained and in a decrease in the fibre length. The optimum HCl concn. is 0.02%. A. R. P.

Measurement of the colour of sheet cellulose with the Pulfrich photometer and the "Beraüh" attachment. A. BACKMAN (Papier-Fabr., 1932, 30, 556—558, 570—571, 579—582).—Satisfactory measures of the colour or whiteness of unbleached and bleached cellulose are obtained with a Pulfrich photometer, using the new spherical illuminator (described). Measurements are made with 7 light filters, and the results may be expressed on the Ostwald system. The smoothness of the surface has only a slight effect. A. G.

Characterisation of cellulose preparations by solubility differences. I. SAKURADA (Cellulosechem., 1932, 13, 153—155).—Cellulose preps. can be characterised by their solubilities in a series of cuprammonium hydroxide solutions containing 1—12 mg.-mols. Cu per 100 c.c. When the additional amount dissolved by each step of rising Cu concn. is plotted against the Cu concn. the position of the max., its height, and the concn. of Cu required to dissolve 50% of the cellulose give indications of the quality and uniformity of the prep. A. G.

Measuring the sizing strength [of paper]. SADLER (Papier-Fabr., 1932, 30, 553—556).—The time which elapses before a strip of the paper immersed in H₂O at room temp. breaks under a definite load is measured. The time varies with the load and the temp. It is recommended to use several loads and to plot a time-load curve. (Cf. B., 1928, 852.) A. G.

"Zewaphosphate," Dyes toxic to silk-worms.—See XVI.

PATENTS.

Heating of cellulose digesting liquors. A. BROBECK (U.S.P. 1,847,589, 1.3.32. Appl., 14.2.29. Swed., 18.2.28).—Formation of deposits from sulphite liquors on the surfaces of the heater is prevented by forcing thin streams of the liquor at a speed of > 1.5 m. per

sec. between concentric tubes heated to the required temp. (>110°). B. P. R.

Paper manufacture. C. A. BENSON, Assr. to RAFFOLD PROCESS CORP. (U.S.P. 1,847,291, 1.3.32. Appl., 30.11.27).—Finely-divided CaCO₃, used as a filling agent, is rendered passive to the action of alum by the addition of a rosin size emulsion of paraffin and montan wax to the paper pulp and CaCO₃ mixture before pptn. of the size with the alum. B. P. R.

Manufacture of staple fibre [from continuous filaments]. BRIT. CELANESE, LTD., and W. I. TAYLOR (B.P. 382,651, 29.7.31).

Artificial silk spinning machine with turntable spool carriers. L. KOHORN (B.P. 382,588, 18.6.32. Ger., 19.6.31).

Rotary screen [for paper stock].—See I. **Filtering gases.**—See I. **Stable emulsions. Condensation products.** **Detergent agents.**—See III.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Scouring action of soap on silk. II. R. TSUNOKAYE (J. Soc. Chem. Ind., Japan, 1932, 35, 405—410 B; cf. B., 1932, 640).—Scoured silk retains about 1% of soap and fatty acid, the ratio of the two depending on the after-treatment. The residue is greater in the case of heavily twisted threads such as crêpes than in the case of skein scouring. The effect of alkali is to destroy the lustre of scoured silk. For alkali concns. > 0.02N the strength and elongation of the silk suffer progressively with increasing concn., rise in temp., and/or duration of treatment. Between 0.02N and 0.0025N the silk suffers little damage. The absorption of fatty acid increases the elasticity of the silk. Whilst saturated fatty acid is good for the colour of scoured silk, unsaturated fatty acids suffer autoxidation bringing about colour changes. Fatty acid is responsible for the scroop of the scoured silk. The effect of absorbed soap on the strength, elongation, and elasticity of the scoured silk varies. V. E. Y.

Notes on dyeing [and oxycellulose]. G. E. HOLDEN (J. Soc. Dyers and Col., 1932, 48, 253—254).—A uniform superficial layer of oxycellulose on cotton fabric produced by singeing (cf. B., 1929, 716) may be disturbed by friction on the fabric in subsequent processes in such a way that the fabric dyes streakily with direct dyes; the rubbed parts, owing to removal of oxycellulose, dye deeper than the remainder of the fabric. Even dyeing of such fabric may be obtained with Janus dyes. Dyeings with direct dyes from a bath containing Na₂SO₄ are far more satisfactorily topped with basic dyes than when NaCl is used, and deep dyeings are produced more satisfactorily on cotton by the use of comparatively insol. direct dyes. After-chroming of cotton dyed with cutch or S dyes prevents the development of an objectionable odour when afterwards "filled" with dextrin and oleine. Streaky direct dyeings may result from intermittent rubbing of cotton fabric on the sides of a "puffer" kier. A. J. H.

Fading of dyes on cotton and cellophane. E. HIBBERT (J. Soc. Dyers and Col., 1932, 48, 251—253).—Chlorazol Blue GS, Direct Red 4B, Chlorazol Sky Blue,

Icyl Blue G, Rigan Blue, and Chlorazol Purpurine 10BS are faster to light on cellophane (viscose film) than on cotton, but give little protection when applied to cellophane screens covering cotton dyed similarly. Chlorazol Yellow SGS, Methyl Violet B, Rhodamine B, Methylene Blue, and Malachite Green on cellophane screens protect similarly dyed cotton during exposure to light. (The basic dyes were applied to the cellophane without a mordant, whereas they were applied to the cotton after mordanting with tannic acid and Sb salts.) Chlorazol Fast Orange WS, which is relatively loose on cotton, provides a satisfactory screen (on cellophane) for similarly dyed cotton (cf. Dufton B., 1894, 633). Cotton dyed with Ciba Blue 2B fades under cellophane impregnated with Indigosol O4B in its developing stage; Ciba Blue 2B (on cellophane) does not protect Anthra Yellow (on cotton), but the latter protects the former. Cellophane impregnated with R salt gave no protection to dyes which readily faded on cotton, although it was strongly fluorescent and absorbed ultra-violet light.

A. J. H.

Treatment of print works dermatitis. J. R. HANNAY (J. Soc. Dyers and Col., 1932, 48, 255—256; cf. B., 1932, 637).—Dermatitis may be caused by Naphthol AS products and the related colour bases, especially *p*-nitroaniline, *p*-nitro-*o*-toluidine (Fast Scarlet G base), and *m*-nitro-*o*-anisidine (Fast Scarlet R base), and treatment with Pellidol ointment (an I. G. product), which is successful for a naphthol-excited dermatitis, aggravates that caused by colour bases. In this latter case treatment with a soap solution containing 0.3% of Izal is effective.

A. J. H.

Mercerising faults. P. KRAIS (J. Soc. Dyers and Col., 1932, 48, 260).—Contrary to Lomax (cf. B., 1932, 797), Knecht's observation (B., 1908, 442), that the drying of mercerised cotton at a high temp. immediately after washing, souring, and washing reduces its affinity for direct dyes, has been confirmed.

A. J. H.

Boil-off, dyeing, and finishing of dress velvets. B. S. HILLMAN (Melliand Text. Month., 1932, 4, 318—320, 450—451, 517—520).—A general review.

Dry-cleaning soaps.—See XII. **Dyeing tannins.**—See XV.

PATENTS.

Artificial mordanting substances [and wool-reserve salts]. IMPERIAL CHEM. INDUSTRIES, LTD., E. CHAPMAN, and E. B. ROBINSON (B.P. 379,314, 26.5.31).—Sol. non-staining thio-derivatives are obtained by heating PhOH (1 mol.), S (2 atoms), and an alkali or alkaline-earth H sulphide (0.25—0.5 mol.), preferably in aq. medium; the products may be isolated as alkali salts. They give wool-reserve salts on oxidation in presence of Na₂SO₃.

C. H.

Manufacture of azo dyes on the fibre [ice colours]. SOC. CHEM. IND. IN BASLE (B.P. 379,555, 30.10.31. Switz., 3.11.30).—Arylamides of 2:3-hydroxynaphthoic acid are coupled on the fibre with diazotised NH₂Ph → *o*-alkoxyanilines. Examples are: NH₂Ph → *o*-anisidine → α -naphthylamide (corinth), *o*-anisidine (violet), etc.

C. H.

Manufacture of insoluble azo dyes on the fibre. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P.

379,279 and 379,280, 22.5.31).—(A) Alkali hydrazine-sulphonates derived from a 4-amino- or 4:4'-diaminodiphenylamine or (B) 2:5-disubstituted 4-acetamidobenzenediazosulphonates are mixed with an *o*-coupling phenolic component, e.g., a 2:3-hydroxynaphthoic arylamide, solubilising groups being absent. The mixtures give dye baths on dissolution in H₂O or may be made up into printing pastes. Examples include the diazosulphonate from 2:5-dichloro-*p*-aminoacetanilide or 4-chloro-5-benzamido-*o*-anisidine with 2:3-hydroxynaphthoic anilide or 5-methoxy-*o*-toluidide; hydrazinesulphonate from 4-amino-4'-methoxydiphenylamine or 4-amino-3-*p*-toluenesulphonamidodiphenylamine with 2:3-hydroxynaphthoic anilide or α -naphthylamide; etc.

C. H.

Dyeing [topping on indigo]. IMPERIAL CHEM. INDUSTRIES, LTD., and D. CARTER (B.P. 379,321, 23.3.31).—Indigo is applied in the usual manner and the material is then dyed with an acid or mordant dye from a bath to which has been added a sulphonic acid or sulphuric ester containing an alkyl above C₁₂, e.g., cetyl, octadecyl, or octadecenyl sulphuric ester, β -olexyethanesulphonic acid, sulphobenzyl cetyl ether, or cetyl sulphoacetate. The topped indigo dyeings so obtained have good rubbing fastness.

C. H.

Preventing the bleeding of dyed textiles on wool. SOC. CHEM. IND. IN BASLE (B.P. 379,442, 22.6.31. Switz., 20.6.30).—A wool-reserving agent is added to the bath, particularly to an acid-fulling, water-fulling, or acid-boiling bath, with a $p_H \geq 7$. Suitable agents are, e.g., the product of example 1 of B.P. 319,249 (B., 1931, 57), tannin, Katanol WL, Albatex WS, butylnaphthalenesulphonic acid, Dispersol, highly sulphonated castor oil.

C. H.

Textile printing by means of vat and sulphur dye preparations. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 379,360, 28.5.31).—Thiolanthraquinones, their salts or ethers, thiocyananthraquinones, dianthraquinonyl sulphides or disulphides, or corresponding leuco-compounds or anthrones are used in vat and S dye printing pastes with or without the assistants described in B.P. 349,955 and 371,848 (B., 1931, 969; 1932, 834).

C. H.

Treatment [desizing] of textile materials. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 380,112, 5.6.31).—Removal of starch etc. by fermentation is combined in one operation with washing the material by using with the ferment acid-stable washing, emulsifying, and/or wetting agents of the aliphatic ether, ester, or amide type. The p_H val. may be adjusted to suit the ferment. Ferment preps. such as "Diastafor" or "Degomma" are thus used with monostearate of sorbitol hexa(hydroxyethyl) ether, or dioleate of the product OH[C₂H₄·O·C₂H₄]₁₁OH from glycol and ethylene oxide, or sulphonated oleyl alcohol.

C. H.

[Optical] methods for applying designs to yarns, bands, or fabrics by the aid of dyeing means. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 380,208, 21.7.31. Holl., 23.4.31).—Cellulosic fabric impregnated with a light-sensitive metal salt is illuminated through a stencil, then washed, and passed through a solution of a suitable mordant dye, whereby the latter is fixed in those parts

exposed to the light; similar alternative variations of the process are described. A. J. H.

Compositions for decolorising dyed fabrics. W. KRITCHEVSKY and H. C. PRUTSMAN (B.P. 382,618, 20.4.31).—See U.S.P. 1,810,663—5; B., 1932, 931.

Stable emulsions. Wetting etc. agents. Dispersing agents.—See III. Azo dyes on acetate silk.—See IV.

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

Petersen's tower process of sulphuric acid manufacture. M. RABE (Chem.-Ztg., 1932, 56, 749—751, 770—771).—Petersen in 1905 was the first inventor to irrigate a tower system with nitrous vitriol and to recognise the significance of liquid-phase reaction. Failure to develop at this time was due to the inadequacy of the acid pumps then available. Difficulties also arose with the packing, and tower systems remained in the experimental stage until 1923, when a Petersen plant was built to deal with smelter gases. In this, only enough SO_2 to denitrate the feed was allowed to enter the Glover tower. The remainder passed direct to the "inner ring" of reaction towers. The acid leaving these towers is strongly nitrous and the process is not interfered with by low temp. of the SO_2 supply. The power consumption for pumping is 17.5 kw.-hr. per ton of acid per 24 hr., and the acid circulation is so heavy that it is immaterial whether the gas enters the Glover tower at the bottom or the top. Production is 40—50 kg. of acid per cu. m. of effective space with 0.95% HNO_3 consumption. Towers of very large diam. are much cheaper, proportionally, to erect. The production space is about one third of the Gay-Lussac space used. The system is claimed to be suitable for any smelter gases whatever the temp. and SO_2 or H_2O content; plants built or building have a total capacity of 7000 tons per day. The Petersen tower may also be interposed in a chamber system. The towers appear to be packed with broken quartz and lined with ceramic material to protect the Pb from the action of conc. nitrous vitriol. C. I.

Fausser synthesis of concentrated nitric acid. A. SANDER (Chem. Fabr., 1932, 412—414).—An account of work already noted (B., 1932, 840). C. I.

Present status and future possibilities of the volatilisation process for phosphoric acid production. W. H. WAGGAMAN (Ind. Eng. Chem., 1932, 24, 983—988).—Advantages of the volatilisation or furnace process over the wet process are that a greater variety of phosphatic material may be employed, acid of any desired concn. can be obtained, and less purification is required. When a fuel furnace is used, the 2-step is preferable to the 1-step process, the concn. of P_2O_5 being very high, and the collecting equipment correspondingly smaller than in the 1-step process, which requires very large Cottrell precipitator units. In the latter method, the P_2O_5 produced has a deleterious action on the siliceous chequer-work in the stoves and so reduces their heat-absorptive capacity. This does not occur in the 2-step process, and higher blast temp. can therefore be employed. When an electric furnace

is used, the advantages of the 2-step process are not so marked, although the flexibility of the method in providing another marketable product (P) is in its favour. The fuel-furnace 2-step process will probably be the ultimate method adopted. W. J. W.

Composition of crude phosphoric acid prepared by the sulphuric acid process. W. L. HILL, H. L. MARSHALL, and K. D. JACOB (Ind. Eng. Chem., 1932, 24, 1064—1067).—Analyses are given of 6 samples of dil. and conc. acid obtained from Florida pebble, Idaho, and Tennessee brown-rock phosphate. The dil. acids contained considerably larger amounts of certain impurities, e.g., F, than the conc. acids. W. J. W.

Potash from polyphalite by reduction process. I. Preliminary experiments with hydrogen. F. FRAAS and E. P. PARTRIDGE (Ind. Eng. Chem., 1932, 24, 1028—1032).—Above 800° there is rapid reduction by H_2 . At 950° volatilisation of K was only 2.10—7.32% but at 1050° it was 33.75—37.30%. The K content of the reduction product can be readily extracted by hot H_2O . Evaporation of the extract gave small amounts of K_2SO_4 and K_2SO_3 , as well as a sulphide material. This gave, on analysis, 51% K and, after fusion, 64% K. W. J. W.

Detergency of alkaline salt solutions. II. Lowering of interfacial tension. F. D. SNELL (Ind. Eng. Chem., 24, 1051—1057; cf. B., 1932, 546).—Measurements have been by means of the Traube and Dimmig stalagmometers. Addition of NaOH, alkaline salts, or NaCl does not affect the interfacial tension (γ) of H_2O , but reduces that of soap solutions, against pure C_6H_6 . Alkaline salts (except NaCl) reduce γ of H_2O or soap solutions against C_6H_6 containing free fatty acid. NaOH produces the greatest lowering of γ , and Na orthosilicate is the most effective alkaline salt. Of the salts available commercially, Na metasilicate is the most effective. Alkalinity (expressed as Na_2O) available above p_{H} 10.2, or above 8, is suggested as a comparative criterion of "builders." E. L.

Decomposition of calcium carbide. P. DUTOIT and M. ROSSIER (J. Chim. phys., 1932, 29, 238—241).—Commercial CaC_2 contains Ca(OH)_2 , with which it reacts on heating. When the Ca(OH)_2 is removed, CaC_2 does not decompose appreciably on heating to 1200° in the absence of O_2 . In the presence of O_2 , CaO and C are formed. C. W. G.

Calcium glycerophosphate. C. T. BENNETT and N. R. CAMPBELL (Pharm. J., 1932, 129, 253).—Presence of citric acid in many "acid" glycerophosphates is held to be undesirable. Four methods of assay are reviewed. W. S.

Preparation and composition of precipitated phosphates of calcium. N. GLASS and A. J. JONES (Pharm. J., 1932, 129, 246—247). W. S.

Utilisation of the residues from the recovery of alumina from kaolin. P. P. BUDNIKOV, G. W. KUKOLEV, and E. L. MANDELGRÜN (Chem.-Ztg., 1932, 56, 869—870).—The residue from the $\text{CaO-Na}_2\text{CO}_3$ decomp. of kaolin after leaching out the NaAlO_2 contains SiO_2 26.2, $\text{R}''_2\text{O}_3$ 11.08, CaO 31.7, MgO 0.43, and $\text{R}'_2\text{O}$ 10.46%; its moisture content is 27% and the loss on ignition

20·1%. Addition of 1% to Portland cement or blast-furnace slag cement accelerates setting and increases the tensile strength; addition of 5—10% to clay for earthenware reduces the porosity and increases the strength of the ware, and substitution of the residue for CaCO_3 in a Na_2O — CaO glass frit reduces the time required to fuse the mixture to a clear glass without affecting the colour.

