

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

SEPT. 2 and 9, 1932.*



I.—GENERAL; PLANT; MACHINERY.

Heat balances of industrial furnaces and their practical application. W. A. MOORSHEAD (Fuel Econ. Rev., 1932, 11, 38—46).—The method of calculating the heat balance of oil and other furnaces is described together with the effect of operating conditions and lay-out of the furnace. C. A. K.

Fundamentals of open-hearth design. V. H. LEGG (Fuel Econ. Rev., 1932, 11, 53—55).—Flues and valves of large diameter should be designed with the elimination of unnecessary bends so as to reduce frictional effect, and high regenerator temp. is desirable if max. gas and air supplies to the furnace are to be maintained. The advantage in the increased coeff. of heat transfer with staggered chequers is doubtful owing to the additional resistance set up. C. A. K.

Heat insulation and refractories for high-temperature work. (SIR) R. HADFIELD and R. J. SARJANT (Fuel Econ. Rev., 1932, 11, 119—126).—Recent progress in the production of super-refractory materials is noted and the const. and fluctuating flow of heat through walls is discussed in relation to theoretical calculations. C. A. K.

Multiple connexion of vertical heat exchangers. O. KREBS (Chem. Fabr., 1932, 5, 257—260).—Heat exchangers are more efficiently arranged in series than in parallel. E. S. H.

Time-pressure characteristics of various diffusion and molecular pumps. P. J. MILLS (Rev. Sci. Instr., 1932, [ii], 3, 309—322).—The more elaborate forms of pump are considered to be necessary only when large vols. of gas are to be handled. Using oils instead of Hg, a refrigerant or charcoal trap is essential for obtaining pressures below 3.5×10^{-4} mm. Hg. C. W. G.

Chemistry of boiler water. H. E. JONES (Fuel Econ. Rev., 1932, 11, 75—86).—In low-pressure boilers dense scale-formation is prevented by a preliminary softening of the H₂O by the CaO-Na₂CO₃ process followed by treatment with Na₂CO₃ provided that certain relative cons. of sulphates and carbonates are maintained. At high pressure (225—250 lb.) the H₂O should be conditioned by means of phosphates to prevent embrittlement, and for still higher pressure condensed and deaerated distilled H₂O should be treated with NaOH to prevent corrosion and also with Na₂SO₄ and phosphates. C. A. K.

Can the formation of boiler scale be prevented by removal of oxygen? K. HOFER (Gesundheitsing., 1931, 54, 740—743; Chem. Zentr., 1932, i, 719).—In the zone of contact between heated metal and the

most supersaturated portion of the solution electrolytic action causes flocculation and fixation of CaCO₃ in colloidal solution. Removal of O₂ from the H₂O prevents the formation of a calcareous rust-protective coating, but not the colloid-chemical process, and therefore not the formation of boiler scale. A. A. E.

Heat transfer through glass. Corrosion of vessels.—See VIII. **Special alloy steels.**—See X.

PATENTS.

Furnaces for pulverulent and small fuel. C. HOLD (B.P. 374,575, 17.4.31).—The dust is burnt above, and the fine coal upon, a grate through which both horizontal and vertical perforations are formed so that the particles of coal are rolled over and over and freed from ash. B. M. V.

Reversible regenerative furnaces [for glass etc.]. KEY GLASSWORKS, LTD., H. V. E. M. RENN, and H. WRIGHT (B.P. 374,514, 12.3.31).—In a furnace having separate sets of oil burners for each direction of operation, the valves for oil, atomising air, and preheated air are changed over by one lever or by juxtaposed levers. B. M. V.

Temperature-control mechanism for furnaces etc. A. SMALLWOOD and J. FALLON (B.P. 374,544, 21.3.31).—A geared pair of chopper jaws is arranged to find and grip the pointer of a moving-coil galvanometer and thereby control a motor circuit operating a fuel-supply valve of the furnace. J. S. G. T.

Manufacture of muffles. A.-G. F. BERGBAU, BLEI-U. ZINKFABR. ZU STOLBERG U. IN WESTFALEN (B.P. 374,671, 22.7.31. Ger., 29.8.30).—A muffle with a lining of different material is moulded from the two clays simultaneously. B. M. V.

Tilting pans, autoclaves, digesters, etc. T. E. FRENCH, F. B. KERN, and ALUMINIUM PLANT & VESSEL Co., LTD. (B.P. 374,239, 19.5.31).—The connexions for heating or cooling fluid are made by means of flexible hoses instead of stuffing boxes. B. M. V.

Tubulous heat-exchange apparatus such as steam reheaters. SUPERHEATER Co., LTD. From SUPERHEATER Co. (B.P. 374,135, 5.3.31).—In a heat exchanger of the type in which the effective flow of the outer fluid is among the convolutions of tubes carrying the inner fluid and the return flow is on the other side of a partition, the ends of the tubes carrying the inner fluid are carried down the partition on the return side to act as a screen so as to avoid heat flow through the partition. B. M. V.

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

Apparatus for grading materials by means of an air current. W. J. JACKMAN & Co., LTD., and F. W. NEVILLE (B.P. 374,245, 22.5.31).—The apparatus comprises an upright distributing cone, an inverted perforated cone, and a no. of cylindrical baffle walls.

B. M. V.

Concentration of minerals including coal. J. F. C. FRIEND (B.P. 374,423, 3.3.31).—The apparatus comprises a shaking reciprocating screen with pulsating upward air currents. The heavy strata are removed through transverse slots in the screen having regulating devices under them.

B. M. V.

Apparatus for sorting or separating coal or other minerals. W. BARKER (B.P. 374,698, 24.8.31).—An air chamber for the supply of air through a table is described.

B. M. V.

Pulp washers. FARRINGTON WORKS & H. PONTIFEX & SONS, LTD., and J. CHIGNELL (B.P. 374,319, 23.7.31).—In a cylindrical tank a propeller is placed within an axial cylindrical baffle, radial baffles are placed in the annular space to remove rotation from the fluid, and an outlet screen surrounds the upper part of the tank.

B. M. V.

Rotary separators or extraction apparatus. C. R. MAYO (B.P. 374,016, 25.2.31).—The pipes which supply the extraction liquid to the interior of a rotary digester are connected to a rotary valve in the trunnion so that they deliver liquid only over a predetermined arc of revolution, preferably when the material is just about to slip off hollow lifting blades which also serve as outlets for the liquid.

B. M. V.

Distillation of high-boiling substances [oils etc.]. E. LUTZ (B.P. 374,662, 14.7.31. Ger., 18.7.30).—Steam or other assisting vapour is generated in an outer vessel and passes into an inner vessel simultaneously with the oil which has been preheated in a heat exchanger that condenses a fraction of oil only because the condenser is also within the outer vessel, *i.e.*, surrounded by steam. Additional (*e.g.*, electrical) heat may be applied to the still.

B. M. V.

Vessels for treatment of liquids. A. D. KEECH (B.P. 374,140, 5.3.31).—The vessel is provided with a gallery at the top to catch foam and return the liquid therefrom to the vessel.

B. M. V.

Filling material or packing for absorption, washing, or reaction towers, reflux condensers such as fractionating columns, or the like. G. HARRINGTON (B.P. 374,707, 31.8.31).—The filling is in the form of hollow truncated cones which are so deeply corrugated that the small end will not enter the large end of another element.

B. M. V.

Cooling towers. L. BALABAN (B.P. [A] 374,077 and [B] 374,089, 22.1.31).—In (A) is described a filling and in (B) a shell constructed almost entirely of precast slabs of concrete or other similar material.

B. M. V.

Production of aqueous dispersions of water-immiscible bodies. W. B. PRATT, ASSR. to DISPERSIONS PROCESS, INC. (U.S.P. 1,833,038, 24.11.31. Appl., 17.10.22).—Solutions in a volatile org. solvent containing, *e.g.*, rubber, S-terpenes, waxes, gums, oils, together with saponifiable material, *e.g.*, oleic acid, vegetable oils,

are added to an aq. solution of a saponifying agent (NH_3), and the solvent is removed by vac.-distillation.

L. A. C.

Mixing two gases in definite proportions. F. MANGIAMELI (B.P. 374,737, 24.9.31).—The gases are supplied under equal pressure to two series of ports which are so controlled by a rotary valve that when a port belonging to one gas is opened a port for the other gas is closed. The size of the ports is determined by the relative d of the gases.

B. M. V.

Separation of dust from air or other gases by moistening. C. HUMPHREYS, and AMALGAMATED ANTHRACITE COLLIERIES, LTD. (B.P. 374,442, 4.3.31).—The gas is humidified and put in motion by steam injectors or by the exhaust from a turbine-driven fan and is then passed over condensing surfaces partly in the form of vertical walls and partly as horizontal tubes, the latter provided with scrapers and preferably rotating.

B. M. V.

Appliances for centrifugally purifying gases, vapours, and steam. W. ALEXANDER (B.P. 374,382 and 374,795, [A] 31.12.31, [B] 1.1.32).—(A) Separators on the cyclone system are described. (B) Forms of vortical separators having a no. of vortex chambers above a common dust-collecting chamber are described.

B. M. V.

Device for separating water and liquid particles from vapours and gases. W. FRIEDRICH (B.P. 374,639, 18.6.31).—A separator of the deflexion type is described.

B. M. V.

Composition for brake blocks, brake linings, or other purposes. W. S. SKERRETT. From TIMKEN DETROIT AXLE Co. (B.P. 374,390, 26.1.32).—One of the compositions claimed is: asbestos 14, powdered talc 1, flaked graphite $\frac{1}{2}$, vegetable pitch 4, blown petroleum asphalt 2, linseed oil 1, China-wood oil 1, MnO_2 $\frac{1}{2}$, PbO $\frac{1}{2}$, S $\frac{1}{2}$, pts. by wt. It is moulded and baked.

B. M. V.

Testing [the vacuum of] evacuated ampoules. I. G. FARBENIND. A.-G. (B.P. 375,123, 11.8.31. Ger., 11.8.30).—Ampoules, ionised by contact with the electrodes of a high-frequency spark gap, are placed in a high-frequency field formed between two metallic coatings, with layers of puncture-proof dielectric material arranged between the coatings. The degree of evacuation is estimated from the glow within the ampoule.

J. S. G. T.

(A) **Indication and control of temperature.** (B) **Temperature-measuring devices.** BRIT. THOMSON-HOUSTON Co., LTD., Assees. of (A) C. A. SABBAB, (B) F. S. MARCELLUS (B.P. [A] 374,754, 31.10.31. U.S., 31.10.30, [B] 374,779, 30.11.31. U.S., 23.11.30).—(A) A glow-discharge tube containing vaporisable material, *e.g.*, Hg, heated by the furnace is arranged to produce periodic discharges, determined by the temp. of the furnace, and forming a switching device controlling the supply of heating current to the furnace. (B) The ionisation between a pair of insulated spaced electrodes, *e.g.*, of SiC, inserted in the furnace and connected to a source of current, controls the supply of current to the furnace.

J. S. G. T.

Thermostats. G. G. ROYER (B.P. 374,046, 26.11.30. Fr., 26.11.29).—The expansion of ozokerit, rendered

plastic by a suitable solvent, *e.g.*, C_6H_6 or turpentine, in proportion suitable to the temp., operates a piston.

B. M. V.

Apparatus for treating gases and liquids by direct contact, particularly refrigerating apparatus. ELECTROLUX, LTD., Assees. of A. LENNING (B.P. 375,939, 7.5.31. U.S., 7.5.30).

Apparatus for compressing gases. WESTINGHOUSE BRAKE & SAXBY SIGNAL CO., LTD., Assees. of B. S. AIKMAN (B.P. 376,337, 11.4.30. U.S., 7.4.31).

Dehydration of emulsions etc.—See II. **Coating containers.**—See XIII. **Purifying feed water.**—See XXIII.

II.—FUEL; GAS; TAR; MINERAL OILS.

Storage of coal. (SIR) F. L. NATHAN (Fuel Econ. Rev., 1932, 11, 5—8).—A *résumé* of the conditions which affect storage on land and in ships. C. A. K.

Cleaning of coal. R. A. MOTT (Fuel Econ. Rev., 1932, 11, 12—15).—The % cleaned of the total output of coal has risen from 15% in 1913 to 30% in 1930. Wet cleaning results in a lower ash content than the dry process, particularly in the grading $< \frac{1}{8}$ in., but has the disadvantage of introducing moisture. C. A. K.

Properties of coals as determined by their mode of origin. H. G. A. HICKLING (J. Inst. Fuel, 1932, 5, 318—328).—An account, illustrated with photomicrographs, is given of the plant materials which enter into the constitution of coals. It is suggested that coals may be grouped into (1) macrofragmental, the common bright coals, which consist dominantly of relatively large fragments of wood and bark (vitrain, fusain, and clarain) in contrast with (2) the microfragmental coals, in which the plant residues have been reduced to a minutely divided condition, so that only the more resistant tissues (spore coats and cuticles, together with resins) are usually recognisable among a mass of highly disintegrated plant débris (durains, cannel coals, and bogheads—the last characterised by the presence of *algæ*). The changes of rank in coals and their causes are discussed. It is shown that the distinctive qualities of particular seams, which are related to the original nature and mode of accumulation of the coal peat, persist while the rank of the coal, as indicated by reduction of O and increase of C, undergoes extensive changes. Evidence is brought to show that these variations in rank have a regular regional distribution and that, in general, the rank of the coals at any given place increases with depth (Hilt's law). It is suggested that the facts are consistent only with the view that rank has been determined by the earth temp. and pressures to which the coal has been subjected.

C. B. M.

Influence of removal of ash from coals on gas and coke yields. N. J. IVISON (Fuel, 1932, 11, 214—217).—A no. of coals were cleaned by flotation in liquids of *d* 1.60, 1.45, and 1.35, respectively, and the original coals and separated clean coals were carbonised at 1000° in a test plant utilising 2.24 lb. of coal at each charge. The thermal yield of gas, calc. on the dry, ash-free coal, tends to be higher in the washed coals, but is occasionally lower than with the raw coal, varying

probably with the character of the refuse rejected in the cleaning process. The hardness of the coke is improved by cleaning the coal, but for most coals there is a max. hardness, further cleaning resulting in a decrease. No apparent relationship exists between the behaviour of a coal on carbonisation and the variation in the % of any constituent in the ash. A. B. M.

Maintenance of uniformity in industrial fuels. A. C. DUNNINGHAM (J. Inst. Fuel, 1932, 5, 303—316).—The uniformity of any particular fuel may be controlled by the determination of ash and moisture contents of a series of samples collected and prepared according to a definite scheme based on the theory of errors (cf. B., 1931, 746). The factors influencing uniformity in the mine and at the surface are described; it is necessary that a consumer, in estimating the likely ash and moisture variations, should know not only the nature of the coal, but also the conditions under which it is washed. The determination of the true ash content and the industrial significance of the extraneous ash are discussed. The importance of the ash m.p. and the difficulty of calculating this val. from the ash analysis are emphasised; the ash m.p. of durains are almost invariably high and much higher than for bright coals; particular seams usually have ash m.p. of the same order over considerable areas, and in the North Midland fields the m.p. of inherent ash is almost invariably low, except for durains. The origin and compositions of the ash contents of fusain, durain, clarain, and vitrain and the occurrence of S and Cl are discussed. A method for determining the reactivity of coal, a modification of that used by the Northern Coke Research Committee for coke (cf. B., 1929, 840), is described, and the behaviour of a fuel in certain processes can thereby be predicted with some accuracy. C. B. M.

Tendency of coal to spontaneous combustion. IV. D. J. W. KREULEN (Chem. Weekblad, 1932, 29, 400—404; cf. B., 1932, 664).—The relation between initial temp. of combustion and % of volatile matter varies somewhat with the type of coal. For 8 samples from seams of increasing depth in the same mine, this initial temp. of combustion was higher and the volatile content lower with increasing depth. A difficultly combustible coal with a high volatile content and abnormally high heat of combustion was found to have a low humic acid curve, and to be more highly carbonised than the volatile content indicated. S. I. L.

Tendency of coal to spontaneous combustion. V. D. J. W. KREULEN (Chem. Weekblad, 1932, 29, 414—417).—Initial combustion temp. curves have been obtained for mixtures of coals. The initial temp. is always somewhat below that calc. additively. Admixture of ash with a coal raises the initial temp., the increase being an approx. linear function of the quantity of ash added, between 20% and 60%. A method is described for calculating the content of spores and plant residues in a coal from determinations of the initial temp. of the durain and vitrain constituents, and of the variation of the initial temp. on admixture with inert material.

H. F. G.

Action of solvents on Indian coal. N. N. CHATTERJEE (Quart. J. Geol. Min. Met. Soc. India, 1929, 2,

89—95. Reprint).—Five Indian coals have been extracted with C_5H_5N and the extracts separated into fractions β and γ , insol. and sol., respectively, in $CHCl_3$. A lignite contained 5.7% of γ -compound, but was non-coking, whereas an anthracitic coal (Jammu) containing only 0.37% of γ -compound was strongly coking.

A. B. M.

Structure of lignite with special reference to the drying problem. A. W. GAUGER and I. LAVINE (Fuel, 1932, 11, 232—238).—The pressure of H_2O vapour in equilibrium with lignite has been determined as a function of the H_2O content of the lignite. The dehydration and hydration processes were not entirely reversible but exhibited hysteresis, the result of the colloidal structure of the material. The greater part of the lignite was found under the microscope to possess a woody structure. The drying of lignite, even under controlled conditions which are successful with wood, leads to its disintegration owing to uneven shrinkage. Successful drying of some Dakota lignites has been effected by the Fleissner process, in which the material is first subjected to steam under pressure, e.g., 15 atm., and is then dried in a current of air; no disintegration occurred and the lumps possessed good weathering and handling properties. The success of the process is due largely to a setting of the colloidal hydrogel with the result that no further change in structure takes place at room temp.

A. B. M.

Determination of humic acids in lignites. I. UBALDINI and F. MAGALDI (Annali Chim. Appl., 1932, 22, 340—352).—The reaction of $Ca(OAc)_2$ with humic acids is incomplete; if, however, the $AcOH$ is removed by $CaCO_3$ the humic acids may be determined from the CO_2 evolved. Free and combined humic acids in various Italian lignites are thus determined (in the latter case after treatment with dil. HCl); for these acids the equiv. is taken as 225.

E. W. W.

Blending coal for coke making. R. A. MOTT and R. V. WHEELER (Fuel, 1932, 11, 204—213).—“Box” tests and tests in an experimental oven have shown that the addition of 1—5% of fusain to a coking coal can greatly improve the strength (shatter index) of the coke produced. The addition was made in the form of a dust of known fusain content. To be effective the fusain must be uniformly mixed with the coal; it is therefore preferable when using a dust of high fusain content to dil. it with coal dust before adding it to the bulk of the coal. In some cases finely-ground coke could be used as a substitute for fusain. The function of the fusain is to provide nuclei for contraction, so that the shrinkage of the coke on loss of volatile matter occurs uniformly throughout the mass without the production of major cracks.

A. B. M.

Technical developments in the by-product coking industry during 1931. G. E. FOXWELL (Fuel Econ. Rev., 1932, 11, 26—29).—The use of high temp. and large ovens has increased, but there is a tendency towards lower temp. with better control. The formation of spongy coke, the relative merits of SiO_2 and semi- SiO_2 oven walls, and the swelling pressure of coal during coking are discussed.

C. A. K.

Possibility of manufacturing metallurgical coke from Rumanian coal. I. L. BLUM (Bul. Chim. Soc. Române Stiinte, 1930, 33, 45—50, 93—98).—The S in two samples of Lupeni coal and the corresponding high-temp. cokes was distributed as follows: sulphide S, sulphate S, and org. S were, respectively, for coal (a), 0.99%, 0.09%, 0.92%; coal (b), 2.17%, 0.11%, 1.91%; coke (a), 0.73%, 0.13%, 1.41%; and coke (b) 0.63%, 0.21%, 3.10%. Float-and-sink tests showed that the S content of the coals could be decreased by washing. The addition of 3% of Fe_2O_3 to coal (b) increased the sulphide S in the coke to 2.5%, but did not affect the sulphate S or org. S; the addition of more Fe_2O_3 had no further effect on the S distribution. The sulphide S in the coke could be completely eliminated by extraction with dil. HCl .

A. B. M.

Utilisation of coke-oven gas in iron and steel industry. H. LENT (J. Inst. Fuel, 1932, 5, 289—302).—The large-scale development of high-pressure distribution of coke-oven gas in the Ruhr district and its advantages in metallurgical operations are described.

C. B. M.

Programmes at the Fuel Research Station. F. S. SINNATT (Fuel Econ. Rev., 1932, 11, 2—4).—No appreciable loss of tar has occurred by substituting an Fe by a firebrick retort which has carbonised up to 10 tons of medium caking coal per day. The working temp. has been 700—900°. High heat releases are possible with the vortex combustion chamber and Hurley's grid burner for pulverised fuel. A high % of low-boiling constituents was produced by hydrogenising coal in the presence of a catalyst, but with no vehicle present and by further treatment 125 gals. of spirit, b.p. up to 230°, have been obtained per ton of coal. Low-temp. tar was converted successfully into motor spirit by means of NH_4 molybdate supported on active C.

C. A. K.

Low-temperature carbonisation. C. H. LANDER (Fuel Econ. Rev., 1932, 11, 15—17).—A review.

C. A. K.

Low-temperature distillation under pressure of solid Italian lignites. M. G. LEVI and I. UBALDINI (Annali Chim. Appl., 1932, 22, 329—340).—Results of low-temp. distillation of Italian lignites at 25 atm. are tabulated; they are very different from and less satisfactory than those obtained with German bituminous lignites (B., 1930, 172; 1931, 51). Italian lignites are considered not to be adapted to this treatment.

E. W. W.

Review of gas-works practice, 1931. H. D. GREENWOOD (Fuel Econ. Rev., 1932, 11, 17—25).—That the rate of flow of heat through a coal charge is proportional to the square of the thickness of the charge has been confirmed, provided that thickness > 1 in. Considerable differences in the expansional pressures of coal when heated were observed by Koppers between small- and large-scale trials. Carbonisation practice tends in the direction of greater bulk charges. Under existing conditions the manufacture of $(NH_4)_2SO_4$ is unprofitable and the production of NH_4Cl and NH_4HCO_3 has been considered. In other cases means for the disposal of the ammoniacal and effluent liquors have been

investigated. The production of stronger liquor and the semi-direct process of sulphate manufacture would prove more economical measures; the latter has produced an average quality of sulphate. Dehydration of gas by means of glycerin or a solution of CaCl_2 has been economic by reason of the saving of service cleaning and pumping. The no. of dry gas holders has increased to 27.

C. A. K.

Improving gas by low-temperature cooling, [oxide] purification in towers, and sulphur extraction. RETTENMAIER (Gas- u. Wasserfach, 1932, 75, 541—548).—The costs and efficiencies of tar removal by centrifuging, electrostatic pptn., and low-temp. cooling are compared; by using the last-named a tar-free S is recovered. The removal of H_2S by oxide in a series of 4 boxes or 3 towers under similar conditions is contrasted; 80% is removed by the first box and 90% by the first tower, the O_2 absorption being proportional. Fluctuations of the O_2 content of the purified gas are due to changes in the composition of the inlet gas, the efficiency remaining const. The overall $\text{O}_2 : \text{H}_2\text{S}$ ratio differs from the theoretical val. owing to variation of the fouling in the series of boxes or towers. The fouled oxide is extracted with CS_2 , the solvent distilled in steam, and the molten S (95—99% pure) run off. The valuable CN compounds remain in the oxide, which is worked up in the usual way after 2 or 3 foulings and extractions.

R. N. B.

Action of noxious constituents of gas on gas meters. O. KNUBLAUCH (Gas- u. Wasserfach, 1932, 75, 531—532).—Benzol, tetralin, and other hydrocarbons dissolve out the impregnating agents of meter leathers. Extraction of old leathers by Et_2O removed mainly C_{10}H_8 and high-boiling hydrocarbons and only traces of aromatics (180—220°) and phenols; in one case 40% of a fraction 300—360° was recovered. NH_3 and $(\text{NH}_4)_2\text{S}$ neutralise the tannic acid. Addition of fatty acids retards this by forming NH_4 soaps which are insol. in hydrocarbons. H_2O dissolves them, and also promotes rust formation. Meter leathers contain no Fe, but after use may have up to 10% Fe_2O_3 present. NO catalyses the formation of resins. All these noxious compounds may be removed at the source by low-temp. cooling of the gas, and meter troubles are eliminated.

R. N. B.

Technique of power-gas producer operation. H. L. PIRIE (Fuel Econ. Rev., 1932, 11, 33—37).—A description of the functions and operations of a producer to make gas for gas-engine consumption.

