

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

JULY 20 and 27, 1934.*

I.—GENERAL; PLANT; MACHINERY.

Heat transfer from saturated steam to transverse surfaces. E. KIRSCHBAUM and B. KRANZ (Chem. Fabr., 1934, 7, 176—180).—Nusselt's heat-transfer formula assumes film condensation at the contact wall. In practice, however, both film and drop condensation may occur and the latter is favoured by the presence of, e.g., oil. In experiments with a Cu tube, using quiescent steam, the condensation was actually observed by the aid of an electric lamp to be a mixture of film and drops. Results were summarised by $\alpha_D = 8840 - 149t + 1565t^2$, where α_D is the heat-transfer coeff. and t the temp. difference. If α_N is the val. calc. by Nusselt's equation, then $\alpha_D/\alpha_N = 2$ (approx.); spraying in oil raised this ratio to 6. Low wall temp. favour film condensation. The ratio $\alpha_D/\alpha_N = 2$ is correct for a wall temp. of 110° and a temp. difference of 15°. C. I.

Better utilisation of an insulator for momentary protection against heat and cold. P. VERNOTTE (Chim. et Ind., 1934, 31, Spec. No., 264—268).—Theoretical. C. W. G.

Grinding in roller mills. W. BÜCHE (Chem. Fabr., 1934, 7, 165—167).—Experiments in wet grinding show that a certain min. pressure is necessary to reduce particle size. Where the force produced by roller velocity and the η of the paste is insufficient, the work done is all transformed into heat. When grinding is proceeding there is a direct relation between the increase of grain surface and the work done. The problem is discussed mathematically. For good work the desiderata are: high paste η ; as great a difference between the roller speeds as possible, there being a min. speed, according to the nature of the paste, which must always be exceeded; heavy construction to prevent elastic deformation. C. I.

Experiences with pneumatic separators [for coal]. R. MAXWELL (Gas World, 1934, 100, Coking Sect., 48—53).—Separators of the Carlshütte-Kirkup (I) (stationary table, pulsating air) and the Birtley (II) (reciprocating table, continuous air) types are described and average results obtained under varying conditions are given. (I) deal with coal graded $\frac{1}{8}$ — $\frac{1}{2}$ and $\frac{1}{2}$ — $1\frac{1}{2}$ in., sizes $< \frac{1}{8}$ in. being by-passed to eliminate blinding of the tables and so increase throughput. (II) deal with coal graded 0— $\frac{1}{4}$, $\frac{1}{4}$ — $\frac{5}{8}$, and $\frac{5}{8}$ — $1\frac{1}{2}$ in. The separators are totally enclosed and under suction, dust being removed by means of cyclones or bag filters. Results of preliminary tests on the separation by (II) of coke nuts with reference to bulk density (D) and ash content (A) are detailed. Using nuts of size 1— $1\frac{5}{8}$ in., four products

were collected which were found to increase continuously in D and A . Open-fire tests in which ease of ignition and appearance were noted placed the cokes in an order corresponding to the progression in D . E. S.

Dewatering of slimes on the cell filter. F. PROCKAT and H. PAUL (Chem. Fabr., 1934, 7, 168—176).—An experimental rotary filter with cellular divisions is placed within a pressure vessel, the interior of the filter being evacuated. Effect of the different variables in filtration on the behaviour of a suspension in H_2O of washed coal dust of $< 500 \mu$ diam. and containing 4% of ash was studied. With reduction in grain size yields increased but so also did residual H_2O . For the filter used the optimum grain size, taking both points into consideration, is a coal dust of 50—60% $< 60 \mu$. With reduction of H_2O content of original suspension from 90% to 60% the output increases enormously owing to better cake formation. Addition of 2% of clay to the H_2O has little effect on filtration, but 4% reduces it almost to zero, owing either to hygroscopicity or to the choking of the pores in the filter-cake. For best results the speed of rotation should be as low as possible. Increase of pressure difference (P.D.) increases yield. The final H_2O content is a min. at 500 mm. Hg P.D. Scrapers should be set as close to the filter cloth as possible. The above results are all given quantitatively and graphically. C. I.

Entrainment in a forced-circulation evaporator. O. C. CESSNA and W. L. BADGER (Ind. Eng. Chem., 1934, 26, 485—492).—The entrainment of aq. NaCl during evaporation has been measured and from the results an expression is derived similar to that obtained theoretically. D. K. M.

Simultaneous drying and pulverising.—See II. **Influence of steam on steels etc.**—See X. **Viscosimeter as control instrument in brewing.**—See XVIII. **Filtering fruit juices etc.**—See XIX.

See also A., June, 618, **Determination of particle size.** 619. **Determining concn. of vapour-air mixtures.**

PATENTS.

(A, B) **Melting furnace (A) and its construction and operation, (B) with secondary heating features.** A. W. SCHEIDT, Assr. to ELECTRIC SMELTING & ALUMINUM Co. (U.S.P. 1,932,354—5, 24.10.33. Appl., [A, B] 7.3.30).—(A) A continuous tapping hearth adjoining a melting furnace for the manufacture of alkali aluminosilicate or other corrosive material is provided with a bottom of cooled metal plates protected in the early stages by refractory material but mainly, after continued

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

operation, by a chilled layer of the charge. (B) In a similar furnace a flame is projected directly on the upper end of the tap-hole to keep it open. B. M. V.

Crucible furnace. F. SOUTH, JUN., and O. E. NEUHAUSEN, Assrs. to LAVA CRUCIBLE Co. of PITTSBURGH (U.S.P. 1,930,323, 10.10.33. Appl., 16.9.30).—A crucible is provided with a feeding head formed integrally with an upward extension of the furnace wall (*W*) and heated by the combustion gases flowing through vertical bores formed in the thickness of *W*. B. M. V.

[Continuously] incinerating [wet material] and equipment therefor. W. A. DARRAH (U.S.P. 1,929,880, 10.10.33. Appl., 26.5.28).—A rotary, cylindrical kiln is formed with a stationary combustion chamber (*A*), rotary combustion chamber (*B*), and rotary drying chamber (*C*) and is provided with mechanically induced draught. In addition to that for combustion a large quantity of air is admitted to the top of *A* and is intended to pass through *B* without taking part in the combustion, and to mix with the gases at the end of *B* and cool them sufficiently to effect drying without scorching in *C*. B. M. V.

Heating of fluids. W. A. DARRAH (U.S.P. 1,929,881, 10.10.33. Appl., 11.3.29).—Air or other fluid is heated partly by contact with a wall (*e.g.*, a furnace arch, *A*) heated by radiation and partly by contact with a wall (*e.g.*, a nest of tubes, *B*) heated by convection from the combustion gases. Thermostatic control is applied to a damper in the combustion air conduit also, to obtain quick response, to one in a by-pass around *B*, which by-pass may be in the form of an additional chimney. B. M. V.

Heating of flowing fluids. V. A. RUMBLE, Assr. to BAILEY METER Co. (U.S.P. 1,930,456, 10.10.33. Appl., 25.3.31).—When a no. of waste-heat exchangers are operated under different circumstances of available temp. drop, dirt, etc., the fluid to be heated is divided and passed in parallel through the exchangers, the ratio of the streams being determined (and adjusted by automatic devices) by the temp. of the heated streams, so that all those temp. are nearly equal. If the temp. of the re-mixed streams is too low an auxiliary live heater may be started up. B. M. V.

Heat-exchange [conditioning] apparatus. P. A. SCHERER and G. B. RIDLEY, Assrs. to SOUTHERN OREGON SALES, INC. (U.S.P. 1,928,912, 3.10.33. Appl., 24.6.30).—Sheets of fabric are hung over perforated horizontal pipes which supply irrigation liquid with which air or other gas is to be conditioned. B. M. V.

Heat-exchange apparatus. R. MAUTSCH (U.S.P. 1,929,365, 3.10.33. Appl., 22.7.31. Belg., 30.7.30).—Gilled tubes are provided with flanges that are embedded in the wall of a cast-metal header. B. M. V.

(A) Cyclonic cooling tower. (B) Cooling tower. S. C. COEY (U.S.P. 1,929,410—1, 10.10.33. Appl., [A] 9.7.30, [B] 1.5.31).—In cooling towers comprising a no. of superposed annular trays over which air is drawn inwardly and up the core of the tower in spiral paths, (A) the trays are divided into sectors and tilted individually to balance exactly the effect of external draughts; (B) the drips from the trays are positioned in spiral paths parallel to the air flow. B. M. V.

Redistribution-type cooling tower. L. T. MART (U.S.P. 1,928,904, 3.10.33. Appl., 2.12.29).—To obviate the effect of wind causing all the liquid to pass down one side of a tower, an intermediate portion (*I*) is made impervious to horizontal air currents and above it is a closed deck which catches all the downflowing liquid and supplies it to upwardly-pointing jets in the lower part of (*I*). B. M. V.

Mills for grinding paints, enamels, inks, and other viscous substances. P. MITCHELL (B.P. 409,752, 7.11.32).—A single roll is provided with cells, in order around the circumference: (1) for supply and first grinding of the paste, (2) for scraping off and re-applying the paste, (3) for finish-grinding and removal. The parts of (1) and (3) are readily detachable. B. M. V.

Roller grinding mills. A. E. BARRETT, and DAVEY, PAXMAN & Co. (COLCHESTER), LTD. (B.P. 410,295, 6.3.33).—The grinding bars are double, a supplementary feed taking place through apertures formed in both bars and emerging under the second. If desired, passages may be formed to allow material that has passed under the first bar only to emerge endways. B. M. V.

Screen assembly for grinding mills. O. N. GREDELL, Assr. to STANDARD STEEL WORKS (U.S.P. 1,928,887, 3.10.33. Appl., 4.9.31).—Means for attaching screen sections to a disintegrator or hammer mill are described. B. M. V.

Tumbling mill. E. W. BENSON (U.S.P. 1,929,546, 10.10.33. Appl., 1.9.31).—The articles to be cleaned are rotated in the mill while secured to a hollow shaft by means of quick-release devices. B. M. V.

Machines for working liquid, pulverised, or granular materials, particularly for mixing and conching cacao and chocolate materials. W. FICKENSCHER (B.P. 409,977, 4.9.33).—An apparatus similar to a gear-wheel pump is elongated axially to give greater capacity, and is formed with rounded and spaced teeth to give agitation rather than pressure. B. M. V.

Leaching of material. A. W. LAIRD, Assr. to WESTERN ELECTRIC Co., INC. (U.S.P. 1,929,927, 10.10.33. Appl., 8.1.30).—ZnCl₂ is leached from parchmentised or vulcanised articles in a cyclic countercurrent system, the articles remaining stationary throughout the cycle and the position of the charging/discharging vat rotating one step at each cycle. The final liquor in contact with the goods is maintained at *d* 1.3. B. M. V.

Open-drainage leaching process. H. E. KEYES (U.S.P. 1,928,728, 3.10.33. Appl., 31.12.27. Renewed 4.2.33).—The material, *e.g.*, ore, is heaped in a cone at the angle of repose and is preferably graded in such a manner that the coarser material is nearer the axis and base of the cone. Leaching solution is applied at the apex only, either down a vertical stand-pipe or after levelling off the top of the cone and rebuilding with very coarse material. B. M. V.

Continuous extraction, by means of one or more solvents, of soluble or liquid constituents contained in any solid material. Soc. ANON. DES ETABL. A. OLIER (B.P. 410,301, 24.3.33. Fr., 24.1.33).—The

material (nuts, copra, cottonseed) is caused to travel downwards through a rising flow of solvent and is then lifted through and above a falling flow of fresh solvent in an adjoining column. Filtration of the solution is followed by distillation in vac. in a horizontal heated chamber. The material in the first extraction column is supported in thin layers on a worm which is subjected to axial jerks as well as to rotation. B. M. V.

Impregnation of materials with a liquid. F. L. JEFFERIES, Assr. to INTERNAT. PATENTS DEVELOPMENT Co. (U.S.P. 1,928,894, 3.10.33. Appl., 22.4.32).—Easily broken material, *e.g.*, crystals or starch lumps, is sprayed while being tumbled to a min. extent in a rotary inclined drum which is preferably slightly double-conical. B. M. V.

Filter. M. B. MOUNT (U.S.P. 1,929,510, 10.10.33. Appl., 30.12.30).—A continuous vac. drum filter provided with a single cloth over all sections is described. B. M. V.

Suction filters applicable for treatment of printing inks [for fabrics]. F. ZIMMER'S ERBEN A.-G. (B.P. 410,427, 2.12.33. Ger., 2.12.32).—The claims relate to means for the easy removal from the vac. chamber of the bucket which catches the filtrate. B. M. V.

Filter. L. E. MILKEY, Assr. to CELLULO Co. (U.S.P. 1,930,209, 10.10.33. Appl., 25.6.31).—A "filter mass" is utilised, the prefilter being applied over the whole outer surface of, *e.g.*, a cylindrical pile and the filtrate drawn off at the mid-point of an axial conduit. B. M. V.

Rigid filter medium. N. B. LUND, Assr. to DORR Co., Inc. (U.S.P. 1,930,128, 10.10.33. Appl., 6.10.30).—Filter cells especially suitable for the internal surface of a drum are formed of punched ductile metal bent into forms sufficiently rigid to resist alternate vac. and pressure and provided with suitable filtrate outlets. B. M. V.

Effecting centrifugal separation. SHARPLES SPECIALTY Co., Assees. of N. BREWER (B.P. 409,832, 24.12.32; U.S., 24.12.31).—Solids are separated from a liquid, *e.g.*, Na₂ or Na₃ phosphate from mother-liquor, (1) by decantation in a zone of larger diam. and (2) by straining in a smaller zone, the liquor from (1) carrying off fine crystals, and wash liquor being applied to (2) while the solids are being turned over by the raking mechanism. The wash effluent may be returned as feed, as it usually contains fine crystals. B. M. V.

Separators for liquids. RAMESOHL & SCHMIDT A.-G. (B.P. 410,445, 9.2.34. Ger., 25.10.33).—The heavy constituent, *e.g.*, skimmed milk, is collected in a separate compartment of the bowl and skimmed off the interior of the parabola of rotation by means of a device extending through the hollow shaft. B. M. V.

Addition of reagents to liquids. W. PATERSON (B.P. 409,854, 30.1.33).—The drop in pressure at a throat or orifice in a main conduit (*A*) regulates the outflow from a const.-level tank (*B*) which is kept filled by liquid exhausted from a hydraulic motor (*C*) under control of a float valve in *B*. *C* may be operated by the liquid from *A*, and works a pump which forces the reagent into *A*. B. M. V.

Fractionation. W. M. STRATFORD, Assr. to TEXAS Co. (U.S.P. 1,927,652, 19.9.33. Appl., 2.8.29).—A fractionating column is provided with a heating coil at the bottom, a cooling coil at the top, a vapour inlet at an intermediate point, and a vapour draw-off at a lower point, by which, *e.g.*, kerosene vapours may be withdrawn without substantial admixture with the top product (petrol) or bottom product (gas oil). B. M. V.

Devices for mechanical separation of dust in gases. SOC. D'ELECTRICITÉ DE LA RÉGION DE VALENCIENNES-ANZIN (B.P. 409,988, 25.9.33. Fr., 28.9.32 and 26.7.33).—Collecting gutters for separators of the skimming type are described. B. M. V.

Dust remover. H. E. MCCRERY, Assr. to BLAW-KNOX Co. (U.S.P. 1,928,670, 3.10.33. Appl., 28.6.32).—An air filter comprising a no. of frames wrapped with filter cloth is described. The cloth is wrapped around itself to seal the spaces between and at the ends of the frames. Provision is made for easy removal and jarring. B. M. V.

Apparatus for collecting dust. R. F. O'MARA, Assr. to RAYMOND BROS. IMPACT PULVERISER Co. (U.S.P. 1,928,702, 3.10.33. Appl., 7.8.31).—A no. of separators (*S*) of cyclone or other type are used as concentrators in parallel, the clean air from all being discharged from the system. The streams of dirty air from the apices of *S* are drawn by a fan tangentially into another cyclone, whence settled dust is removed and dirty air returned to the inlets of the *S*. B. M. V.

Preventing condensation of moisture from flue gases. G. G. SCHMIDT, Assr. to CARRIER ENG. CORP. (U.S.P. 1,928,822, 3.10.33. Appl., 16.8.30).—In a furnace for heating air the flue for products of combustion (*P*) is protected from internal corrosion by a layer of the clean, heated air admitted in such a way as to mix with the *P* as little as possible. B. M. V.

Mist extractor. D. A. SILLERS (U.S.P. 1,928,706, 3.10.33. Appl., 11.4.30).—The apparatus is of the zig-zag-plate type having vertical gutters to lead the collected moisture to a sump. The narrow zig-zag passages are guarded by a screen so inclined as to direct collected matter to the sump. B. M. V.

Apparatus for treatment of flue gases, waste gases from industrial processes, and the like. [Metering of chlorine.] G. H. DREIER, and PATERSON ENG. Co., LTD. (B.P. 409,849, 18.1.33).—In the metering of Cl₂ or other corrosive gas by means of an orifice or the like, a diaphragm of Ag or other suitable metal is inserted in the pressure pipe between the orifice and the barograph or pressure gauge. B. M. V.