A. R. P.

Strong solutions of lead subacetate. C. MORTON (Pharm. J., 1932, 129, 243).—The solid phase of the system PbO — $\text{Pb}(\text{OAc})_2$ — H_2O consists of 2PbO · $\text{Pb}(\text{OAc})_2$ · $4\text{H}_2\text{O}$; the solute varies continuously with the composition of the system. The supposed $\text{Pb}(\text{OH})_2$ · $\text{Pb}(\text{OAc})_2$ is non-existent. Whereas Pb solutions are normally pptd. when the p_{H} val. is > 6 , Goulard's extract has p_{H} 8 and remains clear at p_{H} 9. Reasons for this and for other phenomena in Goulard's extract and in other Pb solutions are discussed. W. S.

Determination of lead and other metals in iron salts. A. D. POWELL and G. F. HALL (Pharm. J., 1932, 129, 247).—The Fe is removed in the form of FeCl_3 by extraction with Et_2O , and the aq. residue tested in the usual way (colorimetrically) after addition of KCN. A limit of 50 p.p.m. of Pb in Fe salts is recommended.

W. S.

Determination of bismuth in solution of bismuth and ammonium citrate. C. T. BENNETT and N. R. CAMPBELL (Pharm. J., 1932, 129, 252—253).—The Bi is pptd., ignited, and weighed as BiPO_4 .

W. S.

Mg(OH)₂ in the petroleum industry.—See II. **Chemistry of CaOCl_2 .**—See IX. **Reduction of BeO.**—See X. **"Zewaphosphate."**—See XVI.

PATENTS.

[Catalyst for] ammonia synthesis. A. T. LARSON, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,844,963, 16.2.32. Appl., 10.3.28).—A mixture of K_2CO_3 0·25—2 (1), MgO 20—40 (20), SiO_2 0·5—5 (1), and $\text{Fe}_3\text{O}_4 > 55$ (78) mol.-% is fused, crushed to small granules, and reduced in pure H_2 or in a 3 : 1 H_2 — N_2 mixture at 400—800°.

A. R. P.

Manufacture of sodium bicarbonate. H. LAWARRÉE (B.P. 382,167, 16.2.32. Ger., 16.2.31).—To a solution containing NaCl (94 kg.), NHMe_3Cl (190 kg.), and NH_4Cl (198 kg. per cu. m.) are added 140 kg. of NaCl and 156 kg. of $(\text{NH}_4)_2\text{CO}_3$ per cu. m., whereby 125—130 kg. of NH_4Cl per cu. m. crystallises out. The mother-liquor is then saturated with CO_2 , and more $(\text{NH}_4)_2\text{CO}_3$ if necessary is added to ppt. NaHCO_3 (200 kg. per cu. m.), equiv. to the NaCl freshly introduced in each cycle. The mother-liquor is then returned to the first stage.

A. R. P.

Manufacture of sodium aluminate. IMPERIAL CHEM. INDUSTRIES, LTD., L. M. CLARK, and H. M. SPITTLE (B.P. 381,971, 17.7.31).—Bauxite is digested with 40% aq. NaOH at 120—130° to obtain a liquor containing Na_2O and Al_2O_3 in the ratio 1·5—2·5 (1·9) : 1; the liquor is diluted to 28% solids, filtered through Ni gauze, reconc. to 55% solids, and allowed to cool to 30°, whereby Na_2O · Al_2O_3 · $2\text{H}_2\text{O}$ crystals separate, leaving a mother-liquor containing 28% Na_2O and 3% Al_2O_3 .

A. R. P.

Treatment of zinciferous solutions having a ferrous iron content. J. KEMP (B.P. 382,146, 23.1.32. Belg., 27.1.31).—The solution is treated in a vessel containing a no. of parallel horizontal sieves with a vigorous current of air with the addition of finely-divided CaCO_3 , whereby Fe_3O_4 is pptd. in a granular form which settles readily.

A. R. P.

Decomposition of magnesium carbonate-containing ores. O. TAGNON (B.P. 380,868, 2.7.31. Belg., 6.6.31).—Dolomite is heated at 400—550° in an atm. of steam to decompose the MgCO_3 but not the CaCO_3 . The product is ground and agitated at 10° with H_2O and CO_2 obtained from the heating gases and the MgCO_3 ; the resulting solution of $\text{Mg}(\text{HCO}_3)_2$ is separated from the insol. SiO_2 , CaCO_3 , etc. and boiled to ppt. a basic carbonate which is converted into MgO by ignition, the CO_2 being returned to the extractor.

A. R. P.

Production of double fluorides of aluminium and alkalis. A. L. MOND. From I. G. FARBENIND. A.-G. (B.P. 382,183, 2.3.32).—A solution of an Al salt, e.g., that obtained by decomp. of bauxite with a mineral acid, is introduced simultaneously with aq. HF and aq. Na_2CrO_4 into a large vol. of H_2O or the filtrate from a previous operation, whereby Na_3AlF_6 is pptd. and a solution of H_2CrO_4 or $\text{Na}_2\text{Cr}_2\text{O}_7$ obtained according to the relative proportions of the reactants used.

A. R. P.

Manufacture of silica gel and like adsorbent oxide gels. W. J. TENNANT. From SILICA GEL CORP. (B.P. 380,796, 14.4.31).—A solution of Na_2SiO_3 (d 1·185) is treated with 10% HCl and the mixture allowed to set to a jelly from which the NaCl and HCl are removed by washing with hot H_2O . The gel is then impregnated with 30% of CaCl_2 or NH_4Cl , dried, and heated until dehydrated, or, if NH_4Cl is used, until this salt is completely volatilised. The product is moistened with steam and leached with hot H_2O to remove CaCl_2 . The final product will withstand 900° without appreciably shrinking.

A. R. P.

Manufacture of hydrogen from hydrocarbons. N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 381,072, 23.2.32. Holl., 28.2.31).— CH_4 is passed at 1000° over a catalyst consisting of mixtures or compounds of FeO , CoO , or NiO with acid-forming metal oxides of the a sub-groups of the groups IV, V, or VI, e.g., $\text{Ni}(\text{VO}_3)_2$. The CH_4 is decomposed into H_2 and C and the latter is removed by intermittently passing air over the catalyst.

A. R. P.

Absorption of nitrogen oxide-containing gases mixed with oxygen or air. A. MENTZEL (B.P. 381,009, 2.12.31. Ger., 16.1.31).—The gases are passed upwards through vessels filled with coarse crystals of NH_4HCO_3 to form NH_4NO_3 and CO_2 , which gas is passed into aq. NH_3 to regenerate NH_4HCO_3 .

A. R. P.

Manufacture of phosphorus in blast furnaces. E. URBAIN (B.P. 380,955, 5.10.31. Ger., 6.10.30).—A mixture of $\text{Ca}_3\text{P}_2\text{O}_8$ (37), a coking coal (73), and brick waste (20 pts.) containing a $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio of 10 : 3 is formed into briquettes, which are coked and smelted in a blast furnace together with a small proportion of ferrophosphorus. The greater part of the P in the

charge is driven off with the furnace gases, and the remainder converted into ferrophosphorus, which is continuously returned to the furnace. The slag contains only 0.2% P. A. R. P.

Dispersion of salts.—See I. H_2 [from hydrocarbons].—See II.

VIII.—GLASS; CERAMICS.

Thermal expansion of some silicates of elements in group II of the periodic system. R. F. GELLER and H. INSLEY (Bur. Stand. J. Res., 1932, 9, 35—46).—By sintering a mixture of finely-ground talc 43, kaolinite 35, and electric-furnace corundum 22%, at 1350° or preferably at 1400—1425°, cordierite, the stable form of $2MgO, 2Al_2O_3, 5SiO_2$ is produced (cf. Cohn, A., 1930, 404). This compound may also be prepared by devitrification of a glass of the correct composition at 950—1425°. Above 1450° cordierite decomposes. The compound has a linear coeff. of thermal expansion of 0.53×10^{-6} between 0° and 200°. Beryl, Zn_2SiO_4 , and celsian have similar low coeffs. of expansion. A. R. P.

Determination of soluble silicates in glass. J. RAE (Pharm. J., 1932, 129, 289).—The glass is powdered, boiled with H_2O , and SiO_2 is determined by the NH_4 molybdate method (A., 1929, 90). Results are given for various glasses. During storage in glass bottles, distilled H_2O dissolves slight traces of SiO_2 ; 0.1N-NaOH dissolves more SiO_2 , but 0.1N- H_2SO_4 has no solvent effect. E. S. H.

Chamotte bricks. J. ROBITSCHKE (Feuerfest, 1932, 8, 145—149).—The importance of the composition of the H_2O used in making grog bricks is emphasised; too acid (p_H 5) H_2O retards the swelling of the clay during tempering and increases the porosity of the brick, whereas too alkaline (p_H 8.5) H_2O reduces the breaking strength of the unfired brick and leads to high losses during firing. The best bricks are obtained when the clay:grog ratio is such that thermal breakdown by the formation of hair cracks just ceases and crumbling just shows signs of beginning; with this ratio the resistance to sudden changes of temp. is the optimum. A. R. P.

Heat insulation.—See I. Kaolin residues.—See VII. Siemensite.—See IX.

IX.—BUILDING MATERIALS.

Application of the co-ordination theory to the chemistry of cement and bleaching powder. L. FORSÉN (Svensk Kem. Tidskr., 1932, 44, 248—267).—The constitution and reactions of hydrated $CaSO_4$ and of the silicates and aluminates occurring in cement can be explained by formulating these substances on the basis of Werner's co-ordination theory, which also affords a satisfactory explanation of the mechanism of the formation of bleaching powder from slaked CaO and Cl_2 . H. F. H.

Siemensite as a constructional material in the basic open-hearth furnace. J. SITTARD (Stahl u. Eisen, 1932, 52, 1014—1017).—Siemensite is produced by fusing a mixture of chromite, bauxite, magnesite, and a reducing agent in the arc furnace to obtain a slag containing 20—40% Cr_2O_3 , 25—45% Al_2O_3 ,

18—30% MgO , and 8—14% of other constituents. The slag is cast directly into bricks, which are allowed to cool slowly or are annealed before use; they have d 3.2—3.4, an expansion of 1.2—1.4% (0—1200°) and 2% (0—1800°), and a softening temp. > 1800° under 2 kg. per sq. cm. The bricks have a high resistance to basic and acid open-hearth slags and can therefore be used in those parts of the open-hearth furnace subject to the greatest amount of corrosion or erosion, e.g., the front and back walls and the tuyère openings. Many examples of its use are given and discussed. A. R. P.

Building materials from blast-furnace slag for small houses. A. GUTTMANN (Stahl u. Eisen, 1932, 52, 969—972).—Examples are given of the use of dense and porous blast-furnace slag for the manufacture of bricks, concrete slabs, and concrete walls for the purpose. A. R. P.

Impregnation of wood. O. ROUTALA and O. KUULA (Suomen Kem., 1932, 5, 107—112).—When wood impregnated with $PhOH$, furfuraldehyde, and aq. NH_3 is heated the furfuraldehyde condensed with the $PhOH$ to form a resin which fills the capillaries and seals the cells, thus preventing ingress of bacteria and fungi spores. If the heating is carried out at a temp. at which the resin becomes insol. the treated wood is almost waterproof, only 0.85% of H_2O being absorbed in 2 hr. compared with 34.4% for the untreated wood. A. R. P.

Preservation of wood by fluosilicates. H. PFLUG (Angew. Chem., 1932, 45, 697, 698, 699). J. KÖNIG and H. MENGELE (*Ibid.*, 698). F. MOLL (*Ibid.*, 698). W. ENGELS (*Ibid.*, 698—699).—A discussion of König and Mengele's paper (B., 1932, 550). A. R. P.

Retention of moisture by wood. W. W. BARKAS (Nature, 1932, 130, 699—700).

Carbolineums.—See II. Kaolin residues.—See VII.

PATENT.

Moulding of blocks, slabs, etc. from cement or concrete or the like. H. HERZBRUCH (B.P. 382,473, 7.1.32).

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

Gas-permeability of the charge in blast-furnace [smelting of iron]. A. WAGNER, A. HOLSCHUH, and W. BARTH (Arch. Eisenhüttenw., 1932—3, 6, 129—136).—The resistance of the blast-furnace charge to the flow of gas through it is inversely proportional to the grain size and is greater when the charge is sintered on travelling hearths than when sintered in a rotary furnace. In general, the resistance is also greater when mixtures of the various constituents of the charge are fed into the furnace than when the individual constituents are fed in as separate layers one on top of the other. A. R. P.

Diffusion of sulphur, manganese, phosphorus, silicon, and carbon through molten iron. W. F. HOLBROOK, C. C. FURNAS, and T. L. JOSEPH (Ind. Eng. Chem., 1932, 24, 993—998).—In a study of the desul-

phurisation of Fe by means of slags, the part played by diffusion was investigated, it being considered analogous to heat transfer and a coeff. of transfer by diffusion being evaluated by equations. To test the method employed, measurements were also made of the Mn, Si, P, and C contents. Results are tabulated for different temp. of test. Diffusion is most rapid at the beginning of a test, the distance to which a measurable amount of an element will diffuse being almost as great in 30 min. as in 3 hr. The rate of diffusion apparently follows the same laws as heat conduction along an insulated rod. If a deep bath of metal remain undisturbed in contact with a bath of slag, desulphurisation will cease after a relatively short time. As transference of material by straight diffusion is very small, adequate agitation must be maintained in the bath. W. J. W.

Effect of zinc coatings on the endurance properties of steel. W. H. SWANGER and R. D. FRANCE (*Bur. Stand. J. Res.*, 1932, 9, 9—24).—Fatigue tests in the rotating-beam and axial-loading machines have been made on an open-hearth Fe with 0.02% C and on steels with 0.45 and 0.72% C after various heat-treatments and in the polished, pickled, hot-galvanised, and Zn-plated states. The reduction in the endurance ratio caused by pickling is much more marked in quenched steels than in annealed or tempered steels and may reach as high as 40%. Hot-galvanising decreases the endurance ratio still further, owing to the notch effect of the Fe-Zn compounds formed at the Fe surface, but Zn plating has little effect and is sometimes distinctly beneficial. Quenched and tempered steels are much more adversely affected by hot galvanising than are annealed steels. A. R. P.

Wrought austenitic alloys. R. H. ABORN and E. C. BAIN (*Amer. Soc. Test. Mat., Amer. Soc. Mech. Eng., Symp.*, 1931, 466—490).—Properties of Fe alloys high in Cr and low in C, and containing enough Ni or Mn to permit existence as austenite, are tabulated. The composition usually lies within the range: Cr 16—30, Ni 7—30, C 0.05—0.20, Si 0.30—2.50%. The high recrystallisation temp. of γ -Fe and its low recrystallisation velocity promote resistance to change of shape. CH. ABS.

Heat-resistant chromium-aluminium steels. E. SCHEIL and E. H. SCHULZ (*Arch. Eisenhüttenw.*, 1932—3, 6, 155—160).—The loss in wt. at 1200° by scaling of Al-Cr steels falls to zero at 14% Al with 0% Cr, at 9% Al with Al/Cr = 3.5, and at 8% Al with Al/Cr = 0.75. The most heat-resistant alloys are those which become covered with a white film of Al_2O_3 , and the least those developing a Fe_3O_4 -rich scale. Increasing Al content of Cr steels reduces the resistance to corrosion by acid media, and both Al and Cr increase the electrical resistance of steel, especially at low temp.; high Cr also decreases the temp. coeff. of electrical resistance. A. R. P.

Determination of oxygen in steel by the hydrogen reduction method. E. CZERMAK and O. VON KEIL-EICHENTHURN (*Arch. Eisenhüttenw.*, 1932—3, 6, 145—147).—In plain steels the amount of O evolved as H_2O in the H_2 reduction method of determining O decreases linearly from 90% of the total with 0.05% C to 65%

with 0.1% C. The remaining O is evolved as CO and perhaps a little CO_2 . The ordinary apparatus has therefore been enlarged to allow for this; after passing the H_2O -absorption tube the gases pass through aq. $Cd(OAc)_2$ to remove H_2S , then through aq. $Ba(OH)_2$ for CO_2 , and finally over I_2O_5 at 100° to remove CO. The proportion of O evolved as H_2O is reduced with increasing MnO:FeO ratio in the slag, but is unaffected by the Mn content of the metal between 0.05 and 0.15%. A. R. P.

Electrographic determination of nickel in nickel steels. A. GLAZUNOV and J. KRIVOHILAVY (*Z. physikal. Chem.*, 1932, 161, 373—388).—The sample serves as anode in a cell in which the electrolyte is unsized paper impregnated with dimethylglyoxime and the cathode is an indifferent metal. Fe ions are kept in solution with AcOH and the Ni content of the steel is deduced from the intensity of the colour produced in the paper by electrolysis. R. C.

Application of chlorine to analysis of pyrites. E. ERDHEIM (*Rocz. Chem.*, 1932, 12, 770—771).—Ostrowski's method (*B.*, 1932, 265) has no advantage over Lunge's method. R. T.

Determination of antimony in commercial copper. H. BLUMENTHAL (*Z. anal. Chem.*, 1932, 90, 118—121).—A reply to Boehm and Raetsch (*B.*, 1932, 801). The complete pptn. of small quantities of Sb in the analysis of Cu-Sn alloys is due to the fact that stannic acid is pptd. at the same time as the antimonic acid, but by use of the author's method (*B.*, 1928, 573) of simultaneous pptn. of MnO_2 hydrate complete pptn. of Sb is always assured whatever the composition of the alloy. M. S. B.

Rapid colorimetric determination of nickel in alloys. I. V. P. OCHOTIN and A. P. SYTSCHOV (*Z. anal. Chem.*, 1932, 90, 109—111).—0.01—0.015 g. of a Cu-Ni alloy is dissolved in 10 c.c. of conc. HNO_3 , diluted with H_2O to 25 c.c., treated with aq. NH_3 until the blue Cu- NH_3 complex is formed, and 15 c.c. of a 1% solution of dimethylglyoxime are added. After rapid cooling it is shaken with Et_2O in a separating funnel, when the whole of the ppt. goes into the Et_2O layer. This is washed twice with H_2O , put in a colorimeter tube with 5 c.c. each of EtOH and collodion, the vol. brought up to the mark, and the colour compared with a standard. 0.0001—0.0002 g. Ni can be determined with an accuracy of 1% in an alloy of high Ni content. If the proportion of Cu is large the excess must be removed electrolytically. An accuracy of 0.02% can then be reached. M. S. B.