C. A. K.

Analysis of coal gas. H. A. J. PIETERS (Z. anal. Chem., 1932, 89, 24—50).—The Bunte burette is recommended for technical purposes when the highest degree of accuracy is not required. O_2 is determined satisfactorily by pyrogallol or alkaline $\text{Na}_2\text{S}_2\text{O}_4$, but the $\text{Mn}(\text{OH})_2$ method gives low results. The best results for CO were obtained with Cu_2SO_4 - β -naphthol or by absorption in I_2O_5 suspended in H_2SO_4 ; Cu_2Cl_2 in aq. NH_3 is not so good. The determination of H_2 and CH_4 by the explosion method gives accurate results, but the method of burning with O_2 over a glowing Pt spiral is not satisfactory unless special precautions are taken; the reactions are complicated by the formation

of NO. H_2 and CH_4 may also be determined satisfactorily by selective combustion over CuO. The calculation of the calorific val. from the analysis data is illustrated.

E. S. H.

Coal-tar distillation by hot gas at the coke-oven plant. G. E. McCLOSKEY (Chem. and Met. Eng., 1932, 39, 333—335).—The process described employs a distillation main in which contact between pitch and gas is effected by a revolving roller with a peripheral speed of 3000 ft. per min. Hard pitch is made if the oil-enriched gas leaves at 300°. The oils condensed have a high coke residue but are otherwise normal. A packed saturating tower was afterwards added. In this plant the pitch is either granulated in H_2O or cooled in a film on a steel belt. The high coke residue which is found in creosote made by this process can be avoided, but rearrangements are necessary.

C. I.

New plant for washing and rectifying crude benzol. C. LELLI (L'Ind. Chimica, 1932, 7, 152—156).—This plant, designed by Romaro and Gallo, serves for the continuous washing of crude benzol with H_2SO_4 and NaOH, filtering through a quartz filter, preheating, and distilling from a pot by means of a coil carrying superheated steam. A special rectifying column with run-offs at various heights is used, the temp. difference between the base and the head of the column being 45°. The whole plant is of Cu with the exception of the washer and its stirrer, which are Pb-coated. For crude 90% benzol, the consumption of H_2SO_4 of d 1.84 (NaOH) is 8—10 (5) wt.-%, the yield of washed, rectified product being about 85%; 6—8% is lost during purification and > 7% during rectification. The residues yield PhOH , $\text{C}_6\text{H}_3\text{Me}_2\cdot\text{OH}$, solvent naphtha, etc. T. H. P.

Recovery of benzol with gas oil. F. WHITE and S. KELLET (Gas World, 1932, 96, Coking Sect., 68—75).—When gas oil is used for the absorption of C_6H_6 vapours from coal gas a sludge is formed and the oil is emulsified when treated with steam, and these may lead to blockages of pipes etc. The sludge is due to the absorption of high-boiling tar compounds of high S content, some of which are sol. in gas oil whilst others are insol., although the latter are sol. in creosote and C_6H_8 . To minimise the sludging the temp. of the gas entering the scrubbers was lowered by spraying with H_2O , but this was not successful because of the necessity of periodic cleaning of the washer. The provision of an additional gas cooler and the removal of the sludge from the cold debenzolised oil by sedimentation and upward filtration through coke gave satisfactory results. The debenzolised oil may also be cleaned by distillation.

D. K. M.

Washing of crude benzol and treatment of waste acid. O. KREBS (Chem.-Ztg., 1932, 56, 509—511, 531—532).—The usual process of washing crude benzol with NaOH and H_2SO_4 is described. The washing loss increases with the proportion of H_2SO_4 used, but lightly washed benzols give a larger residue on distillation. The NaOH wash should be heated to recover hydrocarbons before being treated for tar acids. Plant described for the treatment of the "vitriol tar" includes a small vertical packed tower fed with H_2O , after the condenser. A method of avoiding the production of this tar consists

in neutralising the H_2SO_4 in the benzol washer with 1.2% NH_3 solution; three layers are formed consisting of $(\text{NH}_4)_2\text{SO}_4$ solution, resins, and crude benzol and the first two can be drawn off. Another is to dil. the H_2SO_4 in the washer with H_2O and stir. The resins pass into the still with the benzol and are left in the residue. The S in the still may be objectionable; it is better to dil. in a separate vessel, mix the resins with "spent oil," and burn as fuel. C. I.

Determination of naphthalene in tetralin solution. H. BRÜCKNER (Gas- u. Wasserfach, 1932, 75, 573—574).—Air is passed at the rate of 30—40 litres/hr. over 0.5 g. of C_{10}H_8 -tetralin mixture in a U-tube at 25—28° for 24—36 hr., and then into saturated aq. picric acid. The C_{10}H_8 is determined by titration with alkali. Figures obtained by this method for the solubility of C_{10}H_8 in tetralin from —30° to 30° are given. R. N. B.

Isolation of *n*-decane from petroleum by distillation and equilibrium melting. J. H. BRUUN and M. H. HICKS-BRUUN (Bur. Stand. J. Res., 1932, 8, 583—589).—By use of the technique (A., 1932, 835) of fractional distillation and subsequent equilibrium freezing of the fraction, b.p. 171.5—172.5°, in a low-temp. centrifuge, pure *n*-decane, b.p. 174.0°, f.p. —29.68° (0.6% of the crude petroleum) was isolated from a specimen of crude petroleum from Oklahoma. Its physical consts. and infra-red absorption spectrum have been determined. J. W. B.

Sulphuric acid refining of petrol from the cracking process. F. R. MOSER (Petroleum, 1932, 28, No. 26, 4—6).—Refining of the distillate from the cracking of mineral oil by H_2SO_4 produces dialkylsulphuric esters which are not removed on washing with NaOH and may cause corrosion during subsequent redistillation. Saponification with NaOH-EtOH removes these esters and the redistilled products are better in colour and lower in S and gum contents than are those obtained without saponification. The method may be applied industrially by agitation of equal vols. of NaOH solution (< 20% concn. and containing an emulsifying agent, e.g., Turkey-red oil) and the distillate at 90°, separating the distillate, and redistilling. The method also improves the colour, sludge-forming and corrosive properties of the residue, which is suitable for heavy motor fuel. Continuous cyclic processes are briefly discussed. H. E. B.

Viscosity and resistance to flow ["Fließfestigkeit"] of viscous mineral oils. A. GEMANT (Sitzungsber. Preuss. Akad. Wiss., Kl. 14, 1932, Reprint, 16 pp.).—Mineral oils possess slight elasticity resembling that of colloidal solutions and their resistance to motion in tubes is influenced by both viscosity and limiting elasticity or resistance to flow ("Fließfestigkeit"). The viscosity of highly viscous oils is determined from the rates of flow in tubes, and the resistance to flow from the limiting pressures required to induce flow of the oil in the viscosity apparatus. Investigation of a no. of oils permits their subdivision into two types: those which show marked increase of resistance to flow with fall in temp. from 40—50° and those showing no resistance

even at 0°. The resistance to flow is independent of the viscosity. H. E. B.

Regeneration of used oils by the Korach-Randaccio process. M. KORACH and C. RANDACCIO (Giorn. Chim. Ind. Appl., 1932, 14, 228—236).—This process has given economical results on an industrial scale. The oil, freed from non-emulsified H_2O , is heated in a gas-heated still surrounded by a casing, inside which and near the top is a second ring-burner to break froth. The distillation, which expels petrol and cracking products, is completed by naked superheated steam, supplied through a perforated coil. The hot oil afterwards passes to a gas-heated mixer, in which it is treated with ZnCl_2 , and then to a second mixer containing decolorising earth, this being finally removed by filtration. The yield of regenerated oil is about 80%, other products of marketable val. being the light oils distilled off, tar for varnish and the like, and the ppt. formed by the ZnCl_2 . T. H. P.

Colorimetry of petroleum products and lubricating oils. J. HERBRICH (Ann. Chim. Analyt., 1932, [ii], 14, 291—302).—A technique for determining the colour in oils has been developed, making use of the Duboscq colorimeter and a series of coloured Lovibond glasses. E. S. H.

Charitschkoff reaction [for naphthenic acids]. (FRL.) A. LUFT (Petroleum, 1932, 28, No. 24, 16—17).—Examination of the sensitiveness of Charitschkoff's reaction by using in the test dil. Na salts derived from saponification of Me naphthenates (from Polish and American mineral oil distillates), by substitution of C_6H_6 or Et_2O for petroleum, and by testing in the presence of PhOH, K mineral oil sulphonates, and asphalts, showed that the sensitiveness is < 1% when C_6H_6 or Et_2O is used, that the influence of phenols is negligible, and that of oil sulphonates slight, but that small amounts of asphalt mask the reaction. It is concluded that the sensitiveness is about 0.1% and not 1—3% as previously stated and that the solvent used should be stated. H. E. B.

Explosive mixtures of petroleum vapours with air. V. SHIROBOKOV (Azerbaij. Neft. Choz., 1932, No. 2, 56—60).—Explosions may occur up to 20% below the flash temp. in a Pensky-Martens apparatus. An apparatus for the determination of the lowest explosive limit is proposed. CH. ABS.

Differentiation of bituminous materials. H. BASLER and J. MIEGL (Kolloid-Z., 1932, 59, 345—346).—The substance is dissolved in CS_2 and to a portion light petroleum is added, producing a ppt. When drops of the two solutions are placed on filter-paper characteristic forms are produced. E. S. H.

EtOH from refinery gases.—See III. **Open-hearth furnace.**—See X. **Medicinal C.**—See XX. **Flashlight powder.**—See XXI

PATENTS.

Production of briquettes [containing iron oxide etc.]. TRENT PROCESS CORP. (B.P. 373,166, 18.2.31. U.S., 16.10.30).—A coal-oil amalgam made as described in B.P. 151,236 (B., 1921, 684 A) is mixed with a metallic

substance to be heat-treated in the presence of C, *e.g.*, Fe_2O_3 , the mixture is distilled to remove H_2O and the light fractions of the oil, and is then briquetted. The briquettes may subsequently be baked or carbonised. A desulphurising and fluxing agent, *e.g.*, limestone, may be added to the mixture before briquetting, so that the briquettes are suitable for charging to the blast furnace without further addition of material. A. B. M.

Production of carbon granules. (A) E. E. BLANKENSTEIN, (B) T. O. WESTHAFFER, (C) R. S. HOWARD, ASSRS. to WESTERN ELECTRIC CO., INC. (U.S.P. 1,827,931, 1,828,009, and 1,828,046, 20.10.31. Appl., [A] 28.12.27, [B, C] 12.4.28).—(A) Cellulose dissolved in ZnCl_2 solution is allowed to fall in the form of drops through a bath of EtOH, and the hardened spherical particles so formed are carbonised. (B) The drops may be produced by spraying the solution into the air, *e.g.*, by means of compressed air, before allowing it to fall into the EtOH. (C) Powdered synthetic resin is heated on a surface which it does not wet when melted and the spherical particles formed are cooled, hardened, and carbonised. The granules produced as above described are suitable for use in variable-resistance units, *e.g.*, in telephone transmitters etc. A. B. M.

Production of coke from carbonaceous fuels. G. HILGER (B.P. 373,257, 19.2.31).—A firm and lumpy coke is produced by stirring the charge in the oven before coking commences, in such a manner that the particles are brought into intimate contact with one another and the formation of crevices is prevented. Stirring may be effected by the oscillatory or circular motion of rods or plates, or by the rotation of screws or propellers. The charge is covered with a layer of coal dust which fills in the crevices formed by the sinking of the finer particles. Channels, preferably packed with coke, may be formed in the charge to facilitate the escape of the distillation gases. The upper portion of the charge may be rammed. Methods of carrying out the process are described in detail. A. B. M.

Catalytic destructive hydrogenation of carbonaceous materials. CHEM. REACTIONS, LTD. From DEUTS. GOLD- u. SILBER-SCHNEIDANSTALT VORM. ROESSLER (B.P. 373,345, 10.4.31).—The materials are treated with H_2 at elevated temp. and under high pressure in the presence of Mo, W, Fe, Co, Ni, or their compounds, the excess H_2 being recirculated and the H_2S content of the recirculated gas being regulated to the concn. giving the optimum degree of hydrogenation. A. B. M.

Apparatus for carbonisation of coal. K. M. SIMPSON (U.S.P. 1,831,512, 10.11.31. Appl., 28.9.26).—A horizontal retort contains an endless chain conveyor revolving around a central baffle. Compartments on the chain are heated to 700° by gases from a combustion chamber situated under the retort. Pulverised fuel is introduced into the top half, the heat retained in the metal compartments being sufficient to promote carbonisation at 500° . R. N. B.

Recovering and improving the distillation gases produced in the manufacture of coke. G. HILGER (B.P. 373,241, 19.1.31).—The low- and high-temp. distillation gases obtained on carbonising the fuel are withdrawn separately from the oven in such a manner

that the former pass directly to the cooler parts of the charge without being brought into contact with the heated oven walls. The low-temp. gases may also be subjected to a hydrogenation treatment, *e.g.*, by admixture while hot with water-gas, either in the oven itself or in an adjoining chamber. The low-temp. gases may be withdrawn by suction through channels (preferably filled with coke) formed in the compressed charge. Apparatus for applying the process to the carbonisation of coal in coke ovens and in vertical retorts is described. A. B. M.

Production of fuel gas and carbonised coal. W. G. LAIRD, ASSR. to HEAT TREATING Co. (U.S.P. 1,828,148, 20.10.31. Appl., 16.2.23).—The apparatus comprises a producer (A) and two retorts (B, C) so arranged that the hot gases from A are passed downwards through B and C, thereby carbonising the coal therein. At the same time the gases are cooled and freed from suspended C and pitch by filtration through the layer of coal and coke, and are enriched by the addition of the carbonisation gases. When carbonisation is complete in, *e.g.*, B the coke therein is quenched with steam, the quenching gases are passed through the fuel bed of A, and the hot water-gas formed is passed through the charge in C. Thus the flow of gases is periodically reversed. A. B. M.

Manufacture of water-gas. W. M. RUSSELL, ASSR. to GAS MACHINERY Co. (U.S.P. 1,827,169, 13.10.31. Appl., 18.4.25).—The superheater (A) of the plant is provided with an extension (B) beyond the water-gas outlet, and the cycle of operations is as follows: (a) the fuel bed is air-blasted, the blast gases being used for heating the chequer-brick in the carburettor (C) and in A and B, (b) steam is passed through the fuel bed, the water-gas being carburetted and the oil vapours fixed in A, and (c) water is admitted to B and the steam generated therein is passed through A, C, and the fuel bed in succession, the water-gas so formed being withdrawn directly from the generator. A. B. M.

Manufacture of water-gas from low-grade anthracite fuel. L. MELLERSH-JACKSON. From INDUSTRIES OF AMERICA, INC. (B.P. 373,480, 24.7.31).—The fuel is charged into a generator and is blasted with air, not sufficiently, however, to raise the temp. above the fusion point of the ash. The blast gases are passed to a boiler furnace. The fuel bed is then steam-blasted and the water-gas passed to storage. The greater part of the partly-consumed fuel is then discharged from the generator and passed to the travelling grate of the boiler furnace. The generator is recharged and the process repeated. A. B. M.

Manufacture of carburetted water-gas of low specific gravity. HUMPHREYS & GLASGOW, LTD., ASSEES. of J. A. PERRY and E. L. HALL (B.P. 373,486, 4.8.31. U.S., 10.9.30).—The fuel bed of the generator is air-blasted and the blast gases are burned with secondary air introduced at the circumference of the upper part of the fuel bed, which thereby becomes highly heated. The air blast is followed by up and down water-gas runs, the gas formed during the up-runs being carburetted in the usual way, whilst during the down-runs (with steam which has been passed through

the superheater and carburettor in succession) oil is sprayed on to the upper part of the fuel bed, the oil gas being cracked as it is passed through the hot bed, thereby producing a carburetted water-gas of low sp. gr.

A. B. M.

Manufacture of water-gas. O. B. EVANS, Assr. to U.G.I. CONTRACTING Co. (U.S.P. 1,828,461, 20.10.31. Appl., 24.1.24).—A water-gas plant is provided with a control device which automatically terminates the air and steam blasts, respectively, when predetermined temp. are attained in the superheater.

A. B. M.

Apparatus for generating water-gas. L. B. MOORHOUSE, Assr., to COMBUSTION UTILITIES CORP. (U.S.P. 1,831,788, 10.11.31. Appl., 24.1.28).—A vertical gas generator consists of a fuel preheater and gasifying and cooling chambers placed vertically one below the other. A series of vertical refractory walls equally spaced through the fuel bed contain a no. of ports for the introduction of air or steam, whereby clinker formation is lessened.

R. N. B.

Apparatus for manufacture of gas from oil. L. B. JONES, Assr. to JONES GAS PROCESS CORP. (U.S.P. 1,828,704, 20.10.31. Appl., 21.3.27).—Two oil-gas generating chambers (A, B) are connected at their lower ends, and separate fuel-bed chambers respectively to the upper ends of A and B. The following cycle of operations is carried out: one fuel bed is blown with air and, if desired, some steam, and the resulting gases are burned with secondary air in A and B; the fuel bed is then blown with steam, the water-gas so formed being passed through A and B into the first of which oil is introduced, and the resulting oil-gas and water-gas mixture is passed down through the second fuel bed, wherein any C formed is deposited; the process is then reversed.

A. B. M.

Recovery of sulphur from gas-purifying materials. H. O. G. BOLLMANN and F. E. ENGELMANN (B.P. 374,777, 27.11.31).—The material is distilled in vac. by treatment with steam at 150–180° and sufficient air to prevent formation of H₂S or SO₂; the vapours are brought in contact with H₂O at, e.g., 47° so that the S but no tarry matter is condensed.

L. A. C.

Dehydration of emulsions or suspensions. G. B. ELLIS. From DEHYDRATORS, INC. (B.P. 374,473, 11.12.30).—An electrode of small cross-sectional area is arranged in the emulsion contained in a tank (forming an outer electrode), and a voltage is applied to the former sufficient to break down the emulsion in its neighbourhood while leaving the emulsion near the wall of the tank unaffected.

J. S. G. T.

Filtration of petroleum tars. C. D. READ and R. L. HOLCOMB, Assrs. to STANDARD OIL Co. (U.S.P. 1,830,962, 10.11.31. Appl., 5.4.28).—Finely-divided incombustible material, e.g., kieselguhr, is suspended in oil and forced through the filter bed, which becomes coated with solid. Tar is passed through at 315°, and the solid layer formed cooled with steam at 180°. The filter-cake can then be removed without fear of spontaneous combustion.

R. N. B.

Lubricant. F. W. SULLIVAN, JUN., Assr. to STANDARD OIL Co. (U.S.P. 1,830,970, 10.11.31. Appl., 1.11.26).

—Addition of about 0.5% of a fatty acid "soap" of a non-cyclic org. base having at least two NH₂-N atoms united to a C atom, particularly those which are capable of forming carbonates stable at 100° (e.g., fatty acid soaps of dicyanodiamide, guanidine, or dicyanodiamidine), improves the wetting properties of the lubricant.

E. L.

Distillation. Concn. of coal. Separating coal.—See I. Sulphurised phenols. CH₂O.—See III. PbS materials. NH₄Cl.—See VII. C electrodes.—See XI.

III.—ORGANIC INTERMEDIATES.

Ethyl alcohol from [oil]-refinery gases. V. GERR, O. PIPIK, and E. MEZHEBOVSKAYA (Azerbaij. Neft. Choz., 1932, No. 2, 15–21).—C₂H₄ is selectively adsorbed on C, displaced with superheated steam, and converted into EtOH by dissolution in H₂SO₄ (*d* 1.84) in presence of 0.1% Ag (13–15% yield) or Fe (8% yield).

CH. ABS.

Reactions of phenol with hydrogen at high pressure. C. M. CAWLEY (Fuel, 1932, 11, 217–221).—PhOH was hydrogenated in presence of active C impregnated with 13% of NH₄ molybdate, and with an initial H₂ pressure of 100 atm. At 450°, in the absence of a catalyst, only about 4% of the PhOH was reduced; in presence of active C 14% of the PhOH was converted into a neutral oil, principally C₆H₆ and cyclohexane. In presence of 10% of the catalyst the PhOH was converted almost completely into C₆H₆ and cyclohexane after 2 hr. heating at 450°. The reaction commenced between 300° and 350° and proceeded more rapidly with rising temp. and with increasing proportions of catalyst and of H₂. Addition of S improved the efficiency of the catalyst and increased the proportion of cyclohexane to C₆H₆ in the product. It is probable that the following principal reactions proceed concurrently: PhOH → C₆H₆, C₆H₆ → C₆H₁₂, and PhOH → C₆H₁₁·OH → C₆H₁₂.

A. B. M.

n-C₁₀H₂₂ from petroleum.—See II. CHCl₃.—See XX.

PATENTS.

Manufacture of methane derivatives containing chlorine and fluorine. I. G. FARBENIND. A.-G. (B.P. 370,356, 11.12.31. Ger., 12.12.30).—A mixture of CCl₄ vapour and HF is passed into SbCl₅ containing about 10% SbCl₅ at 100–130° to give CCl₃F (2 pts.) and CCl₂F₂ (1 pt.)

C. H.

Manufacture of alkyl halides. I. G. FARBENIND. A.-G. (B.P. 370,211, 29.4.31. Ger., 29.4.30).—An alkyl H or dialkyl sulphate is heated in liquid phase above 100° (e.g., 130–140°) with aq. HCl or HBr under suitable pressure. EtCl and BuⁿCl are thus obtained in 90–95% yield.

C. H.

Purification of acetylene. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 371,142, 27.3.31).—C₂H₂ is freed from diacetylene, allylene, allene, butadiene, HCN, etc. by freezing out pure C₂H₂ below –20°, e.g., at –30° to –81°. Preferably MeOH vapour is added to the C₂H₂ gas and is removed with any H₂O by a preliminary cooling to –30°, C₂H₂ being thereafter separated at –70°.

C. H.

Manufacture of halogenated alcohols. I. G. FARBENIND. A.-G., and A. CARPMAEL (B.P. 370,490, 7.1.31. Addn. to B.P. 235,584; B., 1925, 738).—In the process of the prior patent, metal alkoxides other than those of Al and the metals of groups I and II are used, especially alkoxides of Zr, Ti, and Fe. Examples are: $\text{CBr}_3 \cdot \text{CH}_2 \cdot \text{OH}$ from $\text{CBr}_3 \cdot \text{CHO}$ and $\text{Zr}(\text{OPr}^n)_4$ or $\text{Fe}(\text{OPr}^n)_3$ in Pr^nOH , or $\text{Sn}(\text{OEt})_4$ in EtOH ; $\text{CCl}_3 \cdot \text{CH}_2 \cdot \text{OH}$ from $\text{CHMe} \cdot \text{CCl} \cdot \text{CHO}$ and $\text{Zr}(\text{OPr}^n)_4$ in Pr^nOH . C. H.

Manufacture of formic acid from formates. LONZA ELEKTRIZITÄTSWERKE U. CHEM. FABR. A.-G. (B.P. 370,300, 7.8.31. Ger., 10.8.30).—A formate is treated with dil. HNO_3 in presence of a buffer substance, e.g., a formate, carbamide, or an amine, and HCO_2H is extracted or distilled off. Thus 63% HNO_3 is added to an aq. suspension of $(\text{HCO}_2)_2\text{Ca}$ (20% excess), and 25% HCO_2H is obtained by distillation in vac. C. H.

Concentration of acetic and other acids. CARBIDE & CARBON CHEMICALS CORP., Assees. of J. G. DAVIDSON and J. J. SCHAEFFER (B.P. 370,771, 14.7.31. U.S., 25.7.30).— Pr^nO is used as entraining liquid, whereby H_2O is removed substantially without carrying over AcOH . C. H.

Manufacture of acetic anhydride. I. G. FARBENIND. A.-G. (B.P. 370,438, 6.1.31. Addn. to B.P. 353,688; B., 1931, 1132).—In the process of the prior patent, phosphates of Fe, Pb, Zn, or other non-alkali metal are used as catalysts, whereby a higher electrical resistance, facilitating electric heating, is secured. C. H.

Manufacture of maleic acid or its anhydride. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 369,963, 17.12.30).—Vapour of crotonaldehyde or crotonic acid is passed with O_2 over an oxide of V or Mo at 200–500°. The aldehyde may be produced by passing air through aldol at 84–100°. C. H.

Manufacture of formaldehyde from gas containing hydrogen and carbon monoxide. L. H. ROMAN (B.P. 371,377, 14.10.30. Fr., 19.7.30).—The gas is passed at atm. pressure and 130–200° over a catalyst comprising Ni, Fe, Co, Cu, Pt, or Pd, or oxides of these, the catalyst being regenerated when necessary by substituting a current of N_2 or N oxides; the gas flows for 80–100 sec., and the regenerating current 25–35 sec. in alternation. C. H.

Production of butaldehyde [from crotonaldehyde]. G. F. HORSLEY, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 371,051–2, 21.1.31).—Crotonaldehyde is hydrogenated (A) in liquid phase in presence of a Ni-Cr catalyst, prepared, e.g., by reducing a mixture of $\text{Ni}(\text{OH})_2$ and $\text{Cr}(\text{OH})_3$ pptd. together, or (B) in vapour phase in presence of a Ni catalyst free from Fe and Co. C. H.