Apparatus for treatment of gaseous products. I. HECHENBLEIKNER, Assr. to CHEM. CONSTRUCTION CORP. (U.S.P. 1,929,246, 3.10.33. Appl., 31.12.30).—A stack of perforated plates has every alternate space filled with filter medium and the filled spaces are alternately connected to a peripheral or central inlet or outlet space so that filtration takes place over a multiplied area through a single thin layer. B. M. V.

Gas and vapour purification apparatus. M. J. TRUMBLE and W. L. SEELEY, Assrs. to PROCESSCO, LTD. (U.S.P. 1,929,659, 10.10.33. Appl., 13.12.30).—The

purifying material is placed on trays suspended from the cover of the vessel. A pair of vessels is connected by a pair of 3-way cocks for alternate use and regeneration.

B. M. V.

Compressing [and cooling of] gases. N. C. CHRISTENSEN (U.S.P. 1,929,350, 3.10.33. Appl., 8.4.30).—To obtain isothermal compression the gas is compressed over a body of liquid, and in the compression space are coils cooled by another liquid together with means for forced circulation of the gas; alternatively, part of the compressing liquid may be sprayed into the space.

B. M. V.

Brake fluid composition. J. W. TATTER, Assr. to LEWIS DIFFERENTIAL Co. (U.S.P. 1,928,956, 3.10.33. Appl., 22.3.30).—A hydraulic fluid comprises, in solution, $[\text{CH}_2\text{OH}]_2$, e.g., 50 vol.-%, with smaller proportions of H_2O (37–45) and sulphonated castor or linseed oil soap (5–13).

B. M. V.

(A) Control device for fractionators and the like.
(B) Condenser control device. F. L. KALLAM (U.S.P. 1,940,802—3, 26.12.33. Appl., [A] 9.12.29, [B] 16.12.29).

Chemical apparatus.—See III. Recovering blast-furnace flue dust.—See X. Drying starch.—See XVII. Filtering beer.—See XVIII. Drying fruits etc.—See XIX.

II.—FUEL; GAS; TAR; MINERAL OILS

Lancashire coalfield. Miscellaneous seams of the lower coal measures. ANON. (Dept. Sci. Ind. Res., Fuel Res., Survey Paper, 1934, No. 32, 80 pp.).—Ultimate and proximate analyses, calorific vals., laboratory assays, etc. of samples of coal, consisting of pillar sections representing the seam from roof to floor, are tabulated for several seams the most important of which are the Lower and Upper Mountain Mines. They are all caking coals and most of them have a high calorific val. The general character and variation of the seams of the lower coal measures are discussed.

A. B. M.

Classification of coals. D. J. W. KREULEN (Natuurwetensch. Tijds., 1934, 16, 4—11).—Classification of coals according to the % volatile matter alone is unsatisfactory. The activity of a coal, however, as indicated by the humic acid factor, is related to the coking properties, the heat of combustion, the yield of tar, ultimate analysis, and the % of combined H_2O , and forms the best basis of classification.

H. F. G.

Composition of coal. Thermal decomposition of lignites. J. E. ASHMORE and R. V. WHEELER (J.C.S., 1934, 474—480).—By observation of the changes in the character of the liquid and gaseous products of decomp. with rising temp. on distilling the material *in vacuo* (cf. B., 1929, 116) the decomp. points of three lignites, Colstrip (73.2% C), Beulah, (68.9% C), and Morwell (67.2% C), were found to be 285–290°, 250–255°, and 225–230°, respectively. The decomp. point of a bituminous coal of low C content (Hamstead Thick, 78.3% C) was 300°; that of a dopplerite (56.7% C) could not be determined with certainty. There was no sudden increase in the production of CO_2 or paraffins at the decomp. point of the lignites as there is

with bituminous coals. In passing from the bituminous coals to the lignites there is no abrupt change in the general character of the decomp. products with decreasing C content of the material, except for a lower yield of phenols from the lignites; it is inferred that the change in character throughout the series of fuels from peat to anthracite is continuous and is due primarily to a gradual polymerisation and dehydration of the ulmins with the elimination of CO_2H and OH groups.

A. B. M.

Coal cleaning by a sand-flotation process. J. DUMMELow (Fuel Econ., 1933, 8, 689—694).—Results of tests on a Chance cleaning plant (B., 1933, 770) show that the max. theoretical separation is actually attained in practice. This efficiency is not affected by variations in size, shape, and rate of feed of the coal. There is no measurable breakage of coal and the operating η (1.25—1.8) can be rapidly altered to suit varying conditions. A 10-ft. cone can deal with 100 tons/hr. and the power consumption is low. Certain of the operating features of a commercial installation are described and the general lay-out of the plant at the Newmarket Colliery is shown.

E. S.

Grindability of coal. C. E. BALTZER and H. P. HUDSON (Fuel Econ., 1933, 8, 703—706, and Canada Dept. Mines, Mines Branch Rept., 1933, 737).—A new method of determining grindability (G), known as the F.R.L. method, is described and compared with the Cross and the Hardgrove methods. A 5–6-lb. sample is carefully reduced by means of a small roll crusher until it will all pass a 10-mesh sieve, care being taken not to overcrush. The sample is mixed and riffled into two parts, one being set aside as reserve while the other is again mixed and divided and the two parts are dried to const. wt. 500 g. of one part are placed in an Abbé pebble-mill jar along with 3000 g. of pebbles ($\frac{1}{2}$ —1 in.) and the jar is then rotated for 1000 revs. at 70 r.p.m. The coal is screened over a 100-mesh sieve and the > 100 -mesh material is weighed and made up to 500 g. with coal from the second dried portion and the grinding repeated. The same procedure is repeated for the third grinding, when the wt. in g. of the > 100 -mesh material subtracted from 500 gives the “grindability index number.” The method gives consistent results which are in agreement with those given by the other two methods, but it is claimed that this method conforms more closely to milling practice. Results of tests on 12 coals show that G increases with the rank of the coal.

E. S.

Simultaneous drying and pulverising [of coal]. ANON. (Fuel Econ., 1933, 8, 695—699).—The drying of coal with air or flue gases prior to milling and/or in the mill is discussed. Simultaneous drying and pulverising increases milling efficiency as measured by power consumption and quality of output. Coals of widely varying H_2O contents can be efficiently dealt with and the process can be rendered fully automatic. When applied to a direct-firing mill the whole of the drying gas can be vented through the burner at a temp. as high as is desirable for the purpose of combustion, thus eliminating the loss of coal in the vantage and troubles caused by condensation of H_2O and oxidation of the coal.

E. S.

The time factor in the determination of volatile matter in coke and coal. F. W. SCHWARTZ and J. L. ROSENHOLTZ (Rensselaer Polytech. Inst. Bull., 1934, No. 47, 3—13).—Cokes, anthracites, and coals of < 60-mesh size were heated at 950° in a Pt crucible in atm. of N₂, A, and air. N₂ was found to react with coal and coke and to produce a continuous decrease in wt., greatly in excess of that due to the volatile matter (V.M.) or oxidation. A was satisfactory, and, from a comparison of the results obtained with this gas and air, the following procedures for the determination in air, using a 15-c.c. crucible with capsule lid and 1-g. samples, are proposed: (1) for coke, anthracite, and semi-bituminous coals (< 25% of V.M.) two intermittent heatings of 7 min. each, the difference between the two losses being taken as the V.M.; (2) for bituminous coals (> 25% of V.M.), heating for 4 min. E. S.

Production of smokeless fuel in chamber ovens at medium temperatures. J. F. SHAW and J. G. KING (Gas J., 1934, 206, 603—609).—Smokeless fuel with 4—5% of volatile matter was produced in Woodall-Duckham chamber ovens, using combustion chamber temp. ranging from 850° at the bottom to 650° at the top of the ovens. Two coals carbonised alone gave weak cokes. The effect of blending a strongly caking Durham coal with a weakly caking Warwickshire coal, and with low-temp. coke breeze, was investigated with reference to the appearance, strength, and combustibility of the coke. Chamber-oven coke prepared from an optimum blend is denser, stronger, and less friable than low-temp. coke made from a very suitable coal in the Fuel Research Board brick retort. The latter coke burns up more quickly and gives a higher radiation in the open grate. Combustibility, shatter, and rumbler tests on coke are described. T. H. B.

Influence of carbonising conditions on certain coke properties. H. E. BLAYDEN and H. L. RILEY (Gas World, 1934, 100, 59—61).—A Durham coking mixture (*M*) was carbonised with and without the addition of 1% of CaO in (i) a beehive oven and (ii) a patent oven. Coke prepared by (i) was larger, more combustible in a closed stove, had a higher shatter index, and when shattered had a lower bulk *d* than coke prepared by (ii). CaO increased the amount of large coke, the bulk *d* of the shattered coke, the combustibility, and the total and fixed S, and lowered the shatter index. The inner ends of half-oven-width pieces of a Durham coke had a higher shatter index, lower bulk *d*, and greater combustibility in a domestic coke boiler than those properties of either the middle or outer ends of the same pieces. Material graded ½—1 in. was generally more combustible than that graded 1—1½ in. Similar results were obtained with a Durham foundry coke. Carbonisation of *M* at a slower rate gave an improved size and shatter index and a higher ignition temp. than did carbonisation at a faster rate, without affecting other properties. (Cf. B., 1934, 5, 388.) G. M.

Specific gravity of coke in relation to particle size. B. NEUMANN, W. GROSS, L. KREMSER, and J. SCHMIDT (Brennstoff-Chem., 1934, 15, 161—165).—The *d* of pulverised coke has been determined by a pycnometer method using PhMe as the displacing liquid and a

volumenometer method using air (cf. B., 1926, 522). The second method was unreliable owing to appreciable variation in the amount of air adsorbed by the powdered material. The observed vals. of *d* for the same coke increased with diminishing particle size, due presumably to the progressive elimination of the closed pores in the material; microscopical examination indicated that the effect of such pores should no longer be appreciable at particle sizes < 120 μ, but this result was not confirmed by the observed variation in *d*. The vals. of *d* for four different cokes, of ash content approx. 9%, for a particle size < 75 μ, varied from 1.761 to 1.990, indicating that the coke substance consisted of mixtures in varying proportions of graphitic C and highly complex hydrocarbons. A. B. M.

Colloidal natural or artificial graphite [for lubricants]? H. KARPLUS (Petroleum, 1934, 30, No. 19, Motorenbehr., 7, 2—6).—The essential requirements in a colloidal graphite lubricant, viz., sufficiently fine dispersion, stability, freedom from impurities, and suitable structure of the graphite particles, can be satisfied equally well by natural as by artificial graphite. A. B. M.

Low-temperature conversion of methane. V. A. KARSHAVIN (J. Chem. Ind. Russ., 1934, 10, No. 2, 31—33).—Complete conversion of CH₄ and H₂O into CO₂ and H₂ at 500—600° is possible only when the CO₂ produced is immediately removed from the reaction gases by CaO. The reaction is catalysed by Ni, which is, however, rapidly inactivated by traces of S in the gas. R. T.

Continuous process for conversion of gases containing methane and other hydrocarbons. V. A. KARSHAVIN and A. G. LEJBUSCH (J. Chem. Ind. Russ., 1934, 10, No. 1, 34—38).—The hydrocarbon constituents are converted into CO and H₂ by passing the gas, mixed with air, over Ni at 1000—1100°; at lower temp. the Ni is inactivated by 0.2—0.25% of S in the reaction gases. R. T.

New catalysts for conversion of carbon monoxide. F. P. IVANOVSKI, G. F. BRAUDE, and A. M. PANINA (J. Chem. Ind. Russ., 1934, 10, No. 2, 37—44).—Siderite containing 0.7% of K₂Cr₂O₇ is an active and stable catalyst at 500° of the reaction CO + H₂O → CO₂ + H₂. Catalysts containing Fe undergo inactivation at > 700°. Co catalysts exhibit high activity, but possess unsatisfactory mechanical properties; this defect can be remedied by adding MgO, but the product is less active. R. T.

Construction of safety devices for low-pressure acetylene generators. H. FRIEDRICH (Chem. Fabr., 1934, 7, 184—188).—Designs are illustrated and described. C. I.

Formation of sulphur compounds in the distillation of bituminous rocks. J. BARLOT (Chim. et Ind., 1934, 31, Spec. No., 426—427).—Most of the S compounds found in the crude oils produced by the distillation of bituminous rocks are formed by the simultaneous decomp. of the CaCO₃ and FeS₂ in these rocks giving rise to COS, which forms additive compounds with the hydrocarbons. The S content may be decreased by distilling at as low a temp. as possible to avoid decomp. of the CaCO₃ and FeS₂. H. S. P.

Indian coal tar. S. K. GANGULY, B. S. RAO, and P. C. GUHA (J. Indian Inst. Sci., 1933, 16A, 185—192).—The gas tars from Calcutta and Bombay gasworks were of normal quality, comparable with similar tars produced in Europe. The coke-oven tar from Jamshedpur was of poor quality, containing no light oil and 80% of pitch. A. B. M.

Formation of carbazole in coke-oven tar. M. STEMART and F. SCHULZ (Chim. et Ind., 1934, 31, 507—513, 764—722).—The pyrogenic decomp. of NH_2Ph in a porcelain tube at 775°, 900°, and 950° yielded 7, 4, and 1.5%, respectively, of carbazole (I), the formation of which commenced at about 600°. The results, considered in relation to the recorded analyses of low-temp. (L) and coke-oven tars (C), are not in accord with the theory that the (I) in C is derived from the thermal decomp. of the primary amines in L. Experiments to decide the possibility of the (I) being formed by thermal reaction between NH_3 and C_6H_6 , NH_3 and phenols, HCN and phenols, etc. have all given negative results. It is concluded that the (I) is derived from other N compounds than NH_2Ph in L. A. B. M.

Hydrogenation of coal and of primary tars. C. BERTHELOT (Chim. et Ind., 1934, 31, 522—536, 786—796).—Recent developments in these processes, in particular those due to the British Fuel Research Board, are reviewed, and the economic position of the processes is briefly discussed. A. B. M.

New apparatus for testing the ductility of bitumens. J. MALETTE (Chim. et Ind., 1934, 31, Spec. No., 752—754).—A ductilimeter is described with which the measurement can be made, on three specimens simultaneously, at const. temp. and with const. speed of drawing-out of the briquettes. T. W. P.

Sterlitamak petroleum. N. D. ZELINSKI and J. R. JURJEV (Bull. Acad. Sci. U.R.S.S., 1934, 8, No. 1, 135—140).—Analytical data are recorded. R. T.

Gas from Indian oil wells. G. P. KANE, K. R. KRISHNASWAMI, and H. E. WATSON (J. Indian Inst. Sci., 1934, 17A, 33—40).—Analyses of 14 samples of oil-well gas from Burma or Assam gave the following ranges of vals.: O_2 0.4—1.3, CO_2 0.2—14.6, CO 0.2—0.9, CH_4 51.7—88.2, C_2H_6 0—7.6, C_3H_8 0—9.5, higher hydrocarbons 0—9.0, N_2 2.4—31.3%, He 0—7 pts. per 10^5 . A natural gas from Bombay had the composition: O_2 1.2, CO_2 0.6, CH_4 92.2, N_2 6.0%, He 12 pts. per 10^5 . Thus none of the gases contained sufficient He to render its commercial extraction feasible. A. B. M.

Distillation of Saveliev (Lower Volga) shales. V. P. GOLUB, F. K. FISCHER, and I. P. RJAZANOV (Sci. Mem. Univ. Saratov, 1934, 10, 64—90).—The shale (I) contains H_2O 3.7, mineral matter 64.5 (CaO 46—50, SiO_2 24—31, $\text{Fe}_2\text{O}_3 + \text{Al}_2\text{O}_3$ 17, MgO 2.1—2.4%), S 2.66 (chiefly org.), org. substances 22, CO_2 8.7%, and has a calorific val. (C) of 1700—1900 g.-cal./g. Gas of high C can be obtained from (I) by destructive distillation or by the action of superheated steam, whereby 350—400 cu. m. of gas are obtained per ton of (I). The inorg. residue is suitable for the cement industry. R. T.

Mineral oil sulphonic acids. II. Colour reaction for the β -sulphonic acids. J. SEREDA (Petroleum, 1934, 30, No. 19, 1—2; cf. B., 1933, 211).—Aq. solutions of the β -acids or their salts give a steel-blue ppt. with FeCl_3 which dissolves in Et_2O to a blue solution. The test is sensitive and is not given by the α - or the γ -acid, by naphthenic acids, or by the sulphonic acids of C_6H_6 , C_{10}H_8 , etc. A. B. M.

Industrial utilisation of decolorising clays. L. DELEMAR (Chim. et Ind., 1934, 31, Spec. No., 432—435).—The decolorising action of clays on mineral oils differs from that on vegetable or animal oils. With mineral oils it does not appear to depend greatly on the degree of subdivision of the clay, but to obtain the best results the clay should be heated to a definite temp. before the oil is added. This heating causes a change in the clay which is irreversible. H. S. P.

Synthetic petrol obtained by hydrogenation of coal in England. J. NICOLETIS (Chim. et Ind., 1934, 31, Spec. No., 428—431).—A general review of the position in England and of the process used is given. H. S. P.