Electrolytic determination of bismuth in lead alloys. L. LUCCHI and A. BARTOCCI (*Annali Chim. Appl.*, 1932, 22, 509—511).—Pb is pptd. as sulphate; the filtrate, freed from Pb and H_2SO_4 (as $BaSO_4$) and containing $> 2\%$ HNO_3 , is electrolysed at 1.8—1.9 volts and 0.1 amp. for 3 hr. Bi is collected on a Pt-gauze cylinder (5 cm. high, 3.5 cm. diam.). The current is prevented from rising above 1.9 volts by a potentiometric circuit. O. F. L.

Reducibility of beryllium oxide. W. KROLL (*Wiss. Veröff. Siemens-Konz.*, 1932, 11, No. 2, 88—92).—When BeO is reduced with C in presence of Ni or Fe

a metal containing much C is produced, the removal of which is difficult. If BeO is reduced with C in presence of Cu a sintered mass is obtained which melts above the b.p. of Cu and contains alloys of Cu and Be, but much Be is lost on attempting to obtain it from the alloy. The reduction of BeO in the presence of Fe and Ca, Mg, Al, Si, Li, or Ce in a high-frequency furnace gives rise, when Ca is present, to alloys of Fe and Be, which, however, contain little Be. No method described is of practical use. A. J. M.

Technical properties of copper-nickel alloys containing beryllium. G. MASING and W. POCHER (Wiss. Veröff. Siemens-Konz., 1932, 11, No. 2, 93—98).—The properties of tempered alloys of Cu-Ni-Be are given; the tensile strength of the 39 : 60 : 1 and 19 : 80 : 1 alloys is 115 and 100 kg./sq. mm., respectively. (Cf. B., 1929, 723—4.) A. J. M.

Casting of magnesium: pouring into green sand. A. CAILLON and R. DE FLEURY (Compt. rend., 1932, 195, 549—551; cf. B., 1932, 774).—The prevention of attack of molten Mg by H₂O when green sand is used for the mould, effected by a small addition to the sand of S and NH₄F, is equally well effected by one of the much cheaper materials such as powdered fluorite and (NH₄)₂SO₄; (NH₄)₂HPO₄, NaHSO₄, or NaHSO₃ act almost as well. (NH₄)₂SO₄ and CaF₂ evolve HF at 150°, which apparently forms a protective film of MgF₂. Addition of S, e.g., as FeS₂, is unnecessary. C. A. S.

Transformations in light aluminium alloys in accordance with their structure. G. A. KASHCHENKO (Trans. II Conf. Non-Ferrous Met. U.S.S.R., 1927, 326—358).—Ageing of light Al alloys (1.5—12% Cu, 1.2—20% Mg) is attributed to separation of CuAl₂. Addition of Mg increases hardness but has no influence on ageing, except that it permits the separation of CuAl₂ at a lower temp. CH. ABS.

Advantages of oxide films as bases for aluminium pigmented surface coatings for aluminium alloys. R. W. BUZZARD and W. H. MUTCHLER (Nat. Advisory Comm. Aeronautics, Tech. Note, 1931, No. 400, 16 pp.).—Anodic coatings on Al alloys have only a small corrosion-resistance; pure Al coatings offer the best resistance. Al-pigmented varnish applied over an anodic coating gives good results which are far superior to those with either alone. CH. ABS.

Cold chromium[-plating] bath. O. MACCHIA (L'Ind. Chimica, 1932, 7, 1209—1210).—With a solution known as Chromolit-B, good deposits of Cr are obtainable on nickeled Cu at 12—22°, the best cathode yield being 11—16%. T. H. P.

Hardness of electrolytically separated chromium. W. BIRETT (Z. Elektrochem., 1932, 38, 793—799).—The hardness diminishes with rising temp. and increases with increasing c.d. The influence of acidity and concn. of CrO₃ is not obvious. Addition of foreign ions, such as Cr²⁺, Na⁺, Ni²⁺, Fe³⁺, or Cu²⁺, does not appear to have much effect, nor does the metal forming the cathode. M. S. B.

Application of the Preece test, especially to electrolytic zinc deposits. J. FEISER (Chem.-Ztg., 1932, 56, 831—832).—The Preece test (determination of

the no. of immersions for periods of 1 min. in neutral 20% aq. CuSO₄ required to remove the Zn) provides a good test for the evenness of a Zn deposit produced by the hot-dipping process, but is not reliable for determining the total Zn coating, as the results depend to a large extent on the Fe content of the Zn coating. The method is not applicable to the evaluation of plated Zn coatings, as the deposit, owing to its greater purity, is more protective than that obtained by the hot-dipping process. A. R. P.

Use of coal in the melting and heating of metals. R. J. SARJANT (Metallurgia, 1932, 6, 149—152).

Coke in metallurgical melting and heating practice. R. J. SARJANT (Metallurgia, 1932, 7, 19—21).

H₂SO₄ [from smelter gases].—See VII. Siemensite. Building materials from slag.—See IX. Thermocouples.—See XI.

PATENTS.

Heating of furnaces charged with metallic material. VEREIN. STAHLWERKE A.-G., and E. SCHREIBER (B.P. 380,844, 25.6.31. Ger., 17.7.30).—When the combustion gases formed in the furnace have a high steam content, oxidation of the metallic material is prevented by adding H₂, or gas containing H₂, to the gases after combustion is complete. A. B. M.

Production of special [chromium] cast iron. W. SCHUMACHER (B.P. 380,988, 11.11.31).—Claim is made for cast Fe containing > 12% Cr made by adding ferrochromium with < 0.6% C to the ordinary cast-Fe charge. A. R. P.

Stainless chromium-nickel steel alloys. F. KRUPP A.-G. (B.P. 380,805, 22.6.31. Ger., 30.6.30).—The alloys contain < 40% Fe, 6—40% Cr, 40—4% Ni, > 1% C, and 0.3—5% of one or more of the elements Si, Ti, V, Mn, and Al; they are annealed and quenched from above 920° to retain a non-magnetic austenitic structure in which are embedded regularly distributed particles of magnetic δ-Fe. A. R. P.

Rustless chromium steel. E. BECKER (B.P. 381,848, 21.3.32. Czechoslov., 21.3.31).—Claim is made for steel containing > 0.4 (0.12)% C, 14—20 (16)% Cr, 0.5—6 (2)% Cu, and 0.4—3.5 (0.4)% Mo. The steel does not rust in 5% aq. NaCl and suffers only a very slight loss in wt. in 5% AcOH. A. R. P.

Making silicon steel from silicon scrap. V. B. BROWNE (U.S.P. 1,842,536, 26.1.32. Appl., 27.9.29).—A charge of Si scrap covered with CaO is melted down in a basic-lined C-arc furnace and during the melting a mixture of Mn ore, SiO₂, and CaO is fed into the furnace between the electrodes so as to cover the metal with a fluid slag which prevents oxidation and carburisation of the molten metal. The furnace is kept closed during operation, or a neutral gas is passed through it; the product obtained contains only 0.25—0.5% Si < the original scrap. A. R. P.

[Nitrogen case]-hardening of alloy steels. H. SUTTON, A. J. SIDERY, and B. EVANS (B.P. 380,882, 17.7.31. Addn. to B.P. 345,659; B., 1931, 546).—The steel is coated with a porous layer of Fe prior to nitrogenisation. [Stat. ref.] A. R. P.

Magnetic [arsenic-aluminium-iron] alloy. A. A. FREY, Assr. to WESTINGHOUSE ELECTRIC & MANUF. CO. (U.S.P. 1,845,493, 16.2.32. Appl., 24.3.31).—Laminated cores having a core loss of < 1.25 watts per kg. at an induction of 10,000 gauss are built up of rolled sheets of an alloy of $> 85\%$ Fe with 0.1 – 6% As and 0.1 – 12% Al. The 2 : 2 : 96 As–Al–Fe alloy is claimed to be more ductile, less brittle, and more permeable than the 4 : 96 Si–Fe alloy now used in cores. A. R. P.

Coating of metals [iron or steel] to be submitted to cold deformations. A. SALVI and F. GIANNI (B.P. 381,956, 8.7.31. Italy, 14.2.31).—The metal is immersed for < 1 min. in dil. aq. HgCl_2 , then dipped into a 50% solution of $\text{Pb}(\text{OAc})_2$ in 5% AcOH at 25 – 37° , whereby a film of Pb is deposited on the metal in such a state that after drawing or rolling it can be removed by gentle heating and pickling, leaving a smooth bright metal surface. A. R. P.

Froth flotation of ores. (A) I. H. DERBY and (A, B) O. D. CUNNINGHAM, Assrs. to P. C. REILLY (U.S.P. 1,813,344 and 1,814,434, [A] 7.7.31. Appl., 17.11.28. Renewed [A] 19.2.31, [B] 14.7.31. Appl., 10.9.28).—(A) Alkali or alkaline-earth metal compounds of phenols, aliphatic or alicyclic alcohols, aliphatic or aromatic thiols, aliphatic or aromatic carboxylic acids, or thio-carbonic derivatives are treated at 25° with P_2S_5 to give flotation agents. Examples are products from Na compounds of cresol, EtOH , and EtSH . (B) Ketones (e.g., COMe_2 , dibenzyl ketone) are treated with NaOH and CS_2 to give 2 : 6-dithiol-4-ketopenthiophens useful as flotation agents. C. H.

Treatment [degassing] of [aluminium and magnesium] alloys. R. T. WOOD, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,845,694, 16.2.32. Appl., 1.4.31).—He is passed through the molten metal. A. R. P.

[Refining the grain size of] aluminium and aluminium-base alloys. NAT. SMELTING CO., Asses. of W. BONSACK (B.P. 381,668, 24.8.31. U.S., 4.9.30).—The molten alloy is stirred with a NaCl – KCl flux containing B_2O_3 and CaF_2 or cryolite. A. R. P.

Controlling grain growth in aluminium-manganese alloys. T. W. BOSSERT, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,845,781, 16.2.32. Appl., 19.6.30).—Addition of 0.2 – 0.7 (0.25) % U to Al–Mn alloys with 0.75 – 3 (1 – 1.5) % Mn retards grain growth on annealing after cold-work. A. R. P.

Alloy [for soldering aluminium]. W. A. SCHUBERT, Assr. to H. A. SCHUBERT (U.S.P. 1,845,103, 16.2.32. Appl., 14.8.30).—The alloy contains 35–75 (55.5) % Sn, 20–60 (37.1) % Zn, 1–4 (2.5) % Sb, 1–4 (1.55) % Pb, 1–4 (1.35) % Al, and a little (2%) Cu. A. R. P.

Manufacture of metallic magnesium from magnesium oxide. ÖSTERR.-AMERIKANISCHE MAGNESIT A.-G. (B.P. 381,115, 25.4.32. Austr., 8.7.31).— MgO is heated with C in an electric furnace and the mixture of CO and Mg vapour produced passed out through a H_2O -cooled flue into which is injected a current of cold H_2 through a H_2O -cooled injector, whereby the Mg condenses as a fine powder. The CO is removed from the waste gases and the H_2 cooled and returned to the injector. A. R. P.

Protection of magnesium and high-grade magnesium alloys from the action of corroding agents. I. G. FARBEININD. A.-G. (B.P. 381,088, 9.3.32. Ger., 10.3.31).—To prevent corrosion of Mg alloys by cooling liquids containing polyhydric alcohols a small quantity, e.g., 0.1 – 0.5% of Na_2S or K_2S is added to the liquids. A. R. P.

Raising the resistance of zinc to tearing during rolling. F. JORDAN (U.S.P. 1,845,155, 16.2.32. Appl., 30.7.28. Ger., 12.6.28).—The Zn ingot is rolled down between two thin layers of Al which are rolled into the surfaces of the Zn during the process and serve as a protection against corrosion. A. R. P.

Recovery of tin, lead, antimony, or bismuth, or alloys of two or more of these metals, with or without precious metals [from zinc-distillation residues]. A. L. MOND. From "BERZELIUS" METALLHÜTTEN G.M.B.H. (B.P. 380,884, 20.7.31).—The residues are heated with wood charcoal, with or without Na_2CO_3 and/or Na_2SiO_3 , in a rotary cylindrical furnace or on an agitated hearth, whereby the fusible metals are reduced and drain out from the sintered mass. The residual pasty slag is cooled and crushed, and the contained prills are separated on shaking tables or by means of jigs. A. R. P.

Removal of tin from antimonial lead and other metals or alloys of low m.p. E. L. W. BYRNE. From AMER. SMELTING & REFINING CO. (B.P. 381,955, 6.7.31).—The alloy is melted, the Cu dross allowed to rise to the surface and then skimmed off, and the Sn removed by heating the metal to 425 – 665° and stirring it with a rapidly moving paddle which produces a vortex in the middle of the kettle and stirs the dross and air into the metal. Sn is thus converted into SnO_2 without oxidation of the As and Sb. A. R. P.

Production of hard [tungsten carbide] alloys. E. A. A. GRÖNWALL (B.P. 380,941, 22.9.31. Swed., 23.4.31).—A mixture of WC or W_2C with 3–20% of W powder is intimately mixed with 20 wt.-% of a pulverised alloy of 50–85% W with one or more of the metals Fe, Co, Cr, Ni, Mo, Ti, or V, and the mixture is shaped and sintered in H_2 in the usual way. A. R. P.

Thermocouple. O. HERMANN, Assr. to THERMO ELECTRIC CO. (U.S.P. 1,845,271, 16.2.32. Appl., 16.3.29).—The negative element consists of an alloy of 62–64% Sb, 35–37% Zn, and 0.75–1.5% V, and the positive element of a 55 : 45 Cu–Ni alloy. A. R. P.

Arc-welding and cutting processes. M. ZACK (B.P. 381,108, 15.4.32. Ger., 17.4.31).—One electrode consists of C with 10–20% of an alkali or alkaline-earth carbonate and the other of the metal to be introduced into the weld together with a proportion of W. Steam is passed into the arc, wherein it is decomposed into H_2 and CO, thereby creating a reducing atm. around the weld. A. R. P.

Coating [paste] for metal moulds. H. P. KIMBER and F. MILLER, Assrs. to E. HOLLEY (U.S.P. 1,845,286, 16.2.32. Appl., 13.12.26. Renewed 23.6.31).—A pasty emulsion of castor oil and lampblack in aq. Na_2SiO_3 to which salicylic acid is added is claimed. A. R. P.

Covering the surface of a relatively corrodible metal with a corrosion-resisting metal. A. D. ROBINSON (B.P. 382,181, 1.3.32).—The resistant metal is fastened to the surface of the corrodible metal by any suitable mechanical interlocking operation and the whole forged, rolled, or drawn into the finished shape. A. R. P.

[Production of metals, e.g., iron by] electrolysis with the use of a mercury cathode. K. W. PALMAER (B.P. 381,049, 18.1.32. Swed., 30.4.31).—The cathode consists of an Fe plate, previously amalgamated, over which a film of Hg is continuously circulated. Other metals of group VIII may be similarly treated. A. R. P.

Electrolytic production of a particularly strong chromium coating [on steel or iron]. M. HOSENFELD, ASS. to METAL & THERMIT CORP. (U.S.P. 1,845,978, 16.2.32. Appl., 7.3.28. Ger., 18.3.27).—The metal is first plated with Cr in the usual CrO_3 bath, then given a fused coating of Cr from a fused mixture of CrF_3 and BaF_2 , a coating of a Cr-B alloy from a bath consisting of Cr_2O_3 dissolved in fused borax, or a coating of a Cr-Si alloy from a bath consisting of Cr_2O_3 dissolved in fused Na_2SiO_3 . A. R. P.

(A) Electroplating and electrodeposition of metals [palladium]. (B) Electrodeposition of palladium. MOND NICKEL CO., LTD., and [A] R. H. ATKINSON, [B] A. R. RAPER (B.P. 381,931—2, 11.7.31).—(A) The anolyte comprises aq. NH_3 containing an insol. anode separated by a porous diaphragm from the catholyte, which consists of a dil. NH_3 solution of a compound or compounds of the metal or metals to be deposited, e.g., $[(\text{NH}_3)_2\text{Cl}_2\text{Pd}]$. (B) Pd is deposited from a bath containing 10 g. of $\text{Na}_2\text{Pd}(\text{NO}_2)_4$ and 10–30 g. of NaCl or NaBr per litre, using a sol. hard-rolled Pd anode. A. R. P.

Electrolytic copper refining. N. V. HYBINETTE (U.S.P. 1,844,937, 16.2.32. Appl., 28.6.28).—Bessemerised Cu-Ni matte with about 60% Cu, 20% Ni, and 1% Fe is roasted to eliminate all S and two thirds is reduced to metal and cast into anodes; the remaining third is leached with H_2SO_4 to obtain aq. CuSO_4 and a Cu-Ni residue which is smelted to anodes. The first anodes are electrolysed in a solution containing Cu 50, Ni 50, Fe 5, and H_2SO_4 250 g. per litre to obtain pure Cu and a Ni-rich solution in which the second anodes are electrolysed. In this stage the cathode deposit consists of an alloy of Cu with a little Ni, and the spent electrolyte contains about 5 g. of Cu, 100 g. of Ni, and 125 g. of free H_2SO_4 per litre. The Cu is cemented out with the spent Ni-rich anodes, the acidity increased to 200–300 g. of free H_2SO_4 per litre, and the solution cooled to -10° to -20° to cause about 90% of the NiSO_4 to crystallise. A. R. P.

Arc-welding [apparatus]. BRIT. THOMSON-HOUSTON Co., Ltd., Asses. of V. J. CHAPMAN (B.P. 382,702, 4.9.31. U.S., 4.9.30).