Manufacture of esters of sulphonated aromatic carboxylic acids [wetting agents]. SOC. CHEM. IND. IN BASLE (B.P. 371,144 and Addn. B.P. 370,845, 30.3.31. Switz., [A] 29.3.30).—(A) Alcohols above C_2 are esterified with sulphophthalic or sulphonaphthalic acids, anhydrides, halides, or esters. (B) Aryl esters of sulphobenzenedicarboxylic acids are similarly prepared. Examples are: (A) amyl sulphophthalate, mixed palmityl and stearyl sulphophthalates, amyl

4-chlorophthalate, amyl 3-sulpho-1:8-naphthalate; (B) *p*-tolyl 3-sulphophthalate. C. H.

Manufacture of sulphurised phenols. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 370,458, 8.1.31).—A sulphurised phenol, obtained, e.g., by the process of B.P. 173,313 (B., 1922, 139 A), is melted with a non-nitrogenous, unsulphurised phenol and a Sn compound. The products have good wool-reserving properties. Sulphurised PhOH is heated, e.g., with PhOH and Na stannate, or NaOH and SnCl_2 or SnCl_4 , or with *p*-chlorophenol and Na stannate. C. H.

Manufacture of sulphurised phenols [for use in flotation processes]. E. J. CANAVAN, Assr. to BARRETT Co. (U.S.P. 1,828,172, 20.10.31. Appl., 29.1.26).—Tar acids are treated with 16–40% of S at temp. above their b.p., e.g., 230°, and under pressure, e.g., 50 lb./sq. in., until the reaction is complete. A. B. M.

Manufacture of picric acid. H. ARUNDEL, G. P. DAVIES, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 370,436, 6.1.31).—Picric acid contaminated with products of incomplete nitration, e.g., picric acid made by the "strong acid" process, is purified by stirring it in nitrating acid at such a temp. (118°) that the picric acid melts. In the "strong acid" process the mixture of acid and pptd. picric acid may be heated with stirring until the latter melts, and then cooled slowly with stirring to give picric acid crystals of convenient size for filtration. C. H.

Manufacture of arylamines [from aromatic halogen compounds]. R. HADDAN. From FEDERAL PHOSPHORUS Co. (B.P. 370,774, 16.7.31).—In the production of benzidine from 4:4'-dichlorodiphenyl, NH_2Ph from PhCl, naphthylamines from chloronaphthalenes, etc., in presence of Cu_2Cl_2 , corrosion of steel reaction vessels is prevented by addition of a base or alkaline-reacting salt of the alkali or alkaline-earth metals, e.g., $\text{Ca}(\text{OH})_2$, Na_2CO_3 , or Na_3PO_4 , in amount sufficient to react with the NH_2Cl formed. C. H.

Manufacture of aromatic monoacyldiamines. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 370,459, 8.1.31).—Monoaroyl-phenylene- or -naphthylene-diamines are prepared according to the series of reactions: $\text{NO}_2 \cdot \text{Ar} \cdot \text{NH}_2 \rightarrow \text{NO}_2 \cdot \text{Ar} \cdot \text{NH} \cdot \text{SO}_3\text{H} \rightarrow \text{NH}_2 \cdot \text{Ar} \cdot \text{NH} \cdot \text{SO}_3\text{H} \rightarrow \text{ArCO} \cdot \text{NH} \cdot \text{Ar} \cdot \text{NH} \cdot \text{SO}_3\text{H} \rightarrow \text{ArCO} \cdot \text{NH} \cdot \text{Ar} \cdot \text{NH}_2$. The last 3 steps may be performed in aq. solution with Fe as reducing agent. The nitro-arylamines used are in some cases more accessible than the isomeric nitroarylamines used in the direct acylation-reduction process. Examples are: 6-benzamido-*m*-4-xylidine, m.p. 176°, and 6-phenylacetamidom-4-xylidine, m.p. 177°, from 6-nitro-*m*-4-xylidine; 6-benzamido- (m.p. 185°), 6-cinnamamido- (m.p. 195–196°), and 6-*o*-chlorophenoxyacetamido- (m.p. 140.5°) -cresidines from 6-nitrocresidine; 4-benzamido-2-methoxy-5-ethoxyaniline, m.p. 117°, from the NO_2 -compound; monobenzooyl-1:4-naphthylenediamine, m.p. 188°; 5- α -naphthamido-*o*-anisidine, m.p. 191–192°. C. H.

Manufacture of diacylated diamines. SOC. CHEM. IND. IN BASLE (B.P. 370,830, 24.9.31. Switz., 27.9.30).—Aliphatic or aromatic diamines are condensed with

5-substituted salicylic acids. The products have affinity for cotton and can be coupled on the fibre with diazo compounds, and are also mordants for basic dyes. The prep. of di-*p*-cresotylidiansidine, m.p. 274—276°, is described. C. H.

Preparation of 2-aminoanthraquinone. NEWPORT CHEM. CORP. (B.P. 370,724, 1.6.31. U.S., 13.6.30).—The mixture of anthraquinone-2-sulphonic acid and aq. NH_3 is first heated to the required temp. and the oxidant (NaClO_3) is then added gradually in such amounts as to prevent reduction below the leuco-stage. C. H.

Manufacture of 1-aldehydoanthraquinone and its nuclear-substitution products. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 369,902, 28.10.30).—In the acid oxidation of 1-methylanthraquinones with oxides or salts of Mn or Pb, e.g., MnO_2 at 0—80°, the aldehyde is formed to the exclusion of diketone when the acid is H_2SO_4 diluted to 50—90% with H_2O or AcOH . The prep. of 1-aldehydoanthraquinone, m.p. 183—185°, and its 4-Cl- (m.p. 216°) and 4-Me (m.p. 180°) derivatives is described. C. H.

Manufacture of 1:4-diaminoanthraquinone. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 368,829, 10.12.30).—The "leuco-1:4-diaminoanthraquinone" obtained by treating leucoquinizarin with NH_3 (B.P. 15,355 of 1908; B., 1909, 791) is in fact 1:4-diamino-2:3-dihydroanthraquinone. It is oxidised, e.g., with MnO_2 , in 50—100% H_2SO_4 to the 2:3-dihydro-1:4-di-imine, which undergoes rearrangement at 90—100° to give 1:4-diaminoanthraquinone. C. H.

Manufacture of anthraquinone compounds. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 368,824, 10.12.30).—Anthraquinones containing 2 NH_2 groups or an NH_2 and OH in *p*-positions, or *N*-alkyl derivatives thereof, are oxidised partly or completely in H_2SO_4 to corresponding 1:4-quinonoid compounds, which are isomerised by warm 85—50% H_2SO_4 and, if desired, reduced; oxidation and isomerisation may be effected in one operation. The final products are 1:4-amino-hydroxy- or -dihydroxy-anthraquinones. Examples are: 1:4-diaminoanthraquinone, oxidised with MnO_2 and H_2SO_4 at 15—20° to the di-imine, diluted to 65% H_2SO_4 and heated at 45—50°, and finally reduced with NaHSO_3 to 1:4-aminohydroxyanthraquinone; 2:3-dichloro-1:4-aminohydroxyanthraquinone similarly obtained from 2:3-dichloro-1:4-diaminoanthraquinone; 4:5:8-triamino-1-hydroxy-, 5:8-diamino-1:4-dihydroxy-, and 8-amino-1:4:5-triamino-anthraquinones from 1:4:5:8-tetra-aminoanthraquinone according to conditions; and 8-amino-1:4:5-trihydroxyanthraquinone from 4:8-diaminoanthrarufin. The amount of MnO_2 may be as little as 5% of theoretical. C. H.

[Manufacture of] intermediates and [vat] dyes [of the dibenzanthrone series]. E. I. DU PONT DE NEMOURS & Co. (B.P. 370,905, 12.1.31. U.S., 11.2.30).—A 3-halogenobenzanthrone having a free 2-position is heated with Se, preferably in a high-boiling solvent (kerosene, $\text{C}_6\text{H}_5\text{Cl}_3$, tetrahydronaphthalene) with or without a substance which reacts with halogen or H halide. The resulting 3:3'-dibenzanthronyl selenide is converted by alkaline fusion into an isodibenzanthrone. C. H.

Manufacture of cyclic ketones. SCHERING-KAHLBAUM A.-G. (B.P. 370,823, 28.9.31. Ger., 17.10.30).—Oxides of cyclic olefines undergo isomerisation into ketones when heated at 250—280°, preferably in presence of surface catalysts (SiO_2 gel), metal salts (MgSO_4 on pumice, Cu pyrophosphate), or heavy metals (Ni). Menthone, b.p. 204—210°, is obtained in 80% yield from Δ^3 -menthene oxide, cyclohexanone from cyclohexene oxide, and carvomenthone, b.p. 219—222°, from Δ^1 -menthene oxide. C. H.

Manufacture of Δ^3 -menthene. SCHERING-KAHLBAUM A.-G. (B.P. 370,288, 21.7.31. Ger., 2.8.30).—8-Menthanol or an ether or ester, or a mixture of 1- and 8-menthans, is passed at 300—500° over a dehydrating catalyst, e.g., "Tonsil" or $\text{Mg}_3(\text{PO}_4)_2$ on pumice. C. H.

Manufacture of camphene. SCHERING-KAHLBAUM A.-G. (B.P. 370,235, 18.5.31. Ger., 26.5.30).—A bornyl halide vapour is passed with steam in countercurrent over a moving mass of alkaline-earth oxide or hydroxide at 200—250°. C. H.

Preparation of alkyl- or aralkyl-pyridones or -quinolones. ILFORD, LTD., and F. M. HAMER (B.P. 369,946, 24.12.30).—The appropriate quaternary salt is oxidised in aq. alkali with solid $\text{K}_3\text{Fe}(\text{CN})_6$, rise of temp. being prevented. Examples are pyridones and quinolones from the quaternary salts prepared from: pyridine and Me and Et *p*-toluenesulphonates (b.p. 249° and 247°, respectively) and CH_2PhCl ; β -naphthaquinoline and Me and Et *p*-toluenesulphonates (m.p. 174° and 138°, respectively). C. H.

Preparation of 2-mercaptobenzthiazole. SILESIA VER. CHEM. FABR. (B.P. 371,172, 30.4.31. Ger., 11.6.30).— NH_2Ph , S, and CS_2 in equimol. proportions are heated at 200° under a H_2S pressure of 50 atm. The hot contents of the autoclave are transferred under pressure to a vessel containing hydrocarbons, b.p. 135—140°, having a 5% phenol and/or 1% $\text{C}_5\text{H}_5\text{N}$ content. A pure, odourless product, m.p. 174—179°, is obtained. C. H.

Compositions for use as emulsifying agents. IMPERIAL CHEM. INDUSTRIES, LTD., H. M. BUNBURY, and R. P. MCGLYNN (B.P. 369,985, 29.11.30).—"Liquid rosin" is esterified, wholly or partly, with an aliphatic polyhydric alcohol (glycerol) and sulphonated below 40°, preferably with an equal wt. or less of sulphonating agent (e.g., 100% H_2SO_4 or 20% oleum), in presence or absence of an org. diluent. C. H.

Manufacture of aqueous dispersions [and emulsions] of water-insoluble materials. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 369,915, 14.11.30 and 20.4.31).—Polymerised olefine-mono- or -di-carboxylic acids or the interpolymerides of these with vinyl compounds are used as dispersing and emulsifying agents. Examples are: Indanthrene Scarlet G pasted with aq. solution of Na polyacrylate (from polymerised acrylonitrile), thickening, glycerol, K_2CO_3 , and formaldehydesulphoxylate; olive oil emulsified in water with Na diisopropyl-naphthalenesulphonate and aq. solution of partly hydrolysed polymerised acrylonitrile; S dispersed in aq. ammoniacal solution of interpolymeride from maleic anhydride and vinyl acetate; etc. C. H.

Manufacture of aqueous emulsions containing lecithin. H. BOLLMANN and B. A. REWALD (B.P. 369,990, 18.12.30. Ger., 24.5.30).—Lecithin and an oil which has no emulsifying properties and is preferably non-acid are emulsified in water in presence of glycol, or its homologues or derivatives. C. H.

Wetting etc. agents. Mordants.—See VI. Glycerin.—See XII.

IV.—DYESTUFFS.

PATENTS.

Manufacture of dyes of the anthraquinone series. IMPERIAL CHEM. INDUSTRIES, LTD., and A. G. PERKIN (B.P. 370,037, 31.12.30).—A 1:2-dihydroxy- or 1-hydroxy-2-alkoxy-9-anthrone is converted directly or by way of the dianthrone into the corresponding helianthrone. 1-Hydroxy-2-methoxy-9-anthrone gives the dihydroxydimethoxyhelianthrone on boiling with I or As₂O₅ in C₅H₅N, or with PhNO₂. Tetrahydroxyhelianthrone is obtained similarly from 1:2-dihydroxy-9-anthrone, or by hydrolysis of the former product with mineral acid. C. H.

Manufacture of alkyl ethers of amino-β-hydroxy-anthraquinones [acetate silk dyes]. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 370,402, 5.1.31).—O-Alkylation proceeds smoothly in presence of H₂O, a H₂O-sol. ketone (COMe₂, COMeEt, COEt₂, cyclohexanone), and a basic compound of Na, K, Ca, Sr, Ba, or Mg. The following anthraquinones are described: 1-amino-2-methoxy-, m.p. 220—222° (orange on acetate silk); 1-amino-2:4-dimethoxy-, m.p. 224—226° (yellow-red); 4-amino-1:2-dimethoxy-, m.p. 283—284° (violet-red); 1:4-diamino-2-methoxy- (violet-red); 1:4-dimethylamino-5:6-dimethoxy- (blue-green); 2-amino-3-methoxy-, m.p. 261—263° (orange). C. H.

Manufacture of [hydr]oxyethylamino-derivatives of the anthraquinone series [acetate silk dyes]. SOC. CHEM. IND. IN BASLE (B.P. 370,716, 27.5.31. Switz., 4.6.30).—The leuco-compounds of 1:4-di-(β-hydroxyethylamino)anthraquinone and its derivatives (e.g., the product from leuco-1:4:5:8-tetrahydroxyanthraquinone and β-aminoethyl alcohol) are oxidised with air in β-aminoethyl alcohol at 50—60°. C. H.

Manufacture of vat dyes [of the dibenzpyrenequinone series]. I. G. FARBENIND. A.-G. (B.P. 371,185, 18.5.31. Ger., 19.5.30).—A 1:4- or 1:5-diaroynaphthalene carrying halogen in both *peri*-positions or in an *o*-position in both aroyl groups is heated with alkali, in presence or absence of a diluent. Examples are: 1:2:6:7-dibenzpyrene-3:8-quinone from 1:5-dichloro-4:8-dibenzoylnaphthalene, m.p. 277°, KOH, and quinoline; 5':5''-dichloro-1:2:6:7-dibenzpyrene-3:8-quinone from 1:5-dichloro-4:8-di-*p*-chlorobenzoylnaphthalene, m.p. 253°; 1:2:7:8-dibenzpyrene-3:6-quinone from 1:4-dichloro-5:8-dibenzoylnaphthalene, m.p. 180°, and its 5':4''-Cl₂-derivative from 1:4-di-(*op*-dichlorobenzoyl)naphthalene, m.p. 188—189°; 1:2:7:8-dinaphthapyrene-3:6-quinone, brown vat dye from 1:4-dichloro-5:8-di-*α*-naphthoynaphthalene, m.p. 278°, and the corresponding diacenaphthapyrenequinone from 1:4-dichloro-

5:8-diacenaphthoynaphthalene, m.p. 307°; 5:10-dimethyl-1:2:7:8-dibenzpyrene-3:6-quinone (golden-yellow vat dye) from 1:5-dichloro-4:8-dibenzoyl-2:6-dimethylnaphthalene, m.p. 284°. C. H.

Manufacture of azo dyes [pigments and ice colours]. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 370,606, 12.3.31).—Suitable diazo, tetrazo, or diazoazo compounds are coupled with arylamides of 3-hydroxydiarylamino-5-carboxylic acids. Examples are brown or red-brown dyes from: 4-chloro-3-hydroxydiphenylamine-5-carboxylic *p*-chloroanilide with diazotised 2:5-dichloroaniline, 4-chloro-*o*-nitroaniline, 4-chloro-*o*-toluidine, or 1-aminoanthraquinone; 3-hydroxydiphenylamine-5-carboxylic anilide with diazotised α -C₁₀H₇NH₂, or dianisidine, 5-nitro-*o*-anisidine, 4-chloro-2-aminodiphenyl ether; 3-hydroxy-4-methyl-diphenylamine-5-carboxylic *p*-toluidide with diazotised 4-chloro-*o*-toluidine, *m*-chloroaniline, or 4-chloro-*o*-anisidine; 3-hydroxy-4-methoxydiphenylamine-5-carboxylic *p*-anisidine with diazotised 2:5-dichloroaniline or 4-chloro-2-aminodiphenyl ether. C. H.

Manufacture of [dis]azo dyes containing sulphur. SOC. ANON. DES MAT. COL. ET PROD. CHIM. DE ST. DENIS, and R. LANTZ (B.P. 370,705, 20.5.31. Fr., 20.6.30).—A coupling component containing a di- or tri-sulphide group is coupled with 2 mols of a diazotised *o*-aminophenol. Examples are: 4-nitro-*o*-aminophenol (2 mols.) → 2:3-hydroxynaphthoic dithioanilide; *o*-aminophenol (2 mols.) → 6:6-dihydroxydi-β-naphthyl disulphide; 4-chloro-*o*-aminophenol (2 mols.) → trisulphide from α -naphthol. C. H.

Manufacture of metalliferous azo dyes. A. G. BLOXAM. From SOC. CHEM. IND. IN BASLE (B.P. 369,936, 23.12.30).—Azo dyes of the type: *o*-aminophenol- or *o*-aminonaphthol-disulphonic acid → a 2:4-dihydroxy-quinoline or -naphthaquinoline, are treated in substance or during prep. with an agent yielding metal. Examples are: *o*-aminophenol-4:6-disulphonic acid → 2:4-dihydroxyquinoline (+ Cr, yellow-red on wool), 2:4-dihydroxy- α - or - β -naphthaquinoline (+ Cr, blue-red or bordeaux), or 4-hydroxy-*N*-phenylquinoline (+ Cr, yellow-red). The dyes are suitable also for silk, viscose silk, cotton, and varnishes. C. H.

Manufacture of azo dyes containing chromium. SOC. CHEM. IND. IN BASLE (B.P. 369,991, 18.12.30. Switz., 18.12.29).—Basic Cr₂(SO₄)₃ is used for pre-chroming, whereby purer and more level shades are obtainable. [Stat. ref.] C. H.

Preparation of ψ-cyanines [photosensitising dyes] containing β-naphthaquinoline nuclei. ILFORD, LTD., and F. M. HAMER (B.P. 370,388, 24.12.30).—2-Iodo-β-naphthaquinoline alkiodides are condensed with a heterocyclic quaternary NH₄ halide having a reactive α -Me group. Examples are dyes from: 2-iodo-β-naphthaquinoline meth- or eth-iodide and β-naphthaquinoline meth- or eth-iodide, or quinoline meth- or eth-iodide, or 2-methylbenzthiazole meth-iodide. C. H.

Benzanthrone dyes.—See III. Lake pigments.—See XII.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Influence of the period of air-drying on the strength of Abacá fibre. Variability of tensile strength of commercial Abacá fibre of the same origin as the pseudostem. M. TIRONA (Philippine J. Sci., 1932, 48, 237—241, 243—256).—Samples of the fibre dried in the air for 20 hr. have generally a higher tensile strength than those similarly dried for 10 hr. The increase in strength on longer drying is most marked in the fibres from the outer section of the pseudostem, less in those from the middle part, and still less, or of doubtful significance, in those from the inner part. Hence the time of drying should be taken into account when comparing the strengths of Abacá fibres.

B. P. R.

Strength and elongation of raw silk under various conditions. T. HAYASHI and K. OGIWARA (Bull. Sericult. & Silk Ind., Japan, 1932, 4, 1—3).—The strength and elongation of raw silk vary with the species of silkworm, the cocoon layers, and the rearing season. For all species of silkworms the yarn from the outer cocoon layers is more extensible than that from the inner ones. The tensile strength increases in proportion to the fineness of the filaments while the elongation increases rapidly up to about 30—40 denier and then only slowly. The silk loses 30—40% of its strength, and its elongation increases by 40—60%, on wetting the threads with H₂O, whilst with aq. EtOH the effects are less. Heating at 80—140° produces no change in these properties, but above 140° both the strength and elongation decrease. In acid solutions the strength increases, and in alkali it decreases, with increasing concn. of the solutions.

B. P. R.

Woods of Karafuto. M. SHIKATA and M. ISHISAKI (J. Cellulose Ind. Tokyo, 1932, 8, 23—25).—Of the two chief pulpwoods of the Karafuto district, "ezo" spruces differ from "todo" firs in yielding a slightly higher percentage of α -cellulose when cooked with the usual bisulphite liquors. Many chemical analyses are given to show how the species differ among themselves.

H. A. H.

Hygroscopic moisture of cellulose. V. Method of drying cellulose. VI. Hygroscopic moisture of raw cotton and tissue paper. VII. Hygroscopic moisture of bamboo celluloses. S. OGURI (J. Soc. Chem. Ind., Japan, 1932, 35, 232—234 B, 235—239 B, 239—244 B; cf. B., 1932, 140).—V. Vac.-drying is compared with the ordinary heating method (4 hr. at 100—105°) and with P₂O₅-drying (40 days in vac. desiccator). The P₂O₅ is the most effective method whilst vac.-drying is the least reliable. The efficacy of the method depends to some extent on the nature of the cellulosic material. In general, for cellulose of low hygroscopicity vac.-drying equals the heating method.

VI. The hygroscopic moisture of raw cotton and of tissue paper was determined at const. temp. Both these materials are more hygroscopic than is standard cotton cellulose, and tissue paper absorbs almost the same amount of moisture as raw cotton under the same conditions.

VII. Isohygrometric curves are given for Mōsō-chiku cellulose, bamboo powder, bamboo pulp, and Kei-chiku

cellulose. The last two are more hygroscopic than is cotton cellulose and resemble mercerised cotton.

V. E. Y.

Deterioration of wood cellulose by bleaching. J. STRACHAN (Paper-Maker, 1932, 84, 225—226 T.S.).—The bleaching of wood pulp with alkaline Ca hypochlorite is not primarily an oxidation process, the lignin being chlorinated and dissolved. Oxidation, causing deterioration of the cellulose, occurs only when the reaction takes place in an acid medium, or when the temp. and Cl concn. become too high. These conditions should be avoided if a permanent and durable paper is required. Hydrated Fe oxide also produces degradation, apparently acting as a catalyst in facilitating oxycellulose and hydrocellulose formation.

H. A. H.

Disposal of cellulose waste liquors in the light of recent research on lignin. C. HARNIST (Chem.-Ztg., 1932, 56, 529—531, 550—551).—Sulphite-cellulose waste has usually been considered inadmissible as a fertiliser owing to the colloidal substances (lignin etc.) choking the soil. It is proposed to mix the waste with quebracho extract, "the properties of which it improves," and then to convert the solution, freed from colloids, into a complete fertiliser by addition of K, N, and P compounds. By the use of sylvinit and (NH₄)₂SO₃, the Na₂SO₃ content is enriched and this latter is returned to the paper works.

C. I.

Plant and process for simplified [cuprammonium] rayon manufacture. T. R. OLIVE (Chem. and Met. Eng., 1932, 39, 326—330).—The Furness process, which has just come into large-scale production, utilises solution which is stable without preservatives or refrigeration, and the spinning and subsequent operations are conducted in a single machine. The requirements of purified H₂O are 40—45 gals. per lb. of product. Cotton linters is used; the Cu-NH₃ reagent is prepared as in U.S.P. 1,800,828 (B., 1932, 103), and the solution can be prepared, diluted, and filtered ready for spinning in 5 hr. No ageing is necessary. The coagulating bath is 5% NaOH solution, and dil. H₂SO₄ is used for neutralising. In the spinning machine, which is described, performs in addition the operations of removing Cu, washing, drying, and twisting, the whole requiring 3 min. only. The only ventilating plant necessary is fume hoods over the mixers. Temp. and viscosity do not require close control. Recovery is 40% of the NH₃ and 95% of the Cu. Much finer counts can be spun than with viscose. Only one quality of yarn is produced and strength is satisfactory.

C. I.

Fractional dissolution of acetone-soluble cellulose acetate. I. SAKURADA and M. TANIGUCHI (J. Soc. Chem. Ind., Japan, 1932, 35, 249—253 B).—Fractional dissolution of cellulose esters is preferred to fractional pptn. since it is more easily reproducible and is less likely to affect the mol. structure of the cellulose derivative. Moreover any required degree of separation can be effected by varying the content of polar solvent in the extracting liquid. Results obtained by the authors agree with those of Ostwald and Ortloff (A., 1932, 336); solution equilibrium is reached in 18 hr. Curves show the % solubility of cellulose acetate (53—54% OAc) in C₆H₆-MeOAc, C₆H₆-COMe₂, and CCl₄-COMe₂.

Characteristic S-curves were obtained in all cases, the % solubility increasing sharply with mixtures containing > 50% of the polar solvent. V. E. Y.