Synthesis of benzene from carbon monoxide by catalytic reduction at atmospheric pressure. I. Methods of synthesis and analysis. S. WATANABE, K. MORIKAWA, and S. IGAWA (J. Soc. Chem. Ind., Japan, 1934, 37, 142—146 B).—A small-scale (1 litre per hr.) apparatus and analytical methods are described. Some polymerisation and condensation on the catalyst occur. A. G.

Aspects of benzol recovery and refining. S. W. A. WIKNER and B. RICHARDSON (Gas J., 1934, 206, 559—567).—Practice at the Newcastle-upon-Tyne and Gateshead Gas Co.'s works is described. Gas oil has given satisfaction as a scrubbing medium. 11.6% of the crude benzol (I) recovered is derived from gas oil. The S content of the gas is reduced 45% by washing for (I). (I) refining by the inhibitor process gives 5% more motor (I) than acid-washing, but the product contains more S, which has to be removed by the MeOH-NaOH process, based on the reaction $\text{CS}_2 + \text{NaOH} + \text{MeOH} = \text{NaS-CS-OMe} + \text{H}_2\text{O}$. This process and the recovery of MeOH by treatment with H_2SO_4 and subsequent distillation are described. T. H. B.

Peroxides in gasoline. Effects of peroxide formation in cracked gasolines. J. C. MORRELL, C. G. DRYER, C. D. LOWRY, JUN., and G. EGLOFF (Ind. Eng. Chem., 1934, 26, 497—502).—Peroxides have been formed in definite amounts in cracked gasolines by oxidation with air or O_2 at atm. and higher pressures and the rates of formation graphed. With increasing peroxide concn. the colour of the gasoline darkens, gum formation increases, whilst anti-knock val. and susceptibility to the action of inhibitors decrease. Peroxides in low concn. can be removed by percolation through fuller's earth, with practically complete recovery of the properties of the original gasoline. D. K. M.

Variations in service-station gasoline. I. Distillation range. II. Vapour pressure. H. M. FAIGENBAUM, M. D. MACNAUGHTON, H. D. DONOVAN, G. F. HODGSON, and R. M. BEACH (Rensselaer Polytech.

Inst. Bull., 1934, No. 47, 14—32).—Data collected over a period of 4 years are detailed. E. S.

Determination of sulphur in benzene or gasoline. Modification of the A.S.T.M. lamp. H. O. ERVIN (Ind. Eng. Chem. [Anal.], 1934, 6, 225).—A simple modification is described. R. S. C.

Purification of aromatic hydrocarbons. S. N. POPOV and S. I. POLONSKAYA (Nef. Choz., 1933, 25, 93—95).—ZnCl₂ pptd. on brick does not yield standard colourless C₆H₆ and PhMe. If ZnCl₂ is used for pre-treatment, 40% less H₂SO₄ is required provided the polymerides are removed by distillation. > 20% of reagents can be saved in the H₂SO₄ refining process by intermediate steam-distillation. CH. ABS.

Knocking characteristics of aromatic hydrocarbons. W. G. LOVELL, J. M. CAMPBELL, F. K. SIGNAIGO, and T. A. BOYD (Ind. Eng. Chem., 1934, 26, 475—479).—The knocking tendencies of 59 hydrocarbons (aromatic and *cyclo*-) in solution in a reference gasoline have been determined and the results are expressed in terms of the NH₂Ph equiv. These are discussed in relation to mol. structure. The relative anti-knock properties of different hydrocarbons may vary with different engine conditions. D. K. M.

Influence of soda on the gasification of heavy oils. Acceleration of water-gas production during pyrolysis of heavy oil in presence of steam. M. A. ELLIOTT [with W. J. HUFF] (Ind. Eng. Chem., 1934, 26, 480—485).—The influence of Na₂CO₃ (I) on the action of heavy oil on steam at 704—871° has been studied. At the higher temp. the (I) causes (1) a pronounced increase in the gasification of the oil-C and decrease of deposits of C, (2) a decrease in calorific val. of the gas, (3) an increase in the total thermal yield, (4) no marked primary effect on the pyrolytic reactions, (5) the production of illuminants predominantly olefinic in character, and (6) a decreased production of gaseous S compounds possibly due to Fe present. At 871° Na₂S has a similar effect to that of (I). D. K. M.

Exact and approximate determinations of the upper and lower calorific values of heavy combustible liquids (mazouts). M. DAMANAY (Chim. et Ind., 1934, 31, Spec. No., 247—250).—Formulae for the calculation of heats of combustion from the C and H contents are given. C. W. G.

Pneumatic separators for coal. Dewatering [coal-dust] slimes.—See I. EtOH from C₂H₄.—See III. Liquid CO₂.—See VII. Removing impurities from materials.—See VIII. Concrete-bitumen mixes. Inflammability of painted wood.—See IX. Cell for measurements on oils.—See XI. Analysis of graphite greases. Determining paraffin etc. in beeswax.—See XII.

See also A., June, 603, Influence of steam on hydrocarbon combustion. Ignition temp. of hydrocarbon-air mixtures. 617, Test for purity of gases. 643, Coloured hydrocarbons of coal tar.

PATENTS.

Cleaning of coal. C. W. H. HOLMES, and BIRTLEY Co., LTD. (B.P. 408,628, 11.10.32).—Comparatively

small raw coal is graded into two or more sizes. The larger-sized coal is then separated into clean coal and shale (dry pneumatic separation) and the smaller-sized coal is similarly separated by a reduced-pressure, wet-flotation process. If an intermediate size is separated this may be cleaned by either a dry or a wet process. The clean coal products from the two or more processes are mixed in appropriate proportions to give the desired H₂O content in the finished product. A. B. M.

Apparatus for distillation of solid carbonisable materials. SOC. D'ETUDES ET DE VALORISATION INDUSTR. DES COMBUSTIBLES (B.P. 409,206, 5.10.33. Fr., 6.10.32).—Sets of tubular elements (*E*) are arranged in horizontal planes one above the other within a chamber (*C*) and are heated externally by the circulation of hot gases through *C*. Each *E* is provided with kneading and propelling devices attached to a central shaft. The *E* in successive horizontal planes are connected at one end by a common header, which is provided with an offtake for the gases and vapours evolved. The material to be carbonised is fed into the uppermost set of *E* and passes thence to the successively lower *E* in zig-zag manner until finally discharged after passing through the lowest set. The *E* corresponding to the zone in which swelling or agglutination of the material occurs may be suitably modified, e.g., by combining two or more *E* to form a compound *E*. A. B. M.

Carbonisation of coal. L. C. KARRICK (U.S.P. 1,923,213, 22.8.33. Appl., 23.5.28).—Coal is carbonised in a tall, vertical retort, the heat being supplied electrically by one or more flexible resistors of heavy wire rope, chain, etc. mounted spirally or in zig-zag form within the charge. The heating element is so designed that it can be forcibly withdrawn when carbonisation is complete and so aid in dislodging the mass of coke. Carbonisation is effected slowly by utilising "off-peak" power only. A. B. M.

Treatment of materials such as coal, lignite, asphalt, etc. R. J. McRAE, Assr. to J. W. McKINNON (U.S.P. 1,923,161, 22.8.33. Appl., 28.2.29. Renewed 12.1.33).—A pair of cylinders rotatable about parallel, horizontal axes are connected by means of a belt (*B*), preferably made of a Cr-Fe alloy of high tensile strength. The outer surface of one cylinder (*C_H*), which is heated internally, is provided with longitudinal ribs, whilst the inner surface of *B* is provided with transverse ribs, the two sets of ribs co-operating to maintain *B* at a distance from the surface of *C_H*. Fine coal etc. mixed, if desired, with a binder is fed on to the inner surface of *B* in such a manner that it is carried into contact with *C_H* and thereby briquetted and/or carbonised. The whole apparatus is enclosed in a casing. A. B. M.

Coal treatment. H. J. ROSE and W. H. HILL, Assrs. to KOPPERS Co. (U.S.P. 1,925,005, 29.8.33. Appl., 25.3.26).—Coal is heated with a high-boiling coal tar, water-gas tar, or cracked petroleum oil, to 200—400°, but below the temp. at which any substantial decomp. occurs, until practically the whole of the coal substance passes into solution, which may then be decanted or filtered from the insol. ash, mineral charcoal, etc. The heating may be effected under moderate

pressure to prevent volatilisation of the solvent. The solution may be used as a fuel or as a convenient means for further catalytic or solvent treatment of the coal. The coal substance may be recovered from the solution by distilling off the oil, preferably in steam, or by pptn. with a low-boiling solvent, *e.g.*, ligroin, and may be utilised for the production of low-ash coke etc.

A. B. M.

Manufacture of fuel. A. A. ROBERTS (B.P. 408,951, 18.7.32).—Pulverised coal is mixed with oil, preferably an oil derived from coal by carbonisation or hydrogenation, and the suspension is stabilised by addition of starch. Combustion-promoting agents, *e.g.*, NaCl, H_3BO_3 , may also be added, in which case the starch is used in the form of an aq. emulsion.

A. B. M.

Extraction of liquid hydrocarbons from coal, shale, and other solid hydrocarbonaceous material. N. H. FREEMAN (B.P. 408,342, 18.10.32).—The material is distilled in a retort comprising a series of superimposed, flat, cylindrical chambers, heated externally to temp. which are maintained by thermostatic control at levels giving the material a progressive heat-treatment in suitable stages. The material passes from one chamber to the next through a central opening and is conveyed to the periphery of the chamber and back to the exit aperture by means of a rotating plate attached to a central shaft and a series of stationary ploughs. Each chamber is provided with a separate gas and vapour offtake fitted with a reflux condenser, and provision is made for returning part or all of the condensate to a preceding or succeeding stage of the process. The excess condensate is passed to storage.

A. B. M.

Hydrogenation under pressure of distillable carbonaceous materials. H. E. POTTS. From INTERNAT. HYDROGENATION PATENTS Co., LTD. (B.P. 407,992, 408,002—4, and 408,255, 24.9.32).—(A) The materials, *e.g.*, coal, tar, mineral oils, etc., are destructively hydrogenated in presence of an org. sulphonic acid, *e.g.*, $PhSO_3H$, and metals or compounds of metals of groups IV—VIII, *e.g.*, Ti, Sn, Pb, Cr, Mo, etc. The acid is added in approx. sufficient amount to neutralise any bases present (B—D) The process is carried out in presence of (B) an org. carboxylic acid, *e.g.*, AcOH, which, when inorg. salts are also present, does not combine therewith to form "ansolvo" acids; (C) an acid salt of Li, Mg, Al (with the exception of Al hydrosilicates), Sn, Mo, W, Mn, etc.; (D) acids of S or N containing O, or their anhydrides, *e.g.*, H_2SO_4 . (E) When the initial materials contain basic or alkaline constituents $\leq 80\%$ of these are neutralised by the addition of acid.

A. B. M.

Manufacture of activated carbon. R. G. DAVIS and M. T. SANDERS, ASSRS. to DARCO CORP. (U.S.P. 1,923,918, 22.8.33. Appl., 5.4.30. Cf. U.S.P. 1,810,871; B., 1932, 457).—The finely-divided carbonaceous material, preferably lignite, is allowed to fall down an externally-heated tube (920—1020°) through an ascending current of steam, the upward velocity of which is so adjusted as to allow the coarser particles to fall but to carry forward the finer and less activated material into a second similar apparatus wherein it undergoes

further activation. The gases produced in the process are burned in the combustion chambers surrounding the activating tubes.

A. B. M.

(A) **Obtaining carbon black and a gaseous mixture of hydrogen and nitrogen in controlled proportions by the thermal dissociation of hydrocarbon gases and vapours.** (B) **Apparatus for dissociating hydrocarbon gases.** W. D. WILCOX (U.S.P. 1,929,664—5, 10.10.33. Appl., [A] 28.6.30, [B] 13.8.30).—The gases are dissociated to C black, CH_4 , and H_2 by contact with progressively heated surfaces, the ratio $CH_4:H_2$ being known from the dissociation temp. After the removal of the C black air is admixed (insufficient to yield an explosive mixture) to produce a 3:1 proportion of $H_2:N_2$ and the mixture made to react by heating to 980°, the other final constituents being CO and H_2O . Steam may be admitted to prevent further dissociation into C and the hot gases used to heat the dissociator. (B) An apparatus comprising vertical pipes in cells of refractory material for carrying out all the stages of a process as in (A) in one setting is described.

B. M. V.

Gas producer. J. VAN ACKEREN, ASSR. to KOPPERS Co. OF DELAWARE (U.S.P. 1,924,820, 29.8.33. Appl., 9.7.31).—A charging device for a gas producer (P) comprises a hopper which is provided with a gastight top cover and with a valved discharge opening into P. The cover of the valve (V) is pivotally mounted and is provided with a H_2O -seal which automatically fills when V is closed.

A. B. M.

Continuous gas manufacture. O. HELLER (U.S.P. 1,924,856, 29.8.33. Appl., 23.3.32. Ger., 7.2.31).—A mixture of steam, powdered carbonaceous material, and water-gas, double gas, or town's gas, preheated to 600—1000°, is projected vertically downwards into a reaction chamber (C) wherein it interacts with air and/or O_2 supplied simultaneously through a pipe arranged concentrically within the jet (J) supplying the mixture. The gas produced is caused to pass up around the outer side of J to an offtake at the top of C. A preheater for the steam used in the process is arranged within C in the space surrounding J.

A. B. M.

(A) **Gas-making process.** (B) **Gas-generating apparatus.** A. JOHNSON, ASSR. to COMBUSTION UTILITIES CORP. (U.S.P. 1,923,540—1, 22.8.33. Appl., [A] 19.6.29, [B] 22.8.31).—(A) A no. of elongated retorts (R) of annular cross-section, preferably $\gt 3$ in. wide, are suspended within a gas generator (G) directly above the fuel bed of the latter, so that they are heated externally by radiation from the incandescent fuel bed as well as by means of the sensible heat of the gases, which pass along both sides of R. When carbonisation of the fuel in R is complete the coke is discharged on to the fuel bed of G by suitable means. The coke is then gasified on the standard, or suitably modified, water-gas or producer-gas cycle. Provision is made for controlling the temp. gradient in R by periodically passing superheated steam in down-run contact with the walls thereof, and/or by introducing secondary air around the walls of R at suitable points. (B) The apparatus is described.

A. B. M.

Purification of packing liquids which have been used in waterless gasholders. W. W. TRIGGS. From MASCHINENFABR. AUGSBURG-NÜRNBERG A.-G. (B.P. 408,742, 12.12.32).—The used liquid is heated to 60–70° with $\leq 1\%$ of soap and/or water-glass, whereby any emulsion formed is broken. The liquid is then allowed to separate and the upper layer, consisting of H₂O and impurities, is removed. A. B. M.

Manufacture of (A) acetylene, (B) hydrocarbons rich in carbon from those poorer in carbon. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 408,934 and 408,691, 12.10.32).—(A) CH₄ and/or its homologues are heated to such a temp. that $\leq 5\%$ of the hydrocarbons are converted into olefines and the resulting gases are subjected to incomplete combustion at $> 1000^\circ$. (B) Hydrocarbon gases containing CH₄, C₂H₆, etc. are subjected to thermal decomp. under conditions yielding hydrocarbons which are normally liquid, and gaseous olefines, and, after separation of the former, the latter are subjected to incomplete combustion at $> 1000^\circ$, whereby C₂H₂ is produced. A. B. M.

Manufacture of refined tar for road purposes. GAS LIGHT & COKE Co., W. G. ADAM, D. G. MURDOCH, and F. M. POTTER (B.P. 408,275, 3.8.32).—Soft pitch is heated at $> 300^\circ$ for 12–24 hr., whereby its tar acid content is reduced, and is then blended with an oil which has been freed from tar acids, bases, and C₁₀H₈, and/or bitumen etc. The product contains no material extractable by H₂O which is toxic to fish. A. B. M.

(A) **Treatment of gasoline or the like.** (B) **Recovering treating agent from sludge.** J. C. MORRELL, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,930,248–9, 10.10.33. Appl., [A] 11.11.29, [B] 11.12.31).—(A) Cracked anti-knock petrol is treated with camphor (*e.g.*, 0–1%), camphorophorone, or camphoric acid. (B) A sludge, *e.g.*, that from the treatment of cracked petroleum vapours with H₂SO₄, is separated into oily and aq. layers; the latter, is conc. if necessary by heat, more H₂SO₄ is added, and the mixture is re-used. B. M. V.

Purifying fatty acid derivatives of mineral oil. G. ALLEMAN, Assr. to SUN OIL Co. (U.S.P. 1,931,855, 24.10.33. Appl., 3.11.30).—The aq. solution of Na soaps of fatty acids derived from the asphaltic residue of mineral oil stills is acidified, the H₂O is removed by addition of xylene and distillation, and the acids are extracted from the residue with EtOH, leaving a residue of colloidal hydrocarbons. A. R. P.

Pressure vessel [for oil cracking]. R. STRESAU, Assr. to A. O. SMITH CORP. (U.S.P. 1,940,277, 19.12.33. Appl., 18.8.30).

Apparatus for cracking hydrocarbons. M. J. TRUMBLE and W. L. SEELEY, Assrs. to PETROLEUM HYDROGENATION Co., LTD. (U.S.P. 1,938,877, 12.12.33. Appl., 1.11.30).