XI.—ELECTROTECHNICS.

Thermo-electric measurement of temperatures up to 2000°. W. GOEDECKE (Chem. Fabr., 1932, 5, 361–364).—For temp. up to 100° Te/Pt couples are

satisfactory; for use up to 300° the Te should contain 1% Sb in order to suppress the transition. The thermo.e.m.f. of constantan (<600°) and Ni-Cr alloys (<1000°) exhibit marked variations with time, but that of Pt/Pt-Re couples is stable even after the couple has been in use for prolonged periods, and is > that of Pt/Pt-Rh couples. For higher temp. Ni-Cr (<1300°) or Fe-Cr/Fe (<1450°) may be used in a reducing or inert atm. A larger e.m.f. is obtained with an Fe-Cr-Al/Pd couple; the Fe alloy, containing about 40% Cr, forms also the outer protective casing. The Pt metals are useless above 1600°, owing to volatilisation. The W/Mo-Fe couple is much more satisfactory than W/Mo for temp. up to 3200°, and the W/Mo-W-Fe (Mo 30, W 69, Fe 1%) couple may be used, in a H_2 atm., at 3000°. BeO is the most suitable material for the casing up to 2400°, on account of its stability and relatively high thermal conductivity. H. F. G.

Electric furnace heating. G. TURNER (Metallurgia, 1932, 7, 1–2, 4).

Mineral insulating oil.—See II. Cr-Al steels. Determining Ni in Ni steels, and Bi in Pb alloys. Cr-plate. Zn-plate.—See X.

PATENTS.

Separating suspended matter from gases.—See I. Si steel. Magnetic alloys. Metals by electrolysis. Thermocouple. Arc-welding etc. Cr-plate. Pd-plate. Cu.—See X.

XII.—FATS; OILS; WAXES.

Twitchell reagents. XI. Properties of the principal constituents isolated from Twitchell reagents. 2. K. NISHIZAWA, M. OKUYAMA, and T. INOUE (Chem. Umschau, 1932, 39, 196–202; cf. B., 1932, 777).—The component T'_1 of the reagents increases the colour of the fatty acids produced (in the presence of H_2SO_4) and does not improve the hydrolytic power of the H_2O -sol. major components ($T_o + T_n$) which constitute the active factors of the reagents. T'_1 is therefore regarded as an undesirable impurity. Fraction T'_1 does accelerate hydrolysis but causes darkening, probably because it, like T'_1 , is insol. in H_2O and very sol. in the fatty acids, to which it mechanically imparts its own dark colour; discoloration in this case does not appear to be due to secondary chemical reactions, such as produce discoloration in the case of T_o and T_n . A study of the discolorations produced by treating fatty acids (obtained by alkaline saponification) with the various components under varying conditions of temp. etc. indicates that a volatile substance is present in rancid acids, which reduces the darkening; this substance is eliminated by treating the acids with H_2SO_4 or the component T_n of the PhOH reagent. The hydrolytic activity of T_o and T_n increases with their concn., but not proportionally, so that the theory of Löffl and Kuriyama, that activity is to be assigned entirely to undissociated reagent, cannot be accepted (cf. B., 1931, 551). It is preferable to accelerate hydrolysis by the addition of H_2SO_4 rather than by excess of reagent. E. L.

Antioxidants of fats and oils. VI. Effect of terpene hydrocarbons, alcohols, aldehydes, ketones,

acids, and phenol derivatives on the oxidation of linseed oil. Y. TANAKA and M. NAKAMURA (J. Soc. Chem. Ind., Japan, 1932, 35, 81—82 B; cf. B., 1932, 29).—The effects of 31 compounds are listed. Terpene alcohols (olefine or aromatic series) and aromatic alcohols are mostly inactive, or (like α -pinene) weak pro-oxidants. Ethers of monohydric phenols (*e.g.*, anethole), aromatic aldehydes (but not citronellal), isosafrole, and aromatic ketones accelerate oxidation, whilst derivatives of dihydric phenols such as eugenol, isoeugenol, etc. act as strong antioxidants. BzOH and salicylic acid are weak pro-oxidants, but $\text{CH}_2\text{Ph}\cdot\text{CO}_2\text{H}$ is inactive. E. L.

Melting and solidification of cacao butter. W. REINDERS, (MISS) C. L. DOPPLER, and E. L. OBERG (Rec. trav. chim., 1932, 51, 917—939).—Microchemical and dilatometric investigations show that molten cacao butter first solidifies into a metastable β -form which slowly changes, with contraction, into larger crystals of a stable α -form in which it is present as a single homogeneous solid phase. The m.p. determined by ordinary methods extends over a wide range depending on the sample, and is best determined by dilatometric measurements. A sample which has been converted completely into the α -form gives a temp.-vol. curve consisting of three parts, the points of inflexion at the ends of the rapidly rising centre portion indicating a m.p. 25—35° for the α -form, that of the metastable β -form being approx. 17—24°. The linear velocity of crystallisation (transition velocity from the β -form) is a max. at about 21°, and the spontaneous formation of α -nuclei is at a max. below 0° (probably -5°). It is concluded that cacao butter is a mixture of two or more glycerides crystallising together as a homogeneous solid solution, a view confirmed by fractional crystallisation of a sample (m.p. 25—35°) at 32°, separation into two fractions, m.p. 23—32° and 26—37°, respectively, being effected. By seeding supercooled cacao butter with various fats and observing whether α -crystals separate it is found that oleomargarine, oleostearine, palm-kernel, tankawan, and soentel fats contain glycerides closely allied to those in cacao butter. J. W. B.

Rumanian butter fat. S. CARAGEA and M. BALDOVIN (Z. Unters. Lebensm., 1932, 64, 251—254).—Analytical data are tabulated. The Reichert-Meissl val. and Bertram's *B*-val. are max. in Dec.—Mar. and min. in Aug.—Sept. The Kuhlmann-Grossfeld ratio (B., 1926, 447), butyric acid/Reichert-Meissl val., is 0.657—0.758, whilst (*B*—*A*)/*b* is 1.21—1.62 (mean 1.41) and (*B*—2*A*)/*b* is 0.817—1.34 (mean 1.08). The former remains almost const. on addition of 10—17.6% of cacao butter, whilst the latter falls to 0.4. J. G.

Commercial edible fats in relation to food control. A. BEYTHIEN (Allgem. Oel- u. Fett-Ztg., 1932, 29, 477—483).—A report of the official analyses of food fats made in Dresden in 1931 is given, with particular reference to butters and margarines which failed to conform to the statutory regulations. E. L.

Digitalis fat. Light petroleum extract of *Digitalis purpurea*, L. A. J. SCHWARZ (J. Amer. Pharm. Assoc., 1932, 21, 856—860, 994—1003).—The average wt. of the extract from the coarsely powdered cultivated

drug (leaves) comprised 1.22% and from German leaves 1.373%. The following compounds were isolated from the fat after saponification: myristic, palmitic, cerotic, melissic (?), oleic, linoleic, and linolenic acids, glycerol, melissyl alcohol, sitosterol, and triacontane. E. H. S.

Simplified method of saponification for determination of the Reichert-Meissl value [of fats]. J. DAVIDSOHN (Chem. Umschau, 1932, 39, 194—196).—The use of glycerol or EtOH, and consequent necessity for a blank determination, can be avoided by a method of "cold saponification," thus: 5 g. of fat, mixed with 3.5 c.c. of 50% aq. KOH, are kept in an oven at 50—60° for 2 hr., with thorough stirring every ½ hr. The saponified mass is rinsed into the Reichert-Meissl flask, acidified, and distilled as usual. E. L.

Phosphorus determination in fats. W. MOHR and J. MOOS (Milchw. Forsch., 1932, 13, 385—387).—A bomb calorimeter is used for the ignition to ash. This method is much more rapid and more efficient than simple ignition. E. B. H.

Auxiliary solvents for dry-cleaning soaps. C. L. BIRD (J. Soc. Dyers and Col., 1932, 48, 256—260).—Using K oleate (4% of free oleic acid) as a typical dry-cleaning soap, the suitability of 60 org. substances as auxiliary solvents for the purpose of rendering such soaps sol. in white spirit (b.p. 155—175°) has been examined as previously described (B., 1932, 434). Clear, non-viscous solutions containing H₂O were usually obtained with the addition of 40—60% of an auxiliary solvent. Such solvents must contain a OH group, be a solvent or potential solvent for K oleate, and be oil-sol. and only slightly sol. in H₂O. The H₂O-carrying powers of substances (auxiliary solvents) in the same homologous series increase with rise in b.p. until the OH group present loses its reactivity, *e.g.*, as in oleyl alcohol; this rule is applicable to isomeric substances which can be compared with each other and also with substances of different mol. wt. but having similar structural formulæ. Bu₂ tartrate is an extraordinarily efficient auxiliary solvent. A. J. H.

Examination of liquid soaps. G. KNIGGE (Allgem. Oel- u. Fett-Ztg., 1932, 29, 492—500).—Methods of sampling and analysis are fully described, including the determination of NH₃, EtOH, sugar, etc. E. L.

Cooking of stand oil on gas fires. G. KLATTE (Farben-Ztg., 1932, 37, 1748—1749).—The use of fires burning compressed air-gas mixtures is recommended for the heating of closed kettles for stand oil manufacture (the advantages over open kettles being stressed). Special burners for the purpose are described, and full details of gas consumption, cooking rate, etc. for a 1000-kg. charge of oil are given. Kettles, on these lines, holding as much as 10,000 kg. of oil are in service. S. S. W.

Yellowing of oils. III. Relation between colour and chemical constitution of oxidised drying oils. A. C. ELM and G. W. STANDEN (Ind. Eng. Chem., 1932, 24, 1044—1045; cf. B., 1931, 982).—Diketostearic acid (prepared by the oxidation of oleic acid) is yellow and, like Ac₂ and thymoquinone, shows a well-defined spectral absorption band in the blue. Ketohydroxystearic acid is colourless and shows a less pronounced selective

absorption situated entirely in the ultra-violet; hence the yellowing of oxidised drying oils cannot be attributed to compounds of the latter type. E. L.

Characteristics of colours [colouring matters] in vegetable oils and methods of removal. B. H. THURMAN (Ind. Eng. Chem., 1932, 24, 1187—1190).—Various bleaching methods are discussed in relation to the type of colouring matter to be removed; e.g., rapid heat-treatment bleaches yellow oils, but fails with red oils. Better bleaching was observed with fuller's earths etc. of low p_H . Pretreatment with alkali tends to prevent reversion of the colour after bleaching.

E. L.

Ultra-violet absorption of vegetable and animal oils. A. CHEVALLIER, J. GUILLOT, and P. CHABRE (Compt. rend., 1932, 195, 678—679; cf. A., 1932, 213).—1% solutions in C_6H_{14} of vegetable and animal oils examined by the authors' method show absorption curves in which absorption for various wave-lengths, considered relatively to the total absorption, is characteristic. In addition vitamin-A, unsaponifiable matter, and fatty acids are indicated respectively by absorption around 3280 Å., by absorption from 2550 to 2950 Å., and by bands at 3175 and between 2825 and 2625 Å., together with massive absorption from 2550 Å.

C. A. S.

Analytical classification of fish-liver oils. N. EVERS and W. SMITH (Pharm. J., 1932, 129, 234—235).—A correlation of analytical and zoological characters.

W. S.

Polymerisation of fatty oils. II. A. STEGER and J. VAN LOON (Rec. trav. chim., 1932, 51, 996—1000; cf. B., 1932, 776).—The CNS val. for a "polymerised" linseed oil (stand oil) is not const., but depends on the concn. of the reagent, its excess, the time of interaction, and on some factor dependent on a balanced reaction, and has therefore no const. relationship to the degree of unsaturation, too high vals. being obtained. Some decomp. of the $(CNS)_2$ occurs, which is greater the higher is the degree of polymerisation, but is unaffected by the non-saponifiable portion of the oil. Similar results accrue with an oil polymerised in a vac., but more reliable vals. are obtained with the total fatty acids of the oil or with their esters. No decomp. of the reagent occurs in this case, and lower vals. tending to a const. after 72 hr. treatment are obtained.

J. W. B.

Olive husks.—See II. **Oil for wool etc.**—See V. **Alkaline salts as detergents.**—See VII. **Oil vapours as germicides.**—See XXIII.

PATENTS.

Apparatus for rendering and filtering animal fatty tissues. G. BOSSINI (B.P. 382,735, 16.10.31).—The oil-jacketed rendering vessel is provided with a central outlet in the form of a vertical perforated tube, surrounded at a radial distance by a filter consisting of a co-axial perforated cylinder wrapped with filtering material (cellulose wadding), which is further enclosed at some distance by a co-axial perforated cylinder acting as strainer.

E. L.

Stable emulsions. Dispersing agents.—See III.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Distribution of ether extractive in turpented slash-pine trees [*Pinus caribæa*]. E. F. KURTH and E. C. SHERRARD (Ind. Eng. Chem., 1932, 24, 1179—1181; cf. B., 1931, 1096).—In areas remote from the face of turpented trees, the amount of the Et_2O extractive (non-resin) increases with the age of the sapwood from the outside to the centre of the trunk and upwards, as in normal untapped trees (cf. *loc. cit.*), and the chemical character of the extract in both types is the same. The extract from wood immediately behind the face (wound) has a relatively high acid val., whilst the figures for sap. val. and unsaponifiable matter are low. Moreover, the amount of extract from the centre of the trunk near the wound is abnormally low. Analyses are given.

E. L.

"Livering" of paints. H. WAGNER (Kolloid-Z., 1932, 60, 307—308).—The phenomenon is due only in part to the formation of heavy-metal soaps (cf. B., 1932, 947). It is observed both in org. and inorg. pigments, is related to the charge, surface activity, structure, and tendency to solvation, and is most frequently encountered in mineral paints containing colloidal silicic acid.

E. S. H.

Antimony-white. C. P. VAN HOEK (Farben-Ztg., 1932, 37, 1749—1751, 38, 43—45).—An account is given of the nature and prep. (on laboratory and commercial scales) of the pigment, and of the physical, chemical, and physiological properties of the various oxides of Sb, patents in this latter field being reviewed. S. S. W.

Pigment pastes for nitrocellulose enamels. F. ZIMMER (Farben-Ztg., 1932, 38, 42).—The use of enclosed triple-roller and other mills for the grinding of pigments in nitrocellulose-resin-plasticiser mixtures or in plasticiser solutions is discussed.

S. S. W.

Synthetic resins from petroleum hydrocarbons. C. A. THOMAS and W. H. CARMODY (Ind. Eng. Chem., 1932, 24, 1125—1128).—A distillate from the cracking of petroleum, containing 45—60% of unsaturated hydrocarbons, is treated with $AlCl_3$. Alkali is then added and the pptd. $Al(OH)_3$ mixed with a white polymeride is separated. The latter is freed from Al compounds by treating with acid and washing with H_2O . When the oil is distilled off under vac. there remains a hard amber-coloured resin, m.p. 110—116°, sol. in nearly all hydrocarbon solvents and also in the higher acetates, but insol. in MeOH, EtOH, CO_2 , and EtOAc. The yield of resin increases and the I val. diminishes by increasing the quantity of $AlCl_3$ up to 2 g. per 100 c.c., after which further increase has no effect. The yield of resin and its I val. are not affected by prolonging the time of reaction beyond 5½ hr. The reactions involved probably include the polymerisation of olefines, the reaction of olefines with diolefines, of olefines with aromatics to form substituted aromatics, and the reaction of the latter with diolefines (cf. A., 1932, 830).

D. K. M.

Synthetic resins (Albertols). E. NIERMAN (Paint., Fig., Ver., 1932, 9, 146—149, 163—166, 174—176).—A review.

S. S. W.

Coatings for Al.—See X.

PATENTS.

Treatment of mineral blacks. P. SCHIDROWITZ, and BIDEFORD BLACK, LTD. (B.P. 380,970, 22.10.31).—Devonshire black, or other mineral black, is treated in aq. suspension with a dispersing agent, *e.g.*, sufficient alkali to bring the alkalinity of the aq. medium to approx. 0.01*N*, and, after keeping, is filtered off and dried at 50–150°.

A. B. M.

Manufacture of colour lakes. IMPERIAL CHEM. INDUSTRIES, LTD., H. H. STOCKS, and F. W. LINCX (B.P. 379,397, 1.6.31).—A basic dye (which may also contain acid groups) is pptd. with inorg. heteropoly-acids containing P, Mo, Si, or W, in presence of complex heteropoly-acids derived from gallic or tannic acid. Examples are: Brilliant-green cryst. Y, Disulphine-green B, Rhodamine 6GDN conc., or Methyl violet 2B, with phosphotungstic acid and K digallomolybdate; Brilliant-green cryst. Y with phosphomolybdic acid and K monogallotungstate or molybdotannic acid, or with phosphomolybdotungstic acid and K digallomolybdate.

C. H.

Liquid-spraying apparatus [for paints, emulsions, etc.]. DEMPSTER, MOORE & CO. (MACHINERY), LTD., and J. McC. ROLLO (B.P. 382,707, 14.9.31).

Pigments. Condensation products.—See III. Ice colours.—See VI.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Whiting. II. Properties in rubber. T. R. DAWSON and G. GALLIE (J. Res. Assoc. Brit. Rubber Manufrs., 1932, 1, 81–98; cf. B., 1932, 1043).—Whiting has a negligible effect on the rate of combination of caoutchouc and S, but the accompanying physical alteration is appreciably accelerated; a small proportion of S undergoes conversion into a Ca-S compound. Increasing proportions of the filler up to 40 wt.-% consistently result in increased tensile strength, the ultimate elongation undergoing reduction up to 60% and beyond; the mild reinforcing effect is much more evident in a simple rubber-S mixture (95:5) than in more highly compounded stock. The effect on slope, permanent set, vol. increase on stretching, hardness, and resilience is also examined. Consideration is given to factors involved in the stretching of compounded rubber and to the mechanism of reinforcement of rubber by finely-divided particles.