Observation of rayons in polarised light. J. H. SKINKLE (J. Text. Inst., 1932, 23, 71—77 T).—The val. of the sp. double refraction serves to distinguish between the various types of rayon except the stretch-spun viscose and cuprammonium varieties. The val. is little affected by the residual NO₂-group content of nitrocellulose rayons or by differences in the thickness of the rayons except where such differences are due to stretch-spinning. B. P. R.

Action of certain species of *Penicillium* on rayons. T. F. HEYES and H. S. HOLDEN (J. Text. Inst., 1932, 23, 79—94 T).—The type of damage observed under the microscope does not vary from one species of *Penicillium* to another for any one sample of rayon. Acetate rayon is more resistant than any other type and stretching in the spinning process appears to confer some power of resistance on non-esterified rayons, but the degree of previous degradation of the cellulose is without influence on its susceptibility to *Penicillium*. Considerable tendering may occur as a result of mould growth without any sign of damage being visible microscopically. *P. purpurogenum* var. *rubri sclerotium* and *Penicillium*, sp. 1, are harmful to rayons of the non-esterified classes, whereas *P. pinophilum* is less so, although under similar conditions cotton is equally badly tendered by all three species. The action of *P. purpurogenum* and *Penicillium*, sp. 1, on cotton or the regenerated cellulose types of rayon resembles that causing oxycellulose formation. B. P. R.

Factors affecting sizing (water-resistance) of paper. H. A. HARRISON (World's Paper Trade Rev., 1932, 97, 1419—1422, 1456—1462, 1803—1804, 1840, 1918—1922, 1974—1976, 1982—1984, 2074—2078; 98, 34—41, 95—99, 175—178, 292—297, 331—332).—Details are given of a method of preparing laboratory-sized sheets having the same degree of H₂O-resistance as mill-made paper of the same furnish and characteristics, using the British standard pulp-evaluation apparatus. Many factors affecting the H₂O-resistance of paper are investigated, under both laboratory and mill conditions, the dry indicator test of Carson (B., 1926, 471) being used. The effect of thickness varies with many factors, and it is not possible accurately to compare sheets of different thicknesses, corrections for such differences being unreliable. The R.H. during conditioning and the temp. of the aq. bath during testing must be rigidly controlled. Optimum concns. and periods of contact of size and alum are determined. Pulp consistency between ordinary limits has no effect on laboratory sizing. The unique nature of alum as a size-pptg. agent is considered. Sizing efficiency is generally destroyed by high temp. during sizing, and, contrary to Oman's conclusions (B., 1929, 13), by medium temp. (about 45°) also under certain conditions; it may, however, be restored by suitable addition of more alum. Pulp which has become desized by keeping may also have its sizing val. restored by addition of alum only until the p_H is about 5.5, and pulp so sized is more resistant to heat. Even when the temp. during beating is high, size may safely be added, provided the addition of alum

is delayed until the temp. has again fallen in the chests owing to dilution. The sizing val. of re-pulped paper cannot be restored by alum alone. These and other results are explained by the assumption that sizing is produced by a variety of Al-resin compounds existing under the varying conditions of acidity and temp. There are different optimum p_H vals. for sizing different types of wood pulp, ranging from 3.8 to 5.8. The difference in sizing capacity of kraft and unbleached sulphite pulps observed on a manufacturing scale cannot be attributed to chemical residues, since treatment of the one type with excess of NaHSO₃ and of the other with alkali produces no changes in sizing; furthermore no difference is observable under laboratory conditions. It is therefore suggested that other factors, especially stretch of the paper web, may be in part responsible for the difficulty in sizing unbleached sulphite pulp. Hot super-calendering also may adversely affect sized sulphite paper. The addition of org. dyes does not affect sizing, but pigments in large quantities may reduce it somewhat. Mechanical strength is invariably reduced by sizing, the greatest reduction taking place during the fluxing of the resin. The sizing properties of resin powders are investigated; acenaphthene resin (B., 1929, 276) is of special significance, since the H₂O-resistance conferred by it is destroyed by alum, although there can be no chemical reaction. H. A. H.

Volumetric composition of paper. IV. Determination of porosity. R. H. DOUGHTY, C. O. SEBORG, and P. K. BAIRD (Paper Trade J., 1932, 94, T.A.P.P.I. Sect., 312—314).—A simple apparatus, adapted from a Mullen bursting tester, is described for determining the porosity of paper in terms of equiv. pore size or of air transmission. Air-flow rates should be compared under the conditions at which they are to be used, since two sheets giving nearly the same transmission at low pressure drops may differ greatly at higher pressures. H. A. H.

Combustibility of fabrics.—See VI.

PATENTS.

Cleansing of fibrous materials particularly for laundry purposes. RÖHM & HAAS A.-G. (B.P. 374,361, 9.11.31. Ger., 20.3.31).—The materials are treated successively in the same vessel with pancreatic or other enzymes and then with a soap liquor, washing between the treatments being omitted. A. J. H.

Preparation of alkali-cellulose. H. P. BASSETT (U.S.P. 1,831,647, 10.11.31. Appl., 13.4.28. Renewed 2.4.31).—Cellulosic material in a loose form is treated with aq. NaOH of mercerising concn. (16—24%) for 30 min.—2½ hr. and, after removal of the excess liquid by centrifuging, the product is aged for 1—3 days, pressed to a cellulose content of 25—35%, and shredded. F. R. E.

Lowering the viscosity [in solution] of cellulose acetate. L. E. BRANCHEN and C. U. PRACHEL, Asssts. to EASTMAN KODAK Co. (U.S.P. 1,831,795, 10.11.31. Appl., 4.3.30).—The finely-divided, solvent-free ester is heated for a time at 120—180°. F. R. E.

Production of artificial filaments, films, etc. BRIT. CELANESE, LTD. (B.P. 374,356, 21.10.31. U.S.,

29.10.30).—In the production of yarn, films, etc. from cellulose esters or ethers, a suspension of white or coloured pigments in some of the spinning solution is introduced into the main spinning solution during its direct passage from the filters to the spinning jets. Suitable apparatus for supplying the mixed solution continuously to the jets is described. B. P. R.

Manufacture of artificial hollow thread. R. PICARD, Assr. to SOC. ALSA IN BASEL (U.S.P. 1,831,030, 10.11.31. Appl., 27.4.28. Ger., 30.4.27).—Viscose containing Na_2CO_3 is spun into a coagulating bath containing H_2SO_4 12%, ZnSO_4 22%, and Na_2SO_4 4%. The resulting threads have greatly increased covering power. B. P. R.

Manufacture of distended fibrous masses. A. L. SPAFFORD, Assr. to WOOD CONVERSION Co. (U.S.P. 1,821,856, 1.9.31. Appl., 28.7.30).—Waterproof and/or fireproof mats are obtained by treating cellulose fibres with the necessary fire- or water-proofing agents such as emulsified wax, Al stearates or resinates, mixtures of clay, wax, and alum, plaster of Paris, etc., mixing the product with a foam-forming solution of soap, saponin, etc., agitating the mixture to form a foam, and drying the latter. B. P. R.

Shrinkable capsule. J. VOSS and W. SPIETSCHKA, Assrs. to KALLE & Co. A.-G. (U.S.P. 1,831,212, 10.11.31. Appl., 8.11.27. Ger., 28.7.26).—Cellulose capsules prepared by coating a form with viscose are treated on the form in baths containing $(\text{NH}_4)_2\text{SO}_4$ and H_2SO_4 at various temp. from 20° to 80° until the cellulose is regenerated, and then with boiling or cold H_2O . B. P. R.

Benzoylation of cellulose. C. S. WEBBER and C. J. STAUD, Assrs. to EASTMAN KODAK Co. (U.S.P. 1,831,274, 10.11.31. Appl., 14.12.29).—Cellulose is refluxed with BzCl and $\text{C}_6\text{H}_5\text{N}$ in presence of $(\text{CH}_2\text{Cl}\cdot\text{CH}_2)_2\text{O}$, which acts at 100° as a solvent for the product. F. R. E.

Stencil sheet. K. W. CARR, Assr. to DITTO, INC. (U.S.P. 1,830,980, 10.11.31. Appl., 14.12.28).—Yoshino paper is coated with a solution of an artificial resin (vinyl acetate), a shortening agent (Al stearate), and a plasticiser (peanut oil and tolyl phosphate) in a mixture of PhMe, EtOH, and ethylene glycol Et ether. F. R. E.

Production of refined wood pulp. G. A. RICHTER, Assr. to BROWN Co. (U.S.P. 1,831,032, 10.11.31. Appl., 30.11.29).—Wood chips are cooked for more than 2 hr. with H_2O at 150–200°, treated with Cl_2 if necessary, and then further cooked with a kraft cooking liquor to complete fibre liberation. B. P. R.

Circulation of digesting liquor in wood-pulp digesters. E. MORTERUD (U.S.P. 1,831,748, 10.11.31. Appl., 24.11.30. Nor., 14.5.29).—A tube connects the lower with the upper part of the digester and is fitted with a pump which circulates the liquor through it. B. P. R.

Treatment of cellulosic materials. C. A. BLODGETT and H. H. HANSON, Assrs. to EASTERN MANUFG. Co. (U.S.P. 1,822,125, 8.9.31. Appl., 6.8.26).—Raw cellulose materials are pulped by means of a sulphite cook, part bleached, and submitted to a second cook for

about 4 hr. with a solution containing 1.6% of NaOH and 1.2% of Na_2SO_3 . The washed product is specially suitable for the prep. of cellulose ester materials. B. P. R.

Production of [wood] pulp of high α -cellulose content. G. A. RICHTER, Assr. to BROWN Co. (U.S.P. 1,819,002, 18.8.31. Appl., 25.3.30).—Wood chips are cooked in superheated H_2O to remove pentosans, then with acid bisulphite liquor to remove lignin, but not so severely as to effect fibre liberation, and finally with an alkaline liquor until complete fibre liberation is secured. The product has a low solution viscosity, high α -cellulose content, and is easily bleachable with little loss of α -cellulose. B. P. R.

Multiple-step process of fibre liberation. G. A. RICHTER, Assr. to BROWN Co. (U.S.P. 1,819,003, 18.8.31. Appl., 25.3.30).—Wood chips etc. are cooked for 3–4 hr. in a liquor containing about 5% of free and 1% of combined SO_2 , the spent liquor is replaced by a 0.2–1% solution of a mineral acid (H_2SO_4) and cooking is continued for 4–6 hr., the material is washed and finally cooked in a NaOH– Na_2S liquor of low alkalinity until the fibres are completely liberated. The product is superior to the usual chemical pulps for use in the prep. of cellulose derivatives. B. P. R.

Production of cellulosic products. H. DREYFUS (B.P. 374,047, 26.11.30).—Wood chips, sawdust, straw, or other raw cellulosic materials still containing lignin, but preferably from which the resins have been extracted by means of aq. NaOH, are heated under pressure with H_2O or aq. NaHCO_3 , and the pressure is then released suddenly so that disruption of the material occurs and its active surface is greatly increased, thereby facilitating subsequent conversion into pulp. B. P. R.

Preparation of strong, bleached sulphate pulp. C. A. BLODGETT and H. H. HANSON, Assrs. to EASTERN MANUFG. Co. (U.S.P. 1,831,436, 10.11.31. Appl., 3.6.26).—Raw cellulose material is given an incomplete cook with aq. NaOH and Na_2S , the liquor is removed, and the pulp digested under pressure for several hr. with aq. NaOH and Na_2SO_3 . The product has a high α -cellulose content and forms paper of exceptional strength and whiteness. B. P. R.

Production of genuine watermark papers using relief moulds. NATIONAL BANK OF HUNGARY, and F. VON HEINRICH (B.P. 373,905, 12.10.31. Austr., 20.10.30).—The surface on which the paper is formed by extraction of H_2O from the stuff is rendered differently permeable to H_2O in certain places, corresponding with the design to be produced, by the application of materials insol. in H_2O , or by photographic or galvanic methods. B. P. R.

Making fibre board by continuous filter process. E. H. HUSSEY (U.S.P. 1,831,599, 10.11.31. Appl., 19.2.27).—Fibrous stock is deposited on a filter cylinder in which the vac. is so varied that a sheet is gradually built up from a thin to a thick layer as the machine rotates and little or no parallelisation of the fibres occurs. B. P. R.

Decortication of fibrous plants. I. W. TEBYRICA (B.P. 376,192, 21.1.32. Brazil, 11.8.31. Addn. to B.P. 358,234).

Decortication of stalks of fibrous plants. W. J. HOLLIER (B.P. 375,834, 2.1.31).

Spinning centrifuges [for artificial silk]. BRIT. BEMBERG, LTD. (B.P. 376,055 and 376,140, [A] 11.8.31, [B] 3.11.31. Ger., [A] 11.8.30, [B] 3.11.30. Addn. [B] to B.P. 373,800).

Coloured [chromolithographic] transfers. H. E. PEACE (B.P. 375,932, 1.5.31).

C granules.—See II. Coatings of cellulose acetate. Mouldable material.—See XIII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Effect of chlorate on the combustibility of fabrics. M. HESSENLAND, F. FROMM, and L. SAALMAN (Chem.-Ztg., 1932, 56, 502—503).—When dil. solutions of NaClO_3 , $\text{Ca}(\text{ClO}_3)_2$, or mixtures of these with CaCl_2 and MgCl_2 are dried on to cotton or woollen cloths, the time required for complete combustion of standard samples of the latter is considerably reduced. With more than one application and intermediate drying on, the time for cotton is further reduced whilst that for wool remains nearly const. When 20% solutions of $\text{Ca}(\text{ClO}_3)_2$ containing CaCl_2 and MgCl_2 are employed and the cloths are dried at 100° the time is approx. the same as when $\text{Ca}(\text{ClO}_3)_2$ alone is used. When the chlorides are present a higher initial temp. is necessary before combustion begins. Use of the hygroscopic $\text{Ca}(\text{ClO}_3)_2$ instead of NaClO_3 causes no increase in the time of burning, but when chlorides are present both the time required for complete burning and that of heating before burning begins are increased. In order to lessen the danger of fire, therefore, the addition of hygroscopic substances to the fabrics is an advantage. B. P. R.

Wood cellulose.—See V.

PATENTS.

Agents for treatment of textiles. DEUTS. HYDRIERWERKE A.-G. (B.P. 369,977, 31.12.30. Ger., 1.10.30).—Alkylxanthates above C_6 , e.g., Na cetyl xanthate or xanthates formed from alcohols corresponding with coconut oil acids, are used as soaps in the impregnation, softening, or delustring of textiles. C. H.

Wetting-out or like agents. DEUTS. HYDRIERWERKE A.-G. (B.P. 369,978, 31.12.30. Ger., 29.9.30).—Alkali alkyl- or cycloalkyl-xanthates above C_6 , e.g., K laurylxanthate or the xanthates from alcohols corresponding with oleic and naphthenic acids, are used as wetting agents. C. H.

Preparations suitable as wetting agents. SOC. CHEM. IND. IN BASLE (B.P. 370,623, 19.3.31. Switz., 19.3.30).—A wetting agent of the aromatic or hydroaromatic sulphonic acid class is dissolved in H_2O containing at least 10% of a H_2O -sol. polyhydric alcohol (glycerol, glycol, $\alpha\gamma$ -butylene glycol, thiodiglycol), whereby stable, conc. solutions (20—40%) are obtainable. C. H.

Manufacture of artificial mordanting substances. IMPERIAL CHEM. INDUSTRIES, LTD., E. B. ROBINSON, and W. A. SILVESTER (B.P. 370,497, 10.1.31).—In the sulphurisation of PhOH the S and the alkaline substance (NaOH , Na_2S , Na_2CO_3 , NaHCO_3) are added alternately

in several small portions to the molten PhOH ; preferably the proportions are 1 mol. PhOH , 2 atoms S, and 0.25 equiv. of alkaline substance. C. H.

Production of [fast green] tints on artificial [viscose] silk. SOC. CHEM. IND. IN BASLE (B.P. 370,536, 23.1.31. Switz., 23.1.30).—Viscose silk is dyed in level green shades by the application of the Cr compound of the dye 5-nitro-*o*-aminophenol \rightarrow J-acid (coupled acid). C. H.

Dyeing or colouring celluloid or shaped articles thereof. W. W. GROVES. FROM SOC. CHEM. IND. IN BASLE (B.P. 371,163, 20.4.31).—Insol. acetate silk dyes, e.g., $\text{NH}_2\text{Ph} \rightarrow 1$ -*o*-chlorophenyl-3-methyl-5-pyrazolone, aminoanthraquinones, etc., are applied in fine aq. dispersion. C. H.

Making tone-in-tone effects in woollen fabrics. R. BRAUCKMEYER, ASST. to DEUTS. WOLLEN-WAREN-MANUF. A.-G. (U.S.P. 1,831,650, 10.11.31. Appl., 25.10.27. Ger., 8.10.27).—Wool yarn is boiled for about 1 hr. in a bath containing 6% (calc. on the wt. of wool) of Na_3PO_4 or $\text{Na}_2\text{B}_4\text{O}_7$ or other substance which yields an alkali by hydrolysis, then woven into fabric with untreated yarn, and the fabric dyed with 2% H_2SO_4 and a "Benzo Light" dye which gives a much deeper shade on the treated yarn. Alternatively, wool fabric is printed with a thickened solution of $\text{Na}_2\text{B}_4\text{O}_7$, steamed, and then dyed. A. J. H.

Printing of textile fabrics. S. TANAKA (B.P. 374,195, 7.4.31).—Fabric passes over a revolving drum on which is mounted a stencil and is pressed thereon by means of a travelling endless wire-gauze band, whilst means are provided within the drum for spraying or blowing colour solutions outwardly through the stencil and the fabric. Means are also provided for sucking the colour through the fabric and for washing the stencil free from adhering colour and drying it by means of hot air between successive exposures to the colour spray. A. J. H.

Mercerising textile materials [viscose silk]. I. G. FARBENIND. A.-G. (B.P. 374,791, 24.12.31. Ger., 1.4.31).—The tensile strength and elasticity of viscose silk etc. are increased by treatment with liquid NH_3 , which is afterwards removed by suction. A. J. H.

[Draw sheet for use in] boiling, souring, bleaching, and dyeing of cloth and the like operations. W. A. CLARKE (B.P. 376,200, 10.2.32).

Wetting etc. agents. Sulphurised phenols. Aq. dispersions etc. Aq. emulsions with lecithin.—See III. Rubber compositions.—See XIV.

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

Ammonia-soda process. N. F. JUSCHKEVITSCH, A. L. URAZOV, and I. S. SOLOVEVA (J. Chem. Ind., Russia, 1931, 8, No. 15—16, 16—22).—The best yield of NaHCO_3 is obtained with optimal $[\text{Cl}^-]$, high pressure of CO_2 , and the highest temp. possible without loss of NH_3 ; $[\text{NH}_4^+]$ must be high. CH. ABS.

Apparatus for nitrogen industry. I. Ammonia combustion elements. II. Synthesis tubes. III. Compressors. B. WAESER (Chem. Fabr., 1932,

5, 209—215, 222—225, 248—250, 266—267, 273—276).—A description of modern plant and technique.

E. S. H.

Syntheses accompanying that of ammonia. J. WIERCINSKI and W. HENNEL (Chim. et Ind., 1932, 27, 1292).—By the extraction of active C which has been used for the syntheses of NH_3 , $\text{CO}(\text{NH}_2)_2$ and a mixture of other substances which gives a cryst. ppt. with picric acid have been obtained.

A. G.

Determination of the insoluble matter in calcium hypochlorite. A. VASSILIEV and H. STUTZER (Z. anal. Chem., 1932, 88, 183—186).—A volumetric determination of insol. matter in Ca hypochlorite may be made by allowing to settle after shaking with H_2O in a suitable vessel. The vol. obtained remains the same on dilution unless this is large. A comparison of the vol. of the different layers might also be made. The wt.-% is not necessarily parallel with the vol. determination. The wt. of insol. matter is approx. half the sum of $\text{Ca}(\text{OH})_2$ and CaCO_3 in the sample.

M. S. B.

Apparatus for determining oxygen in gases. K. W. HETZEL (Chem.-Ztg., 1932, 56, 551—552).—The "oxymeter" is intended for use by untrained workers. A Cu_2Cl_2 solution containing NH_3 and $(\text{NH}_4)_2\text{CO}_3$ is used as absorbent and is kept in a bottle containing Cu gauze. A 20-c.c. pipette is graduated at the upper neck with lines corresponding with 95—100% purity in the O_2 to be tested and a side tube with a glass cock serves for introducing the absorbent. Results are correct within 0.5%.

C. I.

Gas-works practice.—See II. Phosphates.—See XVI.

PATENTS.

Production of sulphuric acid. W. H. LEVERETT and O. L. HARRIS (U.S.P. 1,832,490, 17.11.31. Appl., 22.7.27).—Recovery of the N oxides in the multi-chamber process is improved by introducing some of the gases from an intermediate chamber into the gases flowing from the last chamber to the Gay-Lussac tower.

L. A. C.

Recovery of oxides of nitrogen in sulphuric acid manufacture. A. M. FAIRLIE (U.S.P. 1,833,418, 24.11.31. Appl., 16.9.26).— HNO_3 in quantity at least sufficient to oxidise residual SO_2 is added to the H_2SO_4 passing down the Gay-Lussac tower. The spent acid may be pumped direct to the Glover tower or may first pass through another Gay-Lussac tower in which the HNO_3 content is reduced still further, and the exit gases may be further extracted, e.g., with H_2O and conc. H_2SO_4 , before passing to waste.

L. A. C.

[Apparatus for] direct synthesis of ammonia. F. A. ERNST (U.S.P. 1,832,972, 24.11.31. Appl., 3.11.25).—A cylindrical pressure vessel containing an electric heater, a catalyst chamber, and heat-exchanger tubes is furnished with a liner spaced from the walls and provided with openings near the top. The gases leave the apparatus through two outlets, one in the top leading from the space within the liner, and the other at the bottom leading from the space between the liner and the walls. The quantity of gas leaving by the latter exit is regulated so as to maintain the walls at

the temp. of max. strength of the material of which the walls are made.

L. A. C.

Manufacture of ammonium chloride [from gas liquor]. D. L. JACOBSON, Assr. to KOPPERS Co. (U.S.P. 1,831,864, 17.11.31. Appl., 18.10.28).—The liquor, after treatment with steam or hot gases to expel free NH_3 , is boiled with HCl to decompose NH_4 thio-compounds, and the solution, after filtration, is conc. to crystallise NH_4Cl . The mother-liquor is returned to the process at a stage prior to the addition of the HCl.

L. A. C.

Manufacture of iron oxide and sulphur dioxide from iron sulphide ores. H. FREEMAN (B.P. 374,486, 4.3.31. U.S., 5.3.30).—Finely-divided FeS_2 is charged into the top of a vertical burner supplied at the lower end with air so that the temp. in the combustion zone is sufficiently high to yield Fe_3O_4 and to prevent oxidation of SO_2 to SO_3 . The combustion gases are drawn through a dust chamber attached to the burner and then through the tubes of a boiler so that they are cooled rapidly.

L. A. C.

Converting materials containing lead sulphide into oxygenated compounds. A. HOLMES and L. BURGESS, Assrs. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,832,461, 17.11.31. Appl., 22.6.27).—Residues containing PbS, especially those obtained in the plumbite purification of petroleum distillates, are heated at 500—800° with Na_2CO_3 in a countercurrent of oxidising gases. The product, comprising PbO and Na_2SO_4 , is boiled with aq. NaOH to yield a liquor for re-use in the purification process.

L. A. C.

Manufacture of aluminium chloride. A. McD. McAFEE, Assr. to GULF REFINING Co. (U.S.P. 1,833,430, 24.11.31. Appl., 30.9.27).—A finely-divided mixture of coke and bauxite falls down a retort in which it is treated at 870—1090° with a mixture of O_2 , Cl_2 , and N_2 (preferably 20 : 67 : 13).

L. A. C.

Removing excess alkalinity in synthetic base-exchanging materials. J. G. VAIL, Assr. to AMER. DOUGL Co. (U.S.P. 1,833,505, 24.11.31. Appl., 26.2.26).—The material is treated in a moist state with an acid gas (CO_2 or SO_2) and then washed with H_2O .

L. A. C.

S from gas-purifying materials. See II. Lime kiln.—See IX. Ti pigments.—See XIII. Fertiliser.—See XVI.

VIII.—GLASS; CERAMICS.

Relation between composition and specific gravity of glass. I. S. MORIYASU (J. Japan Ceram. Assoc., 1930, 38, 795—802).—The vol. of glass composed of 6000 g. SiO_2 and 62y g. Na_2O is given by: $0.3084y \text{ Na}_2\text{O} + 2694$ for $y < 50$ and $0.3677y \text{ Na}_2\text{O} + 2464$ for $y > 70$. The change of partial sp. vol. of soda at $y = 50$ indicates the existence of $\text{Na}_2\text{O} \cdot 2\text{SiO}_2$.

CH. ABS.

Yellowing of glasses. W. HEINRICH (Sprechsaal, 1931, 64, 890—907; Chem. Zentr., 1932, i, 1135).—AgCl is better than Ag_2O ; AgNO_3 , Ag_2S , and Ag have little action. Reducing gases favour the action. Addition of FeS deepens the colour. AgCl enters the glass in that form. The effect of various pastes is described. Glasses containing As_2O_3 tend to become discoloured in sunlight.