Hydrocarbon cracking process. F. H. EDSON, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,934,049, 7.11.33. Appl., 29.4.31).

Cracking process [for hydrocarbons]. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,934,847, 14.11.33. Appl., 18.12.25. Renewed 31.7.30).

Cracking of hydrocarbon oils. [A] L. C. HUFF, (B) J. DELATTRE-SEGUY, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,937,959 and 1,939,281, [A] 5.12.33, [B] 12.12.23. Appl., [A] 19.2.30, [B] 24.12.27).

Cracking and coking of hydrocarbon oils. H. L. PELZER, Assr. to SINCLAIR REFINING Co. (U.S.P. 1,937,163, 28.11.33. Appl., 17.4.29).

Cracking of mineral oil. H. THOMAS, Assr. to SUN OIL Co. (U.S.P. 1,938,406, 5.12.33. Appl., 5.7.28).

Refining of mineral oils [by cracking]. W. G. LAIRD, Assr. to HEAT TREATING Co. (U.S.P. 1,940,955, 26.12.33. Appl., 4.4.27).

Oil re-refiner. J. G. SARVENT (U.S.P. 1,936,033, 21.11.33. Appl., 27.9.30).

Apparatus for converting petroleum oil. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,940,711, 26.12.33. Appl., 2.6.27).

Pyrolytic conversion of petroleum oils. F. A. HOWARD, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,934,067, 7.11.33. Appl., 23.10.29).

Conversion of hydrocarbon oils. R. DE M. TAVEAU, Assr. to TEXAS Co. (U.S.P. 1,936,735, 28.11.33. Appl., 30.3.22). C. H. ANGELL, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,940,673, 26.12.33. Appl., 1.2.32).

Conversion of hydrocarbon gases. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,933,845, 7.11.33. Appl., 12.7.29).

Treating [converting] hydrocarbon oil. C. W. WATSON, Assr. to TEXAS Co. (U.S.P. 1,933,574, 7.11.33. Appl., 7.4.28. Renewed 13.12.32).

Hydrocarbon oil conversion. (A) C. P. DUBBS, (B) R. C. COOK, (C) J. B. HEID, (D) J. G. ALTHER, and (E) J. DELATTRE-SEGUY, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,935,148, 1,936,289, 1,936,874, 1,937,863, and 1,939,282, [A] 14.11.33, [B] 21.11.33, [C] 28.11.33, [D] 5.12.33, [E] 12.12.33. Appl., [A] 30.7.27, [B] 27.5.31, [C] 24.3.28, [D] 11.1.32, [E] 23.7.28).

Hydrocarbon oil [conversion] treatment. L. C. HUFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,938,836, 12.12.33. Appl., 30.3.25. Renewed 22.10.29).

Apparatus for distilling oils. J. E. SCHULZE, Assr. to RED RIVER REFINING Co., INC. (U.S.P. 1,934,150, 7.11.33. Appl., 15.2.23. Renewed 14.8.30).

Oil distillate cooler or condenser. J. S. WALLIS (U.S.P. 1,940,338, 19.12.33. Appl., 25.10.30).

Treating [petroleum] oil [by distillation]. O. BEHMER, Assr. to TEXAS Co. (U.S.P. 1,936,657, 28.11.33. Appl., 17.1.22).

Mineral oil distillation. A. E. PEW, JUN., and H. THOMAS, Assrs. to SUN OIL Co. (U.S.P. 1,935,953, 21.11.33. Appl., 5.3.25).

Fractionating process and apparatus [for hydrocarbons]. D. E. STINES, Assr. to STANDARD OIL DEVELOPMENT Co. (U.S.P. 1,934,101, 7.11.33. Appl., 7.4.32).

Fractionation of hydrocarbon oils. H. R. SNOW, Assr. to STANDARD OIL Co. (U.S.P. 1,938,118, 5.12.33. Appl., 19.9.30).

Treatment of hydrocarbon oils. [A] E. F. NELSON, [B—D] A. G. CONNOLLY, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,934,873, 1,934,967—8, and 1,938,998, [A—c] 14.11.33, [D] 12.12.33. Appl., [A] 6.1.32, [B] 30.12.31, [c] 6.1.32, [D] 8.6.31), (E) C. P. WILSON, JUN., (F) G. ARMISTEAD, JUN., (G) H. A. FOUTS, Assrs. to TEXAS Co. (U.S.P. 1,935,967, 1,936,283, and 1,936,298, [E—G] 21.11.33. Appl., [E] 7.8.25, [F] 25.3.31, [G] 22.11.29). (H) J. B. WEAVER, Assr. to GYRO PROCESS Co. (U.S.P. 1,936,699, 28.11.33. Appl., 18.10.26).

Treatment of heavier hydrocarbons. N. H. RANSTEAD, Assr. to JENKINS PETROLEUM PROCESS Co. (U.S.P. 1,934,004, 7.11.33. Appl., 17.9.28).

Treated oil settling device. H. F. FISHER, Assr. to PETROLEUM RECTIFYING Co. OF CALIFORNIA (U.S.P. 1,940,794, 26.12.33. Appl., 14.11.27).

Stabilisation of light hydrocarbon oils and particularly pressure distillate. J. K. ROBERTS, Assr. to STANDARD OIL Co. (U.S.P. 1,939,633, 12.12.33. Appl., 18.12.30).

Processing of viscous hydrocarbon oils. J. C. BLACK (U.S.P. 1,935,693, 21.11.33. Appl., 21.3.30).

Dewaxing of hydrocarbon oils. E. PETTY, Assr. to ALCO PRODUCTS, INC. (U.S.P. 1,940,014, 19.12.33. Appl., 27.7.32).

Crystallisation of wax [from hydrocarbon oils]. E. PETTY, Assr. to ALCO PRODUCTS, INC. (U.S.P. 1,940,015, 19.12.33. Appl., 9.9.32).

Recovery of gasoline from natural gas. E. R. COX, Assr. to TEXAS Co. (U.S.P. 1,937,871—2, 5.12.33. Appl., [A] 15.9.30, [B] 18.10.30).

Generating combustible gas [from liquid fuel]. C. O. WANNACK, Assr. to S. H. G., INC. (U.S.P. 1,935,925, 21.11.33. Appl., 16.11.29).

Centrifugal separation [of C₁₀H₈ crystals etc.]. Fractionation.—See I. Chrysene.—See III. Fibrous products. Crêped paper.—See V. Oil-resistant rubber.—See XIV.

III.—ORGANIC INTERMEDIATES.

Corrosive properties of dichloroethane and trichloroethylene. S. S. DROZDOV and N. S. DROZDOV (J. Chem. Ind. Russ., 1934, 10, No. 2, 53—54).—Corrosion increases in the order Cu < Pb < Fe, and dry C₂H₄Cl₂ < wet C₂H₄Cl₂ < dry C₂HCl₃ < wet C₂HCl₃. R. T.

Production of [ethyl] alcohol from ethylene by means of sulphuric acid under pressure. F. STRÄHLER and F. HACHTEL (Brennstoff-Chem., 1934, 15, 166—169).—By operating at 15 atm. the amount of H₂SO₄ required to produce 1 kg. of EtOH from C₂H₄ is reduced to 2 kg. as compared with 5 kg. at 1 atm. (cf. B.P. 215,000 and Maimeri; B., 1925, 26, 114). Experiments on the absorption of C₂H₄ by H₂SO₄ (*d* 1.83), carried out in an electrically-heated autoclave of V2A steel, fitted with a stirrer, have shown that the optimum conditions for the absorption are: pressure 15 atm., temp. 70°, rate of gas flow 4 litres/hr. per mol. of H₂SO₄, reaction time 24 hr. Under these conditions 400 g. of C₂H₄ were absorbed per kg. of H₂SO₄; 25% of the absorbed C₂H₄ was converted into Et₂SO₄ and

the remainder into EtHSO₄, except for 3—5% which appeared as polymerisation products. Catalysts, e.g., Cu₂Cl₂, Ag₂SO₄, etc., had no influence on the amount absorbed; the initial rate of absorption was increased by the addition of Ag₂SO₄, but the rate subsequently decreased and absorption was complete only after 24 hr. as with no catalyst. A. B. M.

Fatty acids as by-products in the pressure synthesis of aliphatic alcohols from carbon monoxide and hydrogen. M. STRADA (Giorn. Chim. Ind. Appl., 1934, 16, 62—70).—The acids formed in the reaction between CO and H₂ at 370—390°/400 atm., in presence of an alkali catalyst, have been separated quantitatively mainly by fractionation of the Et esters. All the *n*-acids from HCO₂H to heptic acid, and *iso*-butyric, -valeric, -hexoic, and -heptic, together with CHMeEt·CO₂H, CHMePr·CO₂H, and CHMeBu·CO₂H, are formed, the *iso*-acids usually predominating over the *n*-isomerides. Smaller quantities of the C₁₄—C₁₆ acids are also produced. The mol. wt.—vol.-% curve passes through a max. at PrCO₂H. The mechanism of the reactions involved is discussed; the acids are formed by the action of CO on the alcohols already present, the higher alcohols resulting from reduction of the acids. H. F. G.

Glycerol ethers as solvents. O. MERZ (Farben-Chem., 1934, 5, 91—95).—Physical characteristics of various ethers and derivatives are tabulated, together with their miscibility with common varnish solvents and thinners, their solvent power for nitrocellulose (I), acetylcellulose, and some natural and synthetic resins, the η of their (I) solutions, etc. S. M.

Catalytic hydrolysis of alkyl halides in the vapour phase. A. ABKIN and S. MEDVEDEV (J. Chem. Ind. Russ., 1934, 10, No. 1, 30—34).—Of a no. of catalysts of the hydrolysis of MeCl or CH₂Cl₂ (I), Sn phosphate on pumice is the most active [18.6% yields of CH₂O, and 16.1% yields of MeOH from 1:10 MeCl—H₂O mixture at 510°, and 91% yields of CH₂O from (I) at 460°]. The same catalyst also gives 97% yields of BzCl from 1:1 CPhCl₃—H₂O at 240°. R. T.

Preparation of furfuraldehyde. N. M. TSCHETVERIKOV and A. I. LAZAREV (J. Chem. Ind. Russ., 1934, 10, No. 1, 72—76).—By varying the concn. of H₂SO₄ added, the relative quantities of oat bran and H₂O, and the rate of distillation of the products, up to 12.5% yields of furfuraldehyde (I) may be obtained; the most economical process is that giving 7.5% of (I), consisting in autoclaving at > 6 atm. during 3.5 hr. with 4% H₂SO₄ with an expenditure of steam of 75 kg. and of H₂SO₄ of 1 kg. per kg. of (I). 7—9% yields of (I), 6—7% yields of AcOH, and 1% yields of MeOH are obtained by steam-distilling sunflower-seed husks treated with 3—4% of H₂SO₄ at 175—200° during 3—5 hr., after which the temp. is raised to 250°, when H₂SO₄ is expelled as SO₂, leaving a residue of C (40% yields). R. T.

Industrial preparation of pyranthrone. M. GALLOTTI (Giorn. Chim. Ind. Appl., 1934, 16, 157—159).—The semi-industrial conversion of 2-methylanthraquinone (2.4 kg.) into 1-chloro-2-methylanthraquinone (2 kg.),

2-methyl-1:1'-dianthraquinonyl (1.3 kg.), and pyranthrene (1.05 kg.), successively, is described.

T. H. P.

Carbazole in tar. Purifying aromatic hydrocarbons. Mineral oil sulphonic acids.—See II. $C_6H_2Br_3 \cdot OH$ and products.—See VII. Synthesis of fatty materials.—See XII. Chloroprene rubber from C_2H_2 .—See XIV. Determining $COMe_2$ and alcohols.—See XVIII. Products from coffee.—See XIX. Detecting CCl_4 , and determining $EtOH$, in $CHCl_3$.—See XX.

See also A., June, 609, Catalysts for destructive hydrogenation of $C_{10}H_8$. Conversion of org. acids into ketones. 630, Prep. of MeI or EtI from CHI_3 . Addition of C_2H_4 to HCl . Determining $MeOH$. Prep. of org. S compounds from olefines. Detection of $AcOH$. 631, Prep. of $PrCO_2H$. 637, Prep. of anhyd. $C_2H_4(NH_2)_2$. 641, Prep. of pure mesitylene. 643, Coloured hydrocarbons of coal tar. 650. Electrolysis of $BzOH$ and derivatives. 657, Perylene and derivatives. 665, Reaction of ninhydrin and isatin with proline etc.

PATENTS.

Hydration of olefines. H. DREYFUS (B.P. 409,676, 2.11.32).—Olefines containing $\geq C_6$ are dissolved in an inorg. acid (H_2SO_4) containing $\leq 5\%$ of a sulphonic acid or an org. ester of an inorg. acid (excluding lower alkyl H sulphates), and the products hydrolysed by heating with H_2O . Catalysts (Ca, Pb, Ag, Fe, and Hg sulphates, Ag, and Cu) may be added. Thus C_2H_4 is passed into 90% H_2SO_4 containing 5 wt.-% of $HO \cdot C_2H_4 \cdot OSO_3H$ and 10 wt.-% of sulphuricnoleic acid at $70^\circ/2$ atm., the product diluted with thrice its wt. of H_2O , and boiled. H. A. P.

Recovery of solvents. E. R. SUTCLIFFE and W. E. EDWARDS (B.P. 410,541, 9.12.32).—Solvents laden with (acidic) corrosive gases, e.g., CS_2 or CCl_4 containing S_2Cl_2 from cold-vulcanisation processes, are first washed with a dil. aq. alkali after injection of steam if desired. Apparatus is claimed. H. A. P.

Stabilised solvent. A. L. PITMAN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,925,602, 5.9.33. Appl., 5.9.31).— C_2HCl_3 , C_2Cl_4 , and $CHCl_3$ are stabilised by addition of 0.0001—0.1 vol.-% (0.0005%) of NEt_3 . H. A. P.

Manufacture of wetting, cleansing, emulsifying, and bleaching agents. H. T. BÖHME A.-G. (B.P. 409,598, 31.10.33. Ger., 28.12.32).—Higher aliphatic alcohols (e.g., dodecyl, cetyl, octadecenyl) are treated either simultaneously or consecutively with H_3BO_3 and sulphonating or phosphorylating agents. The products, which appear to be boro-sulphates or -phosphates, combine with H_2O_2 to form H_2O -sol. compounds with combined surface-active and bleaching properties. H. A. P.

Manufacture of unsaturated esters and intermediates. IMPERIAL CHEM. INDUSTRIES, LTD., W. COCKER, J. S. H. DAVIES, and R. HILL (B.P. 409,733, 3.10. and 15.11.32).—Alkyl α -hydroxyisobutyrate are treated with a sulphonating agent ($ClSO_3H$, oleum, pyrosulphates, SO_3 -tert.-amines) and the sulphate formed

is heated to $>$ its decomp. temp. (in presence of anhyd. Na_2SO_4). Thus $Et \alpha$ -methylacrylate, b.p. 118—120°, is prepared in 70% yield by adding $ClSO_3H$ (1.25 mol. equivs.) to $HO \cdot CMe_2 \cdot CO_2Et$ at 50° and distilling. Me , b.p. 100—101°, and Bu^α α -methylacrylate, b.p. 162—163°, are similarly prepared. H. A. P.

Production of permanently neutral formaldehyde. M. C. DEARING, Assr. to ECONOMY FUSE & MANUFACTURING Co. (U.S.P. 1,925,795, 5.9.33. Appl., 6.9.32).—Basic Mg carbonate is added to commercial aq. CH_2O . H. A. P.

Catalytic production of [methyl]amines. E. I. DU PONT DE NEMOURS & Co., and C. H. GREENEWALT (B.P. 410,500, 13.10.32).—The corresponding alcohol ($MeOH$) and NH_3 are together passed over a compound of a dehydrating oxide with the corresponding sulphate (or the sulphate from a similar oxide) at 250—500° (300—450°). Preferred catalysts are $Al_2O_3 \cdot Al_2(SO_4)_3$ and "sulphated thoria." Formation (from $MeOH$) of Me_2O or CO and H_2 are inhibited. H. A. P.

Manufacture of (A) *NN'*-diacyl compounds, and (B) monoacyl compounds, of ethylenediamine and derivatives. K. W. ROSENMUND (U.S.P. 1,926,014—5, 5.9.33. Appl., 19.6.31. Ger., 31.10.29).—(A) Asymmetrically diacylated ethylenediamines are prepared by acylation of the monoacyl derivatives (below) by known means (acyl chloride). Examples are: *N*-acetyl-, m.p. 72°, and *N*-propionyl-*N'*-bromodiethylacetyl-, m.p. 57—59°; *N*-propionyl-*N'*-bromoisovaleryl-, m.p. 193°; *N*-salicyl-, m.p. 140—141°, *N*-benzoyl-, m.p. 175°, and *N*-cinnamoyl-*N'*-acetyl-, m.p. 183°; and *N*-cyclohexyl-*N*-acetyl-*N'*-bromodiethylacetyl-ethylene-diamine, m.p. 104°. (B) Esters of fatty acids having $\geq C_{10}$ are heated (at 100—110° under pressure) with $C_2H_4(NH_2)_2$. Examples are: mono-acetyl-, b.p. 135—140°, -butyryl-, b.p. 146—148°, -isobutyryl-, b.p. 138—145°, -isovaleryl-, b.p. 136—142°, -diethylacetyl-, b.p. 152—168°, -crotonyl-, b.p. 160—170°, and -propionyl-ethylenediamine, b.p. 138—143°. H. A. P.