D. F. T.

Evaluation of rubber tubing containing antimony pentasulphide used in the foodstuffs industry. B. BLEYER and E. SPIEGELBERG (Z. Unters. Lebensm., 1932, 64, 209–226).—Sb^{III} was determined by micro-titration with 0.0015*N*-KBrO₃ in the presence of HCl and Me-orange, the end-point being given by decolorisation of the latter. Sb^V is first reduced by TiCl₃ in the presence of HCl and WO₃.3H₃PO₄ and titrated 30 min. after addition of 2 drops of 0.01% CuSO₄. The error is about 0.001 mg. for 0.4 mg. of Sb. Data are given for various commercial rubbers extracted with boiling acids for 4 hr. Unfilled rubbers yielded only small amounts, and new filled rubbers are classified according as the amount extractable was low, medium, or high. Of the solvents, 3–7% org. acids (especially 3% lactic acid) are more effective than is 0.3% HCl. The quanti-

ties of Sb extracted in the cold by commercial mineral waters and by org. acids in the presence of CO₂ increased with the time (15–54 days) and the pressure (3.5–7.5 atm.) for a particular type of rubber and solvent; the max. amount extracted (in 3% lactic acid) was 33 mg. per 500 c.c. The Sb-yielding powers of rubber intended for foodstuffs should be specified.

J. G.

XV.—LEATHER; GLUE.

Japanese dyeing tannins. VIII. Yasha-tannin. IX, X. Mechanism of tannin mordanting (Repts. I and II). Absorption of tannin by cellulose. Y. UYEDA and K. ISHINADA (J. Soc. Chem. Ind., Japan, 1932, 35, 390–392B).—VIII. The Yasha-tannin is a digallic acid of chemical composition C₁₄H₁₀O₉. The Ac, Bz, and Me derivatives were studied.

IX. 4.0% tannic acid solution shows max. absorption for cellulosic material, whilst absorption is usually better at lower temp.

X. Max. absorption was observed at 15° with a 4% tannin solution. Experimental data are compared with the Freundlich formula.

V. E. Y.

Caseins.—See XIX.

PATENTS.

Stable emulsions. Tanning agents.—See III.

XVI.—AGRICULTURE.

Pan ("Nasas") and its origin in the red sandy soils of Palestine. F. MENCHIKOVSKY (J. Agric. Sci., 1932, 22, 689–703).—The formation of the impermeable layers in these soils depends on the transport of Al(OH)₃ and Fe(OH)₃ (the former predominating) into the lower soil layers. "Nasas" soils represent the end-product of decomp. of the red sandy soils, their formation being favoured by the permeability of the red soils and the lack of CaCO₃. The process of formation resembles that of podsols, but occurs in semi-arid areas and in the absence of humus accumulations.

A. G. P.

Chemical and microbiological factors in Quebec soils. R. R. MCKIBBIN and P. H. H. GRAY (Canad. J. Res., 1932, 7, 300–327).—Analyses are given, together with counts of bacteria + *Actinomyces* and of fungi, agricultural val., and general descriptions, of about 100 samples of such soils.

D. R. D.

Dependence of soil colour on the iron and humus content. K. UTESCHER (Z. Pflanz. Düng., 1932, 26A, 257–270).—Soil colour depends not only on its Fe and humus content, but also on the fineness of division of the humus and the ratio SiO₂/Fe₂O₃ sol. in HCl. Soils having mol. ratio SiO₂/Fe₂O₃ > 6 are grey, and with < 2 are brown. Red colour is probably due to lesser hydration. In no case examined was the colour of a soil influenced by the presence of FeO. Colour associated with the SiO₂/Fe₂O₃ ratio usually predominates over that attributable to humus.

A. G. P.

Adaptation of the seedling method to the examination of moor soils. F. BRÜNE, T. ARND, E. GÜNTHER, and A. POOCK (Z. Pflanz. Düng., 1932, 26A, 271–283).—The use of fresh soil samples, measured by vol., is recommended. If necessary, CaCO₃ is added to give an equiv. of 4000 kg. of CaO per hectare. After the growth

of the barley plants, roots are cut off immediately beneath the seed and analyses made of the upper portion only. A. G. P.

Soils. XI. Aluminium cycle. Exchange acidity. J. CLARENS and J. LACROIX (Bull. Soc. chim., 1932, [iv], 51, 1167—1172; cf. B., 1931, 732).—The action of dil. HCl alone and with KCl on non-calcareous clay has been examined, the quantities of Al and heavy metals dissolved and of acid neutralised being determined. Results indicate that the Al is present as: (1) Al silicate, insol. in HCl and KCl; (2) free Al_2O_3 , sol. in HCl; (3) "displaceable Al," which can be determined by treatment with aq. KCl and titration with alkali. The difference between the titres using Me-orange and Me-red as indicators is a measure of the displaceable Al. The use of the term "exchange acidity" in this connexion is misleading. D. R. D.

Nature of soil acidity and its significance in the decomposition of chalk and phosphorites in soil. D. L. ASKINASI and S. S. JARUSSOV (Z. Pflanz. Düng., 1932, 26A, 138—166).—In soils treated with $AlCl_3$ the rate of decomp. of $CaCO_3$ is similar to, and of phosphorites <, that in soil saturated with replaceable H⁺. The relative effects of different forms of soil acidity on the decomp. of phosphorites were in the order: exchange acidity (H⁺ in complex) 100, hydrolytic acidity 67, exchange acidity (Al^{+++} in complex) 39. A. G. P.

Relation between fineness of limestone particles and their rates of dissolution [in soil]. F. E. BEAR and L. ALLEN (Ind. Eng. Chem., 1932, 24, 998—1001).—The rate of dissolution in acid soil of the various separates of two limestones was determined in comparison with that of standard separates of 48—65- and 150—200-mesh. The % efficiencies were 48.11 and 63.42, respectively. For finely-pulverised separates, theoretical calculations from the diams. of the particles are nearly valid. The low vals. obtained for the coarser separates are due to the effects of diffusion. W. J. W.

Modification of the Hutchinson-MacLennan method for determination of soil acidity. E. ALINARI (Annali Chim. Appl., 1932, 22, 512—514).—The $Ca(HCO_3)_2$ solution used in this method (B., 1914, 932) is replaced by one prepared by dissolving 1.8 g. of $NaHCO_3$ in 900 c.c. of H_2O , passing CO_2 , and adding, while stirring, a solution of 1.2 g. of anhyd. $CaCl_2$ in 100 c.c. of H_2O . The solution, approx. 0.02N in respect to $Ca(HCO_3)_2$, remains unaltered after keeping for 1 year. Comparative results are given. O. F. L.

Nitrogen fixation by soil algæ. F. E. ALLISON, and H. J. MORRIS (Proc. 2nd Internat. Cong. Soil Sci., 1932, 3, 24—28).—A blue-green alga (? *Anabaena variabilis*) grown in artificial light on media containing neither sugar nor N and aerated with sterile air containing 1% CO_2 fixed appreciable amounts of N. Sol. N compounds were produced. When grown in darkness N fixation by the organism was extremely slow. A. G. P.

Nitrogen fixation as influenced by calcium. W. A. ALBRECHT (Proc. 2nd Internat. Cong. Soil Sci., 1932, 3, 29—39).—Liming affected the growth and nodulation of legumes, not only by destroying soil

acidity, but directly by stimulating nodulation. An adequate supply of Ca within the plant modifies structural and functional conditions and facilitates symbiosis. A. G. P.

Factors affecting the non-symbiotic fixation of atmospheric nitrogen in desert soils. P. S. BURGESS (Proc. 2nd Internat. Cong. Soil Sci., 1932, 3, 42—52).—Aërobic N fixation may occur in arid soils of low H_2O contents and at high temp. (30—40°). The presence of alkali salts up to 3% has little effect on the activity of aërobic or anaërobic N-fixing organisms. A. G. P.

Rôle of nitrogen and the significance of free fixation under semi-arid conditions. P. L. GAINNEY (Proc. 2nd Internat. Cong. Soil Sci., 1932, 3, 15—23).—The N content of virgin semi-arid soils is small as the result of low activity of N-fixing organisms both free and symbiotic. Cultivation of these soils may lead to losses of N, but *Azotobacter* become abundant after a brief period of cropping. A. G. P.

Microbiological tests of soil fertility; nitrification and nitrogen fixation. J. ZIEMIECKA (Proc. 2nd Internat. Cong. Soil Sci., 1932, 3, 53—54).—Rates of N fixation and nitrification are satisfactory indices of p_H and buffer capacity in soils. *Azotobacter* did not occur in soils of $p_H < 6.0$ and was invariably present in soils of $p_H > 6.9$. In soils deficient in P *Azotobacter* were present but inactive. In non-acid soils the organism was active in all cases where the sol. P was > 10 mg. per kg. of soil. The no. of *Azotobacter* in soils was markedly influenced by the mineral-N content, growth being retarded by high N contents. Nitrifying bacteria are less sensitive to acidity than are *Azotobacter*. Nitrification was weak in soils of $p_H < 6.3$. Nitrification tests were valueless for determining the sol.-P deficiency of soils. A. G. P.

Transformations of urea and their resultant effects on the soil. H. W. JONES (Soil Sci., 1932, 34, 281—299).—The rate of transformation of urea into NH_3 and subsequently into NO_3^- in soils varied with the soil- H_2O content. The first transformation was much more rapid than the second. The efficiency of the complete conversion declined with increasing proportions of urea applied. Leaching of sol. matter produced by the biological changes tended to increase the p_H of the soil- H_2O suspension to an extent depending on the concn. of NH_3 and NO_3^- in the soil. A. G. P.

Formation of higher polythionates from sulphur in soil. G. GUITTONNEAU and J. KEILLING (Compt. rend., 1932, 195, 679—681).—The presence of higher polythionates in peptonised garden soil to which S has been added is confirmed. In addition to pentathionic acid (cf. B., 1930, 876) tetrathionic acid has been isolated. C. A. S.

Relationship between hygroscopicity, adsorbed bases, and some physical properties of soils. I. S. KÜHN (Z. Pflanz. Düng., 1932, 26A, 357—370).—Hygroscopicity of soils is dependent on the hydration of adsorbed ions. Relationships between hydration and the ultimate structure of base-absorbing particles are discussed and the individual effects of adsorbed ions and of sol. salts examined. A. G. P.

Relationships between the degree of saturation and buffering of a soil and the reaction value. III. Biochemical examination of buffer capacity. H. NIKLAS, A. HOCK, and A. FREY [with H. POSCHENRIEDER] (*Z. Pflanz. Düng.*, 1932, **26A**, 129—138).—In the *Azotobacter* method for determining soil reaction, results are markedly influenced by the CaCO_3 content of the soil, the nature and quantity of $\text{PO}_4^{''''}$ in the nutrient, the proportion of soil to nutrient used, and the length of the incubation period. The buffer power of the soil can be determined by the reaction changes in the nutrient since the growth of *Azotobacter* involves the production of org. acids. Results so obtained are comparable with those yielded by Jensen's method. Small differences in reaction or buffer capacity in neutral or acid soils are not detectable by this method.

A. G. P.

Determination of potassium in soils by the cobaltinitrite method. S. KATAKOUSINOS and A. PAPADIMITRIOU (*Z. Pflanz. Düng.*, 1932, **26A**, 166—175).—The use of 50% aq. EtOH in place of AcOH solutions accelerates pptn. and, moreover, the $\text{K}_2\text{NaCo}(\text{NO}_2)_6 \cdot \text{H}_2\text{O}$ is less sol. in this reaction medium. Results so obtained for small quantities of K (12—13 mg.) are more accurate than those given by pptn. as KClO_4 or K_2PtCl_6 . Details of the method as applied to various soil analyses are given.

A. G. P.

Determination of aluminium by means of 8-hydroxyquinoline, especially in soil analysis. E. JUNG (*Z. Pflanz. Düng.*, 1932, **26A**, 1—8).—Satisfactory adaptation of the method for soils and silicates containing Fe and Ti is recorded.

A. G. P.

Determination of the ion-exchange capacity of soils. J. S. CSIKY (*Soil Sci.*, 1932, **34**, 269—279).—The amounts of ions exchanged by treating soil with increasing proportions of a replacing agent are related to the quantity of exchangeable ions present and are practically independent of sp. soil properties. Using increasing ratios of soil to replacing reagent, the cation adsorption curve is shown to be hyperbolic and its asymptote equation forms the basis for the calculation of certain soil characteristics. The equiv. wts. of different soil complexes with respect to their exchangeable H^+ are proportional to the calc. ratio of soil to displacing agent necessary to produce similar amounts of base exchange.

A. G. P.

Determination of lactic, acetic, and butyric acids and their salts in silage. W. STOLLENWERK (*Wiss. Arch. Landw.*, 1932, **A**, 8, 558—564; *Chem. Zentr.*, 1932, ii, 463).—Wiegner's formula is modified. Gradual decomp. of the salts during distillation leads to high vals. for PrCO_2H and AcOH. In presence of excess of acetates free lactic acid cannot be detected.

A. A. E.

The *Azotobacter* test of soil fertility applied to the classical fields at Rothamsted. J. ZIEMTECKA (*J. Agric. Sci.*, 1932, **22**, 797—810).—The soil-plaque method (B., 1928, 239) indicated correctly differences in P manuring on soils not heavily treated with N (<86 lb. N per acre). On soils rich in N, growth of *Azotobacter* was poor even where P and CaCO_3 were applied.

A. G. P.

Action of neutral, acid, and basic fertilisers of various physiological and chemical characters on the activity of soil micro-organisms. H. ENGEL and G. BARTHEL [with B. HARITANTIS] (*Z. Pflanz. Düng.*, 1932, **26A**, 307—326).— CO_2 production in fertilised soils varied with the physiological reaction of the fertiliser in the order neutral > alkaline > acid. The early stages of cellulose decomp. followed the order alkaline > neutral > acid. Under acid conditions, however, active decomp. continued for a longer period. Nitrification of $(\text{NH}_4)_2\text{SO}_4$ was active in soils receiving alkaline and weak with neutral fertilisers. Acid materials inhibited the process completely. Addition of peat to soils improved cellulose decomp. and nitrification and, in general, tended to eliminate the effects of acid fertilisers.

A. G. P.

Yields of pineapples as influenced by fertilisation and conformity to the law of diminishing increment. O. C. MAGISTAD, C. A. FARDEN, and C. B. LAMBERT (*J. Amer. Soc. Agron.*, 1932, **24**, 610—622).—The use of yield curves constructed according to Mitscherlich or to Spillman in determining the available nutrient of soils is examined.

A. G. P.

Boron requirements of cotton. F. M. EATON (*Soil Sci.*, 1932, **34**, 301—305).—For the max. growth of cotton plants, 10 p.p.m. of B in the nutrient are necessary. Manuring with B some time prior to planting is probably advantageous. The use of colemanite is recommended. B should not be applied before sowing maize, other cereals, or beans.

A. G. P.

Cropping trials with "Zewaphosphate." H. NIKLAS, W. SCHROPP, and K. SCHARRER (*Landw. Versuchs-Stat.*, 1932, **114**, 175—202).—"Zewaphosphate," obtained by treating sulphite liquor from the cellulose industries with crude phosphate for the recovery of SO_2 , contained total P_2O_5 30, citric-sol. P_2O_5 6.2, and citrate-sol. P_2O_5 3.7%. In cropping trials the material was rather less effective than basic slag or superphosphate, but was more satisfactory on acid than on neutral soils.

A. G. P.

Action of neutral, acid, and basic fertilisers of various physiological and chemical characters on the reaction of soils and on crop yields. O. LEMMERMANN, L. FRESSENIUS, and E. GERDUM (*Z. Pflanz. Düng.*, 1932, **26A**, 284—307).—On light sandy soils plant growth may be influenced directly by the physiological reaction of the fertilisers to a greater extent than by the natural soil reaction. The effects of the reaction of fertilisers were apparent even on limed soils. Repeated use of physiologically neutral fertilisers tends to increase soil acidity to some extent. Determinations of p_{H} and of hydrolytic acidity alone are insufficient to establish the suitability of soils for particular crops. The humus content is also important in this connexion.

A. G. P.

Influence of time on the activity of rye seed used in the seedling method. H. NEUBAUER (*Z. Pflanz. Düng.*, 1932, **26A**, 326—330).—The effect of storage over CaO in increasing the germinative capacity and growth activity of rye is recorded, and the effective details of the process are discussed (cf. B., 1932, 855).

A. G. P.

Comparative sugar determinations, and considerations of a polysaccharide and hydrocyanic acid in seed material of different vitality. A. NIETHAMMER (Z. Pflanz. Düng., 1932, 26A, 350—357).—The % germination of a no. of seeds increased with their sugar and HCN contents. A. G. P.

Effect of fluorine ions on the germination and early growth of some crops. K. SCHARRER and W. SCHROPP (Landw. Versuchs-Stat., 1932, 114, 203—214).—The toxicity of KF to cereal crops was relatively small and approx. the same for each crop. Its action is more marked in acid than in neutral soils. A. G. P.

Action on the growth of crops of small percentages of certain metallic compounds when applied with ordinary artificial fertilisers. W. E. BRENCHLEY (J. Agric. Sci., 1932, 22, 704—735).—Additions of small amounts of CuSO_4 or of Ti salts to fertilisers did not increase the growth of various crops when applied to several soil types. Cases of crop reduction following the use of very finely-ground basic slag may be due to the toxic action of V present in the slag. Li is much less toxic than Cu to many plants, and some evidence of a stimulative effect is recorded. Al was toxic to a no. of crops, notably barley. Its effect is not due to an increased $[\text{H}^+]$. No stimulation was observed at any concn. A. G. P.