A. A. E.

Relation of the physical properties of glasses to their composition. V. Effect of the more important constituents on the turbidity of silicate glasses resulting from addition of fluoride. G. GEHLHOFF, H. KALSING, and M. THOMAS (Z. tech. Physik, 1931, 12, 323—344; Chem. Zentr., 1932, i, 1134—1135).—

Opaque (Na_2SiF_6) glasses were prepared at 1400° starting with 18% Na_2O and 82% SiO_2 , and the SiO_2 was replaced by increasing quantities of MgO , CaO , SrO , BaO , ZnO , PbO , B_2O_3 , and Al_2O_3 ; variations were also made in the Na_2O and F contents, and Na was replaced by K. The transparency, reflexion, and absorption of the glasses so prepared were measured. The transparency decreased in the order MgO , CaO , SrO , BaO , ZnO , PbO . Turbidity was increased by increasing F and usually by decreasing Na_2O . Al_2O_3 in small quantities and B_2O_3 diminish turbidity. K glasses behave like Na glasses, but are more difficult to cloud. The more transparent a glass is, the easier it is to cloud. Provided the composition of the glass remains the same, F may be added in any form. A. A. E.

Glass-melting pot. IV. Resistance to corrosion. S. KONDO and M. NAKATSUJI (J. Japan. Ceram. Assoc., 1932, 40, 143—147).—The resistance of bodies composed of a grog, a ball clay, and a plastic kaolin to corrosion by 0.3 PbO , SiO_2 , Na_2O , SiO_2 , and B_2O_3 , SiO_2 glasses was measured. The porosity is important; the relation between the grog content and the corrosion varies with the raw materials. The results do not agree with the pyrometric cone equiv. CH. ABS.

Heat transfer through industrial glass tubing. J. T. LITTLETON, JUN., and H. C. BATES (Chem. and Met. Eng., 1932, 39, 315—318).—Heat transfers were determined through Pyrex glass to a cold- H_2O flow from a jacket containing hot H_2O flowing in the reverse direction and from a series of bends containing hot H_2O with a film of cold H_2O flowing over them. Tests were made with vapour-liquid heat transfer through glass of varying thickness to eliminate film effects, the outside diam. being const. From these the conductivity was computed as 0.0027 c.g.s. unit. With const. film conditions the overall heat transfer varies inversely as the wall thickness, the effect of thickness being less at lower velocities. The data enable heat-transfer apparatus using glass to be designed. C. I.

Measurement of particle size and concentration in opal glass. C. DUNBAR (Trans. Opt. Soc., 1932, 33, 135).—An oil-immersion objective is used, and the magnification is determined by measuring a displacement of a mechanical stage, the fixed and moving stages carrying interferometer plates. C. W. G.

Kaolins and clays. G. KEPPELER and H. GOTTHARDT (Sprechsaal, 1931, 64, 863—892; Chem. Zentr., 1932, i, 1136).—43 clays were subjected to rational analysis; the highest mica content was 82%. The H_2O -sol. and org. constituents have a considerable influence on the behaviour of the clay. By means of the pipette method the content of particles down to 0.1 μ was measured. Kaolins and kaolin clays are coarser than plastic clays. The dispersion was measured by coloration with methylene-blue and by absorption of H_2O from air. The plasticity val. is approx. parallel

with the particle size. The behaviour on firing and the porosity are discussed in relation to composition and particle size. A. A. E.

Stoneware and bubble formation. W. SCHUEN (Tonind.-Ztg., 1931, 55, 1172—1173, 1187; Chem. Zentr., 1932, i, 725).—Bubbles may arise by introduction of air when the green mass is pressed, by the use of clays which "froth" on over-burning, or by the formation of CO from Fe oxides and C. A. A. E.

Corrosion of vessels made of pure oxides. R. WINZER (Angew. Chem., 1932, 45, 429—431).— MgO , BeO , Al_2O_3 , and ZrO_2 vessels withstand the action of all gases except F at temp. up to 1700—1800°; for F, fluorspar may be used up to 1000°. In strongly reducing atm. MgO is reduced at $> 1800^\circ$, whilst halogens in presence of, e.g., C or CO cause corrosion. Ignited Al_2O_3 is highly resistant to boiling conc. H_2SO_4 , HCl , HNO_3 , HF (40%), H_3PO_4 , and NaOH (20%), ZrO_2 being rather less resistant owing to the traces of impurities normally present; BeO is especially resistant to alkalis. Details are given of the behaviour of ignited Al_2O_3 and ZrO_2 , and in certain cases MgO and BeO , when in contact with molten metals, minerals, oxides, hydroxides, and salts. In a reducing atm. one or other of the 4 oxides may be used for all metals except Li. Na_2O , Na_2O_2 , etc. and Sb_2O_3 , MoO_3 , and B_2O_3 have very little action on the vessels, whereas Fe and Mn oxides react rapidly; Al_2O_3 is moderately satisfactory for SiO_2 at 1780°. Most salts and many minerals are without action at $< 1200^\circ$, and even alkali silicates, borates, and phosphates have little action, especially on Al_2O_3 , at still higher temp. H. F. G.

Refractories. VI. Methods of determining water absorption. M. NAKAMOTO (J. Soc. Chem. Ind., Japan, 1932, 35, 214 B).—The same result for the H_2O -absorption of various refractory materials was obtained by drying at 130°, 110°, and 100°. Partial and total immersion in H_2O also gave the same result. H. F. G.

Regenerative furnaces. Heat insulation and refractories.—See I.

PATENTS.

Electric lehr [for annealing glassware]. V. MULHOLLAND, ASST. to HARTFORD-EMPIRE Co. (U.S.P. 1,833,090, 24.11.31. Appl., 30.12.25).—Apparatus comprising a tunnel having a perforated metallic floor formed with angularly arranged heat-reflecting surfaces, and supporting an endless conveyor, electric heating elements, and means for causing a vertical current of temp.-controlling medium to flow between the ware to be treated, through the conveyor and the perforations in the floor, is claimed. J. S. G. T.

Enamel containing barium and strontium compounds and for enamelling of metals. L. E. MIGEOT (U.S.P. 1,833,087, 24.11.31. Appl., 27.5.27. Fr., 26.6.26).—The enamel, which may be sprinkled upon a first coating of opaque white enamel, comprises, e.g., borax 21%, H_3BO_3 11.25%, baryta 25%, felspar 8.75%, alkalis 11%, CaO 11.5%, Zn 10%, and Al_2O_3 1.5%. L. A. C.

Ceramic. S. M. PHELPS (U.S.P. 1,832,913, 24.11.31. Appl., 18.9.29).—A mixture of clay and pitch is baked

and crushed, and incorporated with more of the original mixture, shaped, and fired. L. A. C.

Manufacture of silica-alumina refractories. P. G. WILLETTTS, Assr. to HARTFORD-EMPIRE Co. (U.S.P. 1,832,678, 17.11.31. Appl., 6.9.30).—A material containing $\leq 96\%$ of $\text{Al}_2\text{O}_3 + \text{SiO}_2$ and $\geq 1.5\%$ of $\text{Fe}_2\text{O}_3 +$ alkalis is ground to an impalpable powder, mixed with suitable grog of the same material, pressed ($12\% \text{H}_2\text{O}$) in stages in a mould free to float in the direction of pressing, and fired to $\leq 1480^\circ$ on supports with a firing shrinkage \leq that of the object. J. A. S.

Manufacture of articles of silica. BRIT. THOMSON-HOUSTON Co., LTD., Asses of G. A. F. WINCKLER (B.P. 374,761, 6.11.31. U.S., 6.11.30).—A layer of irregular or shaped SiO_2 particles is heated by a gas flame to cause sintering and union of the particles at the points of contact, and a clear, compact layer is sprayed on to the surface. L. A. C.

Manufacture of porous articles of silica. ALBRIGHT & WILSON, LTD., and G. KING (B.P. 374,463, 6.3.31).—A mixture of amorphous SiO_2 , CaCO_3 , and a Si ester (cf. B.P. 290,717; B., 1928, 531) is moulded and, when set, the product is treated with dil. HCl to extract the CaCO_3 . L. A. C.

Silicate-bonded material and its manufacture. L. L. WAGNER (U.S.P. 1,831,982, 17.11.31. Appl., 6.12.26).—A mixture of kieselguhr and an alkaline earth is subjected to superheated steam to form a silicate, and the product sintered, or carbonaceous material is included and the mixture fired. C. A. K.

Lehrs for annealing glass bottles etc. W. P. GREEN (B.P. 376,333, 1.4.31).

Ampoules. Composition for brake-blocks etc.—See I.

IX.—BUILDING MATERIALS.

Properties of porous building materials. V. Absorption of water in certain special cases. E. MADGWICK (Phil. Mag., 1932, [vii], 14, 180—191; cf. B., 1932, 424).—Theoretical; coated specimens, the absorption and transmission of H_2O by cements, and prolonged permeation in stone are considered.

H. J. E.

Durability of slates for roofing. C. M. WATKINS and F. L. BRADY (Dept. Sci. Ind. Res., Bldg. Res. Bull., 1932, No. 12, 10 pp.).—Physical and mechanical tests other than the H_2O absorption afford little correlation with the weathering properties. An accurate estimate of quality may be formed by observing the effect of immersing slates in 20% and $40\% \text{H}_2\text{SO}_4$ for 10 days, and this test is suggested for inclusion in a standard specification. C. A. K.

Hydration of anhydrite in presence of calcium hydroxide. H. LAFUMA (Compt. rend., 1932, 194, 2309—2311).—Addition of CaO accelerates the setting of anhydrite (cf. B., 1919, 905 A). Such addition diminishes the velocity of hydration and the amount of CaSO_4 in solution, but also greatly diminishes the loss by evaporation etc. of H_2O , which, being thus retained longer in contact with the CaSO_4 , effects more complete hydration and consequent setting; moreover in

presence of CaO much smaller crystals of $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ are formed, which increases the hardness of the set product. C. A. S.

Hardening of Portland cement. K. KOYANAGI (Cement, 1932, 5, 214—218).—Cryst. $\text{Ca}(\text{OH})_2$ is produced when CaO is slaked either with pure H_2O or with gypsum solution, the only difference being that with the latter the crystals are larger and are more numerous and perfectly formed. The solubility of $\text{Ca}(\text{OH})_2$ is somewhat less in CaSO_4 solution than in H_2O . $\text{Ca}(\text{OH})_2$ has never been found to crystallise in the form of fine needles, and such needles formed by the reaction of cement with excess of H_2O are actually $3\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 3\text{CaSO}_4 \cdot 32 \cdot 6\text{H}_2\text{O}$. (Cf. Tippmann, B., 1932, 64.) C. A. K.

Effect of small quantities of magnesia on the colour of Portland cement clinker and on the formation of alite. I. M. FUJII and K. ASAOKA (J. Japan. Ceram. Assoc., 1932, 40, 148—154).—Raw mixtures were heated at 1500° for 1 hr. in a Udo furnace, ground, and passed through a 4900-mesh sieve. All clinkers from $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-CaO}$ (A) were yellow or yellowish-brown, whilst those from $\text{SiO}_2\text{-Fe}_2\text{O}_3\text{-CaO-MgO}$ ($0.5\text{--}6.5\%$) (B) were greyish-green. Addition of MnO_2 or Na_2O to A gave brown or yellowish-green cements, but caused no colour change in B. CH. ABS.

Accelerators in cements used in drilling oil wells. N. LUTZENKO and R. GRODZOVSKAYA (Azerbaij. Neft. Choz., 1932, No. 2, 75—81).— CaCl_2 and NaCl have similar accelerating properties; their use is discussed.

CH. ABS.

Absorption of water by cement. P. HÄNSEL, R. STEINHERZ, and C. L. WAGNER (Zement, 1931, 20, 1048—1052, 1064—1069; Chem. Zentr., 1932, i, 725—726).—The quantity of H_2O retained by the cement when a mixture of cement and H_2O is centrifuged 5 min. after mixing increases with the quantity of H_2O used to a limiting val. which depends on the fineness, but not on the chemical nature, of the cement. The centrifuged mass can be stirred and re-centrifuged with separation of H_2O until a min. quantity is retained. The system Portland cement- H_2O behaves exactly like cement-vaseline oil, fine sand- H_2O , or fine sand-vaseline oil. If the mixed cement is left for 1—3 hr. before centrifuging, little change takes place in the H_2O uptake, but in longer periods more, up to 100% , is retained. The solutions obtained are alkaline alkali sulphate solutions.

A. A. E.

Reaction between water and cement. H. KÜHL [with WANG, BERCHEM, and KAEMPFE] (Tonind.-Ztg., 1931, 55, 1399—1401; Chem. Zentr., 1932, i, 726).—Cement clinker (0.1 mm.) was shaken with saturated $\text{Ca}(\text{OH})_2$ solution. $3\text{CaO} \cdot \text{Al}_2\text{O}_3$ is slightly sol., whilst Ca silicate is practically insol.; Fe is insol. The dissolved aluminate was subsequently deposited as a gel. $3\text{CaO} \cdot \text{SiO}_2$ appears to eliminate CaO when it takes up H_2O . On hydration of alumina cement $2\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$ is formed in spherulites and hexagonal plates. The aluminous constituents of the alumina cement react more rapidly than the siliceous. Hydration experiments with blast-furnace slag are described; polysulphides play an important part. A. A. E.

Concrete containing trass. A. STEOPOE (Bul. Chim. Soc. Române Stiinte, 1930, 33, 19—23).—The crushing strength (after 7 days) of concrete made with cement containing 20% of trass was 26—27% lower than that made with pure cement. Replacing 12.5% of the sand in the concrete by trass lowered the strength by 2.7% and 17.4% respectively with two different samples of cement. The strength (after 7 days) of concrete made with a binder consisting of cement, trass, and CaO was much lower; such concrete could not be used for work requiring a high initial strength. Slightly higher strength was possessed by a concrete in which the sand and gravel were replaced by volcanic tuff. A. B. M.

Influence of addition of trass on the contraction of concrete. A. STEOPOE (Bul. Chim. Soc. Române Stiinte, 1930, 33, 33—35).—On the addition of trass to ordinary Portland cement the contraction on drying at first decreases, passes through a min. when 20—25% has been added, and thereafter again increases. With superior cements, however, the initial decrease is negligible. The contraction is smaller the longer the test-pieces have been immersed in H₂O. A. B. M.

Composition of Philippine woods. III. Balobo, alupág, banai-banai, dulit, and pine. L. BAENS, F. M. YENKO, A. P. WEST, and H. M. CURRAN (Philippine J. Sci., 1932, 48, 299—303).

Woods of Karafuto.—See V. EtHg compounds [for timber].—See XVI.

PATENTS.

Lime kiln. R. T. HASLAM, ASSR. TO ROCKLAND & ROCKPORT LIME CORP. (U.S.P. 1,832,552, 17.11.31. Appl., 27.12.26).—In a lime kiln fired by means of mechanically operated stokers, flue gas is recirculated to the kiln in advance of the hot combustion gases to prevent overburning. C. A. K.

Calcium sulphate plaster mixes and their application. IMPERIAL CHEM. INDUSTRIES, LTD., and V. LEFEBURE (B.P. 374,440, 4.2.31).—A plaster of the accelerated anhydrite type < 70—80-mesh is gauged with H₂O and sprayed. A smooth surface may also be obtained by incorporating up to 50% of a relatively coarse filler, e.g., quartz. C. A. K.

Plaster and cement mixes and their application. V. LEFEBURE, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 374,455, 4.2.31).—A glossy exposed surface is produced by using a mixture of 5—95% of Ca(OH)₂, Portland, white, or high-Al₂O₃ cement and 95—5% of an accelerated anhydrite plaster. The backing may be made non-absorbent by applying a bitumen emulsion. C. A. K.

Manufacture of Portland cement. A. C. EICHENLAUB and H. G. LOEFFLER, ASSTS. TO C. C. MILLER (U.S.P. 1,832,192, 17.11.31. Appl., 7.1.27).—Cement slurry is passed through a rotating annular chamber surrounding a tube through which the clinker passes, thus effecting a heat exchange. C. A. K.

Increasing the solidity of concrete. C. GROSSMANN (B.P. 374,716, 8.9.31).—Prepared concrete mixture is subjected to mechanical pressure directly after mixing and before placing. C. A. K.

Manufacture of artificial stone products. J. HAGGARD, ASSR. TO ATLAS LIME CO., INC. (U.S.P. 1,831,858, 17.11.31. Appl., 1.3.30).—A plastic mixture of 1% of gypsum, 8.5% of Ca(OH)₂, 0.5% of a water-proofing colloid, and 90% of a vesicular aggregate is moulded and heated to approx. 150° by means of steam. C. A. K.

Apparatus for treating wood with fluids for preserving and other purposes. F. POUND (B.P. 375,890, 7.4.31).

Sulphurised phenols.—See III. Moulding compositions.—See XIV.

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

Regenerative chambers in a 200-ton open-hearth furnace fired with mixed gas. K. HÜBNER (Arch. Eisenhüttenw., 1931—2, 5, 591—599).—The quantities of gas, air, and flue gases passing through the regenerative chambers of a modern open-hearth furnace have been measured, and their temp., pressure, and composition determined; from the results the thermal balance and efficiency of the regenerator have been calc. and conclusions drawn as to the efficiency of the insulating material. A. R. P.

[Gas and heat] distribution in puddling furnaces. A. BRANDL (Arch. Eisenhüttenw., 1931—2, 5, 609—613).—Variations in the speed, temp., and pressure of the gases in a puddling furnace fired with 3 large end burners and 12 small side burners are shown graphically. A. R. P.

Problem of basic open-hearth slags. A. KLAUS and N. WARK (Arch. Eisenhüttenw., 1931—2, 5, 603—606).—The Fe content of basic open-hearth furnace slags during the melting of the charge and the "boiling" operation increases with increasing basicity of the slag and decreases with increase of SiO₂. The amount of Mn taken up from the bath appears to have little relation to the slag composition, but increases with increasing slag:metal ratio. A. R. P.

Slag problem in iron foundry practice. J. E. FLETCHER (Fuel Econ. Rev., 1932, 11, 62—68).—The influence of slag constituents is dealt with and stress is laid on careful cupola operation during charging if the slags produced are to function properly. Many scavenging dopes have been used; probably the most successful consists in adding approx. 1 lb. of Na₂CO₃ in the ladle to 100 lb. of Fe. C. A. K.

Superheating and heat-treatment of grey cast iron. J. W. DONALDSON (Metallurgia, 1932, 6, 49—52).—The influence of superheating and heat-treatment of cast Fe as observed by other workers during recent years is reviewed. C. A. K.

Precipitation-hardening of steel with 18% Cr and 8% Ni by addition of beryllium, boron, or titanium and its effect on the resistance to corrosion. H. BENNEK and P. SCHAFMEISTER (Arch. Eisenhüttenw., 1931—2, 5, 615—620).—Addition of > 0.38% Be to 18:8 Cr-Ni steel causes the separation of α on quenching from 1100° whereas 1.19% Be totally destroys the austenitic structure. With const. Be content between these vals., increase of Cr reduces and increase

of Ni increases the amount of residual austenite; with 0.7% Be the quenched steel is purely austenitic with 11.6% Ni and 13.3% Cr. Hence Be has a much more powerful effect than Cr in restricting the area of the γ -field. The hardness of oil-quenched Be-Cr-Ni steels increases with rise of quenching temp. between 950° and 1250° when the structure is ferritic and decreases when the structure is austenitic. After quenching in oil from 1250° max. pptn.-hardening is obtained at 500° in 2 hr. (600 Brinell) with the 1.2:7:20 Be-Ni-Cr steel, at 500° in 48 hr. (395 Brinell) with the 0.8:12:18 steel, and at 600° in 20 hr. (370 Brinell) with the 0.7:12:13 steel; in all cases the pptd. constituent is readily visible under the microscope. Hardened ferritic steels of this type are extraordinarily brittle, but those with an austenitic structure, although more brittle than plain Ni-Cr steel, are satisfactory for cutlery. Ti has a similar effect to Be, but less marked, on the austenitic structure of Ni-Cr steels; pptn.-hardening is obtained only with >1.8%, preferably 3%, Ti, and these steels are entirely ferritic and, like the Be steels, very brittle in the fully hardened state. Addition of up to 1.3% B to Ni-Cr steels has no effect on the quenched austenitic structure. After pptn.-hardening B-Ni-Cr steels have a high yield point and ultimate strength combined with a relatively good elongation. The corrosion-resistance of Ni-Cr steels decreases with increasing addition of hardening constituent and with increase in pptn.-hardening, but in no case does it approach that of plain Ni-Cr steels.

A. R. P.

Testing nickel-iron alloy by means of the a.c. potentiometer. D. C. GALL (J. Sci. Instr., 1932, 9, 219—222).—A simple method of measuring simultaneously the power loss and the energy stored in the Fe by means of the a.c. potentiometer is described, and results are given for an Fe-Ni sample. C. W. G.

Special alloy steels as applied to chemical engineering. T. G. ELLIOT, R. J. SARJANT, and W. CULLEN (Chem. & Ind., 1932, 502—514, 527—531).—Results of corrosion tests in acids, resistance to scaling, working properties, and physical properties of Cr and Cr-Ni steels are given. The application of such alloy steels in furnace operation, the glass industry, and other chemical processes is discussed. C. A. K.

Limits of [plastic] flow in non-ferrous metals. P. SCHOENMAKER (Rec. trav. chim., 1932, 51, 598—604).—The absence of discontinuities in the load-extension curves of many non-ferrous metals is due to the ease with which twinning occurs in such metals at comparatively low stresses. The lattice of metals showing this behaviour is face-centred, whilst those having a space-centred lattice undergo plastic deformation by translatory slipping which occurs abruptly at much higher stresses. When the freedom of movement of atoms of metals of the former class is restricted by lowering the temp., discontinuities in their load-extension curves are observed, as shown by the behaviour of Cu and brass at temp. down to -80°. F. L. U.

Properties of Cu-Ni-Sn and Cu-Ni-Si alloys used for safety valves. L. GUILLET, A. LE THOMAS, and M. BALLAY (Compt. rend., 1932, 194, 2102—2105).—Alloys containing Cu 50—30 pts., Ni 50—70, Sn

0—15 possess a structure similar to that of ordinary bronzes containing the same amount of Sn. The Brinell hardness at 20° is a max. (168) for 30Cu + 70Ni + 15Sn. The Si alloys examined contained Cu 48—34, Ni 50, Sn 2—16, and Si 0—5 pts.; the max. hardness (426) is given by 34Cu + 50Ni + 16Sn + 5Si. Specially suitable for steam-valve construction are: Ni 50, Cu 39, Sn 8, Si 2%, and Ni 65, Cu 27.5, Sn 4, Si 3.5%, both having a hardness of approx. 350 at 20° and 315—320 at 450°, with structures resembling that of 15%-Sn bronze. C. A. S.

Influence of iron and silicon on properties of aluminium and aluminium alloys. W. O. KROENIG (Tzvet. Met., 1931, 872).—Fe and Si improve the mechanical properties, but reduce resistance to corrosion. Fe increases brittleness of alloys, whilst Si (1—2%) has no effect on the mechanical properties of alloys not containing Mg, and does not considerably increase corrosion. CH. ABS.

Viscosities of fluxes and slags occurring in smelting magnesium. HARDOUIN, COCHET, and DE FLEURY (Compt. rend., 1932, 194, 2143—2144).—Viscosity measurements at 700° show that the addition of a fluoborate to mixtures of Na₂B₄O₇ and B₂O₃ gives a very wide range of viscosities, providing fluxes which facilitate the production and pouring of Mg.

C. A. S.

Determination of the thickness of electrolytic deposits of chromium. O. MACCHIA (L'Ind. Chimica, 1932, 10, 717—725).—Cu discs are Cr-plated, the central part is covered with a rubber stopper, and the remainder paraffined or protected with a thin layer of lard. After removing the stopper the circular zone of Cr is removed by dissolving in HCl and the CrCl₃ formed is determined by chemical analysis. The thickness of the deposit is calc., the area covered by the stopper being known. O. F. L.

Coke-oven gas. Metallurgical coke.—See II.

PATENTS.

Nitrogenisation of iron, steel, and alloys thereof. ELECTRO METALLURG. Co., Assees. of J. J. EGAN (B.P. 374,097, 26.2.31. U.S., 26.2.30).—Fe with 1% Al is wrapped in a Cu or brass gauze and nitrogenised by heating in NH₃ at 450—580°. The Cu accelerates and intensifies the case-hardening, which may still further be improved by addition of NO to the NH₃. A. R. P.

[Hard, non-staining] iron and steel alloys. F. KRUPP A.-G. (B.P. 374,541, 19.3.31. Ger., 22.1.31).—Fe alloys with >50% Fe, 6—40% Cr, 25—0.5% Ni, \geq 1% C, 0.1—8% of Ta, Nb, Ce, or U, and small quantities of Si, Mn, W, Mo, V, or Co are claimed. After quenching from 700—1300° pptn.-hardening occurs on subsequent tempering at 150—800°.