Manufacture of α -chloroethylbenzene and related compounds. I. G. FARBENIND. A.-G. (B.P. 410,526, 24.11.32. Ger., 24.11.31).— HCl gas is passed into styrene in presence of compounds capable of forming loose additive compounds with HCl ($NPhMe_2$, alcohols, $COMe_2$, H_2O) ($< 1\%$). The method is applicable to other aromatic vinyl compounds. H. A. P.

Manufacture of diethylaniline. R. L. HEINDEL, JUN., Assr. to DOW CHEM. Co. (U.S.P. 1,925,802, 5.9.33. Appl., 4.8.30).— NH_2Ph (1 mol.) is heated at 170—240° (210—240°) in a closed autoclave with an Et halide (> 2 mols.) and $Ca(OH)_2$ (> 1 mol.). If $EtCl$ is used a product containing 2—7% of $NHPhEt$ is obtained, which is preferably re-ethylated with $EtBr$ and $Ca(OH)_2$. H. A. P.

Manufacture of [β -hydr]oxyethylated amines of aromatic series. I. G. FARBENIND. A.-G. (B.P. 410,707, 21.12.33. Ger., 24.12.32).—Nitroarylamines are converted into their *NN*-di- β -hydroxyethyl derivatives by heating with $(CH_2)_2O$ (2 mols.) at 140—170°; the products, if desired, are reduced to amines. The di- β -hydroxyethyl derivatives of *m*-, m.p. 98—99°,

and *p*-nitroaniline, m.p. 101—102°, and of 4-nitro-*o*-toluidine, m.p. 113—114°, and *o*-anisidine, m.p. 100—101°, are described. H. A. P.

Manufacture of phenol. W. J. HALE and E. C. BRITTON, Assrs. to DOW CHEM. CO. (U.S.P. 1,925,321, 5.9.33. Appl., 26.1.31).—PhCl etc. is heated at 250—400° (300°) in H₂O with the salt of a strong base and a weak acid (Na₂CO₃, borax) in presence of Cu as catalyst, and sufficient Ph₂O to restrain its formation during reaction. H. A. P.

Chemical apparatus [for converting poly- into mono-carboxylic acids]. F. A. CANON, Assr. to SELDEN CO. (U.S.P. 1,929,624, 10.10.33. Appl., 22.7.30).—In, e.g., the prep. of BzOH from phthalic acid, the reagents are passed slowly over a stationary conical surface, forming the ceiling of a heating bath containing a non-boiling liquid, by means of rakes or the like attached to a rotating conical cover. B. M. V.

Production of esters of monocarboxylic acids and their derivatives. A. O. JAEGER, Assr. to SELDEN CO. (U.S.P. 1,925,590, 5.9.33. Appl., 17.12.30).—A volatile polycarboxylic ester or a mixture of the corresponding anhydride and alcohol (and a non-alcoholic reducing gas) is passed over a heated contact mass (ZnO). Thus phthalic anhydride and MeOH over ZnO-pumice at 380—400° give MeOBz and BzOH; Me₂ or Et₂ phthalate and H₂ over Al vanadate give MeOBz or EtOBz and some PhCHO. H. A. P.

Production of benzoic acid and benzoates. BOZEL-MALÉTRA SOC. INDUSTR. DE PROD. CHIM. (B.P. 409,755, 13.6.33. Ger., 8.11.32. Addn. to B.P. 402,529; B., 1934, 232).—The process of oxidation is carried out in presence of sufficient non-oxidisable acid (H₂SO₄, KHSO₄, H₃PO₄, BzOH) to give a neutral, Cr-free final solution of benzoate. H. A. P.

Manufacture of diphenyl. W. H. WILLIAMS, Assr. to DOW CHEM. CO. (U.S.P. 1,925,784, 5.9.33. Appl., 9.2.31).—C₆H₆ is passed through a tubular, electrically heated element of C (graphite) or SiC at 650—950° (780°), passage of vapours through the element being minimised by preheating the C₆H₆ on the outer surface. Apparatus is claimed. H. A. P.

Manufacture of mixed halogenated compounds for use as dielectric media. TELEGRAPH CONDENSER CO., LTD., and F. C. STEPHEN (B.P. 410,008, 12.10.33).—A mixture of Ph₂, an alkylated Ph₂, or Ph₂O with a polynuclear hydrocarbon (C₁₀H₈, anthracene, phenanthrene, and homologues) is halogenated to give non-cryst. products (chlorinated to 50—55% Cl). H. A. P.

Hydrolysis of chlorinated diphenyls. C. F. BOOTH, Assr. to SWANN RESEARCH, INC. (U.S.P. 1,925,367, 5.9.33. Appl., 21.4.30).—The (4-)chlorodiphenyl and steam are passed over SiO₂ impregnated with Cu or a Cu compound (CuO) at 525—600°. H. A. P.

Manufacture of 2-nitrodiphenyl. I. G. FARBENIND. A.-G. (B.P. 409,615, 29.11.33. Ger., 24.12.32).—Ph₂ in CCl₄ with HNO₃ (*d* 1.45) at 18—20° gives approx. 50% of theory of 2- and 25% of 4-C₆H₄Ph·NO₂, and 2:4-C₆H₄Ph(NO₂)₂. H. A. P.

[Manufacture of] aryl[am]ides of hydroxy-naphthoic acids. E. F. GREYER, Assr. to DOW CHEM.

Co. (U.S.P. 1,925,801, 5.9.33. Appl., 18.4.32).—Prep. of (2:3-)hydroxynaphthoyl derivatives of 2-halogeno-4-aminodiphenyl ethers by standard methods is claimed. The 2-Cl-compound has m.p. 210—212°. H. A. P.

Manufacture of chrysene. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 409,837, 31.12.32).—Indene, hydrindene, or gases containing them (e.g., from a suitable coal-tar fraction, or from cracking of indene resins) are passed rapidly over dehydrogenating catalysts (MgO, MgO-ZnO) at 500—750° (690—700°). The catalysts retain their activity better if first coated with lustrous C by treatment with C₂H₄ at 750°. H. A. P.

Catalytic synthesis of heterocyclic bases. GOOD-YEAR TIRE & RUBBER CO. (B.P. 409,732, 1.10.32. U.S., 27.6.32).—A *sec.* heterocyclic amine (I) is heated with an org. OH-compound and a dehydrating and hydrogenating catalyst (Ni-kieselguhr) at 175—250° (200°)/100 atm. Alternatively, a corresponding unsaturated amine (e.g., C₅H₅N) and H₂ are used in place of (I). Examples include the prep. of *N*-ethyl-, b.p. 125—129° (from C₅H₁₁N and EtOH), *N*-*n*-butyl-, b.p. 162—172°, and *cyclohexyl*piperidine, b.p. 98—100°/100 mm.; and 2-methyl-1-ethyl-, b.p. 145—147°, and 1-*n*-butyl-piperidine, b.p. 185—190°. H. A. P.

Manufacture of unsulphonated indole compounds. I. G. FARBENIND. A.-G. (B.P. 409,350, 28.10.32. Ger., 31.10.31).—2-Mono- and 2:3-disubstituted indoles, carbazoles, etc., are prepared by condensation of an arylhydrazine salt of an inorg. or sulphonic acid with a suitable ketone in aq. medium (in presence of free acid) at 80—160°. Examples are: 5-methoxy-2:3-dimethyl-, m.p. 114—115°; 2-phenyl-, 2:3-diphenyl-, and 5-phenyl-2:3-dimethyl-indole; 2:3-dimethylindole-5-carboxylic acid; 2-methyl- α -naphthindole; 7-hydroxy-1:2:3:4-tetrahydrocarbazole; and 3-methyl-2-ethyl-5:6-(2':3'-indolo)indole (from 2-hydrozincocarbazole and COEt₂). H. A. P.

Production and use of diphenyl derivatives. RUBBER SERVICE LABORATORIES CO. (B.P. 409,773, 10.11.32. U.S., 26.9.32).—See U.S.P. 1,921,546; B., 1934, 492.

C₂H₂.—See II. Intermediates for oxazine dyes.—See IV. Preserving oxidisable materials.—See XIV.

IV.—DYESTUFFS.

Mono-azoic dyestuffs and lake colours and their applications. A. H. WHITAKER (J. Oil Col. Chem. Assoc., 1934, 17, 168—190).—A lecture and discussion, in which the possibility of making dispersions of lake dyestuffs in litho-varnish directly from aq. pastes and the properties of Fanal colours are particularly stressed. S. C.

See also A., June, 646, Derivatives of retene. 665, Reaction of ninhydrin and isatin with proline and hydroxyproline.

PATENTS.

Manufacture of water-soluble dyes of the anthraquinone series. CHEM. FABR. VORM. SANDOZ (B.P. 408,440, 11.3.33. Switz., 12.3.32).—A 1- β -naphthyl-aminoanthraquinone (I), in which positions 4, 5, and

8 may carry acylamino- or halogen substituents (≤ 1 being occupied by acylamino), position 3 may carry alkyl or SO_3H , and the β -naphthyl group may contain substituents, is sulphonated to give brown acid dyes. Examples are (I) carrying 1-NHBz-2-Me, 1-NHBz, 1-NHBz-2-Br, and 1-NHAc-2-Me. C. H.

Manufacture of carbocyanine dyes. KODAK, LTD., Assees. of (A) L. G. S. BROOKER, (B) F. L. WHITE (B.P. 408,273 and 408,277, [A] 30.6.32. U.S., 30.6.31; [B] 27.8.32. U.S., 27.8.31).—(A) Thiazolocarboyanines carrying a substituent on the central C atom (7) are obtained by condensing, preferably in $\text{C}_5\text{H}_5\text{N}$, an alkiodide (etc.) of a 2-methylthiazole (2 mols.) with an ortho-ester (1 mol.) of an aliphatic acid $> \text{C}_1$. With excess of $\text{CH}(\text{OR})_3$ there are produced mainly neo-thiazolocarboyanines, $\text{X}:\text{CH}:\text{C}:(\text{CH}:\text{X})\cdot\text{CH}_2\cdot\text{X}$ or $\text{X}:\text{CH}:\text{C}:(\text{CH}:\text{X})\cdot\text{CH}:\text{CH}:\text{X}$ (where X \equiv the thiazole residue), especially when the quaternary salt is an alkyl alkylsulphate or *p*-toluenesulphonate. (B) An alkiodide (etc.) of a benzelenazole is condensed, preferably in $\text{C}_5\text{H}_5\text{N}$, with an ortho-ester of an aliphatic acid $> \text{C}_1$ or of an aromatic monobasic acid. C. H.

Manufacture of [oxazine] dyes and intermediate products. I. G. FARBENIND. A.-G. (B.P. 408,456, 1.5.33. Ger., 29.4.32).—A 1:4-benzo- or -naphthoquinone is condensed with 2 mols. of a monoaminopyrene, -fluoranthrene, or -chrysenes, or a halogen derivative thereof, below 150° , preferably in a solvent (EtOH, AcOH), to give corresponding diaryldiaminoquinones (I), which on heating above 150° , e.g., in PhNO_2 ,

are converted into oxazines, $\text{Ar} \begin{array}{c} \diagup \text{N} \\ \diagdown \text{O} \end{array} \text{C}_6\text{H}_2 \begin{array}{c} \diagdown \text{O} \\ \diagup \text{N} \end{array} \text{Ar}$.

The oxazines are obtainable directly above 150° , or from (I) by heating with H_2SO_4 ; in both cases an oxidant may be used. Examples are diamines (I) and oxazines (II) from chloranil with: 4-aminofluoranthrene, m.p. 116° (II sulphonated, red-violet); 3-aminopyrene, m.p. 116 – 117° (II, blue pigment; sulphonated, green-blue; Ca or Ba sulphonate, blue pigment); amino-chrysenes, m.p. 206 – 207° (II, blue-violet pigment; sulphonated, green-blue). C. H.

Manufacture of [nitro-]dyes. I. G. FARBENIND. A.-G. (B.P. 409,512, 11.5.33. Ger., 11.5.32).—Yellow-to reddish-brown dyes for wool are obtained by condensing a 3:5-dinitro-2- or -4-alkoxybenzoic acid or ester with N_2H_4 or a primary alkyl- or aryl-hydrazine (in presence of an acid-binding agent, e.g., NaOAc). Examples are: 3:5-dinitro-2-methoxybenzoic acid (I) + p - $\text{NH}_2\cdot\text{NH}\cdot\text{C}_6\text{H}_4\cdot\text{SO}_3\text{H}$, $\text{N}_2\text{H}_4\cdot\text{H}_2\text{O}$ (II), or $\text{NH}_2\cdot\text{NHMe}$; Me ester of (I) + $\text{NH}_2\cdot\text{NHPh}$ (III); 3:5-dinitro-4-methoxybenzoic acid + (II), and its Me ester + (III).

H. A. P.

Sensitising photographic emulsions.—See XXI.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Convolutions in cotton hairs. O. ROEHRICH (Chim. et Ind., 1934, 31, Spec. No., 819–823).—When tubes of collodion filled with H_2O are dried in a stove convoluted ribbons similar to cotton hairs are obtained. The direction of convolution of cotton hairs is controlled by that of the fibrillar spiral of the cellulose wall. A. G.

Structure of flax tows. (MISS) V. BOSSUYT and (MISS) J. GADENNE (Chim. et Ind., 1934, 31, Spec. No., 858–862).—Photomicrographs are given of linen retted to various degrees and thus in different stages of disintegration. Breaks in length of specimen-strength curves for fully disintegrated material indicate an elementary fibre length of 7–8 cm.; when disintegration is incomplete further breaks are found at greater lengths. A. G.

Relations between intimate structure and mechanical properties of fibres and their solutions. R. MICHEL-JAFFARD (Chim. et Ind., 1934, 31, Spec. No., 768–783).—The elongated form of the mols. of fibres is responsible for the relation between the η and concn. of their solutions. In the fibrous state the orientation of the mol., whether produced mechanically as in artificial fibres, or biologically as in natural fibres, results in increasing the tensile strength and diminishing the plasticity. The biological organisation into fibrils and layers, as well as the chemical constitution, gives the natural fibres their special properties, and plastic heterogeneity leads to hysteresis. A. G.

Effect of alkalis on degumming of silk. VI. Strength and extensibility of degummed silk after various times. I. TOYODA (J. Soc. Chem. Ind., Japan, 1934, 37, 150–153 B; cf. B., 1933, 780).—Silk degummed with 0.001N-NaOH is stronger than that degummed with Na oleate both when fresh and after storing for a few years. Degumming with straw liquor (extract of burnt straw, i.e., aq. K_2CO_3) gives a stronger silk after many years' storage than does degumming with soap. A. G.

Method of washing raw wool with acid, and its advantages. M. J. VALLÉE (Chim. et Ind., 1934, 31, Spec. No., 854–857).—The impurities to be removed are sol. salts, soil, and fatty substances. Salts are removed better by acids than by alkalis, and removal of soil is mechanical. The fatty substances are largely unsaponifiable and must be removed by a detergent at a temp. (60°) above the m.p. Two baths of 0.2% H_2SO_4 at 30– 40° , followed (a) by two baths of 0.05–0.2% sulphonated lauryl alcohol at 55– 60° and (b) by swilling, are recommended. A. G.

Causes and prevention of mildew on wool. R. BURGESS (J. Soc. Dyers and Col., 1934, 50, 138–142).—The amounts of nutrient substances present influence greatly the mildew-susceptibility of wool in a damp atm. Intense chlorination and treatment with H_2O_2 or ultra-violet light cause increased susceptibility. For bacterial development actual wetness is probably required. Mildew may be prevented by adding an antiseptic (Shirlan NA) during winding, back-washing, or oiling, or a volatile antiseptic may be included with goods in airtight containers. Mildewing of the paper of packages such as cones causes damage, which may be avoided by adding an antiseptic to the adhesive or by using Bakelite. A. G.

Determinations on yarns. E. VIVIANI and G. COLOMBO (Boll. Rep. Fibre Tess. Veg., 1934, 29, 244–250).—The importance of the apparent d of yarns is discussed, a method for its measurement is given, and

the vals. for various qualities of cotton and rayon are tabulated. T. H. P.

Regularigraph for yarn. J. PINTÉ and L. GUIMBÉTIÈRE (Chim. et Ind., 1934, 31, Spec. No., 833—837).—When yarn is passed through a cup of Hg and then up a trough (T), the coarser is the yarn the longer is the tongue of Hg carried by it into the trough. Several (e.g., 16) electric contacts are equally spaced along the T, and as each circuit is closed by the tongue of Hg it operates a counter, a tell-tale lamp, and an electromagnet. The armatures of the magneto are articulated together, and their mean motion is recorded by a pen on a rotating drum; a thickness-time curve is thus obtained. The yarn leaving the machine is wound spirally on gummed paper on a drum and may be further examined. A. G.