Nutritive value of pasture. IX. Influence of the intensity of grazing on the yield, composition, and nutritive value of pasture herbage. IV. H. E. WOODMAN and D. B. NORMAN (J. Agric. Sci., 1932, 22, 852—873; cf. B., 1931, 277).—Extension of the rotational grazing period from 4 to 5 weeks involved a small but definite reduction in the digestibility of the herbage. This effect was most marked during the "flush" period and fell mainly on the protein constituents. The digestibility of the crude fibre remained high. During this period the pasture was capable of satisfying the needs of fattening stock. A. G. P.

Root-rot in peas. J. G. HORSFALL, Z. I. KERTESZ, and E. L. GREEN (J. Agric. Res., 1932, 44, 833—848).—Root-rot produces a curtailment of growth and a lowering of quality in the peas, associated with decreased proportions of H_2O , ash, and N. H. D.

Strawberry root weevil, *Brachyrhinus (Otiorynchus) ovatus*, as a conifer pest. E. I. MCDANIEL (J. Econ. Entom., 1932, 25, 841—843).—Larvæ in soil were destroyed by the injection of CS_2 , and adults trapped by poison baits containing apple oil as attractant. A. G. P.

Comparison of oxidation rates of liquid lime-sulphur and solutions of dry lime-sulphur. D. E. BULLIS (J. Econ. Entom., 1932, 25, 922—928).—Dilutions of liquid CaO-S and solutions of "dry" CaO-S of the same polysulphide-S content oxidised at similar rates. Sludge did not appreciably affect rates of oxidation. A. G. P.

Dusting tomato seed with copper sulphate monohydrate for combating damping off. J. G. HORSFALL (New York State Agric. Exp. Sta. Tech. Bull., 1932, No. 198, 34 pp.).— $\text{CuSO}_4 \cdot \text{H}_2\text{O}$ as a dust was more effective than soaking in CuSO_4 solution or dusting with

Cu carbonate, for controlling the "pre-emergence" phase of damping off. In the "post-emergence" phase the efficiency of the treatments was in the order: CuSO_4 soak > $\text{CuSO}_4 \cdot \text{H}_2\text{O}$ dust > Cu carbonate dust. Dilution of $\text{CuSO}_4 \cdot \text{H}_2\text{O}$ with 3 times its wt. of kaolin caused no reduction in efficiency. Anhyd. CuSO_4 is as effective as, and more adherent to seed than, $\text{CuSO}_4 \cdot \text{H}_2\text{O}$. A. G. P.

Comparison between rotenone and pyrethrins as contact insecticides. J. M. GINSBURG (J. Econ. Entom., 1932, 25, 918—922).—Derris extract and pure rotenone were much more toxic to aphids than to honey bees. The reverse order of toxicity obtained with pyrethrum. A. G. P.

Toxicity of vapours of volatile organic compounds to the "red spider" mite (*Tetranychus telarius*, L.). W. H. READ (Ann. Appl. Biol., 1932, 19, 432—438).—With the exception of HCO_2Me the aliphatic alcohols and formates (Et to amyl) increase in toxicity as the series is ascended. HCO_2Me was the most toxic of the formates examined. Normal compounds are more toxic than the branched-chain isomerides, the decreased toxicity with branching being greatest where branching occurs in the α -position to the OH or CO_2H groups. The toxicity to plants is of the same relative order as that towards insects, but differences attributable to mol. structure are more definite. A. G. P.

Toxicity of certain coal-tar dyes for the silkworm. F. L. CAMPBELL (J. Econ. Entom., 1932, 25, 905—917).—The toxicity of a no. of dyes administered by injection and by the mouth is examined. Malachite-green, safranin-bluish, brilliant-green, and crystal-violet were toxic. The leuco-base of malachite-green was harmless. A. G. P.

p_{H} and wireworm incidence. G. A. MAIL (J. Econ. Entom., 1932, 25, 836—840).—Soil reaction does not influence the distribution of wireworm, which can tolerate a range of p_{H} 4.8—8.0. A. G. P.

Relative toxicity of some dusts to *Carpocapsa pomonella*. R. E. BARRETT (J. Econ. Entom., 1932, 25, 859—863).—Among F compounds examined, only BaSiF_6 and synthetic cryolite were effective in controlling codling moth on walnuts. Talc was a better carrier than CaO . A dust consisting of 35% BaSiF_6 or synthetic cryolite with 65% of talc (400-mesh) is recommended. A. G. P.

Boll weevil control on plots receiving different rates of fertiliser. J. M. ROBINSON and F. S. ARANT (J. Econ. Entom., 1932, 25, 759—766).—Increased yields of cotton from infected plants after dusting with Ca arsenate were small on unmanured soils, but very considerable where manures had been applied. A. G. P.

Controlling the peach borer (*Synanthedon exitiosa*), with special application to young trees. O. I. SNAPP (J. Econ. Entom., 1932, 25, 786—799).—Spraying trunk bases and the surrounding soil with $p\text{-C}_6\text{H}_4\text{Cl}_2$ -mineral oil emulsions effectively controlled the borer without injury to 1—3-year trees. Results were superior to those previously obtained by the use of $p\text{-C}_6\text{H}_4\text{Cl}_2$ alone or emulsified with crude cottonseed

oil. $C_{10}H_8$ and $C_{10}H_8$ -crude cottonseed oil emulsions were injurious to young trees and gave incomplete control of the borer. A. G. P.

XVII.—SUGARS; STARCHES; GUMS.

Physical and chemical activity of lime in technical carbonatation [of beet juice]. V. KONN (Z. Zuckerind. Czechoslov., 1932, 57, 11—15; cf. B., 1932, 203).—Of the total actual CaO added to beet juice, that portion which reappears as $CaCO_3$ in the carbonatation scums is termed "physically active" by the author since it has only a physical purifying effect, whilst the balance is termed "chemically active," and that portion of it which remains combined in the final filtered juice is termed the "objectionable" or "injurious chemically active CaO." The physically active CaO may be calc. from the wt. and CO_2 content of the combined carbonatation scums, and the chemically active CaO by difference. According to data given, when the total CaO employed is 1.5—2.5% of the wt. of juice the amount of chemically active CaO usually lies between 0.5 and 0.8%, and it varies inversely with the purity of the raw juice. Addition of invert sugar to the raw juice was found to increase the amount of objectionable chemically active CaO. J. H. L.

Further investigations on [beet] juice purification, especially on dry and wet liming. O. SPENGLER, F. TÖDT, and S. BÖTTGER (Z. Ver. deut. Zucker-Ind., 1932, 82, 617—652).—Beet juice limed at 80° with 2% of CaO in the form of dry lumps or powder dissolved 0.3—0.4% of CaO, compared with 0.2—0.25% when milk-of-lime was used, and the ppt. formed settled more rapidly in the former than in the latter case. After carbonatation, however, there was no difference in rate of filtration nor in colour between the juices limed with powdered CaO or milk-of-lime, whilst that limed with lumps filtered more rapidly and was paler. When raw juice is limed at 80° with dry powder or milk-of-lime, its alkalinity rises beyond the isoelectric point (p_H 10.9) within 10—15 sec. When lumps are used the juice takes about 100—150 sec. to reach p_H 10.9 if the lumps are of average hardness and even 500 sec. if the lumps are exceptionally hard; the juice in fact passes through the isoelectric point slowly enough for a pre-liming effect (cf. B., 1932, 363, 909) to be produced. This is the sole cause of the improved filtration and colour of carbonated juice which has been limed with lumps, for if the raw juice is first pre-limed to p_H 10.9 with milk-of-lime or powder, it makes no difference whether the main liming is effected with lumps or milk. The pre-liming effect of CaO in lumps varies with the quality of the CaO, but it is always much < that produced by cold optimum pre-liming (*ibid.*) and does not appreciably improve the analytical vals. for the final juice, apart from colour. In practice it would best be attained by enclosing the CaO in lumps the size of a fist, in a cage which is kept in motion in the juice. The beets used for this investigation had been stored for 5—6 months and, although in good condition, had undergone some obscure change, for the juice when limed and carbonated in the usual way filtered 2—3 times as rapidly as that from similar beets before storage. Moreover, optimum pre-liming of juice from the stored beets, in contrast

with that from the fresh roots (*ibid.*), was more effective at 80° than at 40° in accelerating filtration, but in all cases pre-liming at 40° yielded the palest final juices. Preliminary experiments on cold-diffusion of beet cosettes with acidified H_2O , using long-stored beets, are described. J. H. L.

Practical methods of pre-liming [of beet juice]. O. SPENGLER, S. BÖTTGER, and F. TÖDT (Z. Ver. deut. Zucker-Ind., 1932, 82, 653—664).—In accordance with the authors' recent work (B., 1932, 363, 909), raw juice may be pre-limed by treatment with about 1% of its vol. of the usual milk-of-lime, or 10—20% of fully limed juice, or 100% of unfiltered juice from the first carbonatation. In the first two methods particularly, the proportion of pre-liming agent to be added must be accurately determined (B., 1932, 363) and closely adhered to in practice. Pre-liming with milk-of-lime at 40° and main liming at 80° gives the best results but requires most care; very rapid heating of the pre-limed juice to 80° for the main liming is necessary to avoid darkening. Arrangements of plant in use for the three methods in factories equipped with rapid juice-heaters are described. Where only open juice-heaters are available the juice may be pre-limed at 35—40° with milk-of-lime in the measuring vessels, then transferred to larger vessels and fully limed at the same temp., and finally heated to 80° and carbonated; slow heating of the fully limed juice does not cause darkening. Other methods of procedure are suggested. J. H. L.

Application of base-exchange agents with amphoteric cations to the purification of sugar juices. C. JEANPROST (Bull. Assoc. Chim. Sucr., 1932, 49, 206—208).—Raw beet juice can be freed from about 75% of its ash and 90% of its N, and at the same time almost decolorised, by treatment with a glauconite previously charged with $Al(OH)_3$. The natural salts in the juice are converted into Al salts, and many of these at once undergo hydrolysis owing to the feebleness of their acids. The $Al(OH)_3$ thus liberated adsorbs colloids and colouring matters. In a case cited, a raw beet juice of purity 86.35 was thus converted into a clear, practically colourless juice of purity 94.6. J. H. L.

Purification [of beet juice] with Redoid Z.N. J. BOLIN and R. WARNERY (Bull. Assoc. Chim. Sucr., 1932, 49, 237—242).—Factory trials were made in which raw juice, before liming and carbonatation, was treated with a solution of 50 g. of Redoid ZN (cf. B., 1931, 1115) followed by 50 g. of liquid SO_2 per ton of beets. When the usual amount of CaO was used the final juice showed slightly increased purity and a marked improvement in colour and viscosity as compared with normal working. With reduced amounts of CaO the improvement in the quality of the juice was lost and the first carbonatation had to be carried to an alkalinity depending on the amount of CaO used, otherwise filtration and sweetening-off became difficult. J. H. L.

Excess of sugar obtained in the crystallisation of masscutes by the Zamaron process for purifying beet and cane juices with alumina gel. J. ZAMARON (Bull. Assoc. Chim. Sucr., 1932, 49, 212—215; cf. B., 1931, 1114).—Calculations are made. J. H. L.

Inversion in cane sugar manufacture. J. GUILLAUME (Bull. Assoc. Chim. Sucri., 1932, 49, 224—228).—In Martinique raw juices are sulphited before liming and the filtered juices are kept at p_H 6.4—6.6. This slight acidity does not cause any inversion in practice. The tendency to inversion in solutions of raw sugars depends on other factors besides p_H val., probably on the presence of enzymes. J. H. L.

Determination of small quantities of reducing sugars, particularly in raw or refined sugar. A. MOLHANT (Bull. Assoc. Chim. Sucri., 1932, 49, 220—224; cf. B., 1932, 814).—50 c.c. of a neutral or faintly alkaline solution of the sample, clarified if necessary, are heated to boiling, and Soxhlet's Fehling solution is added drop by drop to the boiling liquid until in slight excess as shown by a faint bluish tint. The liquid is at once cooled and, as in Bertrand's method, the ppt. is filtered off, dissolved in $Fe_2(SO_4)_3$ solution, and titrated with 0.1*N*- $KMnO_4$, 1 c.c. of which corresponds to 3.16 mg. of glucose or invert sugar, whether in absence or in presence of sucrose, or to 5.74 mg. of maltose. For raw and refined sugars a solution containing 20 g./100 c.c. is filtered with a little animal charcoal and 50 c.c. of the filtrate are used for analysis. J. H. L.

Thermophilic bacteria in refined cane sugars. W. L. OWEN and R. L. MOBLEY (Ind. Eng. Chem., 1932, 24, 1042—1044).—The average nos. of "flat sour" thermophile organisms (cf. B., 1932, 319) found in numerous samples from different sources were, per 10 g.: in fine and coarse granulated sugars 13 and 8.5 respectively, in powdered sugar 191, in raw sugars 70, and in starch 132. In 11 samples of confectioners' sugar containing starch, James found 358 per 5-g. sample on the average. On new bags, of the towelling type as used for granulated sugars, the authors found 5.5/sq. in., probably derived from starch dressing. The thermophile organisms in refined sugars are on the surface of the crystals only; they are derived in part from the raw sugar and in part, sometimes mainly, from airborne infection. Tests in different parts of a sugar refinery having a starch-mixing plant showed that airborne spores were most numerous near the starch mixer and, in less degree, near the sugar-powdering mill. Except in rare cases, the organisms are not likely to develop at any stage of sugar manufacture or refining. J. H. L.

Viscosity of corn [maize] syrup. W. B. BISHOP and N. YOUNG (Ind. Eng. Chem., 1932, 24, 1171—1173).—Using a falling-sphere viscosimeter, it is shown that maize syrup acts as a truly viscous solution. A change in temp of 1° alters the viscosity by 9—12.5%; of 0.1° B., by 10%; and of 1% of reducing sugars by 6—7%. T. McL.

Sugar determinations and seeds.—See XVI.

PATENT.

Preparation of starch conversion products. AMER. DIAMALT Co. (B.P. 382,517, 4.2.32. U.S., 30,431).—A sol. product which may be incorporated with foodstuffs, e.g., milk, to serve as an emulsifying agent, to prevent crystallisation, or to give body without

affecting their flavour, is prepared from maize or other starch by dextrinising with mineral acid until the I reaction is blue to blue-purple and then partly converting with a diastatic agent; e.g., a 10—30% solution of the dextrinised starch at 75° and p_H 5 is treated with diastase equiv. to 0.5—1° Lintner, calc. on the solution, maintained for 10—15 min. at 75°, then heated for 10—15 min. at 100°, cooled again to 70—75°, treated with further diastase equiv. to about 1.2° Lintner, and maintained at 70—75° until the I reaction is brown and the maltose content corresponds to about 24—27% for a syrup of d 1.39. The product, decolorised if necessary, is conc. to syrup, or to a dry form which is non-hygroscopic. J. H. L.

XVIII.—FERMENTATION INDUSTRIES.

Differentiation and classification of culture yeast by the spectroscope. H. FINK [with K. WEBER and E. BERWALD] (Woch. Brau., 1932, 49, 313—318, 322—324).—Culture yeasts are divided into two groups according to differences in their cytochrome spectra. Thus, in group *A* are yeasts of the respiration type, which yield a 4-band cytochrome spectrum consisting of one distinct orange band, two bands closely adjacent in the pale green region, and one dark green band. Bakery yeast and the mould yeasts alone belong to this group. The second group, *B*, which consists of top- and bottom-fermentation beer yeasts, distillery yeast, and wine yeast, yields a 2-band cytochrome spectrum. There is a dark green band but no orange line, and the two pale green lines in group *A* are replaced by one broad green band. The one type of yeast may be transformed into the other, and bakery yeast grown with insufficient aëration easily changes into type *B* (2-band spectrum), whilst distillery and wine yeast, when aërated vigorously, rapidly undergo the reverse transformation (4-band spectrum type). Brewery yeast so far has resisted transformation. C. R.

Application of the Zeiss immersion refractometer to malt analysis. V. BERGLUND and W. EMLINGTON (Woch. Brau., 1932, 49, 324—327).—By means of this instrument suitably illuminated the amount of extract in malt wort prepared by the Congress method can be determined at 20° by the following formula: % extract in the wort = $0.499 + (0.2376 \times \text{refraction difference})$, where refraction difference is the difference between the n of the wort and that of distilled H_2O at the same temp. The accuracy of the determination is unaffected by the type of malt, the colour, or by the clarity of the wort, and the average difference of the val. from that obtained by the pycnometer is approx. $\pm 0.02\%$. C. R.

Aqueous extraction of hops before use. H. STADLER and H. REIDT (Woch. Brau., 1932, 49, 337—338).—Hops extracted with H_2O at 80° for 30 min. lost 30—40% of their content of tannin. The content of total resins, soft resins, lupulone, and γ -resin increased, but the amount of humulone decreased. Similar results followed immersion of the hops in boiling H_2O for 2 min. Beers brewed with hops extracted in this way were paler in colour, had greater foam retention, and showed a markedly improved flavour. C. R.

Rapid determination of the final degree of fermentation of wort and beer. W. SCHÜLER (Woch. Brau., 1932, 49, 318—320).—Wort held at 25° or 30° in a water-bath is pitched with pressed yeast and aerated at the rate of approx. 1 bubble of air per sec. until the decreasing amount of extract, which is determined periodically, reaches a const. The aëration keeps the yeast in motion and removes the CO₂. With 2% of pressed yeast the amount of extract is const. after 12 hr. with aëration, and after 48 hr. without. A pitching rate of 4% of yeast reduces the period required to reach the final attenuation to 9 hr. with aëration, but does not affect the time required without aëration.

C. R.

Undistilled water for brandy and brandy blending. C. LUCKOW (Pharm. Zentr., 1932, 73, 561—563).—Distilled H₂O is without effect on the quality or taste of brandy.

A. R. P.

Free sulphur dioxide in white wines. J. RIBERAUGAYON (Ann. Falsif., 1932, 25, 339—341).—The amount of free SO₂ increases with rise in temp.; thus 100 mg. at 15° may increase to 200 mg. at 80°, if this temp. is held sufficiently long to reach the equilibrium. Its preservative activity is therefore greater at higher temp., which is an advantage.