A. R. P.

Heat-treatment of [steel] rails such as railway or tramway rails. BETHLEHEM STEEL Co., Assees. of E. F. KENNEY (B.P. 372,316, 29.1.31. U.S., 5.2.30).—After hot-rolling to shape the rail is allowed to cool until the metal of the web and flanges just becomes magnetic while the head is above this crit. point. The rail is then quenched in H₂O for 30 sec., transferred

to a Pb bath at 540° for 4—5 min. and then to a closed furnace at 540° for 1—1½ hr., and finally allowed to cool in the air. In this way a hard sorbitic structure is obtained in the head, but the metal is free from permanent internal stresses. A. R. P.

Concentration of [oxidised copper] minerals by flotation. MINERALS SEPARATION, LTD., and S. TUCKER (B.P. 373,667, 2.3.31).—Flotation is effected with a mixture of a xanthate and a sulphonated compound of a fatty acid or fatty oil (*e.g.*, oleic acid or castor oil) with a sol. frothing agent, *e.g.*, cresylic acid. A. R. P.

Flotation concentration of [copper] minerals. MINERALS SEPARATION, LTD., Assees. of C. H. KELLER (B.P. 373,662—3, 2.3.31. U.S., 1.3.30).—Collectors for use in floating Cu sulphide minerals comprise (A) the reaction product of P₂S₅ with BzOH, EtCO₂H, AcOH, furoic or salicylic acid, or the Pb or Cu salts thereof, or (B) a salt of an alkylmonothiocarbonic acid. A. R. P.

Compounding a lead alloy. W. W. TRIGGS. From S. & T. METAL Co. (B.P. 374,005, 23.2.31).—Molten Pb under a layer of fused CaCl₂ is treated at 870° with 0.5—2 (1)% Sn, 0.02—0.1 (0.05)% Al, and 0.3—1 (0.5)% Ca, cooled to 315—370°, treated with rosin, and, while the rosin is burning, with 0.02—0.22% of one or more of the metals Mg, K, and Li (0.075% Mg, 0.04% K, 0.04% Li). Addition of 0.1—0.5 (0.25)% of Hg may be made after the Li. A. R. P.

Modification of aluminium-base alloys containing silicon. LIGHTALLOYS, LTD., Assees. of METALGES. A.-G. (B.P. 374,370, 30.11.31. Austr., 23.12.30).—Si-Al alloys with 3—35% Si are melted under a flux comprising chlorides, fluorides, carbonates, and oxides of the alkali and/or alkaline-earths metals, and modification is effected by addition of > 0.1% of Na or K. With 0.3% Na the alloy with 17% Si has a purely eutectiferous, fine-grained structure. A. R. P.

Production of tarnish-resisting metals, particularly those comprising silver. PRECIOUS METALS DEVELOPING Co., INC. (B.P. 374,002 and Addn. B.P. 374,003, 20.2.31. U.S., [A] 31.5.30, [B] 21.1.31).—(A) A tarnish-resisting surface on Ag is produced by plating it with Rh, using a bath obtained by dissolving in 1 litre of H₂O the dry salt obtained by evaporating to dryness a solution of 5 g. of (NH₄)₃Rh(NO₂)₆ in 1 litre of boiling H₂O containing 20 c.c. of H₂SO₄, 100 g. of NaNO₃, and 20 g. of NH₄NO₃. The bath is operated at 27—38° using 20—50 amp. per sq. ft. (B) The article is plated with Ni and/or Pd prior to plating with Rh. A. R. P.

Recovery of molybdenum, tungsten, and vanadium from ores or the like. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 374,250, 26.5.31).—Ores or residues (spent catalysts) containing sulphides of Mo, W, or V and carbonaceous matter are heated in a non-oxidising atm. to expel volatile matter without burning off the fixed C, and then treated with Cl₂ or HCl containing 3—10% O₂ so as to volatilise the Mo, W, or V as oxychloride. A. R. P.

Recovery of beryllium from a silicate or silicate ore thereof. BERYLLIUM DEVELOPMENT CORP., Assees. of H. C. CLAFLIN (B.P. 374,705, 27.8.31. U.S., 17.9.30).

—A mixture of crude beryl (10—12% BeO) 30 pts., Na₂SiF₆ 19 pts., and NaF 4 pts. is fused at 600—900° for 3 hr. and the product is leached with H₂O to separate Na₂BeF₄ from the residue of Al₂O₃ and SiO₂. The solution is heated with NaOH to recover BeO and regenerate NaF. A. R. P.

Silver-plating of spoons and the like. H. KRÜGER (B.P. 372,631, 25.7.31).—The deposit is thickened locally by the use of shielding devices provided with openings at the places to be thickened. A. R. P.

Casting of magnesium and its alloys. F. BADGER (B.P. 375,979, 9.6.31).

Muffles.—See I. Enamel.—See VIII. Pickling baths.—See XIII.

XI.—ELECTROTECHNICS.

Primary battery improvements. Ammonium persulphate as a depolariser. A. M. CODD (Electr. Rev., 1932, 111, No. 2849, 14—15).—The construction, action, and characteristics of a primary battery comprising C and Zn electrodes arranged in a solution of (NH₄)₂S₂O₈, functioning both as excitant and depolariser, are described. The output of the cell is 4—5 amp.-hr. at 1.5 volts per oz. of (NH₄)₂S₂O₈ used. J. S. G. T.

Cr-plate.—See X.

PATENTS.

Electric [arc] furnace. A. E. GREENE (U.S.P. 1,832,483, 17.11.31. Appl., 8.8.31).—Means are provided for controlling the flow of current through the metal or ore being treated, for stabilising the arc, and for regulating the current, *e.g.*, by movement of electrodes. J. S. G. T.

Electric [arc] furnace. F. FRENZEL, Assr. to SIEMENS & HALSKE A.-G. (U.S.P. 1,830,992, 10.11.31. Appl., 10.8.29. Ger., 13.4.29).—A furnace comprising an adjustable double-walled furnace shell, preferably with both parts open at the bottom, and a hearth consisting of a trough of considerably greater diameter than the inner shell is claimed. J. S. G. T.

Electric furnace. H. I. ALTSHULER and G. B. LANTZ (U.S.P. 1,831,054, 10.11.31. Appl., 23.4.28).—Heating chambers, completely separated from one another, are arranged around a completely sealed enclosure filled with granular resistor material through which a const. electric current is maintained. J. S. G. T.

Production of an electrochemical reaction between the gases of a gas mixture by means of glow discharges. METALGES. A.-G. (B.P. 374,485, 3.3.31. Ger., 2.4.30).—The mixture, to which electrically charged particles may be added, is subjected to positive glow discharges emitted by discharge electrodes coating with electrodes which are earthed or of opposite polarity. J. S. G. T.

Electrolytic cells and electrolytes. R. S. McNELLIS (B.P. 374,684, 8.8.31).—A cathode formed of inactive material, *e.g.*, Pb, C, and an anode of PbS are arranged in an electrolyte containing free acid, *e.g.*, HCl or AcOH, and a salt the anion of which contains Cr, *e.g.*, K₂Cr₂O₇. J. S. G. T.

Electrolytic apparatus. K. TEUFEL, Assr. to I. G. FARBENIND. A.-G. (U.S.P. 1,831,934, 17.11.31. Appl., 11.2.28. Ger., 21.2.27).—Electrolyte is introduced into

the cells from below and withdrawn from the upper part by passing over weirs arranged in opposite cell walls normal to the electrodes. J. S. G. T.

Manufacture of carbon electrodes. H. D. ELKINGTON. From VERKAUFSVEREINIGUNG F. TEERERZEUGNISSE G.M.B.H. (B.P. 373,165, 8.1.31).—The raw materials, *e.g.*, pulverised anthracite or petroleum coke, are mixed with a binding agent obtained by the destructive distillation of coal-tar pitch; the resulting mass is shaped into electrodes and carbonised in the absence of air in known manner. If desired, the pitch distillate may be used in admixture with other binding agents. A. B. M.

Electrical insulator. G. W. BOWER, Assr. to GEN. ELECTRIC Co. (U.S.P. 1,832,804, 17.11.31. Appl., 17.3.30).—Insulators composed of material comprising mica and Pb borate (see B.P. 152,780; B., 1920, 820 A) are soaked in an aq. solution of H₂SO₄ to prevent absorption of H₂O. J. S. G. T.

Mass core [for induction coils etc.]. E. KRAMER, Assr. to HARTSTOFF-METALL A.-G. (HAMETAG) (U.S.P. 1,832,937, 24.11.31. Appl., 14.4.30. Ger., 13.4.29).—A mixture of powdered metal and particles of fibrous material, *e.g.*, silk paper, considerably thinner than, and of length not exceeding the circumference of, the metal particles, together with an agglutinant, *e.g.*, bakelite, is compressed. J. S. G. T.

Liquid electrode devices [e.g., switches]. W. R. WALKER, Assr. to GEN. ELECTRIC VAPOR LAMP Co. (U.S.P. 1,831,935, 17.11.31. Appl., 29.4.29).—Pure Hg is introduced into a tubulated envelope filled with N₂ after removal of occluded gases and vapours, the N₂ replaced by H₂, and the envelope sealed off. J. S. G. T.

Vapour [mercury] arc apparatus. W. J. WINNINGHOFF, Assr. to GEN. ELECTRIC VAPOR LAMP Co. (U.S.P. 1,831,985—6, 17.11.31. Appl., [A] 20.7.25, [B] 25.1.27).—A cathode composed of Hg amalgamated with 0.003—0.03% of (A) Al, (B) Cu is claimed. J. S. G. T.

Vapour [electrical] discharge device. T. E. FOULKE, Assr. to GEN. ELECTRIC VAPOR LAMP Co. (U.S.P. 1,832,009, 17.11.31. Appl., 2.3.26).—Lead-in wires and the regions of sealing-in of electrodes of gas-filled discharge devices filled, *e.g.*, with He (95%) and Ne (5%) are coated with Li₂O. J. S. G. T.

Photoelectric tube. V. K. ZWORYKIN, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING Co. (U.S.P. 1,832,607, 17.11.31. Appl., 15.5.26).—Metallic ions, *e.g.*, of K, passed electrolytically from an external bath, *e.g.*, of molten KNO₃, into the interior of an envelope of glass substantially free from Na and containing > 1% Pb, are deposited on a part of the envelope wall. J. S. G. T.

Photoelectric tube. A. J. McMASTER and C. E. PARSON, Assrs. to G.-M. LABORATORIES (U.S.P. 1,831,314, 10.11.31. Appl., 14.6.30).—An alkali metal, *e.g.*, Cs, is deposited upon a cathode consisting, *e.g.*, of a Cu plate coated with Ag, arranged within a heated envelope containing an inert gas, *e.g.*, A. The Cs deposit is oxidised by introducing O₂ into the cooled envelope after removal of the A. Finally the O₂ is removed and the envelope heated and exhausted to remove excess Cs. J. S. G. T.

Cathode [for vacuum tubes]. H. S. COOPER and M. D. SARBEY, Assrs. to KEMET LABORATORIES Co., INC. (U.S.P. 1,830,825, 10.11.31. Appl., 20.11.28).—A metallic conductor, *e.g.*, of Pt, Ni, W, immersed in an aq. solution of an alkaline-earth bicarbonate is heated electrically so that solid alkaline-earth compound is deposited on the conductor. J. S. G. T.

Gaseous electric-discharge luminous devices. CLAUDE NEON LIGHTS, INC., Asses. of L. L. BECK (B.P. 374,419, 5.12.30. U.S., 7.12.29).—A hollow cathode surrounding a heating element and coated inside with a lower oxide of Ba produced by heating a deposit of BaO₂ is arranged within a relatively narrow discharge tube filled with Kr or Xe and Hg, and operated at a c.d. of 0.5—1.5 amp. per sq. cm. of gas column cross-section, the voltage drop along the positive column being 10—20 volts per ft. length of tube. J. S. G. T.

Production of galvanic cells. A. KUNZE (B.P. 375,898, 8.4.31. Ger., 8.4.30).

[Ultra-violet] electric glow-discharge lamps. WESTINGHOUSE LAMP Co., Asses. of J. W. MARDEN and M. G. NICHOLSON (B.P. 374,466, 10.3.31. U.S., 21.3.30).

Ampoules. Temp. control.—See I. C granules. **Dehydration of emulsions etc.**—See II. Lehr.—See VIII. **Tarnish-resisting Ag. Ag-plating spoons.**—See X. **Glycerin.**—See XII. **Purifying feed water etc.**—See XXIII.

XII.—FATS; OILS; WAXES.

Deacidification of oils with glycerin. E. SCHLENKER (Allgem. Oel- u. Fett-Ztg., 1932, 29, 343—346; cf. B., 1931, 641).—Experiments quoted indicate that a mixture of EtOH and glycerin (*e.g.*, 2:1) might be employed in suitable plant to deacidify highly acid oils; in laboratory tests, at least, the fatty acids extracted do not entrain much neutral oil. E. L.

Oxygen absorption of oils and fats. E. I. BETTER (Allgem. Oel- u. Fett-Ztg., 1932, 29, 330—341).—Linseed and olive oils rapidly increased in peroxide no. and Kreis reaction on exposure in thin films to a daylight lamp, but scarcely oxidised in the dark; soya-bean oil, however, oxidised at the same rate in the light or the dark. Oils treated with bleaching earths readily became rancid. Bleached palm oil gave a strong peroxide (and Kreis) reaction, which decreased on illumination. E. L.

Refractive index of tung oil. J. RINSE (Rev. trav. chim., 1932, 51, 529—532).—The *n* is used to indicate the extent of polymerisation which occurs on heating. F. L. U.

Polymerisation of fatty oils. I. A. STEGER and J. VAN LOON (Rec. trav. chim., 1932, 51, 648—652).—The Wijs I val. of "polymerised" linseed oil or its Me ester is not characteristic of the product, since it does not reach a max. even after 2 hr. The "final" val. is approx. the same as that of the original oil. The Br—NaBr method gives slightly lower figures, but is not reliable, since absorption increases with time and with the acid (not with the ester) is dependent on the Br concn. Depolymerisation is assumed to accompany addition of halogen. R. S. C.

Twitchell reagent. X. Properties of the principal constituents isolated from Twitchell reagents.

I. K. NISHIZAWA and M. OKUYAMA (Chem. Umschau, 1932, 39, 127—134; cf. B., 1932, 269).—Four principal fractions have been isolated from Twitchell reagents prepared from naphthalene (TN) and PhOH (TP) respectively, following the method of Kuriyama (J. Soc. Chem. Ind., Japan, 1923, 131; 1926, 13); the results obtained differed somewhat from those of Kuriyama, e.g., the hydrolytic power of the new products was lower. The effect of electrolytes on the emulsifying power, hydrolytic activity, and darkening of fatty acids is of the same type as the effect on the complete reagents studied previously. The emulsifying and fat-splitting power of the TN derivatives are greater than those of the corresponding TP components. The unfavourable effect of added AcOH on emulsification etc. is evident even in presence of H_2SO_4 ; AcOH apparently acts to some extent as a solvent, thus reducing the colloidal properties of the reagent. E. L.

Nickel carbonyl in fat hardening. W. NORMANN (Chem. Umschau, 1932, 39, 126).—The formation of $Ni(CO)_4$ by the action of CO on Ni catalyst contained in oil (cf. Fischer and Peters, B., 1931, 962) had been observed by Normann and Pungs (B., 1915, 237) at temp. as low as 30° . H_2 prepared by the water-gas-Fe process always contains sufficient CO (traces) for $Ni(CO)_4$ to be detectable in residual gases from the fat-hardening vessel. The amount of Ni lost in consequence is not known, although it does not appear to be considerable. E. L.

Preparation of stearine from highly hardened fats without pressing. F. WITTKA (Allgem. Oel- u. Fett-Ztg., 1932, 29, 323—330).—Large-scale experiments showed that the fatty acids obtained by hardening palm oil (or beef tallow) to m.p. about 58° and saponifying by the autoclave process were very similar in composition (stearic, palmitic, and isooleic acid contents) to commercial press-stearines, and possessed many, although not all, of the desired physical properties. E. L.

Catalytic action of perfumes in the deterioration of scented soaps. E. I. BETTER (Chem.-Ztg., 1932, 56, 549—550).—The tendency, when a perfume has been added to an unsuitable soap base, for the soaps to become rancid may be due to reactions between alkali and CO_2H and OH groups in the scent. Aldehydes may undergo surface oxidation followed by neutralisation and polymerisation. Rancidity is associated with oxidation of fats or fatty acids liberated by atm. oxidation. Aldehydes, especially aromatic aldehydes, have been shown to be oxidation catalysts, as are also aromatic ketones. Terpenes, aromatic alcohols, and aromatic acids having the CO_2H group in the side chain are inactive or anti-oxidants, as are esters of differing homologues. This classification is confirmed to some extent by practical experience, but other factors may also operate. C. I.

Preparation of the soap base for toilet soaps. R. KRINGS (Allgem. Oel- u. Fett-Ztg., 1932, 29, 346—348).—A note on current German methods, and suggestions for improvements. E. L.

Determination of free [caustic] alkali in soap. W. POETHKE (Chem. Umschau, 1932, 39, 121—126).—

The $BaCl_2$ method (using 50% EtOH or H_2O as solvent for the soap) gives results that are far too low, especially when only small amounts of free alkali are to be determined. The EtOH method (without filtration) is satisfactory and returns 95—98% of the free NaOH present. CO_2 should be excluded as far as possible during the test. The problem of "neutralising" EtOH is discussed. The use of Pr^oOH as solvent is suggested in order to obviate the gelation of the soap solutions on cooling. E. L.

Olive grignons.—See XVI.

PATENTS.

Treatment of oils. T. J. FAIRLEY, Assr. to W. J. and M. P. HUNTER (U.S.P. 1,831,105, 10.11.31. Appl., 21.5.28).—Fatty or essential oils or, particularly, terpene hydrocarbons, e.g., turpentine, are distilled over colloidal clay of the type of bentonite; the distillate (50—75%) is useful as a solvent, e.g., for reclaiming rubber, and the viscous residual oils serve as lubricating oils. E. L.

Removal of solid oils and waxes from [demargarinating, de-waxing] liquid oils and similar materials. C. V. ZOUL, Assr. to CELITE CORP. (U.S.P. 1,831,433, 10.11.31. Appl., 1.7.24).—Fatty or mineral oil is mixed with 1—8% of diatomaceous earth, chilled sufficiently to solidify the constituents ("stearine," sterols, wax, etc.) it is desired to remove, and filtered through a press which has been pre-coated with a layer of the earth wetted with the de-waxed oil. E. L.

Lead[oil] compound. S. H. DIGGS and F. S. CAMPBELL, Assrs. to STANDARD OIL CO. (U.S.P. 1,830,984, 10.11.31. Appl., 9.8.28).—Pb soap compounds are produced by heating (at $< 163^\circ$) 1 mol. of glyceride with 3 mols. PbO (+ PbO equiv. to any free fatty acids present), preferably in presence of sufficient of an inert diluent to maintain fluidity of the reaction mass (cf. B., 1928, 717). E. L.

Rendering of fatty materials and apparatus therefor. DARLING & Co. (B.P. 374,438, 4.3.31. U.S., 17.3.30).—The comminuted material, preferably mixed with tallow or oil in order to facilitate the flow and heat exchange, is preheated and circulated through a rendering unit consisting of a no. of steam-heated tubes, under vac. to remove moisture etc. Suitable apparatus, including means for separating the oil from the fully rendered material (H_2O 5%), is described. E. L.

Preparation of colloidal solutions of water-immiscible bodies. W. B. PRATT and R. J. NOBLE, Assrs. to DISPERSIONS PROCESS, INC. (U.S.P. 1,831,544, 10.11.31. Appl., 29.12.27).—The H_2O -immiscible materials, e.g., fats (Japan wax), waxes, bitumen, are made into a clear solution (mixture) with a hydrophilic colloid, e.g., soap, phenolsulphonic acid, and sufficient H_2O is added at a suitable temp. to produce phase inversion and yield a very finely-dispersed colloidal solution of the wax etc. in H_2O , which on cooling may form a solid material suitable for transport (e.g., at 15% H_2O , 10% soap) and may be readily diluted with H_2O as required. E. L.

Purification of glycerin. SIEMENS-ELEKTRO-OSMOSE G.M.B.H. (B.P. 374,769, 20.11.31. Ger., 18.12.30).

—Glycerin lyes which have received a preliminary chemical purification (*e.g.*, diluted dynamite glycerin) are subjected to electro-osmotic purification (on a continuous system) in the cathode compartments of a two-cell type of apparatus, and then transferred to the middle compartments of a three-cell type of apparatus for further treatment. E. L.

Manufacture of soap. E. SCHUCK, Assr. to G. E. MCCREERY (U.S.P. 1,831,610, 10.11.31. Appl., 19.3.30).—A relatively dry, fully saponified, neutral soap is prepared by mixing intimately the theoretical amount of powdered NaOH (and/or KOH) with the warmed (38–65.5°) fat and a limited amount of H₂O, > the wt. of the alkali. The thickened emulsion is discharged into a container where saponification is rapidly completed with spontaneous evolution of heat, and the soap is chilled and shredded or milled. E. L.

Distillation. Dispersions.—See I. Lubricant. —See II. Wetting etc. agents. Aq. dispersions etc.—See III.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Red- or white-lead priming for oil enamels. H. WOLFF and B. ROSEN (Farben-Ztg., 1932, 37, 1319–1320).—The use of Pb₃O₄ priming tends to produce early cracking in finishing enamels that are satisfactorily durable over a white-lead foundation. This is tentatively explained by post-drying phenomena. S. S. W.

Hellige-Stock-Fonrobert [colour] comparator. E. FONROBERT (Farben-Ztg., 1932, 37, 1320–1323).—Apparatus and procedure are fully detailed for the determination of "colour nos." of oils, varnishes, resin solutions, etc. according to the author's method (concn. of I solution, matching the colour of the sample under test, in 1-cm. layer). S. S. W.

Testing natural resins. A. W. C. HARRISON (Farben-Chem., 1932, 3, 255–259).—Hard fossil resins show wide variations in their physical properties because ordinary supplies are not uniformly fossilised. The method and significance of the following tests in the evaluation of natural resins are discussed: colour, appearance of fracture, hardness, loss on heating, discoloration on heating, acid val., and sp. gr. S. M.

Solubility of Kauri gum in alcohol-toluene mixtures. L. S. SPACKMAN (New Zealand J. Sci. Tech., 1932, 13, 301–303).—Addition of PhMe increases the solubility of Kauri gum in EtOH. The presence of small amounts of H₂O in the solvent markedly affects the form of the solubility curve. The curve for abs. EtOH-PhMe is a combination of four distinct curves intersecting to produce 3 well-defined peak vals. with varying proportions of solvent constituents. A. G. P.

Hard gutta-percha resin for nitrocellulose lacquers. O. MERZ (Farben-Chem., 1932, 3, 260).—The solubilities of a hard, golden-yellow, transparent gutta-percha resin (const. given) in 25 common solvents are tabulated. The resin appears to be useful for nitrocellulose lacquers. S. M.

PATENTS.

Manufacture of titanium pigments. TITANIUM PIGMENT Co., Inc., Assees. of L. E. BARTON and C. E.

REYNOLDS (B.P. 374,420, 31.12.30. U.S., 14.1.30).—Ti compounds are pptd. by hydrolysis in presence of >10% (*e.g.*, 0.5%, calc. on TiO₂) of Na or K sulphate, nitrate, carbonate, or hydroxide as accelerator, and the product is calcined at >900°. L. A. C.

[Manufacture of] rosin soap lake pigments. G. C. (BARON) MARKS. From E. I. DU PONT DE NEMOURS & Co. (B.P. 369,956, 23.9.30. Addn. to B.P. 334,874; B., 1930, 1164).—In the process of the prior patent the insol. metal compounds of azo dye and/or rosinate are wholly or partly preformed before mixing, any deficiency of metal compound is then supplied, and the pigment is developed under non-acid, preferably alkaline, conditions. [Stat. ref.] C. H.

Fractional distillation of resins or substances containing resin. E. ÖMAN and S. H. LEDIN (B.P. 374,056, 27.2.31).—Heat is supplied to different parts of the distillation column by means other than steam, *e.g.*, hot gases immiscible with the resins. The requisite high temp. is obtained without resort to high pressures, and the separate heating stages give more definite fractionation. S. S. W.

Protective coatings. LE JOINT FRANÇAIS, Soc. ANON. (B.P. 374,465, 7.3.31. Fr., 8.3.30).—Insulating and coating compositions resistant to Cl₂, hypochlorites, alkalis, etc. comprise nitrocellulose (1 pt.) with bituminous substances (2–4 pts.) including especially Judea bitumen. E. L.

Coatings or coverings [of cellulose acetate] for protection [of cellulose nitrate films] against light. KODAK Co., LTD. From EASTMAN KODAK Co. (B.P. 371,901, 24.10.30).—"Cellulose finishes" (obtained with cellulose nitrate lacquers) are protected against loss of lustre through weathering and particularly through exposure to ultra-violet light by a coating of cellulose acetate containing 0.5–5.0% of a polycyclic hydrocarbon (*e.g.*, C₁₀H₈, phenanthrene, anthracene) or certain aromatic derivatives (*e.g.*, phthalimide, nitroanisole, PhNO₂, *p*-NH₂·C₆H₄·CO₂H, and quinaldine) which cause the acetate to absorb substantially all light < 3800 Å.; a plasticiser such as Ph₃PO₄ may also be present. A. J. H.