Hygrometric properties of textiles and conditioning of rayons. E. BURLET (Chim. et Ind., 1934, 31, Spec. No., 824—832).—The % H₂O absorbed by textiles from an atm. of controlled humidity and temp. depends on the past humidity history of the material, especially of rayons. The wt. under standard conditions may be determined by exposing halves of the sample to wet and dry atm., respectively, and then to the standard conditions, and adding the wts. of the halves. A. G.

Continuous process for manufacture of cellulose. G. CONSIGLIO (Chim. et Ind., 1934, 31, Spec. No., 797—813).—Details are given of the process and plant for the manufacture of cellulose from wheat straw, rice straw, or bamboo by Pomilio's chlorination process (B., 1932, 593). The normal product from rice straw contains 81% of α -cellulose, but this may be increased to 94% by a modified process. The yield is 38—39%, and an additional 7—8% of short-fibred cellulose. A. G.

Titrimetric determination of the copper number of cellulose. D. KRÜGER and TSCHURCH (Zellstoff u. Papier, 1934, 14, 233—235).—The residual Cu is directly determined by adding to the acidified solution KCNS and KI (150—300 mg. per 100 c.c. of solution) and titrating the I liberated with 0.1N-Na₂S₂O₃. A no. of examples are given of the applicability of this method to different methods of determining Cu no. D. A. C.

Determination of α -cellulose. C. K. BUMP (Ind. Eng. Chem. [Anal.], 1934, 6, 223—225).—Dissolution of non- α -cellulose from paper pulp by 17.5% NaOH at room temp. is very rapid in the first few min., but becomes very slow in 10 min. α -Cellulose (I) can be determined by extraction for 15, 30, and 45 min., and noting graphically the limit to which the (I)-time curve tends. R. S. C.

Ageing of alkali-cellulose. Solubility of regenerated cellulose in cuprammonium alkali solution. F. FUJITA (J. Soc. Chem. Ind., Japan, 1934, 37, 121—122 B).—Cellulose is depolymerised during ageing, the process being influenced by atm. O₂. The α -cellulose content and η fall and the solubility in cuprammonium rises, whereas the I val. is little affected. A. G.

Additive compounds of cellulose with water and with sodium hydroxide. G. CHAMPETIER (Chim.

et Ind., 1934, 31, Spec. No., 814—818).—The method of residues applied to cotton or ramie cellulose (C₆H₁₀O₅ = Cel) steeped in aq. Na₂S₂O₄ or aq. C₂H₅N indicates the formation of the compound 2Cel, H₂O from normal cellulose and Cel, H₂O from cellulose pretreated with aq. NaOH of concn. < 150 g./litre, or with cuprammonium. In aq. NaOH the compound 2Cel, NaOH is formed at concn. 140—190 g./litre, and Cel, NaOH at > 550 g./litre, and there are also indications of the formation of 3Cel, 2NaOH and 4Cel, 3NaOH. A. G.

Low acetylation of cellulose fibres. E. CHIPPINDALE (J. Soc. Dyers and Col., 1934, 50, 142—149).—Low acetylation may be accomplished by the use of the usual acetylating mixtures if the amounts of powerful catalysts are limited and controlled, and the temp. is suitable. Cotton yarn should be pressure-boiled and chemicked before treatment, and may also be mercerised and dyed. Pre-dyed yarn is, after treatment, much faster to washing, but the low-acetylated yarn has a reduced affinity for direct dyes and dyes readily with acetate-rayon dyes. Fibrous esters from alkali-cellulose have no affinity for direct dyes on account of an impervious outer layer of ester. Similar immunity may be conferred by filling the intermolecular spaces with a mordant such as tannin and ZnCl₂. Low-acetylated yarns may be submitted to all ordinary processes except warm alkaline treatments; they may be mercerised under certain conditions. Their use permits many special dyed or printed effects. A. G.

Cellulose acetates from viscose silk and viscose film by-products. F. OHL (Cellulosechem., 1934, 15, 67—70).—The crude material, cut into as uniform pieces (\geq 10 mm.) as possible, is treated with 2% Na₂CO₃ at 60°, 1% Na₂CO₃ at 80°, and boiling 0.5% Na₂CO₃ successively, then with 1% AcOH, and finally with boiling H₂O until neutral. The product is pressed, dried to 16—20% H₂O, and separated. After pretreatment at \geq 20° for \geq 1 hr. with 1:1 AcOH-Ac₂O mixture containing 2.0% of H₂SO₄ and 0.5% of NaHSO₄ (calc. on cellulose), using 30—40% of the acetylating mixture, the remainder of the latter is added and the temp. raised about 5° per hr. to 70° with thorough kneading followed by stirring. The success of the operation appears to depend more on mechanical than chemical considerations. As from linters, cellulose acetates of greater or less viscosity can be obtained by suitable variation of the concn. of the catalyst and of the temp. H. W.

Cellulose oxalates. W. CARO (Diss., Berlin, 1931; Bied. Zentr., 1934, A, 4, 442—443).—Mixed cellulose oxalates are obtained by the action of ester chlorides (I) of H₂C₂O₄ and C₅H₅N on cellulose (II). Cellulose Et oxalate may be formed under milder conditions. The activity of (I) decreases as the alkyl group becomes more complex. The (I) of succinic and adipic acids do not react with (II) under these conditions. A. G. P.

Cellulose ethers. I. Composition of the benzylating mixture for the preparation of benzylcellulose. II. Mechanism of benzylation of cellulose. K. ATSUKI and I. KAGAWA (J. Soc. Chem. Ind., Japan, 1934, 37, 128—132 B, 132—133 B).—I. The extent of

benzylation (*B*), as measured by the proportion of the product sol. in C_6H_6 -EtOH (90:10), increases with increasing amount of aq. NaOH [240—450% of cellulose (I)] left in the squeezed soda-cellulose, with increasing amount of CH_2PhCl [170—280% of (I)], and with increase in [NaOH], the optimum concn. being 40—45%. *B* proceeds from the outside to the inside of the fibre and is controlled by the dispersion of the benzylated cellulose and the diffusion of the CH_2PhCl into the fibres.

II. At whatever stage of *B* the process is stopped the product consists of benzylcellulose (2.2 mols. CH_2Ph per $C_6H_{10}O_5$ mol.) sol. in C_6H_6 -EtOH and insol. unchanged (I). There is an induction period during which the rate of *B* increases. A. G.

Manufacture, dyeing, and application of Viscacelle (regenerated cellulose film). C. P. ATKINSON (J. Soc. Dyers and Col., 1934, 50, 132—138).—The manufacture of Viscacelle (I) differs from that of viscose rayon mainly in the shape of the jet and in the continuity of the process. (I) is carried by rollers from the jet through coagulating, purifying, dyeing, washing, and softening baths, and is then dried on cylinders. The continuity of the dyeing process requires dyes of the max. affinity and purity. (I) is tested for wt. per sq. in., thickness, tenacity, extensibility, bursting pressure, and folding-endurance. The red, black, and emerald shades of (I) are nearly opaque to ultra-violet rays, and protect dyed materials from fading and also fats from developing rancidity. A. G.

Adsorption of [oil] emulsions by viscose rayon. K. TANEMURA and K. NISHIMURA (J. Soc. Chem. Ind., Japan, 1934, 37, 122—124 B).—The adsorption by viscose rayon of olive oil or oleic acid from emulsions in aq. Leonil LE (I) or Nekal AEM and tartaric or lactic acid is a max. at p_H 3.5. The oil in emulsions in aq. soap is positively, and in (I) negatively, charged. A. G.

Increasing the yield in the manufacture of soda pulp. G. DUPONT and J. DE FAXARD (Chim. et Ind., 1934, 31, Spec. No., 784—787).—The yield of pulp from pine may be increased to 80% by the addition of a little $CaOS_n$ (milk-of-CaO boiled with S); the lignin is not dissolved, but is softened sufficiently to allow disintegration. Prolonged milling is required, but the pulp is of good quality. Fir, but not pine, may be disintegrated by treatment with EtOH at high pressures. A. G.

Elimination of obnoxious gases in the sulphate pulping process. W. O. GORDON and E. E. CREITZ (Ind. Eng. Chem., 1934, 26, 565—567).—Mercaptans (I) and alkyl sulphides (II) are destroyed by OCl' . Since, however, very large quantities of active Cl are needed to obtain complete decomp., the treatment becomes commercially impractical. Treatment with OCl' of the relief gases and condensate from black-liquor evaporation destroys the odour due to (I) and (II), but does not render them entirely odourless. It is suggested that the gases containing (I) and (II), and the black liquor after evaporation in vac. pans to 75% of solids, be injected into a very hot calcining furnace. D. A. C.

Correct composition of [wood-pulp] cooking acid. E. A. WEBER (Pulp and Paper Canada, 1934,

35, 307).—For general use, a cooking liquor containing 4.75% of free SO_2 and 1.25% of combined SO_2 is advocated for the manufacture of sulphite pulp, although a higher concn. of free SO_2 shows certain advantages, which are listed. H. A. H.

Standardisation of pulp testing and its present position. D. JOHANSSON (Papier-Fabr., 1934, 32, 241—245).—The standard methods adopted in different countries are compared and variables encountered in pulp testing are discussed. At low wetness reduction of the H_2O content from 61 to 47% of sheets during pressing raises the strength appreciably, whereas at 50° S.R. there is no difference. Strength comparisons between the Ostrand and Köthen methods gave variable results. D. A. C.

Microbiological film production. J. R. SANBORN (Ind. Eng. Chem., 1934, 26, 532—533; cf. B., 1933, 343).—Pulp- and paper-mill slimes (I) develop rapidly in groundwood extract to form a rubbery growth, from which a parchment-like membrane can be produced by suitable treatment. (I) formed by *Oidium* and *Monilia* contain a mucilaginous fraction and constituents resembling oxycellulose, hydrocellulose, and cellulose. H. G. R.

Testing the water-resistance of paper and fibre board. F. T. CARSON (Paper Trade J., 1934, 98; T.A.P.P.I. Sect., 264—266).—A description, with some small modifications, of the Bureau of Standards sugar-starch-dye indicator test for H_2O penetration. H. A. H.

Separate detection of animal size and casein in paper. B. SCHULZE and E. RIEGER (Papier-Fabr., 1934, 32, 245—246).—The gelatin (I) may be extracted by digesting the paper in the cold for 24 hr. with 0.5—1% AcOH solution; the casein (II) is then similarly extracted with 1% borax solution. Both (I) and (II) are pptd. by NH_4 molybdate and HNO_3 , whereas only (II) gives a ppt. with HNO_3 . D. A. C.

Painted canvas.—See XIII. Linings for butter boxes.—See XIX.

See also A., June, 593, Action of alkaline Cu solution on silk fibroin. 606, Mechanism of acetylation of cellulose. 607, Stability of cellulose nitrates. 609, Cellulose deterioration. 637, Nitration and denitration of nitrocellulose. 653, Reactions of maple and spruce lignins. 671, Separation of sericin.

PATENTS.

Production of vegetable fibres. L. B. TRAFERRI (B.P. 410,144, 11.8.32).—The plant (flax), in a green, raw, or waste condition, is sprayed with H_2O containing a bactericide (I) ($HgCl_2$), then subjected to a willowing or shaking action, and finally sprayed with an emulsion of oil (e.g., olive) in H_2O containing a small quantity of (I). (Cf. B.P. 408,007; B., 1934, 494.) D. A. C.

Treatment of jute in preparation for spinning. CHELSEA FIBRE MILLS (B.P. 410,421, 25.11.33, U.S., 7.12.32).—A straightening step is introduced between the softening and carding. With the apparatus described it is claimed that, due to the absence of short fibre, the production of slubs or fuzz in the yarn is prevented. D. A. C.

Manufacture of pure cellulose from vegetable fibres. C. BOUVIER, G. FOUCHÉ, and E. SEGUIN (U.S.P. 1,927,541, 19.9.33. Appl., 22.6.32. Fr., 1.7.31).—The material is treated with aq. SO_2 alternately in two interconnected digesters (*D*). The SO_2 is recovered from one of the *D* at the end of the cook by pumping into the second, which is already filled with the raw material and H_2O and is under vac. To facilitate rapid dissolution of the SO_2 , the H_2O at the bottom of the filled *D* is cooled by circulation of brine, forming there conc. aq. SO_2 . At the end of the cook the same process of retransference of the SO_2 into the first *D* is repeated. D. A. C.

Manufacture of films [of cellulose derivatives]. H. E. RENARD, Assr. to EASTMAN KODAK Co. (U.S.P. 1,928,031, 26.9.33. Appl., 24.9.30).—Collodion is fed through a slit opening in the form of a sheet on to parallel, perforated bands placed at its edges. It adheres to the bands and is led by them through the coagulating bath to the take-up device. The bands are maintained parallel by passing over guide rolls containing sprockets which mesh with the perforations. Shrinkage is thus prevented. D. A. C.

Manufacture of pulp from coloured rags. S. LENHER and H. F. LEWIS, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,929,145, 3.10.33. Appl., 12.10.32).—The rags are cooked under pressure with 3–6% CaO solution and 1–2% Na_2CO_3 or 2–6% NaOH solution for 1–3.5 hr., washed, and given up to four extractions at 80–105° with 0.5–1% $\text{Na}_2\text{S}_2\text{O}_4$ solution. All dyes, except anthraquinone and vat dyes, will be stripped. (Cf. B., 1933, 222.) D. A. C.

Paper-making. C. E. LIBBY, Assr. to NAT. ALUMINATE CORP. (U.S.P. 1,929,205, 3.10.33. Appl., 4.4.32).—The initial acidity in the beaters, due to acidity of the pulp, white- H_2O , etc., is neutralised with Na_2CO_3 or, preferably, NaAlO_2 to give p_{H} 7.0–8.0. Size is then added followed by alum to p_{H} 4.0–5.0. It is claimed that sizing thereby is greatly increased and the freeness of the stock improved. D. A. C.

Manufacture of paper and similar products. M. R. ISAACS (U.S.P. 1,929,432, 10.10.33. Appl., 16.5.31. Renewed 22.11.32).—The stock, towards the end of the beating operation, is treated with 2–6% of casein and with 10–20% of $\text{Ca}(\text{OH})_2$ and 5–8% of NaF (on the wt. of casein). An additional treatment with aq. 1- $\text{C}_{10}\text{H}_7\cdot\text{SO}_3\text{Na}$ and/or CH_2O neutralised with aq. NH_3 produces a hard and H_2O -resistant paper, which may be softened by addition of a H_2O -sol. soap. It is claimed that the bursting strength is increased by 100%. D. A. C.

Manufacture of crêped paper. E. H. ANGIER, Assr. to E. H. ANGIER (trustee) (U.S.P. 1,928,045, 26.9.33. Appl., 10.10.32).—Paper is coated with an asphalt emulsion and subjected to the action of a suction box to remove H_2O and leave the coated surface partly coagulated and viscid so that it will adhere uniformly to the crêping roll. The sheet is thus also rendered waterproof. D. A. C.

Manufacture of paper. H. R. RAFTON, Assr. to RAFFOLD PROCESS CORP. (U.S.P. 1,922,325, 15.8.33.

Appl., 11.12.30).—Paper containing alkaline fillers (I) (e.g., CaCO_3) may be sized by adding the size and precipitant to the web after it has been formed, e.g., after pressing or drying. The size is thus substantially not deteriorated by the (I). D. A. C.

Rubber-repellent coated paper. H. W. WALKER, Assr. to CHAMPION COATED PAPER Co. (U.S.P. 1,928,192, 26.9.33. Appl., 16.5.30).—Paper is coated with water-glass which has been partly neutralised so that "the normality with respect to Na_2O " is > 1.4 , and so that it sets to a gel within 16 hr. It is claimed that increased pliability and strength of the paper are thereby obtained. D. A. C.

Impregnation of fibre board with a salt. A. WINOGRADOW (U.S.P. 1,928,805, 3.10.33. Appl., 8.10.31).—The board is fireproofed by soaking in a solution of H_3PO_4 or HCl in EtOH , pressing, and passing in NH_3 gas. D. A. C.

Manufacture of fibrous products. T. ROBINSON, Assr. to LANCASTER PROCESSES, INC. (U.S.P. 1,927,047, 19.9.33. Appl., 18.11.31).—Waste paper is treated at 70–77° with a detergent (e.g., K abietate, Na_3PO_4 , Na silicate). It is then completely defibred and at the same time mixed with an asphalt emulsion which acts as a binder, and subsequently formed into a continuous sheet of any desired thickness by de-watering with high vac. The sheet may then during drying be coated with asphalt or cement to act as a facing. D. A. C.

Leaching [parchmentised] material.—See I. Size for paper.—See XIII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Variations in critical luminosity in dyeing. R. TOUSSAINT (Chim. et Ind., 1934, 31, Spec. No., 765–767).—The luminosity- λ curves for dyes are steeper on the side of high than of low λ . From this it follows that when the concn. is increased yellows and oranges remain comparatively pure, whereas violets and blues give full shades tending to black. The extreme red is little absorbed, hence the lack of good greens. Exposure to sunlight tends to flatten the curves and produce greys. Dyes should be compared at their crit. mean luminosities, i.e., at the concns. at which the difference between the dominant and complementary luminosities is a max. At this concn. the purity is a max. and the solidity a min. A. G.