T. McL.

Proportion of tartaric acid to [total] free acid in natural Moselle, Saar, and Ruhr wine musts for 1930 and 1931. F. SEILER (Z. Unters. Lebensm., 1932, 64, 278—282).—In 1930 the mean val. of this ratio was about 50% for the musts, dropping by about 10% on fermentation. In 1931 the mean vals. ranged from 33 to 48%; fermentation produced much smaller decreases and, in some cases, an increase. The ratio, which was usually highest for the lowest total acidities, does not depend mainly on the EtOH present, but varies with such other factors as the time of harvesting, cellar temp., etc.

J. G.

Determination of tartaric acid in must and wine. F. SEILER (Z. Unters. Lebensm., 1932, 64, 285—288).—Berg and Müller's method (B., 1927, 24) gives satisfactory results for up to 13% of tartaric acid so long as 0.5 mg. of KOAc is added for every 1 mg.-equiv. of tartaric acid present. A smaller proportion gives low results.

J. G.

Chemical changes which occur during the storage of bottled wines. F. SEILER (Z. Unters. Lebensm., 1932, 64, 283—285).—Analytical data are recorded for 3 classes of Moselle wine at the time of bottling in 1912 (cf. B., 1920, 607B) and in Jan., 1932. In most cases there are decreases in EtOH, total and non-volatile acidities, an increase in mineral matter in one case, and no appreciable change in sp. gr., total extract, sugar, volatile acidity, tartaric and lactic acids. Riveriser wine, but for a slight decrease in mineral matter, showed almost the same composition as in 1913.

J. G.

Specific characteristics of cider brandy. Distinction between ordinary cider brandy and brandies prepared by rapid fermentation of the apple juice. G. WARCOLLIER and LE MOAL (Ann. Falsif., 1932, 25, 337—339).—Brandies prepared by the old slow process are entirely different in general properties

from those obtained by the rapid-fermentation method from poor juice by the addition of activators. Slow fermentation increases the volatile acids and ethers, giving per 10⁶ pts. acid 38—77 and ethers 248—341, as against acid 18—58 and ethers 36—71 by rapid fermentation. Furfuraldehyde is found only in traces in rapid-fermentation brandies.

T. McL.

Distinguishing between wine- and spirit-vinegar. P. RUDOLPH and H. BARSCH (Z. Unters. Lebensm., 1932, 64, 293—295).—The sample (10 c.c.) is heated with 0.5 c.c. of 0.02N-I for 15 min. at 55°: a deep blue colour produced on addition of starch indicates < 5% of wine vinegar, whilst > 20% completely reduces the I; the reaction may be made approx. quant. by titration with Na₂S₂O₃. Wine vinegar is also distinguished by the ppt. and blue colour (MoO₃) produced on addition of NH₄ nitromolybdate. Spirit vinegar gives a red colour 15 min. after the addition of 0.5 c.c. of FeCl₃ to 10 c.c. of the C-decolorised sample; wine vinegar turns yellow-green and finally yellow.

J. G.

“Soyament.”—See XIX.

PATENTS.

Preventing formation of unpleasant flavour in fermented cereal beverages. M. HAMBURG, Assr. to E. JALOWETZ (U.S.P. 1,843,321, 2.2.32. Appl., 15.3.28. Austr., 13.1.26).—Beers free from undesirable “young bouquet” flavour are produced by cooking boiled hopped wort in a vac. at approx. 70° until the albuminous constituents are pptd. The ppt. is removed and the wort fermented.

C. R.

Desizing textiles.—See VI. Starch conversion products.—See XVII.

XIX.—FOODS.

Proteins of milk. I. R. NESENI (Milchw. Forsch., 1932, 13, 363—367).—In order to maintain the normal N distribution in milk, CHCl₃ and 1% of H₃BO₃ are suitable as preservatives. If only residual N is to be determined, Trypaflavin (1 pt. in 20,000—40,000) is sufficient.

E. B. H.

Phosphatide content of milk and milk products. W. MOHR and J. MOOS (Milchw. Forsch., 1932, 13, 442—447).—In view of the different lecithins, e.g., myristo- and palmito-laurolecithins etc., it is considered advisable to refer to the phosphatide content in terms of % P. Results obtained by various workers are calc. to P and summarised.

E. B. H.

Testing for preservation of milk. K. JESCHKI (Milchw. Forsch., 1932, 13, 508—514).—The Rothenfusser test (B., 1931, 315), Kohn-Klemm's modification of the Schern-Gorli test, and Hock's rennin-serum test have been examined. In no case was it possible to decide if the milk had been pasteurised, whether at 63° for 30 min. or at 80° for 3 min. The only sure method of control is with the use of thermographs.

E. B. H.

Temperature treatment for increasing the viscosity of sweet cream. J. C. HENING and A. C. DAHLBERG (New York State Agric. Exp. Sta., Tech. Bull., 1932, No. 197, 18 pp.).—If pasteurised milk be cooled to 4.5°, then warmed to 27° before separation,

the cream is of greater viscosity after ageing than cream prepared normally. If cream be warmed from 4–5° to 27° in 3–10 min., then cooled to 5° in the same time, the viscosity of the cream is materially increased. The richer the cream the greater is the viscosity. The increase cannot be attributed to fat-clumping. E. B. H.

X-Ray examination of cheese. F. W. J. BOEKHOUT and E. BROUWER (*Milchw. Forsch.*, 1932, **13**, 381–384).—X-Ray photographs are used in studying the development of holes in the interior of cheese of the Emmenthal variety. E. B. H.

Detection of salicylic acid, methyl, ethyl, and propyl *p*-hydroxybenzoates, benzoic acid, and *p*-chlorobenzoic acid in cheese. H. HOSTETTLER (*Mitt. Lebensm. Hyg.*, 1932, **23**, 65–70; *Chem. Zentr.*, 1932, ii, 463).—The cheese (40–50 g.) is distilled with steam, affording 900 c.c. of distillate. Salicylic acid is determined colorimetrically in 50 c.c.; 400 c.c. are extracted 4 times with Et₂O and the solution is extracted with 4 c.c. of 0.05*N*-NaOH, whereby the esters remain, and after removal of Et₂O are detected with Millon's reagent. The alkaline extract is purified with KMnO₄, the BzOH being extracted with Et₂O and detected by the Mohler-von der Heide-Jacob test. For *p*-chlorobenzoic acid the residue from an Et₂O extract of the distillate is sublimed, and the sublimate tested for Cl with CaO. A. A. E.

Optical activity of commercial caseins. S. P. GOULD (*Ind. Eng. Chem.*, 1932, **24**, 1077–1079).—[α]_D for 15 samples of casein (dissolved in NaOAc and filtered) have been determined: variations in [α]_D cannot be correlated with differences in adhesive strength, as prolonged contact with HCl or lactic acid at low *p*_H vals. decreases the former without affecting the latter. Drying at temp. up to 85–90° does not affect [α]_D, although it may reduce the solubility. (Cf. *infra*.) E. L.

Effect of excessive temperatures and time of drying on solubility of casein. E. O. WHITTIER and S. P. GOULD (*Ind. Eng. Chem.*, 1932, **24**, 1081–1082).—Samples of casein dried for 5–6 hr. at temp. from 85° to 120° dissolved progressively more slowly and gave thicker solutions in solubility tests in "15% borax"; samples dried at 130–150° swelled but did not dissolve. A specimen dried at 96° in a vac. oven for 5 hr. resembled that dried at 100°. The highly viscous solutions of caseins dried at 100–110° formed satisfactory glues. Caseins dried for periods of 5–72 hr. at 51–55° had the same solubility. (Cf. preceding abstract.) E. L.

Manufacture of potato flakes. E. SZÉGÖ and A. REGNAUDIN (*Bull. Assoc. Chim. Sucri.*, 1932, **49**, 216–219).—Potato flakes contain all the solid constituents of the tubers and are an easily digested fodder material. For their manufacture, the potatoes are washed, cooked or steamed under pressure, and then mashed to a pulp, which is dried as a film on steam-heated rollers, scraped off, broken up, and stored. 400 kg. of potatoes containing 18% of starch yield 100 kg. of flakes containing 12–15% of H₂O, 6–7% of protein, 0.3–0.5% of fat, 1.2–1.5% of cellulose, and 72–77% of *N*-free extractives. Costs are worked out. J. H. L.

Comparative studies of the soya and the hydrolytic product of soya-bean cake, "Soyament."

N. SHIKAZONO and Y. TOMODA (*J. Soc. Chem. Ind., Japan*, 1932, **35**, 368–369B).—Soya and "Soyament" (obtained by hydrolysis of soya-bean cake with conc. HCl, neutralisation, and fermentation with wheat koji) contain, respectively, moisture 68.42, 57.53; ash 17.24, 20.87; fat 2.34, 1.42; protein 6.94, 15.25; carbohydrate 5.06, 4.93%. Analysis of total, protein-, and NH₂-N shows that Soyament contains more NH₂-acids than does soya. J. W. B.

Influence of drying temperature on digestibility and biological value of fish proteins. L. A. MAYNARD and A. V. TUNISON (*Ind. Eng. Chem.*, 1932, **24**, 1168–1171).—Haddock waste, vac.-dried, had digestion coeff. 85, biological val. 85; the direct flame-dried waste had vals. of 80 and 78, respectively. Corresponding vals. for menhaden whole-fish vac.-dried waste were 78 and 76; and for flame-dried, 61 and 70. The menhaden fish were first cooked and pressed before drying, part of the sol. protein being lost in the process. T. McL.

Detection of hydrogen sulphide in the evaluation of the freshness of flesh products. F. BUDAGJAN (*Z. Unters. Lebensm.*, 1932, **64**, 226–235).—Max. sensitiveness for the detection of H₂S is attained by passing CO₂ for 30 min. through 6% CuSO₄ and over 10 g. of sample in a small tube which is partly closed at the exit end by a stopper supporting a strip of paper 2 mm. wide and soaked in an alkaline solution of Pb(OAc)₂. The flesh of mammals and cold-blooded animals gives no reaction, but the progress of decomp. of various meats and fish may be followed from the change in colour of the stain from yellow to black. Although a positive reaction indicates that the sample is not fresh, a negative reaction should be confirmed by other methods, since decomp. does not always produce H₂S. J. G.

Determination of the colour of honey. J. KOCZKÁS and J. STITZ (*Z. Unters. Lebensm.*, 1932, **64**, 255–259).—Curves relating % absorption and wave-length (478–720 m μ) are characteristic for each of the 10 honeys examined, and the data are in good agreement whether obtained by the König spectrophotometer using 7 wave-lengths, or by the Pulfrich step-photometer using red, yellow, green, and violet filters. J. G.

Mel depuratum and the Fiehe test. W. ZIMMERMANN (*Pharm. Zentr.*, 1932, **73**, 577–578).—The Fiehe test is reliable and should be officially recognised as it discloses the origin and care of prep. of both Mel depuratum and Mel crudum. Many commercial samples of these substances showed, by their feeble reaction in the test, that they had been overheated during their prep. With careful working these products can be prepared without decomp. occurring. E. H. S.

Turbidity of raspberry juice and its elimination. H. KUNZ-KRAUSE (*Pharm. Zentr.*, 1932, **73**, 609–611).—The "after turbidity" of raspberry juice is ascribed to the separation of cryst. ellagic acid, which can be distinguished from yeast, pectin, etc. by microscopical examination. It can be removed only by settling in a cool place. E. H. S.

Absorption spectra of herba maté, tea, and coffee. J. EISENBRAND (*Arch. Pharm.*, 1932, **270**, 369–374).—Extraction of herba maté with H₂O (100 pts.) at 95°

for 10 min. gives a solution which shows an absorption band from 270 to 350 $m\mu$ (max. at about 315), but not the caffeine band. Tea and coffee extracts show the caffeine, and not the herba maté, band. The absorbing substance of maté is sensitive to alkali, absorbed by basic Pb acetate, and can be separated from the absorbent by H_2SO_4 and hot EtOAc; it is probably identical with chlorogenic acid. Absence of the typical band denotes falsification of maté, but its presence does not exclude adulteration. R. S. C.

Cacao butter. **Butter fat.** **Edible fats.**—See XII. **Rubber and foodstuffs.**—See XIV. **Pasture.**—See XVI.

PATENTS

Storage of fruit and like products. N. BERNHARDT and D. KRASSO (B.P. 382,200, 19.3.32).—Perishable products such as grapes, legumes, and mushrooms are kept in a fresh condition by embedding them in sawdust, cork chips, etc. previously saturated with neutralised $CuSO_4$ and dried. E. B. H.

Food jelly. F. M. BOYLES (B.P. 382,157, 8.2.32).—The addition to pectin of 0.01 vol.-% of HCl or other mineral acid has the effect of making a quick-setting pectin which will gel at room temp. E. B. H.

Salting of fish for curing. H. SUTTON, JUN. (B.P. 382,789, 3.12.31).

Starch conversion products.—See XVII. **Cereal beverages.**—See XVIII.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Investigation of medicaments, patent medicines, cosmetics, and similar products. C. GRIEBEL and F. WEISS (Z. Unters. Lebensm., 1932, 64, 295—302).—Descriptions and compositions of 75 German products are given. J. G.

Determination of phenol in medicaments and the phenol content of some nasal antiseptic tablets and phenol lozenges. C. E. CORFIELD and L. M. MUNDY (Pharm. J., 1932, 129, 251—252).—The PhOH is freed from interfering ingredients by distillation in presence of $CaCl_2$ and dil. HCl, and is determined by the usual (standard Br) method. W. S.

Determination of phenol in phenol ointment. E. M. SMELT (Pharm. J., 1932, 129, 252).—Two methods are described for the prep. of phenolic extracts, which are then assayed by the B.P. 1932 (standard Br) process. W. S.

Copper content of certain pharmaceutical preparations and chemicals. N. EVERS and L. A. HADDOCK (Pharm. J., 1932, 129, 247—248).—Vals. obtained by a method already described elsewhere (A., 1932, 101) are listed for numerous products. W. S.

Determination of mercury in mixtures containing mercuric chloride and vegetable infusions. L. M. MUNDY and C. W. S. RIX (Pharm. J., 1932, 129, 245—246).—Interference of infusion of calumba is overcome by the addition of KI under suitable conditions. W. S.

Surface tension of tooth paste solutions. S. M. GORDON and E. W. SHAND (Ind. Eng. Chem., 1932, 24, 1148—1152).—Measurements on tooth pastes mixed

with 1—12 pts. of H_2O and then centrifuged divide the pastes into two classes: (1) those containing soap and having surface tensions of 28—38 dynes/sq. cm., independent of the degree of dilution, and (2) those free from soap and having surface tensions of 40—60 dynes/sq. cm., increasing with the dilution ratio. A. G.

Effervescent properties of granular effervescent [pharmaceutical] preparations. D. S. RATTRAY (Pharm. J., 1932, 129, 249).—Stability and best methods of storing are discussed. W. S.

Behaviour of iodine solutions at liquid-solid interfaces. I. **Wetting power of iodine from various antiseptic solutions.** II. **Importance thereof in the preparation of new iodine antiseptics.** G. M. KARNS [with L. H. CRETCHER and G. D. BEAL] (J. Amer. Pharm. Assoc., 1932, 21, 779—782, 783—787).—I. The wetting power (measured by adsorption of I on silk fibre) of I from aq. KI solution is much superior to that from EtOH and glycerin solutions of similar concn. and is an approx. logarithmic function of the unused solvent power of the solution for I. The abs. surface tension of the solution has only an indirect bearing on the wetting power of a single constituent. When a large no. of solvents is being considered, direct adsorption measurements are of more significance than surface tension measurements.

II. The staining power, penetration, bactericidal efficiency, and adsorption behaviour of various I solutions is discussed. The theoretically ideal solution contains I 1.0, $CaI_2 \cdot 6H_2O$ 0.044, KI 0.048, and NaI 1.104 pts. in 2—3% I concn. E. H. S.

Suggested reasons for colour changes in prescriptions containing salicylates. F. GRILL (J. Amer. Pharm. Assoc., 1932, 21, 765—773).—Darkening of alkaline solutions of salicylates is ascribed to the ease of oxidation of the phenolic structure to the quinonoid derivatives by the action of O_2 , light, and Fe^{+++} , and possibly to the alteration of a keto-enol equilibrium. It may be minimised by using pure materials, boiled H_2O , and coloured containers. E. H. S.

Comparison of tests for balsam of Peru. E. M. SMELT (Pharm. J., 1932, 129, 241).—Several qual. tests for adulterants are recommended. W. S.

Colouring matter of cochineal. S. TAYLOR (Pharm. J., 1932, 129, 256).—Defatted cochineal is more sol. in acids and/or alkalis than in H_2O owing to the presence of 50% of a gelatinising agent, obtainable as a black powder insol. in water but sol. in acids to an orange and in alkalis to a purple solution. This indicator undergoes sharp colour changes at p_H 4 and 10, and imparts to cochineal tinctures their dark colour. W. S.

Determination of colchicine in Colchicum corm and seed and the official Colchicum preparations.—P. A. W. SELF and C. E. CORFIELD (Pharm. J., 1932, 129, 236—237).—The processes described are those introduced into the B.P. 1932. W. S.

Colorimetric assay of ergot. N. L. ALLPORT and T. T. COCKING (Pharm. J., 1932, 129, 235—236).—The addition of a trace of $FeCl_3$ to the *p*-dimethylamino-benzaldehyde- H_2SO_4 reagent of the B.P. 1932 obviates the necessity of exposing the test solution to light. W. S.

Biological assay² of *Scilla* and *Strophanthus* tinctures prepared by different methods. A. STASIAK (Arch. Pharm., 1932, 270, 385—391).—Tinctures prepared according to various Pharmacopœias are compared. Conc. EtOH gives less active extracts than dil. EtOH. The extract obtained from *Bulbus scillæ* by conc. EtOH is unstable in H₂O. R. S. C.