[Polyvinyl-drying oil] coating compositions. E. I. DU PONT DE NEMOURS & Co. (B.P. 374,113, 4.3.31. U.S., 4.3.30).—Divinylbenzene is polymerised by known methods in the presence of a solvent, *e.g.*, C₆H₆, PhMe, which is subsequently removed. The polymeride (which may alternatively be obtained by pptn. from the solution by adding a non-solvent, *e.g.*, EtOH) is mixed with raw drying oils, *e.g.*, linseed, tung, driers, *e.g.*, Co oleate, and solvents, to give flexible coating materials. S. S. W.

Application of protective coating compositions to containers [*e.g.*, metal pickling baths]. W. E. SMITH (B.P. 373,994, 29.11.30. U.S., 29.11.29).—A mixture of 45 pts. of a filler (*e.g.*, > 28% of asbestos fibre, < 44% of Al silicate, and the remainder BaSO₄) with 55 pts. of a vehicle comprising a mineral asphalt, stearine pitch, blown petroleum asphalt, and naphtha is applied to the interior walls of such containers, and the coating is covered with a protective fibrous material, *e.g.*, wood. S. S. W.

Production of varnish- and enamel-like coatings.

A. JAEGER, Assr. to "HEROLD" A.-G. (U.S.P. 1,830,906, 10.11.31. Appl., 2.7.29. Ger., 28.12.27).—A liquid $\text{PhOH}\cdot\text{CH}_2\text{O}$ condensate is combined with water-glass in the presence of a protective colloid (casein waste, resin or cellulose esters, albuminous material, etc.) in quantity sufficient to prevent pptn. of H_2SiO_3 . L. A. C.

Production of moulded articles from synthetic resins. A. L. MOND. From CELLON-WERKE DR. A. EICHENGRÜN (B.P. 373,995, 29.12.30).—Polymeric thermoplastic vinyl compounds, e.g., polymerised $\text{CH}_2\cdot\text{CHAc}$ or $\text{CHPh}\cdot\text{CH}_2$, together with fillers and/or pigments if desired, are subjected to an "injection moulding process." S. S. W.

Manufacture of mouldable material [from scrap canvas etc.]. L. T. FREDERICK, Assr. to CONTINENTAL DIAMOND FIBRE Co. (U.S.P. 1,831,063, 10.11.31. Appl., 13.8.27).—Scraps of canvas are agitated with a solution of a heat-curable binder (a synthetic resin) until the solvent has evaporated, and the product is moulded under heat and compression. L. A. C.

Manufacture of re-entrant objects from moulding materials containing or consisting of synthetic resin and the like. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 375,974, 8.6.31. Holl., 7.6.30).

Dispersions.—See I. **C granules.**—See II. **Metalliferous azo dyes.** **Azo pigments.**—See IV. **Treating oils.**—See XII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Ageing of vulcanised rubber. XI. **Influence of free sulphur.** T. YAMAZAKI and K. OKUYAMA (J. Soc. Chem. Ind., Japan, 1932, 35, 265—266 B).—The content of free S is not a trustworthy index for the prediction of ageing qualities of vulcanised rubber. The time of vulcanisation and the selection of a vulcanisation accelerator and of the appropriate % of S are important factors towards the ageing behaviour. D. F. T.

Gutta-percha resin.—See XIII.

PATENTS.

Concentration of latices, particularly rubber latex, by the so-called creaming process. E. A. HAUSER (U.S.P. 1,831,492, 10.11.31. Appl., 8.1.30. Ger., 24.1.29).—The concn. of latex by creaming in the presence of mucilages such as of carrageen or Iceland moss is effected at above 90° , whereby complete separation is obtained. D. F. T.

Separation of rubber latex. H. O. LINDGREN, Assr. to DE LAVAL SEPARATOR Co. (U.S.P. 1,831,500, 10.11.31. Appl., 2.7.28. Swed., 12.7.27).—An efficient process for the purification of rubber latex and the separation of a concentrate of high purity comprises two stages demanding two distinct types of centrifuge: in the first the bulk of the impurities, including those liable to clog the separator bowl, are removed; in the second the separation into cream and "skim" is effected. D. F. T.

Apparatus for forming rubber articles [from latex]. W. A. GIBBONS and E. HAZELL, Assrs. to GEN. RUBBER Co. (U.S.P. 1,832,012, 17.11.31. Appl., 28.10.27).

—Thread or tubing is formed by extruding a rubber dispersion contained in a movable vessel (for maintenance of const. head) from an orifice at an adjustable depth below a coagulant where it subsequently passes around a drum while complete coagulation is effected; it is then progressively removed, washed, and vulcanised.

D. F. T.

[Rubber] latex composition. W. B. VAN ARSDEL and R. B. HILL, Assrs. to BROWN Co. (U.S.P. 1,831,895 17.11.31. Appl., 23.7.29).—The concn. and/or purification of vulcanised latex by creaming is expedited by the addition of more than 25% of unvulcanised latex and the physical character of the vulcanised material is concurrently modified. D. F. T.

Manufacture of rubber compounds. GOODYEAR TIRE & RUBBER Co. (B.P. 374,624, 4.6.31. U.S., 27.9.30).—Bloom in unvulcanised rubber is prevented by incorporating a mixture of insol. S_μ with no more ordinary S than the rubber will dissolve (about 1% at room temp.). The S_μ is conveniently made by suddenly quenching boiling hot S in cold H_2O and grinding after hardening. Mixtures so made are less prone to pre-vulcanisation. D. F. T.

Accelerator for vulcanisation of rubber. G. S. WHITBY, Assr. to ROESSLER & HASSLACHER CHEM. Co. (U.S.P. 1,832,163, 17.11.31. Appl., 22.10.27).—"Carb-isopropoxythione disulphide," $(\text{CHMe}_2\cdot\text{O}\cdot\text{CS}\cdot\text{S})_2$, obtained by oxidation of Na isopropylxanthate with NaOCl , is applied to accelerate vulcanisation.

D. F. T.

[Accelerator for] vulcanisation of rubber. G. H. STEVENS (U.S.P. 1,831,932, 17.11.31. Appl., 12.4.28. Cf. U.S.P. 1,465,743; B, 1923, 1187 A).—Vulcanisation is accelerated by a substance of the structure $\text{NH}_2\cdot\text{C}(\text{:NH})\cdot\text{NHR}$, where R is an aromatic group, e.g., monophenylguanidine. D. F. T.

Compounding of rubber [for preservation]. W. S. CALCOTT and W. A. DOUGLASS, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,830,749, 10.11.31. Appl., 13.6.29).—The resistance of rubber to deterioration is greatly improved by incorporating a compound of the formula $\text{HO}\cdot\text{R}\cdot\text{R}'$ where R and R' are aryl residues, e.g., *p*-hydroxydiphenyl, *p*- β -naphthylphenol, and 4-hydroxy-4'-methylidiphenyl. The rate of vulcanisation is unaffected and no substantial discoloration occurs even in sunlight. D. F. T.

Rubber protection. C. E. BRADLEY and C. D. MASON, Assrs. to MISHAWAKA RUBBER AND WOOLEN MANUFG. Co. (U.S.P. 1,832,964, 24.11.31. Appl., 9.12.26).—Rubber compounded with 1—4% of a mixture (m.p. 60—68.5°) of paraffin wax with 25—75% of a mineral wax having substantially the characteristics of Casper wax (*d* 0.933, m.p. 71—74.5°) has age- and sun-resisting properties superior to those of rubber protected with either wax alone and exhibits a reduced tendency to blooming. D. F. T.

Rubbers for use in the production of dentures. C. JOANNIDES (B.P. 374,471, 2.11.28).—Dental rubber in ribbon or strip is wound in reel form together with a separating strip of non-adhesive material such as cellophane. D. F. T.

Bituminous rubber composition. J. N. BYRD (U.S.P. 1,831,226, 10.11.31. Appl., 24.10.24).—A composition, of low viscosity and high rubber content, suitable as a waterproofing and binding agent for fibrous materials is obtained by mixing an aq. suspension of bituminous material containing a protective colloid with a stabilised aq. rubber dispersion. Fillers may be added. D. F. T.

Production of rubber and ebonite coatings with rough, shagreened, or the like surfaces. METALLGES. A.-G. (B.P. 374,723, 14.9.31. Ger., 15.9.30).—Surfaces, preferably previously roughened or treated with a suitable adhesive substance, are sprayed with a liquid rubber mixture, *e.g.*, compounded latex, under such conditions that the droplets do not coalesce. After removal of the solvent or dispersion medium, the applied layer is vulcanised. D. F. T.

Moulding composition [containing rubber-latex serum]. J. MCGAVACK, Assr. to NAUGATUCK CHEM. CO. (U.S.P. 1,831,538, 10.11.31. Appl., 6.6.29).—Latex serum, preferably that obtained in the concn. of latex by a creaming process, is an efficient binder for sand and other finely-divided materials used for moulding purposes in foundries. It is desirably first conc. to a solid content of 25%. D. F. T.

Dispersions.—See I.

XV.—LEATHER; GLUE.

Fixed tannin and fixed water-soluble matter in hide powder tanned with oak-bark extract. H. B. MERRILL and R. G. HENRICH (J. Amer. Leather Chem. Assoc., 1932, 27, 196—201).—Page's work (cf. B., 1932, 652) on mimosa-bark liquors was repeated using oak-bark extract liquors and hide powder, but the results were different. The % of free H₂O-sol. matter in the oak-bark tanned powder was < that calc. from the solids content of the spent tan liquor retained by the powder. Page's results cannot be assumed to apply to tannins other than those of mimosa bark. D. W.

Filtration of tannin solutions for the determination of insoluble matter. A.L.C.A. Committee report. J. S. ROGERS (J. Amer. Leather Chem. Assoc., 1932, 27, 215—230).—In comparative tests on solid quebracho and valonia extracts, the closest agreement was obtained with the Riess method (cf. B., 1929, 567) followed by the official method of the A.L.C.A. Longer time was required by the Riess method, but clear filtrates were obtained with both extracts. No appreciable difference was caused by increasing the amount of kaolin used between 0.5 g. and 4 g. No material error was introduced in the Riess method owing to adsorption of tannin by untanned filter papers. D. W.

Distribution of fat in chrome[-tanned] leathers oiled with sulphonated oil, raw neatsfoot oil, and mineral oil. H. B. MERRILL (J. Amer. Leather Chem. Assoc., 1932, 27, 201—205).—Wet, unfa-tiquored chrome leather was hand-oiled on the grain side, dried out, and the oil determined in the different layers of the skin. The depth of penetration of the oil and the % of oil at the different depths were increased by applying a greater amount of oil. Max. penetration was obtained with

mineral oil, less with neatsfoot, and least with the sulphonated neatsfoot oil. The distribution of the oils in the leather is determined by physical and not chemical forces. D. W.

Gas meters.—See II. **Cellulose waste liquors.**—See V.

PATENTS.

Abating foamingness in glues. L. BRADSHAW (U.S.P. 1,833,771—2, 24.11.31. Appl., [A] 19.6.29, [B] 20.2.30).—The H₂O for mixing with glue bases comprising proteinous material, CaO, and an alkali has added to it (A) 1—4% of a liquid chlorinated aliphatic hydrocarbon (CCl₄, C₂H₄Cl₂) and 0.5—1.5% of a phenol, or (B) 1—5% of a mineral or vegetable oil (kerosene, cedar-wood oil) and 0.1—1.0% of a phenol. L. A. C.

Adhesive. F. F. LINDSTAEDT, Assr. to HERCULES GLUE Co. (U.S.P. 1,833,527, 24.11.31. Appl., 20.12.27).—A proteinous meal (peanut, pea, or bean meal) is mixed with CaO, NaOH, KMnO₄, Na₂SiO₃, and a waterproofing agent, *e.g.*, CS₂ and a metal soap. L. A. C.

Manufacture of [patterned sole] leather. J. W. JOHNSON and J. W. NOWELL (B.P. 375,957, 26.5.31).

XVI.—AGRICULTURE.

Solonetz-like processes during [soil] amelioration. L. P. ROSOV (Trans. 6th Comm. Internat. Soc. Soil Sci. (Russ. Sect.), 1932, A, 30—69).—During the leaching of solonchak soils processes resembling those of solonetz formation (*e.g.*, accumulation of adsorbed Na, increased *p*_H and dispersion, dissolution of humus, and partial decomp. of the adsorbing complex) occur in the early stages. With further leaching there is a gradual displacement of adsorbed Na by Ca from soil carbonates. The presence of CaSO₄ diminishes the intensity of the solonetz-like changes. In saline soils Na₂SO₄ is more injurious than NaCl to plants when CaSO₄ is absent, but less injurious in its presence. Characteristics of solonetz soils are not necessarily dependent entirely on the amount of adsorbed Na which they contain. In some cases the B-horizon, although originally formed through the agency of Na, has had much Na replaced by Ca and Mg; in others the clayey illuvial horizon may be formed without the participation of adsorbed Na. The general effect of irrigation on these soils is examined and discussed.

A. G. P.

Dynamics of water percolation in soils and its importance in ameliorative processes. A. N. KOSTIAKOV (Trans. 6th Comm. Internat. Soc. Soil Sci. (Russ. Sect.), 1932, A, 17—21).—The measurement of the permeability of soils to H₂O is discussed in its relation to irrigation problems. A. G. P.

Determination of the clay content of soils by moisture absorption at 70% humidity. A. N. PURI (Soil Sci., 1932, 33, 405—411).—V.p. curves of soils consist of three portions corresponding with 3 forms of hygroscopic moisture, *viz.*, H₂O of hydration, capillary-absorbed H₂O, and interstitial H₂O. The second portion depends on the total surface area of the soil and is represented by the approx. straight portion of the

curve lying between 10 and 70% humidity. An empirical formula is presented for calculating the clay content from the H_2O absorption at 70% humidity. A. G. P.

Changes in salt solutions during passage through soil. B. POLYNOV and S. BYSTROV (Trans. 6th Comm. Internat. Soc. Soil Sci. (Russ. Sect.), 1932, A, 22—29).—The capillary rise of solutions of $NaCl$ and Na_2SO_4 through a column of soil is examined. The amount of SO_4^{2-} distributed in the lower strata exceeds that of Cl^- but above a limiting height the Cl^- is in excess. This effect is ascribed to the displacement of adsorbed Ca by Na and the subsequent partial pptn. of $CaSO_4$ in the lower layers. The Cl^- diffuses more rapidly than the SO_4^{2-} through moist soil. A. G. P.

Determination of the p_H of soils. M. A. BRUNO (Bull. Soc. d'Encour., 1932, 131, 402—406).—Portable apparatus for the approx. colorimetric determination of p_H of soils in the field is described. A. G. P.

Importance of depth of soil sampling in studies relating to mineral content of pastures. H. O. ASKEW, T. RIGG, L. BISHOP, and O. BARTON (New Zealand J. Sci. Tech., 1932, 13, 284—294).—The considerable differences in chemical composition between manured and untreated pasturage are invariably accompanied by differences in botanical composition and in carrying capacity. Applications of CaO and P fertilisers, while increasing the exchangeable Ca and available P contents of the soils, do not affect the proportions of available K . P fertilisers rarely penetrate > 3 in. below the soil surface, but CaO penetrates more readily. In pastures the examination of 3-in. soil samples yields more useful information of the CaO and P status than the customary 9-in. sample, and is more closely related to the composition of the herbage. A. G. P.

Composition, solubility, assimilability, and analysis of phosphates and phosphatic manures. A. GRAIRE (Chim. et Ind., 1932, 27, 1023—1036, 1274—1291).—Systematic measurements of sol. P_2O_5 were made with two series of solutions, one of NH_4 citrate with a varied excess of NH_3 or of citric acid, and the other of citric acid alone in various concns. In general, the dissolution of Ca phosphates by citric acid alone occurs through the formation of the sol. salts $CaH_4(PO_4)_2$ and $CaH_4(C_6H_5O_7)_2$ and thus increases with increasing concn. of the acid until there is an excess over the amount theoretically required. In the presence of NH_4 citrate the reactions are more complex. The P_2O_5 in superphosphate has been rendered so sol., even in H_2O , that the solubility is little affected by the composition of the citrate solution. In activated phosphates the solubility has been increased by the treatment with H_2SO_4 and 30—40% of the P_2O_5 is sol. in alkaline NH_4 citrate; $CaHPO_4$ is nearly completely sol. in this solution. From other phosphatic manures little P_2O_5 is dissolved by alkaline solutions, and the solubility increases with increasing acidity of both series of solutions. The solubility of phosphatites increases with increasing fineness. The P_2O_5 in the poor Gafsa (Tunis) ore is more sol. than that in the rich Morocco ore, so that the poorer ore yields the more sol. P_2O_5 . The

insolubility of the phosphatites is ascribed to the presence of apatite, of which there is probably more in the Morocco ore than in that from Gafsa. Except for its solubility in alkaline solutions, activated phosphate is similar to Gafsa phosphatite. The P_2O_5 in bone ashes and basic slag is readily dissolved by aq. citric acid and by the more acid solutions of NH_4 citrate, and that in the latter is also somewhat sol. in alkaline solutions. When superphosphate is treated with NH_3 its solubility in alkaline citrate is reduced, but that in acid citrate is unaffected, and the latter is in better agreement with agricultural experiments. Natural phosphates which have been solubilised by calcining with alkali salts and SiO_2 etc. behave towards citrate solutions like $CaHPO_4$. When neutral NH_4 citrate is stirred with phosphates for times varying from 15 min. to 6 hr. a definite max. solubility is not reached, and the effect of the time of treatment is relatively greater the less is the solubility. Thus the P_2O_5 dissolved from Gafsa phosphatite increases twofold, but that from superphosphate only from 87% to 92%. Increasing the ratio of neutral citrate solution to manure does not affect the solubility of superphosphate or of activated phosphate, but greatly increases that of other fertilisers, especially of phosphatites, bone ashes, and slag. When alkaline citrate solutions are used, increasing the ratio has little effect. The standard French method using alkaline citrate and a ratio of 40:1 is better than the American method using neutral citrate and a ratio of 50:1 or 100:1. The French method divides phosphatic manures into three classes in which the P_2O_5 is available immediately, slowly, and only after a term of years, respectively, whereas the American treatment dissolves the latter two classes more freely and makes the classification less sharp; increasing the solvent:fertiliser ratio would accentuate this fault. A. G.

The Lemmermann method and the influence of temperature on solubility of phosphates [in soils]. L. STEJKAL (Chem. Listy, 1931, 25, 345—349).—Lemmermann and Fresenius' method (A., 1923, i, 1276) of determining citric acid-sol. P_2O_5 gives reproducible results only when carried out at a fixed temp. The sol. P_2O_5 content of soils is 25% higher when the determination is carried out at 28° than when at 14°. R. T.

Pigeon guano. I. M. VENEZIA (Annali Chim. Appl., 1932, 22, 325—328).—Pigeon guano is analysed, chiefly as regards its N content. E. W. W.

Preparation of artificial farmyard manure. E. GERDUM (Z. Pflanz. Düng., 1932, 11B, 249—257).—Urea proved the best source of N for the prep. of artificial farmyard manure from rye and barley straw. The use of $Ca(NO_3)_2$ and $NaNO_3$ resulted in heavier losses of N. To minimise losses the heap should be undisturbed and N added in successive portions. Stirring the heap, however, improves the "rotting-down" process. Using straw with a C:N ratio 20:1 and with 0.7% of added N, complete rotting-down occupied 4½—5 months. Increasing the N to 1.05% reduced this period to 3 months. A suitable and uniform H_2O content and, in the early stages, an adequate air supply are essential to the success of the process. The addition

of CaO to inhibit possible acid fermentation processes is not advisable. A. G. P.

Effects of farmyard manure and mineral fertilisers on soils and crops. O. LEMMERMANN (Z. Pflanz. Düng., 1932, 11B, 1—17).—12 years' experiments conducted at two centres show that in most cases a higher crop yield is obtained from the use of farmyard manure + minerals than from either alone. The effects of different materials on the composition of the crop and on soil fertility are reviewed and discussed. W. G. E.

Nature of actual soil acidity and its influence on root growth. A. WIELER (Jahrb. wiss. Bot., 1932, 76, 333—406).—The effect of smoke on growing crops is associated with the occurrence of acidity in the soil, but is related only to "actual" (H_2O -sol.) acidity. Repeated leaching of these soils removes injurious acidity. The H_2O extracts from smoke-injured soils contain H_2SO_4 , Fe, and Al, but no appreciable amounts of HNO_3 , HCl, or the common org. acids. The growth of seedling roots was depressed by small amounts of $Al_2(SO_4)_3$ and $Fe_2(SO_4)_3$ and ceased in the presence of quantities sufficient to produce pH 4.0. The relative toxicities of the two salts vary with the species of plant examined. A. G. P.

(i) Iron in relation to the stimulation of growth by humic acid. (ii) Physiological nature of humic acid stimulation of *Azotobacter* growth. D. BURK, H. LINEWEAVER, and C. K. HORNER (Soil Sci., 1932, 33, 413, 453; 455—487).—(i) Stimulation of *Azotobacter* growth by humic acid is associated primarily with its Fe content. The effect is not produced by synthetic Fe-free humic acid or by salts of metals other than Fe, but occurs with certain org. and inorg. Fe compounds. In cases where natural humic acid produced no stimulation, Fe compounds also were ineffective. Natural humic acids produce their effect more rapidly than org. Fe compounds, and these in turn more rapidly than inorg. Fe salts. Synthetic Ca humate can supply Ca to *Azotobacter* in Ca-free media, but it is no more available than $CaSO_4$.

(ii) Growth stimulation of humic acid and Fe compounds involves an induction period of several hr. varying with the nature of the material supplied. Optimum action is obtained with 50 p.p.m. of humic acid with 0.5 p.p.m. Fe. The latter val. is the same for other Fe compounds. Part of the active stimulant is consumed during growth. Humic acid does not act by increasing the availability of normal constituents of the media or by deactivating toxic metabolic products or by affecting the surface tension, viscosity, or p.d. between organism and medium. A. G. P.

Is the action of potash fertilisers influenced by supplementary manuring with magnesium phosphate? M. POPP (Z. Pflanz. Düng., 1932, 11B, 241—249).—No difference was observed between the effects of $MgHPO_4$ and $CaHPO_4$ on the action of K fertilisers. A. G. P.

Influence of [soil] reaction on the phosphoric acid intake from various phosphate fertilisers. K. NEHRING and A. KELLER (Z. Pflanz. Düng., 1932,

11B, 257—273).—In the acid soils examined liming increased the proportion of assimilable PO_4^{4-} but decreased the % utilisation of added P fertilisers. This is ascribed to the low assimilability of the naturally-occurring Al and Fe phosphates and to the action of CaO in lowering the solubility of Ca phosphates. Superphosphate applied to very acid soils may be partly "fixed" in a form which is difficultly utilisable by plants. On these soils basic slag and Rhenania phosphate are more effective than is superphosphate. The reverse is the case in neutral or weakly acid soils. The amount of PO_4^{4-} assimilated from rock phosphate on acid soils was markedly reduced by liming. A. G. P.

Effect of season and fertilisers on the dry matter content of a Nelson dairying pasture. T. RIGG, H. O. ASKEW, L. BISHOP, and L. HODGSON (New Zealand J. Sci. Tech., 1932, 13, 295—301).—The dry matter content of pasturage was largely influenced by climatic conditions and only slightly affected by manurial treatment. A slight depression following applications of $(NH_4)_2SO_4$ was observed. A. G. P.

Relationships between soil properties and performance of Baldwin and Greening apple trees. R. C. COLLISON, S. E. COLLISON, and J. D. HARLAN (New York State Agric. Exp. Sta. Tech. Bull., 1932, No. 194, 19 pp.).—Greening apples were not appreciably affected by soil characteristics. Yields of Baldwin were correlated positively with the sand content and negatively with the silt and exchangeable Ca contents of the soil. Relationships are also indicated between yields and C content and also the sticky-point moisture. In the soils examined, structure was dependent on the C and colloid contents and to a large extent on the proportion of exchangeable Ca. A. G. P.

Effect of hydrogen-ion concentration on the growth of strawberries in sand and soil. C. S. WALTMAN (Kentucky Agric. Exp. Sta. Bull., 1931, No. 321, 335—352).—Optimum growth and fruiting of strawberries occur in soil of pH 5.3—5.5. Growth ceases at pH <3.0 and >9.0. Injury was much more rapid under excessively acid than under alkaline conditions. Strawberries have a high P requirement, and an acid reaction favours the utilisation of P by the plants. Addition to soil of CaO in sufficient quantity to improve the growth of clover does not necessarily reduce the growth of strawberries. A. G. P.