Influence of dispersion and solubility of colours on the dyeing of cellulose acetate. J. ROLLAND (Chim. et Ind., 1934, 31, Spec. No., 847–850).—If the dispersion of dyes is increased by an efficient agent the depth of shade and rate of dyeing are increased and the dyeing is fast to rubbing. If dyeing is prolonged at a high temp. a protective colloid should be added. A. G.

Principles and practice of acetate rayon dyeing. E. FERBER (Chem.-Ztg., 1934, 58, 429–431). A. G.

Influence of concentration on degradation of colours [on dyed materials] by light. J. PINTÉ (Chim. et Ind., 1934, 31, Spec. No., 844–846).—The sensitivity (I) of colours to light is a max. at a crit.

mean density. The curve (I)—concn. is similar for all colours, so that if (I) at the crit. mean density is known its (I) at any other concn. can be deduced. (Cf. B., 1933, 745, 1053.) A. G.

Influence of traces of metal in dyed textiles on rubber-coating. J. PINTE and A. DELHALLE (Chim. et Ind., 1934, 31, Spec. No., 838—843).—The effect of traces of heavy metals in accelerating the decomp. of rubber (I) is influenced by the composition of the (I) mixture. In the particular case studied, mixtures were found which were unaffected by traces of Cr, Mn, Fe, or Cu, whether tested by artificial or natural ageing or by the amount of the COMe₂ extract. A. G.

Sulphonated oils. XVI. Properties when used as auxiliary agents in dyebaths. XVII. Dispersion of calcium soaps and silk-degumming power. K. WINOKUTI (J. Soc. Chem. Ind., Japan, 1934, 37, 120 B, 120—121 B).—XVI. The addition of sulphonated oils effects the dispersion of dyes, but the direction of the effect on dye absorption depends on the nature of the dye and of the fibre.

XVII. No ricinoleate prevents the pptn. of Ca soaps and Na sulphoricinoleate acts even more powerfully, but Na oleate has no effect. The normal and acid salts of the sulphuric ester of ricinoleic acid will not degum silk, but alkaline solutions of Na sulphoricinoleate act more powerfully than NaOH solutions of the same alkali concn. A. G.

Printing with vat dyes. GES. F. CHEM. IND. IN BASEL (Textilber., 1934, 15, 121—122).—Developments are reviewed. Printing pastes as commonly used in roller-printing are not suitable for hand-printing with blocks since the Na₂S₂O₄—CH₂O compounds (I) present oxidise during the prolonged exposure to air of the fabric during printing. A satisfactory alternative process consists in printing with a paste containing the unreduced vat dye (10 pts.) and a mixture of 50% aq. gum arabic (II) (55), 40% aq. AcOH, and 10% aq. FeCl₃ (10), then drying, and padding with a liquor containing (I) and K₂CO₃, followed by steaming for 4—5 min. During the drying process AcOH volatilises and allows the formation of an insol. Fe compound with the (II) which prevents bleeding of the vat dye. Colloresin DK (I. G.—a cellulose ether) may be used instead of FeCl₃ and (II). A. J. H.

Soap solutions used in desizing. J. ROLLAND (Chim. et Ind., 1934, 31, Spec. No., 851—853).—For fibres which are sensitive to alkalis and absorb fatty acids the amounts of Na₂CO₃ and glycerol in the soap are important. Analysis of the solid soap is not sufficient, and p_H and detergent power of the solution should also be studied; a knowledge of the former allows a spent solution to be readjusted with NaOH for further use. A. G.

Low-acetylated cellulose. Dyeing Viscacelle.—See V. Treatment of dyeing and printing waste.—See XXIII.

See also A., June, 594, Absorption of dyes by cellulose. 596, Accelerated diffusion in dye solutions. 609, Cellulose deterioration [and bleaching].

PATENTS.

Stripping dyeings of vat dyes. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 409,336, 22.10.32).—The dyeing is treated with an alkaline reducing agent (Na₂S₂O₄) containing a Mg compound [MgSO₄, MgS, MgCl₂, Mg(OH)₂, Mg(NO₃)₂, Mg(OAc)₂], and, if desired, a protective colloid, preferably a polymeride of an alkylene oxide or its product of interaction with an org. compound containing < C₆ and < 1 reactive H (cf. B.P. 368,530, 380,431, 346,550; B., 1932, 591, 1114; 1931, 666). H. A. P.

Colouring of rubber. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 409,451, 23.12.32).—H₂O-insol. disazo dyes free from SO₃H, CO₂H, and NO₂, prepared from tetrazotised benzidine and its derivatives and hydroxynaphthoic amides (2 equivs.), are used as pigments. Blue to violet shades stable to vulcanisation are obtained. Dyes from dianisidine and 2:3-hydroxynaphthoic anilide, *o*-toluidide, and 5-chloro-*o*-toluidide are specifically claimed. H. A. P.

Filtering printing inks.—See I. Bleaching etc. agents.—See III. Pulp from coloured rags.—See V.

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

Effect of pressure on sulphuric acid formation, using nitrogen oxides as oxygen carriers. E. ABEL (Z. anorg. Chem., 1934, 218, 111—112; cf. A., 1933, 233).—A criticism of the interpretation put forward by Berl and Althoff (B., 1934, 142). F. L. U.

Catalysts for ammonia synthesis. D. A. EPSCHTEIN and I. S. UPOLOVNIKOV (J. Chem. Ind. Russ., 1934, 10, No. 3, 37—39).—The degree of poisoning of titanomagnetite catalyst (I) by traces of O₂ or CO (0.01—0.1%) in the reaction gas is at a max. after 60 min., thereafter falling slightly to a const. val.; subsequent reduction of (I) by pure H₂ restores its original activity. The expression $\Delta y = c/(kc + b)$ is derived, in which Δy is the % diminution in activity of (I), c is the concn. of poison, and k and b are consts. R. T.

Prevention of formation of northrupite deposits in the manufacture of calcined soda. L. F. BABKIN and V. I. SOKOLOV (J. Chem. Ind. Russ., 1934, 10, No. 3, 52—54).—94% of the Mg content of NH₃—Na₂CO₃ liquor is removed as northrupite (I) by seeding with powdered (I) at 30—50°, and decanting after 30 min.; in this way formation of deposits of (I) in the various further stages of the process is avoided. R. T.

Continuous determination of carbonate-caustic ratio in a carbon dioxide absorption system. Conductance apparatus used in the Bureau of Mines helium plant. A. S. SMITH (Ind. Eng. Chem. [Anal.], 1934, 6, 217—220).—The procedure depends on the continuous variation of the electrical conductivity of the absorption liquid as the ratio Na₂CO₃:NaOH increases. The apparatus may be adapted to automatic control of the system for removing CO₂, or to an alarm for indicating a spent solution. E. S. H.

Isothermal processes for the working up of saline solutions. I. G. BOZZA (Giorn. Chim. Ind. Appl., 1934, 16, 58—62).—The principles of the phase

rule are applied, with special reference to ternary and quaternary systems, to the working up of saline waters by means of solar evaporation. Practical cycles of operation are developed for the general cases of solutions of two and three salts having a common ion.

H. F. G.

Preparation of sodium silicofluoride from hydrofluoric acid, quartz, and sodium chloride. I. G. RYSS (J. Chem. Ind. Russ., 1934, 10, No. 3, 48–52).—Aq. HF is filtered through sand, and NaCl is added to the filtrate, when 96–98% Na_2SiF_6 is pptd. R. T.

Calcium sulphide solution. R. A. CAIN and H. A. LANGENHAN (J. Amer. Pharm. Assoc., 1934, 23, 344–347).—Much sol. sulphide (I), remaining in the CaO–S residue (II) after removal of the conc. solution of (I), can be obtained by washing (II) with hot or cold H_2O .

A. E. O.

Promotion of solubility of natural phosphates by water saturated with carbon dioxide under pressure. J. CAMPARDOU (Bull. Soc. chim., 1933, [iv], 53, 1400–1404).—The action of H_2O saturated with CO_2 at 3 and 5 kg./sq. cm. on a natural phosphate containing 8.4% of CaCO_3 is first to dissolve CaCO_3 . Thereafter the solubility of the phosphate itself increases rapidly with increasing pressure of CO_2 . There are obtained finally a residue of $\text{Ca}_3(\text{PO}_4)_2$, and a solution from which can be isolated (1) a mixture of CaCO_3 with some CaHPO_4 and (2) pure cryst. CaHPO_4 . By extrapolation, 1 litre of H_2O saturated at 7–10 kg./sq. cm. would dissolve 100 g. of natural phosphate. F. L. U.

Preparation of cupric sulphate and insecto-fungicides from sulphuric acid factory pyrites clinker. I. N. POMERANTZEV and D. E. SORKINA (J. Chem. Ind. Russ., 1934, 10, No. 1, 47–54).—The residue (I) after roasting pyrites is powdered (60-mesh), and extracted with 1% H_2SO_4 (3 vols.) at room temp. during 1 hr., when 60–80% of the Cu is dissolved, leaving 0.3–0.45% of Cu (chiefly CuS) in the residue. Solutions (II) containing 1.5–1.8% Cu and 0.5–0.8% Fe are obtained by adding fresh acid, and repeating the extraction successively 6 times with fresh portions of (I). The Fe can be removed by adding KClO_3 and CaCO_3 to (II). (II) is best utilised by adding $\text{Ca}_3(\text{AsO}_4)_2$, when a ppt. of $\text{Ca}_3(\text{AsO}_4)_2$, $\text{Cu}_3(\text{AsO}_4)_2$, serving as an insecticide, separates. R. T.

Acid decomposition of aluminous minerals and working up of pure alumina. F. GEWECKE (Chem. Fabr., 1934, 7, 199–209).—In the Nuvalon process, using HNO_3 , as in all acid processes, the principal difficulty is the separation of Al from Fe. The raw material is ground and calcined with excess of air at $> 900^\circ$. Dissolution of Fe in HNO_3 is minimised by using less acid than is required to give a normal Al salt. With prolonged stirring the Fe content of the solution is lowered but the Al remains const. Difficultly sol. raw materials can be treated under pressure in apparatus made of Fe–Cr–Ni alloy. No SiO_2 is dissolved. The removal of Fe from “basic” solutions by hydrolysis is favoured by low temp., and by concn. of the solution while there is an optimum basicity. Al crystallises from such solutions as $\text{Al}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ (I) unless there is a great deficiency of HNO_3 ; the presence of colloidal

Fe does not impair the purity of the crystals, which can be washed with conc. HNO_3 . Fe can also be removed as $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$. (I) when heated melts at 70° in its H_2O of crystallisation, but at 400° all the HNO_3 and H_2O are driven off, for which purpose a partial vac. may be employed. 90–95% of the HNO_3 is recovered as such, and the remainder as NO etc. The principal difficulty in this stage is the poor heat conductivity of the powdery nitrate. C. I.

Production of liquid carbon dioxide. A. I. SOLOVIEV (J. Chem. Ind. Russ., 1934, 10, No. 1, 76–77).—Flue gases from the combustion of coal, wood, or peat are freed from org. constituents by scrubbing with dil. aq. CaOCl_2 ; the resulting gas is suitable for liquid CO_2 production. R. T.

Preparation of sulphur from sulphur dioxide. N. F. JUSCHKEVITSCH, V. A. KARSHAVIN, A. V. AVDEEVA, and J. P. NIKOLSKAJA (J. Chem. Ind. Russ., 1934, 10, No. 2, 33–37).—85% of the S of 8:1.4:0.6 $\text{N}_2\text{—SO}_2\text{—CH}_4$ mixtures passed over bauxite at 900° is converted into S, 3% into H_2S , and 12% remains as SO_2 . Similar results are obtained by substituting benzene vapour for CH_4 , at $700\text{—}800^\circ$. R. T.

Acid-resisting linings of fused sulphur. R. BIGAZZI (L'Ind. Chimica, 1934, 9, 616–618).—These linings of crude S, about 5 cm. thick, are readily applied to vats of wood, brick, or cement, and resist conc. HCl or H_2SO_4 , even at $65\text{—}70^\circ$. The mode of application is described in detail. T. H. P.

Determination of water in liquid sulphur dioxide. P. WOOG, R. SIGWALT, and J. DE SAINT-MARS (Bull. Soc. chim., 1933, [iv], 53, 1522–1524).—The specimen is cooled in solid CO_2 and COMe_2 and the temp. at which crystals separate is noted. The H_2O content is read off from a curve. The method is rapid and accurate and is applicable when the H_2O content is $< 0.069\%$. F. L. U.

Influence of carbon monoxide and dioxide on the catalytic oxidation of sulphur dioxide to trioxide. E. M. JAKIMETZ and N. P. BAKINA (J. Chem. Ind. Russ., 1934, 10, No. 2, 21–23).—CO and CO_2 do not inactivate catalysts used in the conversion of SO_2 into SO_3 . R. T.

Preparation from tribromophenol of (A) bromine and picric acid by nitration, (B) bromides by ignition with alkali. A. G. BATSCHIKOV and A. G. ZABRODKIN (J. Chem. Ind. Russ., 1934, 10, No. 3, 58–59, 59–61).—(A) 80% yields of Br and 40% yields of picric acid are obtained from 1:1.5:0.5 $\text{HNO}_3\text{—H}_2\text{SO}_4\text{—C}_6\text{H}_2\text{Br}_3\text{—OH}$ (I) mixtures after 45 min. at 110° . The yields of Br can be raised to 89% by increasing the relative concn. of acids in the mixture. (B) 98% yields of CaBr_2 are obtained by heating 1:1.3:0.45 $\text{Ca}(\text{OH})\text{—NaOH}$ (I) mixtures for 2 hr. at 600° . R. T.

Preparation from natural salines of (A) iodine, without preliminary oxidation, (B) bromine as tribromophenol. A. G. BATSCHIKOV (J. Chem. Ind. Russ., 1934, 10, No. 1, 54–57, 58–65).—(A) [With V. A. EVSTIGNEEV.] Ramanin ditchwater (I), containing 0.21% Br and 0.01–0.02% I, is shaken with kerosene (II) for 1 min. to remove mechanical impurities. An

emulsion of the aq. layer with 0.1 vol. of fresh (II) is treated with CaOCl_2 during 6 sec., the (II) layer is shaken with aq. Na_2SO_3 (used repeatedly), and KClO_3 is added to the aq. NaI thus obtained, when a ppt. containing 90% of I, representing 36—40% of the original I content of (I), is obtained.

(b) [With L. A. DEMIDOVA and V. S. EFREMOV.] (I), after extraction of I, is treated simultaneously with a slight excess of Cl_2 and of PhOH , when $\text{C}_6\text{H}_2\text{Br}_3\cdot\text{OH}$, representing 90% of the original Br content of (I), is pptd. R. T.

Conversion of CO. [He in] oil-well gas.—See II. **Alloys for potash industry.**—See X. **Determining O_2 in gases.**—See XI. **Cr-yellow. Cr_2O_3 -green.**—See XIII. **[Salts in] Macedonian "stink-lakes."** **Action of CaO on $\text{CaH}_4(\text{PO}_4)_2$. Basic slag. Conc. fertilisers. Bordeaux mixture.**—See XVI.

See also A., June, 592, **Distillation of dil. HCl and HNO_3 .** 609, **Prep. of ThO_2 aërogels, and of NaBO_3 .** 613, **Reduction of Na_2SO_4 to Na_2S . Prep. of alkali fluophosphates.** 615, **Prep. of GeH_4 , and of P_3N_5 .** 618, **Determining particle size of hydrated CaO. Determining HOCl.** 619, **Analytical separation of phosphates.** 625, **F prep. cell.**

PATENTS.

Treatment of bentonite and the like. J. D. HASEMAN (U.S.P. 1,929,113, 3.10.33. Appl., 15.10.30).—The bentonite is disintegrated while damp, and washed in H_2O , and, if free from Ca and Mg, dolomite or $\text{CaCl}_2 + \text{MgCl}_2$ is added; the mixture is then washed, in turn, with HCl, H_2O , H_2SO_4 , and H_2O until nearly free from acid, dried, and pulverised. B. M. V.

Carbon dioxide recovery apparatus. F. W. HOGAN and H. M. BULBROOK, Assrs. to H. H. ADAMS (U.S.P. 1,931,817, 24.10.33. Appl., 11.12.29).—Stack gases (I) from a lime-kiln are passed through a scrubber (II), then into conc. aq. K_2CO_3 or Na_2CO_3 in an absorbing tower, the liquor from which is circulated through a heat interchanger in which it is heated to expel CO_2 by the (I), which are thereby cooled before passing to (II). A. R. P.

Apparatus for separating oxygen and nitrogen in air. N. C. CHRISTENSEN (U.S.P. 1,929,349, 3.10.33. Appl., 10.12.29).—The usual countercurrent heat exchanges of a liquefying and rectification system are effected in an apparatus comprising a no. of concentric cylindrical walls, the innermost compartment being the evaporator and the final heat exchange being made efficient by having the incoming condensing gas at a higher pressure than that of the evaporating liquid. B. M. V.

Melting furnace. Centrifugal separation [of crystals etc.]. Metering Cl_2 .—See I. **H_2 - N_2 mixture from hydrocarbon gases.**—See II.