Composition of modern quinetum. J. A. GOODSON and T. A. HENRY (Quart. J. Pharm., 1932, 5, 161—171).—Control analyses of an artificial mixture of quinine, cinchonidine, cinchonine, and quinidine of known composition show that such determinations have been made reliable. The causes of previous errors have been confirmed (cf. B., 1930, 882) and largely obviated. Results of analyses by the improved methods indicate that modern quinetum is of variable composition which differs, in general, from that of the original preps., and tends towards the standards specified for "totaquina" by the Malaria Commission of the League of Nations. W. S.

Beam's reaction for *Cannabis indica*. G. RENDE (Ann. Falsif., 1932, 25, 332—336).—Trolle's observation (B., 1932, 817), that Beam's reaction is not sp. for *C. indica*, is confirmed. Extracts prepared from the dried drug do not respond to the reaction, though cannabinol is present. (Cf. A., 1931, 1342.) T. McL.

Senega decoctions and their evaluation. K. HERING (Arch. Pharm., 1932, 270, 402—409).—The most active extract is obtained by boiling the coarsely powdered roots with 10% aq. NaHCO₃. Alkaline solutions extract more saponins than neutral or acid solutions. R. S. C.

Tinctures of kino, krameria, and gambir compound. Study in stability and assay methods. A. LICHTIN (J. Amer. Pharm. Assoc., 21, 774—778).—Results of assays of tinctures made with different menstrua by colorimetric, pptn., and the Lowenthal KMnO₄ methods are given. E. H. S.

Manufacture of concentrated pyrethrum extract. C. B. GNADINGER and C. S. CORL (Ind. Eng. Chem., 1932, 24, 988—991).—The most satisfactory solvent is C₂H₄Cl₂; 7.3% of oleoresin (completely sol. in kerosene) is obtained by extraction of the ground flowers at < 40°, and the solvent is distilled at < 60° to yield the resin, which contains 97—98% of the total pyrethrins of the flowers. The solvent loss is < 3%. The resin is extracted by an org. solvent, and when properly stored (indoors in "tin" cans or Fe drums at 26—35°) the conc. extract retains its strength for at least 13 months. There is no measurable loss in pyrethrins during these processes, and the toxicity of a kerosene extract of the marc is > that of kerosene alone. E. H. S.

Determining the method of preparation of fluid extracts [of drugs] by capillary analysis. H. SCHMIDT-HEBBEL (Pharm. Zentr., 1932, 73, 595—598).—Capillary examination of the extracts of varying origin by methods previously described (B., 1932, 1103), particularly in the dilutions, give varying capillary "pictures," especially in the upper zones. This is exemplified by the examination of fluid extracts of hydrastis, calumba, viburnum, cinchona, and opium. E. H. S.

Ash determination in drugs. L. W. WINKLER (Pharm. Zentr., 1932, 73, 593—595, 612—617, 705—708).—Ash determinations, by specified methods, of many species of each of 100 drugs, compared with the limits of the D.A.B. VI, show that the latter are much too high (usually 2—3 times the average). The D.A.B. VI ash-determination method is unreliable. The upper and lower ash limits should be stated together with average figures. Most of the commercial samples of powdered drugs examined came within these suggested limits. The importance of ash determination, microscopical examination, and frequent and efficient sieving of stored drugs is emphasised. E. H. S.

Occurrence and distribution of saponins in vegetable drugs. I. Flowers. L. KOFLER and G. STEIDL (Arch. Pharm., 1932, 270, 398—400).—Only 4 out of 33 drugs examined contained saponins. R. S. C.

Determination of santonin in plants. P. S. MASSAGETOV (Arch. Pharm., 1932, 270, 392—395).—The plant material is ground with Ca(OH)₂, boiled with H₂O, and filtered. The filtrate is acidified and extracted with CHCl₃, which, after shaking with aq. NaOH and C, gives pure santonin. R. S. C.

Assay of santonin-bearing drugs. H. M. BURLAGE and A. C. SMITH (J. Assoc. Off. Agric. Chem., 1932, 15, 491—499).—The existing methods were examined and various modified colorimetric methods tested. Good results were obtained by a gravimetric method in which the drug is defatted by refluxing with light petroleum (saturated with santonin) and then extracted with EtOH. The extract is diluted, boiled with basic Pb acetate solution, and filtered. The santonin crystallises out on keeping and is collected on a tared filter, washed with 5% NH₃ solution and then with H₂O, dried at 100°, and weighed. For each 10 g. of dil. (15 vol.-%) EtOH used 0.006 g. is added to the wt. of santonin. W. J. B.

Assay of santonin in *Artemisia*. J. COUTS (Pharm. J., 1932, 129, 240—241).—A new gravimetric process is described, in which the powdered drug is extracted with C₆H₆ and the filtered extract shaken with 8% aq. Na₂CO₃. W. S.

Detection of organic compounds. VIII. Microchemical separation of larocaine, novocaine, and tutocaine. L. ROSENTHALER (Pharm. Ztg., 1932, 77, 726—727; cf. A., 1932, 72).—The different cryst. forms of the ppts. given by those 3 drugs with Reinecke salt, picric acid, KI, KBr, and other reagents are described. A. C.

Comparison of two methods of determining theobromine in diuretine. J. M. A. HEGLAND (Pharm. Weekblad, 1932, 69, 1078—1080).—Comparison of the methods in which (a) AgNO₃ is added to an aq. solution and the liberated HNO₃ is titrated with alkali, and (b) I is added in excess to an AcOH solution to form theobromine tetraiodide, the excess of I being titrated, shows the former to be the more reliable and the less dependent on conditions of analysis. H. F. G.

Nicotine content of cigarette tobacco smoke. II. C. PYRIKI (Z. Unters. Lebensm., 1932, 64, 263—277; cf. B., 1931, 1027).—Pfyl and Schmitt's method for the

determination of nicotine, modified by extracting the acid absorbing solution with CHCl_3 , making the aq. portion alkaline, and pptg. with picric acid or iodoeosin, gives higher and more accurate results, since all the suggested modifications (e.g., B., 1931, 1932) are applicable to other cigarette tobaccos containing $>0.2\%$ of nicotine. Only smoke in which nicotine is detectable, and which yields 0.2—1.2% the relation between nicotine in the tobacco and smoke is almost linear; most of the excess of nicotine above 1.2%, however, does not appear in the smoke. It is suggested that cigarette tobaccos designated "nicotine-free" and "poor in nicotine" should contain >0.1 —0.15 and 0.5—0.6%, respectively. None of the denicotinising preps. examined was appreciably effective, and Bonicot's fluid (B., 1932, 287), which reduces the nicotine content by 12—15%, appears to do so by rendering the tobacco moist, and is no more effective than H_2O . Most of the nicotine in the smoke is held by the acid decomp. products, but alkaline tobacco yields uncombined nicotine. The nicotine content of the stump (25%) of a smoked cigarette is increased by 11—13%. J. G.

Protein content of commercial pituitary extracts. F. WOKES (Pharm. J., 1932, 129, 241—242).—Inefficient freezing before extraction, or bad manufacturing processes, result in high N (protein) contents in the preps., many of which vary, in this respect, between wide limits. W. S.

Determination of essential oils in drugs and spices. T. T. COCKING and G. MIDDLETON (Pharm. J., 1932, 129, 253—255).—An apparatus is described in which the material is distilled with H_2O , the aq. part of the distillate being continuously returned to the still. W. S.

Strophanthus oil. K. C. KÜHN (Arch. Pharm., 1932, 270, 395—397).—Consts. for 4 oils are recorded. R. S. C.

Quality of Japanese peppermint oil produced in Florida. E. V. CHRISTENSEN and L. D. HINER (J. Amer. Pharm. Assoc., 1932, 21, 793—795).—Plants grown during 1927—1930 yielded 0.180—0.557% of oil (green basis) having d_{25}^{25} 0.8927—0.8981, n_D^{25} 1.4530—1.4774, α -39.68° to -35.15° , free menthol 59.93—69.10%, combined menthol 3.38—6.24%. There was no gradual decrease in menthol content from year to year. E. H. S.

Ca glycerophosphate. Conc. Pb subacetate. Bi citrate solution.—See VII. **Digitalis fat.**—See XII. **Honey.**—See XIX.

PATENTS

[Manufacture of] **p-tolyl caprylate [octoate].** M. BOLLMANN, Assr. to WINTHROP CHEM. Co. (U.S.P. 1,813,607, 7.7.31. Appl., 19.3.29. Ger., 30.3.28).—*p*-Cresol is heated with octoic acid with addition of POCl_3 ; the ester, b.p. 170—172°/6 mm., is used in jasmine perfumes. C. H.

[Manufacture of an] **acetylated disazo compound [antiseptic, antineuralgic, antirheumatic, and anti-arthritis].** S. L. SUMMERS (U.S.P. 1,813,365, 7.7.31. Appl., 27.2.29).—2 : 2'-Diamino-5 : 5'-diethoxydiphenylmethane, from CH_2O and *p*-phenetidine, is

tetrazotised and coupled with 4 : 4'-dihydroxydiphenylmethane-3 : 3'-dicarboxylic diamide, and the product is diacetylated. C. H.

[Manufacture of] **acetyl-3-phenylsalicylic acid [2-acetoxydiphenyl-3-carboxylic acid].** E. C. BRITTON, Assr. to DOW CHEM. Co. (U.S.P. 1,812,856, 7.7.31. Appl., 19.9.29).—2-Hydroxydiphenyl-3-carboxylic acid is acetylated; the product, cryst. from CCl_4 , has m.p. 131—131.5° (135° when rapidly heated). C. H.

[Manufacture of] **therapeutic compounds containing silver.** W. W. TRIGGS, From VON WINKLER AMINE DES (B.P. 379,677, 30.5.31).—Ethylenedi- and dried As_2S_3 under pressure with H_2O and the washed ferably by add. of sulphonated castor oil, made pre- to sulphonated purif. Na_2CO_3 and then aq. AgNO_3 is a H_2O -miscible red. oil. The diamine compound [Manufacture of] **aliphatic liquid.** C. H.

C. S. PALMER, Assr. to PARKE & CO. (U.S.P. 1,794,119, 24.2.31. Appl., 12.12.27).—Arseno-compounds are reduced alone or in adm. with H_2O & Co. (U.S.P. acids are reduced alone or in adm. with H_2O & Co. (U.S.P. or aromatic arsenic acids. Examples are phenylarsinic propionic and -hexoic acids, bisarsenopropionic acid, As_2O_3 [CO₂H·CHMe·As·As·As·As·CHMe·CO₂H] from arsenopropionic-arsenic acid and AsCl_3 or As_2O_3 in alkali, and product from β -hydroxyethane-arsenic acid, *p*-amino benzene- and 3-amino-4-hydroxybenzene-arsenoacetic acid. C. H.

Production of complex metal compounds of pyridinecarboxylic acids containing one or more sulphhydryl residues. A. ROTHMANN (B.P. 380,083, 5.5.31).—Thiopyridinecarboxylic acids or their alkali salts are treated with a compound of a metal other than alkali or alkaline-earth metal; alkali may be present. The products may be pptd. with EtOH or COMe_2 , and the free metal-containing acid may be liberated from its alkali salt. The following products are described: complex Pb compounds of 2-amino-6-thiol- (I) and 2 : 6-dithiol- (II) -pyridine-4-carboxylic acids, 2 : 4 : 6-trithiopyridine-3-carboxylic acid (III); Cu compound of (I); Cu, Cd, V, As, Ag, Sn, Bi, and Au compounds of (II); As compound of (III); Au compound of 2 : 4-dithiopyridine-3-carboxylic acid. C. H.

[Tube and ladle] **device for collecting and dealing with particles suspended in liquids [e.g., blood, urine].** R. PICKER (B.P. 381,002, 24.11.31. Hung., 24.11.30).

Stable emulsions.—See III. **Dye injections.**—See IV.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Intensification of photographic records by subsequent exposure to weak light before development. W. HARTREE and A. V. HILL (J. Sci. Instr., 1932, 9, 329—330).—An example is given of "sensitisation by auxiliary exposure." C. W. G.

PATENTS

Manufacture of light-sensitive materials. KODAK LTD., Assees. of L. G. S. BROOKER (B.P. 380,140, 12.3.31. U.S., 12.3.30. Cf. B.P. 378,455; B., 1932, 1009).—Thioisocyanines are made by condensing a quaternary

quinolinium salt with a 2-methylnaphthathiazole quaternary salt, preferably in hot alcoholic alkali. Examples are: quinoline ethiodide with 2-methyl-3-ethyl- α -naphthathiazoleum *p*-toluenesulphonate or 2-methyl- β -naphthathiazole ethiodide. C. H.

Reversal development of light-sensitive silver halide layers. I. G. FARBENIND. A.-G. (B.P. 382,815, 18.1.32. Ger., 17.1.31).—For reversal development without any second exposure, the second developer contains 0.005–5 g. of thiosinamine or thiourea per litre. Developable nuclei of Ag_2S form in 1 min.

J. L.

[Apparatus for] production of photographic prints. T. K. FRANK (B.P. 382,729, 7.10.31).

Applying designs to yarns etc.—See VI.

XXII.—EXPLOSIVES; MATCHES.

PATENT

Countercurrent treatment of liquids.—See I.

XXIII.—SANITATION; WATER PURIFICATION.

Removal of suspended solids and production of gas by the Imhoff tanks of Decatur, Ill. W. D. HATFIELD and K. MORKERT (Sewage Works J., 1932, 4, 790–794).—The performance of this plant, treating a sewage containing excessive starch waste, is given for the period 1928–1931. A 50–60% removal of suspended solids is obtained with a normal detention period of 55–70 min. An average of 45,000–50,000 cu. ft. of gas is obtained from a daily addition of 10,000–14,000 lb. of dry solids. The addition of activated and humus sludge to the digesting solids reduced the vol. of gas produced per lb. of dry solids added, but otherwise had no material effect on the operation of the plant. C. J.

Rapid moisture determination of sewage sludge. H. WEINER (Sewage Works J., 1932, 4, 795–799).—An approx. val. is obtained from the vol. of H_2O which can be removed by vac. filtration of sludge, which has been conditioned by $FeCl_3$, by reference to a previously prepared graph relating to the particular type of sludge. C. J.

Effect of sulphate salts on hydrogen sulphide production in [sewage-]sludge digestion. W. RUDOLFS and P. J. A. ZELLER (Sewage Works J., 1932, 4, 771–781).—When mixtures of fresh solids and ripe sludge were treated with various sulphates (1000 p.p.m. $SO_4^{''}$) gas production was retarded in all cases as compared with the control. There was a general relationship between total H_2S produced and amount of $SO_4^{''}$ destroyed, but the formation of free S seems to be the normal result of the digestion process. C. J.

Enzymes and [sewage-]sludge digestion. W. RUDOLFS (Sewage Works J., 1932, 4, 782–789).—Fresh solids, fine screenings, and activated sludge were treated with lipase, trypsin, and pepsin. Under optimum conditions of temp. and reaction no advantage was observed to accrue. C. J.

Heat and energy relations in the digestion of sewage solids. IV. Measurement of heat and energy interchange. G. M. FAIR and E. W. MOORE (Sewage Works J., 1932, 4, 755–770; cf. B., 1931, 1028).—A balance struck between the initial charge

and final products of the digestion process shows that there may be a considerable increase in the heat of combustion of the final products over that of the original charge. This increase appears to occur more frequently when the "seeding" of the mixture is good. A thermodynamic treatment of reactions for the sludge-digestion process proposed by other workers indicates that most of them are of a type which would show such an increase. In an addendum, the authors re-state their data so as to show the relationship between the wt. of gases produced and the volatile matter destroyed. Fresh sedimentation sludge gave an average of 1.28 lb. and activated sludge 0.71 lb. of gas per lb. of volatile matter destroyed. C. J.

Chemical nature of germicidal vapours emanating from irradiated oils. R. S. HARRIS, J. W. M. BUNKER, and N. A. MILAS (Ind. Eng. Chem., 1932, 24, 1181–1183).—The germicidal action at a distance of irradiated oils (cf. B., 1932, 962) is shown to be due to volatile products, consisting in part of peroxides. Aldehydes, butyric acid, or free or dissolved O_3 are not responsible. The germicidal action can be correlated semi-quantitatively with the increase in peroxidic O on irradiating the oil. Light of about 3130 Å. is most effective in activating the oils, which still retain the power of emitting germicidal vapour after 9 months' storage in the dark. E. L.

Is germ chlorination fatal? D. W. HORN (Amer. J. Pharm., 1932, 104, 651–655).—Doubts cast on the reliability of the standard bacteriological tests when applied to chlorinated waters, because of the excess Cl_2 in the sample, are shown to be without foundation. C. J.

Elimination of tastes and odours of industrial origin from public water supplies. M. M. GIBBONS (Ind. Eng. Chem., 1932, 24, 977–982).—Tastes and odours due to wastes from solvent naphtha, rosin soap, and fermenting cereal processes are removed by $KMnO_4$, but lacquer-solvent wastes require additional treatment with activated C. Superchlorination combined with activated C is effective against phenolic compounds. Preliminary storage and sand-filtration are useful in dealing with certain medicinal tastes, and by the use of activated C at existing filter plants a wider range of effectiveness is secured than by any other process although the cost is greater. C. J.

De-ionised iron in surface-water. G. BODE (Woch. Brau., 1932, 49, 321–322).—A surface- H_2O with an Fe content of 3–5 mg. per litre, according to the season of the year, gave no reaction with KCNS even when the H_2O was previously boiled with a few drops of dil. HNO_3 . The Fe was de-ionised (masked) by the humus acids. If the H_2O was first made alkaline by NH_3 or NaOH, the Fe was liberated from the humic acids and ionised, and if the treated H_2O was then boiled with dil. HNO_3 , the addition of KCNS gave the usual CNS reaction. C. R.

Print works dermatitis.—See VI.

PATENTS.

[Apparatus for controlling the admission of reagents in] treatment of flowing water. F. D. C. (Sewage Works J., 1932, 4, 755–770; cf. B., 1931, 1028).—A balance struck between the initial charge

Still [for H_2O].—See I.

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322/32/I