Fertilising experiments with olive grignons. J. BONNET (Bull. Mat. Grasses, 1932, 16, 207—210).—Fresh grignons, even with the addition of phosphate slag and sylvinit, are unsuitable; old grignons that have been stored in heaps, preferably under shelter, form an excellent manure for olive trees, especially if mixed with phosphate slag (50 kg.) and sylvinit (25 kg. per 100 kg. of grignons). E. L.

Ethylmercury compounds as agricultural disinfectants. W. H. TISDALE (Ind. Eng. Chem., 1932, 24, 745—747).—The successful use is reported of $EtHg$ salts (notably phosphate and chloride) for seed and soil disinfection, in wet sprays for growing plants, and in the prevention of sap stains in recently sawn timber. A. G. P.

Dusting of cut potato seed. E. E. CLAYTON (New York State Agric. Exp. Sta. Bull., 1932, No. 610, 16 pp.).—Dusting with preps. containing Cu compounds, $\text{Na}_2\text{Cr}_2\text{O}_7$, NaF, dinitrophenol, or β -naphthol promoted decay in storage. S, CaSO_4 , CaO, HgCl_2 , and creosote were less harmful. Storage for 3–4 weeks after dusting with S or CaSO_4 resulted in injury in some cases, but storage for 7–10 days caused no injury. Treatment with a 1:1 mixture of S and $\text{Ca}(\text{OH})_2$ or charcoal dust containing 3% of creosote increased the yields of potatoes cut 3–4 weeks before planting, but not of those treated 7–10 days before planting. No visible effect on the "corking over" of the cut surfaces was produced by materials other than the S- $\text{Ca}(\text{OH})_2$ mixture. Use of 6–7 oz. of the latter per bushel of seed is recommended. A. G. P.

Insecticidal value of certain pyrethrum extracts. H. G. WALKER (Virginia Truck Exp. Sta. Bull., 1931, No. 75, 943–971).—Of 50 varieties of plants examined only a few showed evidence of injury by pyrethrum-soap sprays even at high concns. EtOH, CO_2 , and $\text{C}_2\text{H}_4\text{Cl}_2$ were equally effective in extracting the toxic material from pyrethrum flowers, but C_6H_6 and light petroleum were inferior. Among wetting agents tested, soaps (except triethanolamine oleate) were superior to oils for most insects. For meal-worm larvae triethanolamine oleate gave best results. The toxic properties of oleoresins stored alone and stored in combination with a coconut-oil soap for 11 months were not appreciably different. An oleoresin-coconut oil soap prep. of p_H 9.5 retained its toxicity for at least a month, but a similar mixture of p_H 12.0 lost its toxicity in 12 hr. A. G. P.

Cellulose waste liquors.—See V.

PATENT.

Mixed fertiliser. O. KASELITZ and F. POHLE (U.S.P. 1,833,680, 24.11.31. Appl., 16.2.31. Ger., 20.2.30).— K_2SO_4 and/or $(\text{NH}_4)_2\text{SO}_4$, a finely powdered crude phosphate, and sufficient dry, final product from a previous operation to yield a dry, crumbling product are added to HNO_3 . L. A. C.

XVII.—SUGARS; STARCHES; GUMS.

Examination of molasses by Wood's light. G. GÉRARD (Ann. Falsif., 1932, 25, 212).—Cane-sugar molasses gives a maroon-coloured fluorescence in a dilution of 1:5 and a yellowish-brown one at a dilution of 1:25; the colours with beet molasses are bluish-grey and greenish-grey, respectively. A sample thought to be a mixture gave a grey colour with a yellow reflexion. T. McL.

Dextrin in beer.—See XVIII.

PATENT.

Manufacture of [dextrin] adhesives. F. KUTZNER (B.P. 374,399, 2.3.32. Ger., 28.3.31).—Granulated dextrin dried to a moisture content of 2% is stirred and moistened with a spray of atomised H_2O , preferably containing 0.1% SO_2 and 1.5% $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$, until the mixture contains 10% H_2O . A. R. P.

XVIII.—FERMENTATION INDUSTRIES.

Determination of dextrin in beer by ultrafiltration. K. SILBEREISEN (Woch. Brau., 1932, 49, 201–206).—Dextrin cannot be determined by ultrafiltration as its complete separation from the other constituents of the beer is impossible by that method. The ultrafiltrate of a beer which had passed through a collodion filter contained approx. 80% of the maltose originally in the beer and 49–57% of the original dextrin. Repeated filtration of a beer did not diminish the amounts in the filtrate, and washing of the residue with H_2O did not increase them. The addition of peptone or albumin to the beer reduced the dextrin content of the ultrafiltrate to 44–45% of that of the original dextrin, whilst kaolin and $\text{Al}(\text{OH})_3$ were not so effective and C gave a slight increase. By adjusting the p_H of the beer to vals. between 7.0 and 1.6, the dextrin and maltose contents varied slightly and irregularly, but, if peptone was also added, the amount of dextrin passing through the filter showed a min. at approx. p_H 4.0 and progressively increased to slightly over 90% of the content of dextrin in the original beer as the p_H was decreased to 1.7. The maltose content was almost unchanged under the same conditions. The degradation of the dextrin to the filterable form is probably due to its enzymic hydrolysis activated by the presence of peptone and NH_2 -acids. C. R.

Chemical relations of sulphurous acid with compounds of aldehydic and ketonic function [present in wine must]. (The late) A. BIANCONI and A. BIANCHI (Annali Chim. Appl., 1932, 22, 291–316).—The velocity of reaction of MeCHO with KHSO_3 is less in presence of tartaric acid. Fructose combines with KHSO_3 less readily than glucose, lactose only slightly, and sucrose not at all. The combination of must containing the two former sugars with KHSO_3 is studied; during fermentation almost all the uncombined SO_2 escapes. Slight oxidation to H_2SO_4 is not due to tannin, which has no action on H_2SO_3 . E. W. W.

Manufacture of pure malt vinegar. W. WARREN and T. MCLACHLAN (Food Manuf., 1932, 7, 163–168, 198–202).—A full account of the manufacture of malt vinegar and its control is given. Filtration of vinegar is preferred to pasteurisation. Attention is drawn to the amount of N absorbed by the yeast and AcOH organisms during fermentation. T. McL.

XIX.—FOODS.

Thermophilic bacteria in milk pasteurised by the "holder" process. R. S. BREED (New York State Agric. Exp. Sta. Tech. Bull., 1932, No. 191, 27 pp.).—Direct microscopical examination of milk is advocated in addition to the customary agar plate count. A. G. P.

Solid content of milk. D. C. DE WAAL (Chem. Weekblad, 1932, 29, 331).—A reply to Janse (B., 1932, 574). The practical difference between the author's formula and that of the Codex is negligible, except for milk of low fat content and high sp. gr., and *vice versa*, when the former is the more satisfactory. H. F. G.

Reports of the Government analytical laboratory at Amsterdam during 1931. J. STRAUB (Chem. Weekblad, 1932, 29, 349—351).—Reference is made to investigations on (1) the relation between the "simplified mol. const." and the Koestler Cl-sugar val. for milks, (2) the use of azorufin in place of methylene-blue for the reductase test, (3) the determination of solid unsaturated fatty acids in edible fats by the Twitchell and Hilditch methods, and (4) a new method for determination of dry milk constituents in milk chocolate. A simple apparatus for warming several samples of milk at one time is described. S. I. L.

Influences of heating and agitating milk before separation on the fat loss in skim milk. J. LYONS and W. FINLAY (Econ. Proc. Roy. Dublin Soc., 1932, 2, 423—443).—Fat determinations carried out on separated milk by the Gerber method (4 whirling periods of 5 min. each) showed that heating milk before separation caused a decrease in the fat loss, which became more marked as the lactation period advanced. Agitating milk caused increased skimming losses. It is doubtful economy to heat milk for separation, in Irish creameries with small output, with the type of heaters now in use. E. B. H.

Accuracy of fat determinations in buttermilk and effect of presence of lecithin. J. LYONS and W. FINLAY (Econ. Proc. Roy. Dublin Soc., 1932, 2, 445—459).—The Roese-Gottlieb and Gerber methods give results for fat which include part of the phospholipins present in buttermilk. The Minnesota method does not appear to include lecithin in the fat results. The fat loss in buttermilk is higher in summer than in winter, indicating an increased stability of lecithin and fat in milk during the winter. E. B. H.

Determination of vitality in starters. H. R. WHITEHEAD and G. A. COX (New Zealand J. Sci. Tech., 1932, 13, 304—309).—The milk sample, mixed with the starter, is incubated for 30 min. at 38°. Rennet is added and incubation continued for 1 hr. The curd is cut into sections ($\frac{1}{4} \times \frac{1}{4}$ in.) and after further incubation for 2 hr. the whey is drained off as completely as possible. More whey separates, and after 2 hr. a sample is titrated with NaOH. The acidity of a second sample is obtained after continued incubation for 1 hr. A difference of > 0.1% of lactic acid in the final whey drainings indicates a significant difference in the vitality of starters used. A. G. P.

Bacteriology of common salt. IV. Reddening of salted fish. V. Brine fermentation of vegetables. W. CLAYTON (Food Manuf., 1932, 7, 109—110, 172—173).—A crit. review of the literature on these subjects. Reddening of fish has not been recorded when brine-evaporated NaCl has been employed. Halophilic bacteria appear to be acclimatised strains of sea-water bacteria. T. McL.

Quick freezing. C. R. BARNICOAT (New Zealand J. Sci. Tech., 1932, 13, 371—376).—A review.

Role of acidity in food preparation. W. V. CRUICK (Food Manuf., 1932, 7, 115—119, 176—178).—Vegetables of low acidity are difficult to sterilise at 100°, and temp. of 116—121° are frequently necessary in practice; this causes adverse effects on flavour and

texture, which may be avoided by the addition of AcOH or citric acid to the brine so that p_{H} after sterilisation will be < 4.5. All strains of thermophilic and spore-forming bacteria were destroyed at 100°. Vegetables must be loosely packed, so that the hot brine can come in contact with all surfaces which have been exposed to the atm. BzOH, SO₂, and acid preservatives exert their action in acid solution. *Penicillium glaucum* grew in 10% NaOBz, whilst 0.05% of BzOH is usually sufficient to prevent the growth of moulds, yeasts, and bacteria at p_{H} 3.4—3.6. The preservative action of NaCl, CH₂O, and sugar appears to be unaffected by [H]. T. McL.

Utilisation of the radicle of germinating grain. T. RUEMELE (Pharm. Zentr., 1932, 73, 410—411).—In germinating barley only the germ is antirachitically active and this also contains more ergosterol than either the barley or the malt, but there is also present a substance, possibly related to ergosterol and formed during germination, which is biologically active and has a high nutritional val. E. H. S.

Nutrient values of potato flakes and potato slices. G. FINGERLING (Landw. Versuchs-Stat., 1932, 114, 1—112).—Flakes and slices were equally digested by store cattle. The use of either material tended to reduce the digestibility of other foods. For pigs slices were better digested than flakes, but no secondary effects were observed. Starch equivs. recorded were: flakes, 83.1 and 90.1; slices, 87.6 and 87.5 for cows and pigs, respectively. A. G. P.

Chemistry of cooking. II. Critical temperature in cooking the sweet potato. O. SINODA and S. KODERA (Biochem. J., 1932, 26, 650—657).—The flavour of the sweet potato improves when it is stewed or steamed at temp. > that of the gelatinisation of its starch (74°). There is a morphological change in the starch granules when the sweet potato is cooked. Partial hydrolysis of starch in the tissue occurs between 70° and 80°. At higher temp. polymerisation of the lower sugars begins and influences the taste. It is advisable to treat the sweet potato at higher temp. for shorter times. S. S. Z.

Conservation of iron in vegetables by methods of preparation and cooking. O. SHEETS, E. FRAZIER, and D. DICKINS (Mississippi Agric. Exp. Sta. Bull., 1931, No. 291, 16 pp.).—Heaviest losses of Fe (20%) from mustard and turnip occurred during cooking with much H₂O for 1—2½ hr. Losses were reduced by use of less H₂O for shorter periods. Min. losses (6—9%) occurred in strained and pressure-cooked samples. A. G. P.

Substances containing vitamins. Winter-stored moosberry juice and preserved blackcurrant juice. B. A. LAVROV, B. I. JANOVSKAJA, and N. JARUSOVA (Z. Unters. Lebensm., 1932, 63, 498—501).—Moosberry juice stored through the winter contained only traces of vitamin-C, but preserved blackcurrant juice contained 0.3 vitamin-C unit per c.c. E. B. H.

PATENTS.

Shortening composition [for the bakery]. E. B. WORKING, ASSR. to AMER. LECITHIN CORP. (U.S.P. 1,831,728, 10.11.31. Appl., 16.7.30).—The addition of

0.01—1% of lecithin or other phosphatide is claimed to increase the creaming properties of shortening fat compounds. Their physical stability and resistance to rancidity changes are stated to be improved.

E. B. H.

Product adapted for use as a filling for pastries, icing cakes, etc. E. EGLI (B.P. 374,604, 18.5.31).—A sterilised mixture of potato starch and sugar solution is added to almond paste.

H. R.-D.

Testing milk for derangements in composition. G. ROEDER (U.S.P. 1,831,034, 10.11.31. Appl., 7.8.30. Ger., 26.8.29).—A solution containing H_2O_2 , bromothymol-blue, and EtOH is used to detect derangements in milk as drawn from the udder.

E. B. H.

Pasteurisation of liquids in bulk. G. W. HYDE (B.P. 374,577, 23.4.31).—The milk (etc.) is passed downwards through a coil the upper part of which is of small bore giving high heat transmission and the lower part of large bore giving a long dwell at low velocity. The whole coil is immersed in a tank of heat-transmitting liquid to which the heat is applied above the large coil but below the small one.

B. M. V.

Working up slaughterhouse offal, animal carcasses, fish, etc. W. STEINMANN (B.P. 374,659, 8.7.31. Switz., 26.7.30. Addn. to B.P. 256,162; B., 1926, 848).—The pulp-like mass mentioned in the first patent is completely dried by indirect heat, the liquid fat present is partly separated, and the dry mixture is treated with a solvent for de-fatting.

H. R.-D.

Coffee preparations [in blocks etc.]. G. A. PFISTER and C. J. GRACE (B.P. 376,588, 24.10.31).

Aq. emulsions with lecithin.—See III.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Evaluation of medicinal carbons. C. ROHMANN and P. GERICKE (Pharm. Ztg., 1932, 77, 653—655).—The equilibrium condens. of antipyrine solutions treated with medicinal C under varying conditions, the relationships between the times of shaking and adsorption, and the variations in adsorptive powers of 10 different carbons are discussed. Each C possessed a different power of adsorption for antipyrine than for methylene-blue, but the adsorptive power of all the samples varied to the same degree with both substances.

E. H. S.

Use of benzidine for the production and examination of narcotic chloroform. F. SCHLEMMER and M. SIEGERT (Pharm. Ztg., 1932, 77, 689—693).—The purification of commercial $CHCl_3$ by the addition of benzidine (I) before distillation (Sbarskago) is limited in its application; 0.1—0.5% of (I) removes $COCl_2$ and HCl (<27 mg./100 g. $CHCl_3$) and Cl (<120 mg./100 g.), but a large excess is necessary to remove completely aldehydic impurities, and many samples of commercial $CHCl_3$ still gave a positive reaction with Nessler's reagent after treatment with 0.5% of (I). The quantity of foreign org. substances, judged by the $CH_2O-H_2SO_4$ reaction, is not materially altered, but the residue on evaporation is smaller the higher is the amount of (I) added before distillation. The D.A.B. VI test for HCl with (I) is sensitive to 0.00045 g. HCl/100 g. $CHCl_3$ and the dimethylaminoazobenzene

test to 0.00015 g. HCl/100 g. (I) is more satisfactory than $ZnCl_2$ -starch for the detection of Cl.

E. H. S.

Determination of synthetic menthol in presence of methyl salicylate in ointments. A. LANGER (Pharm. Ztg., 1932, 77, 707—708).—The volatility of synthetic menthol is lowered considerably in the presence of Me salicylate, and in the extraction of these substances from ointments the conditions under which the solvent is removed from the extract has a large influence on the results.

E. H. S.

Colour reaction for novocaine, anæsthesine, and related compounds, whereby these may be detected in admixtures with cocaine and related substances. M. WAGENAAR (Pharm. Weekblad, 1932, 68, 727—737).—Colour reactions given by NH_2Ph and *p*-aminobenzoic acid (I) and by 13 anæsthetics with furfuraldehyde and on diazotisation and coupling with β -naphthol are described, together, in certain cases, with the colorations produced after nitration and reduction. Derivatives of (I) yield a violet coloration with furfuraldehyde, and the reaction will detect 1% of novocaine in cocaine.

H. F. G.

Decrease in activity of alkaloid salt solutions and pharmaceutical tinctures on exposure to sun and ultra-violet light. C. A. ROJAHN and H. HERZOG (Pharm. Zentr., 1932, 73, 401—410).—The change in alkaloid content, pH , colour, and capillarity of 10 alkaloidal tinctures and the loss in alkaloid activity of 8 alkaloid salt solutions on exposure to sun and ultra-violet light are given.

E. H. S.

Identification of homeopathic tinctures. H. NEUGEBAUER (Pharm. Ztg., 1932, 77, 796—799).—A detailed scheme involving capillary luminescence analysis is described (cf. B., 1930, 82, 883).

Comparison of [tobacco] denicotinising processes. G. FRITZ and W. BARLAY (Magyar Gyóg. Társ. Ert., 1931, 7, 513—520; Chem. Zentr., 1932, i, 758).—The "nicotex" method (removal of nicotine with steam) causes a loss of 51% of nicotine; the "nikostop" method (filtration of tobacco smoke through cotton wool and activated C) removes 73%, whilst the "bonicot" process (treatment of cigarettes with a liquid) causes a diminution of $\geq 33\%$.

A. A. E.

Essential oil of *Suim latifolium*. E. V. PIGULEVSKI and A. P. SIVERTZEV (J. Gen. Chem. Russ., 1932, 2, 80—83).—The fruit of *S. latifolium*, which is widely spread throughout Russia, yields an essential oil which varies from 6% in Novgorod to 7½% in the Poltava districts. The Novgorod oil contains 80% of a strongly optically active limonene, $[\alpha]_D +116.7^\circ$, whilst the Poltava oil contains 89% of a limonene of b.p. 175.7—176°, $[\alpha]_D +93.02^\circ$ (tetrabromide, m.p. 103°). The limonene is removed by fractionation in vac., and the fraction boiling at 108—112°/11 mm. (about 6% of total) was found to consist of perilla-aldehyde. The oil also contains about 0.6% of an unidentified high-boiling substance, $[\alpha]_D +25.16^\circ$.

M. Z.

PATENTS.

Manufacture of derivatives of the choline type of the carbamic acid series. W., K., L., W., and F. MERCK (E. MERCK) (B.P. 370,693, 8.5.31. Ger., 8.5.30).—Therapeutically useful compounds are obtained

by converting dialkylaminoalkyl carbamates or alkyl chloroformates into quaternary salts of the type $X \cdot NR_3 \cdot CO_2 \cdot R \cdot NR_2$, in which R = alkyl and R' = alkylene. Examples are quaternary salts from: β -diethylaminoethyl carbamate, m.p. 42–43°, and MeI (m.p. 123–124°), ethylene iodohydrin (m.p. 105–107°), β -iodoethylurethane (m.p. 151°), phenacyl bromide (m.p. 182°); β -iodoethylurethane and NMe_3 (m.p. 200°; chloride, m.p. 208°); $NMe_2 \cdot CH_2 \cdot CMeEt \cdot O \cdot CO \cdot NH_2$ and MeI (m.p. 230°); hordenine and β -iodoethylurethane (m.p. 152–153°); β -dimethylamino- α -phenyl-*n*-propyl carbamate, m.p. 130–131°, and MeI (m.p. 220–221°).

C. H.

Manufacture of 4-aralkyl-3-keto-3:4-dihydro-1:4-benzoxazines. F. HOFFMANN-LA ROCHE & Co. A.-G. (B.P. 370,350, 13.11.31. Ger., 17.4.31).—3-Keto-3:4-dihydro-1:4-benzoxazines are aralkylated. The 4- CH_2Ph (m.p. 70–71°), 4-*o*-chlorobenzyl (m.p. 106°), and 4- β -phenylethyl (m.p. 87°) derivatives of 3-keto-3:4-dihydro-1:4-benzoxazine, and 4- CH_2Ph derivatives of its 2-Ph (m.p. 90°) and 6-Me (m.p. 118°) compounds are described, having analgesic or anti-spasmodic action.

C. H.

Treating oils.—See XII.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Time of combustion of flashlight powder. S. KALYANARAMAN (Phil. Mag., 1932, [vii], 14, 158–160).—The average duration of the flash, measured photographically, was 0.058 sec. for a spoonful of powder.

H. J. E.

PATENTS.

Manufacture of films for colour photography. I. G. FARBENIND. A.-G. (B.P. 375,229, 27.1.32. Ger., 27.1.31).—In the manufacture of lenticular films the casting surface is swollen before the embossings are impressed, the roller being warmed. When the colloid is a cellulose ester, it is regenerated to cellulose at the surface after the impressing.

J. L.

Coating screens for the projection of pictures thereon. J. CRAWFORD (U.S.P. 1,833,317, 24.11.31. Appl., 6.2.30).—A screen surface giving great depth of reflection is obtained by applying a priming coat of varnish to the fabric, dusting on Al powder and ground white mica before the priming is quite dry. A further coat of varnish or a burnish coating of gilder's whitening is applied to the dried surface.

J. L.

Photographic resist or film. J. HELFRICH, Assr. to STAR Co. (U.S.P. 1,833,161, 24.11.31. Appl., 13.4.27).—A light-sensitive resist, particularly adapted to be flowed on metal plates, is composed of white and orange shellac, borax, dragon's blood, $(NH_4)_2CrO_4$, and eosin, the last two being mixed in solution separately.

J. L.

Colour photography. TECHNICOLOR MOTION PICTURE CORP., and L. T. TROLAND (B.P. 374,849, 9.3.31).—The two colour records of a bipack (at different depths of a single emulsion, or two coatings on the same side of the support) are stained in contrasting colours not necessarily related to the recorded colours, and the separate prints exposed by correspondingly coloured light.

J. L.

Colour photography. [Copying images on lenticular films.] SOC. FRANÇ. DE CINÉMATOGRAPHIE ET DE PHOTOGRAPHIE FILMS EN COULEURS KELLER-DORIAN (B.P. 374,993, 7.4.31. Fr., 5.4.30).

Protective paper strips [parchmentised on one side only] for photographic film rolls for daylight loading. I. G. FARBENIND. A.-G. (B.P. 374,787, 17.12.31. Ger., 10.3.31. Addn. to B.P. 356,981).

Packing for photographic plates, papers, and films. I. G. FARBENIND. A.-G. (B.P. 375,999, 25.6.31. Ger., 23.7.30).

Photosensitising dyes.—See IV.

XXII.—EXPLOSIVES; MATCHES.

Anti-oxidation catalysis and the stabilisation of nitric esters. A. ALBERTO (Ann. Acad. Brasil. Sci., 1931, 3, 113–114).—The stabilising action of substances such as $CO(NH_2)_2$ and NH_2Ph when added to NO_2 -explosives is ascribed to negative catalysis of the spontaneous oxidation. "Anti-knock" substances probably act in a similar manner.

H. F. G.

PATENTS.

[Repeatedly ignitable] matches. R. KONIG (B.P. 374,602, 15.5.31. Hung., 26.1.31).—The matches are formed from mixtures comprising a CH_2O polymerisation or condensation product (metaldehyde) and an easily inflammable substance (amorphous P, S, lycopodium, Mg), with the addition, if desired, of gum arabic, glass powder, etc.; they are ignited by friction against a surface containing, e.g., $KClO_3$, gypsum, $Cu(NO_3)_2$, and PbO_2 .

L. A. C.

Picric acid.—See III.

XXIII.—SANITATION; WATER PURIFICATION.

Ventilation of vehicular tunnels (Blackwall and Rotherhithe). C. J. REGAN (L.C.C. Ann. Rep., 1930, 4, 271–281).—The mean CO content in both tunnels was 11.7 pts. per 100,000 and tended to be higher when the tunnel was cooler than the external air. Humidity was always <100%. Determinations of S and suspended matter are also recorded. It is suggested that the max. concn. of CO in such tunnels should be 20 pts. per 100,000 and of black suspended matter 1.92 mg./cu. m.

P. G. M.

Boiler water.—See I. Cellulose waste liquors.—See V.

PATENT.

(A) Removing scale matter from liquids [boiler feed water]. (B) Apparatus for purifying water. G. S. NEELEY, Assr. to G. WATKINS (U.S.P. 1,831,075–6, 10.11.31. Appl., [A] 20.10.26, [B] 15.1.27).—(A) The H_2O is passed through a vessel in which a d.c. is applied to it through alternate perforated metallic electrodes embedded in fine gravel, whereby potential scale-forming materials are removed and deposited on the electrodes or retained in the gravel bed. (B) The pre-heated feed H_2O is passed successively through an electrode chamber in which a.c. is applied, a gravel filter for the removal of coagulated solids, and a cone-shaped vessel for the separation of oil etc.

C. J.