VIII.—GLASS; CERAMICS.

Distribution of temperature during [glass-]pot arching. W. MASKELL (J. Soc. Glass Tech., 1934, 18, 71—78 T).—Considerable temp. gradients and rapid fluctuations were noted. J. A. S.

Influence of boric oxide on rate of melting and

on thermal expansion and resistance to weathering of soda-lime-silica sheet glasses. V. DIMBLEBY, M. PARKIN, E. SEDDON, W. E. S. TURNER, and F. WINKS (J. Soc. Glass Tech., 1934, 18, 12—18 T).—The addition of up to 1.5% of B_2O_3 increases the melting and fining rates and decreases the thermal expansion slightly, but affects the durability inappreciably. J. A. S.

Thermal expansion of some soda-lime-silica glasses. E. SEDDON, W. E. S. TURNER, and F. WINKS (J. Soc. Glass Tech., 1934, 18, 5—12 T).—The linear expansion (E) of a series of glasses (SiO_2 70—80, CaO 2.7—14.4, Na_2O 10.5—22.7%) varied from 658×10^{-8} to 1054×10^{-8} . The relationship between E and composition was linear. Transformation and transition points were determined. J. A. S.

Study of the series of glasses containing sodium oxide, boric oxide, and silica. E. J. GOODING and W. E. S. TURNER (J. Soc. Glass Tech., 1934, 18, 32—66 T).—The d , thermal expansion, annealing temp. and general characteristics of 50 glasses belonging to the three series $\text{Na}_2\text{O}-\text{B}_2\text{O}_3$, $\text{Na}_2\text{SiO}_3-\text{B}_2\text{O}_3$, and $\text{NaBO}_2-\text{SiO}_2$ have been determined. Comprehensive analytical and physical data are recorded. Maxima and minima occurred on most of the property-composition curves but these could not be correlated conclusively with the chemical constitution. J. A. S.

Determination of the transformation point of the same optical glasses in three different laboratories. E. BERGER, M. THOMAS, and W. E. S. TURNER (J. Soc. Glass Tech., 1934, 18, 79—87 T).—The results obtained for 7 glasses at Jena (thermal-expansion method) and at Berlin and Sheffield (electrical a.-c. resistance methods) were in agreement within $\pm 5^\circ$. The prep. of the test-pieces and the apparatus used are described. J. A. S.

Application of statistical methods to the planning of routine [glass-]testing procedure. B. P. DUDING and (Miss) I. M. BAKER (J. Soc. Glass Tech., 1934, 18, 19—31 T).—Various questions raised by a previous paper (B., 1934, 18) are discussed. J. A. S.

Scientific precious stones and their manufacture. F. RAVIER (Chim. et Ind., 1934, 31, Spec. No., 1031—1039).—A review of commercial methods of manufacturing synthetic precious and semi-precious stones. H. J. E.

Removal of "non-magnetic" impurities from ceramic materials. G. W. JARMAN, JUN. (Bull. Amer. Ceram. Soc., 1934, 13, 126—129).—General methods of removing impurities from materials, and the development of magnetic separation methods, are described. The Johnson induction magnetic separator, in which the falling grain stream is subjected to an intense magnetic field applied at 90° , or at any angle from 0° to 90° , to the direction of the gravitational force, is described; its application to the separation of the following materials is discussed: mica and felspar, cyanite and SiO_2 , Ti and ilmenite, ash and combustible in anthracite, and bauxite. The factors essential to and limiting induction magnetic separation are discussed. A. L. R.

High-frequency furnace linings and the results of the investigation of several lining failures. J. E.

PRIESTLEY and W. J. REES (Trans. Ceram. Soc., 1934, 33, 177—199).—The life of unburned brick linings compares favourably with that of linings of the rammed (*e.g.*, Rohn) type. Amongst the common causes of failure are improper grading of material, corrosion by metal and slag, particularly on the slag line, or, on the other hand, building up of the lining especially when basic. A slow first-melting period of a non-corrosive type, and the raising of the lining above the normal level of the metal, are recommended. The mineralogical characteristics of used linings have been examined. C. A. K.

Cr-plated printing plates.—See X.

See also A., June, 614, **Silicate research.** 623, **Recording time-settle curves with elutriation.** **Al-surfaced mirrors.** 624, **Uniformity of Lovibond glasses.**

PATENTS.

Glass-melting furnace. P. L. GEER, Assr. to AMCO, INC. (U.S.P. 1,927,658, 19.9.33. Appl., 30.9.30).—A forehearth is provided with a roof and curtain walls and with means for heating the glass (*A*) within; chilled glass broken off at the suction gathering zones without the curtain is returned to *A* by a refractory paddle situated within *A* and causing a continuous circulation of the glass inwards at the surface and outwards at depth. B. M. V.

Treatment of clay. D. F. McCORMICK, Assr. to KAOLIN PROCESSES, INC. (U.S.P. 1,930,247, 10.10.33. Appl., 12.5.31).—Clay is dried and subjected to pneumatic separation, yielding clean clay and a middling which is divided into light and heavy portions, the former going back to the dry separator and the latter passing to a wet separator with other wet, raw clay, if desired. B. M. V.

Working of clay slips. R. M. KING, Assr. to NAT. ALUMINATE CORP. (U.S.P. 1,929,172, 3.10.33. Appl., 4.4.32).—Addition of Na aluminate and, if desired, Na silicate improves the working qualities of the slip. B. M. V.

Colouring the surface of unglazed fired bricks, tiles, earthenware, and the like articles. A. L. MOND. From I. G. FARBENIND. A.-G. (B.P. 410,651, 10.8.33).—Surface coloration (I) of the above articles is produced by subliming a chloride (II) such as AlCl_3 , FeCl_3 , or CrCl_3 in the kiln at a temp. at which sublimation is substantially immediate (*e.g.*, 1150—1200° for FeCl_3). By irregularly distributing (II) throughout the kiln, a diversity of (I) may be obtained, and by continuing the firing in a reducing atm. after the (I) is produced, its shade may be modified. The sublimation of (II) may be effected in vessels outside the kiln, particularly by waste heat, and that of CrCl_3 may be accelerated by suitable preheating. A. L. R.

Production of refractory bodies. BRIT. THOMSON-HOUSTON CO., LTD., Asses. of A. LER. ELLIS and G. A. F. WINCKLER (B.P. 410,033, 28.11.33. U.S., 30.11.32).—A burner in which finely-divided material is melted for an agglomeration process (B., 1932, 343) is described. J. A. S.

Sound-absorbing material.—See IX. **Adhesive for abrasives.**—See XV.

IX.—BUILDING MATERIALS.

Clay of Portland cement. VII. **Semi-industrial experiments on tuff burning in a shaft kiln.** VIII. **Industrial grinding of burnt tuff.** Y. SANADA (J. Soc. Chem. Ind., Japan, 1934, 37, 118—119 B, 119—120 B; cf. B., 1934, 579).—VII. An output of 150 tons per day was obtained from a kiln 12.5 ft. diam. \times 43 ft. Coal-shale consumption for a burning temp. of 800—900° was 20% of the tuff.

VIII. Grinding took place in a hammer mill (12 \times 16 in., output 30 tons per hr.) and finally in a Unidan mill (7 \times 40 ft., output 20 tons per hr., 4% of residue on a 4900-meshes per sq. cm. screen). J. A. S.

Hydration of Portland cement. XIII—XIV. K. KOYANAGI (J. Soc. Chem. Ind., Japan, 1934, 37, 113—117 B).—The formation of Ca(OH)_2 during the hydration of cement and the influence of various additions and reagents were observed under the microscope in polarised light. With a rapid-hardening cement and an ordinary cement "accelerated" with CaCl_2 , the crystals of Ca(OH)_2 were smaller, more numerous, and formed more quickly than with an ordinary cement. The addition of sugar ("retarding" agent) delayed the formation of the crystals, which were needle-like instead of prismatic or hexagonal. During the initial setting period a large no. of small crystals of Ca(OH)_2 were formed which proceeded to grow during the hardening period. The cement was harder in proportion to the no. of crystals. Cryst. Ca(OH)_2 plays an important part in the hardening of cement. J. A. S.

Ultimate strength and modulus of elasticity of high-strength Portland-cement concrete. W. H. THOMAN and W. RAEDER (Amer. Concrete Inst. J., 1934, 5, 231—238; Road Abs., 1934, 1, 47—48).—The ultimate strength of concrete (I) is a linear function of the cement/ H_2O ratio (by wt.) up to a val. of 3, when the H_2O per cu. ft. of (I), the grading of fine to coarse aggregate, and the abs. vol. of constituent material are maintained const. in the mixes. The strength and the modulus of elasticity vary with the coarse aggregate used. T. W. P.

Strength of cements immersed in sulphate solutions. G. BAIRE (Chim. et Ind., 1934, 31, Spec. No., 717—718).—Normal Portland cement and high-strength Portland-cement mortars, tested in compression after immersion in sulphate solution for ages up to 3 months, is $<$ for the same mortars in ordinary H_2O at the same ages. Pozzuolanic cement mortars are practically unaffected. T. W. P.

Action of dissolved magnesium sulphate on cements. G. BATA (Chim. et Ind., 1934, 31, Spec. No., 732—741).—Powdered, set cements shaken with MgSO_4 solution (I) react rapidly to form Mg(OH)_2 , which is pptd. quickly, and CaSO_4 , formed more slowly. The action is slower with high- Al_2O_3 cements than with Portlands. The results of microscopical examinations of the products are given. In tests in which the cements were filled into Le Chatelier tongs and immersed in (I), a progressive expansion took place in the case of Portland cement, but high- Al_2O_3 cement and slag cement showed no expansion. T. W. P.

Theory of the action of pure water on cements.

H. LAFUMA (Chim. et Ind., 1934, 31, Spec. No., 719—721).— $\text{Ca}(\text{HCO}_3)_2$ in ordinary natural H_2O forms CaCO_3 in the pores of the cement and protects it from the dissolving action of the H_2O , but carbonation from the air or from the small amount of CO_2 in pure H_2O is not always effective. In the last case, cements of low hydraulic modulus give the best resistance.

T. W. P.

Constitution and properties of rational puzzuolanic cements. C. VITTORI (Chim. et Ind., 1934, 31, Spec. No., 742—751).—In rational puzzuolanic cements, the puzzuolanic constituent is the most abundant and the combined cement has a hydraulic modulus ≥ 1 . The strength of these cements is $>$ that of mixtures of normal Portland cement with a smaller amount of puzzuolana. Data on the materials used for manufacture are given and theories are outlined for determination of suitable cements and puzzuolanas, and the mechanism of the heat-treatment and of the hardening process. Rational puzzuolanic cements have a low heat of hardening.

T. W. P.

Spontaneous re-sealing of cement test-pieces.

G. BAIRE (Chim. et Ind., 1934, 31, Spec. No., 715—716).—Tensile test-pieces of cements, broken at different ages and stored in soft H_2O or sea- H_2O with the broken edges held firmly together, often become sealed. On re-testing, the tensile strength is much reduced but is appreciable. With normal Portland cement the strength is greatest when the test-piece is first broken at an early age, but with puzzuolanic cements the reverse is the case. High-early-strength cements show the lowest strength after re-sealing. In all cases a slight increase is obtained with increase in time between breakings.

T. W. P.

Effect of cooling conditions on quality of cement clinkers. W. R. CHANDLER (Rock Products, 1934, 37, No. 4, 46—48).—Different methods of cooling clinker have no effect on chemical composition, soundness, or H_2O requirements for normal consistency. Rapid quenching may cause quicker setting and increases the ease of grinding and tensile strength (T) up to 7 days, although T at later ages is adversely affected.

T. W. P.

Temperature effects on compressive strength of concrete.

A. G. TIMMS and N. H. WITHEY (Amer. Concrete Inst. J., 1934, 5, 159—180; Road Abs., 1934, 1, 44—45).—The strength and gain in strength with age are low for concrete (I) cured at 0.5° and 10° and are not materially improved by subsequent heating to 21° except with satisfactory humidity conditions. The later strengths of (I) cured at -10° are improved somewhat by heating to 21° .

T. W. P.

Concrete strength in the light of modern physical research.

A. POGANY (Zement, 1934, 23, 48—50, 63—65; Road Abs., 1934, 1, 45—47).—The theoretical strength of concrete calc. from the Born and Laue at. space-lattice theory is $>$ that found in practice. A microscopical method for the study of thin sections of cement submitted to compressive, shear, and bending stresses shows that the discrepancy is due to minute cracks. The cracking in specimens made from rich mixes is $>$ those from less rich plastic mixes. Curing

under pressure or in H_2O also reduces the no. of cracks.

T. W. P.

Concrete with bituminous admixtures. HAEGERMANN (Zement, 1934, 23, 159—162, 190—193; Road Abs., 1934, 1, 49—50).—Addition of bitumen reduces the permeability and shrinkage of concrete. A review of the literature is given.

T. W. P.

Design of concrete dams, with special reference to deterioration due to moorland water. W. T. HALCROW (Engineering, 1934, 137, 609—610, 637—638).—In tests on concretes in contact with acid moorland waters, only those with aluminous cement were unaffected after $11\frac{1}{2}$ years. Staffordshire blue bricks were also unaffected, but the mortar joints softened. 1:2 Portland cement-sand mortars resisted corrosion for 8—9 years. Surface treatments were not permanent. In a concrete dam, examined after 24 years, seepage of acid waters through cracks caused leaching of the CaO with production of CaCO_3 on the downstream face. The construction of concrete dams, with special reference to temp. development, is discussed and the use of precast concrete blocks suggested.

T. W. P.

Study of corrosion phenomena in mortars by means of water seepage. H. KUHLE, J. PARGAPONDAL, and S. BAENTSCH (Zement, 1934, 23, 63—74, 84—89, 127—30, 141—144).—The changes in cement mortars during curing can be detected by wt. or by permeability measurements. The effect of percolating H_2O depends on the time and type of preliminary storage and on the chemical composition. The alkalis in the cement are first to be leached out. The amount of CaO extracted from specimens with preliminary H_2O storage is $>$ that of those previously air-stored, the effect being due to carbonation of the latter. When the $[\text{CaO}]$ in the solution is high, the $[\text{SO}_3]$ and $[\text{SiO}_2]$ are low. A low $[\text{CaO}]$ together with a high concn. of alkalis is often associated with high $[\text{SiO}_2]$. Al_2O_3 and Fe_2O_3 are not leached out. Seepage reduces the strength of specimens and the effect is more marked with a short curing period.

T. W. P.

Permeability to air and to water of some buildings bricks. E. O. MILLS (Trans. Ceram. Soc., 1934, 33, 200—212).—Tests on the permeability (P) of building bricks showed a definite reduction in the ratio of flow to pressure as this val. increased above 1 c.c. H_2O -pressure, due to disturbance of a steady uniform flow. No relation was observed between porosity and P , which varied in a wide range between 0.00008 and 5.81. Determination of P to air is recommended as being more accurate than with H_2O , though the absorption of H_2O in relation to time is valued as an indication of the uniformity of texture.

C. A. K.

Inflammability of painted wood. I. Introduction and method of investigation. II. Inflammability tests with plain and painted wood. C. A. L. DE BRUYN (Verfkroniek, 1933, 6, 322—325; 1934, 7, 135—139).—I. Of the various methods described, Truax and Harrison's method (Proc. Amer. Soc. Test. Mat., 1929, 29, II, 973) is preferred.

II. The results obtained by this method with wood painted with a wide variety of paints are tabulated. Inflammability decreases approx. in the order: oil

varnish > Al paint with an oil-varnish medium > unpainted wood > bituminous paints > various linseed oil and linseed oil-stand oil paints containing ZnO, lithopone, C black, and ochre as pigments > paints with glyptal varnish media. The bituminous paints do not catch fire readily, but burn vigorously when once ignited. D. R. D.

Testing ductility of bitumens. Shale [residue for cement].—See II. **Acid-resisting linings of S.**—See VII. **Preventing corrosion of steel. Corrosion of Zn.**—See X. **Timber for butter boxes.**—See XIX.

PATENTS.

Manufacture of hydraulic cement. P. T. LINDHARD, Assr. to F. L. SMIDTH & Co. (U.S.P. 1,929,953, 10.10.33. Appl., 22.12.31).—The upper end of a rotary kiln is closed to the exit of gases, but not to the entry of material; the shell below that point, but above the clinking zone, is formed of cells shaped and perforated so that the gases have free exit but the material is tumbled back into the kiln. B. M. V.

Artificial gypsite. [Plaster.] C. K. ROOS and R. ERICSON, Assrs. to UNITED STATES GYPSUM CO. (U.S.P. 1,932,120, 24.10.33. Appl., 8.2.30).—A mixture of gypsum (26,180), dry peat (600), and clay (2820 lb.) is stirred and heated with aq. CaCl₂, *d* 1.4 (4 quarts), in the usual plaster kettle at 155–165°. A. R. P.

Manufacture of sound-absorbing material. E. T. HERMANN (U.S.P. 1,929,425, 10.10.33. Appl., 14.7.30).—A moist mixture of mineral particles (*P*) and a ceramic bond (*B*) is shaped and fired, *B* being only sufficient to stick the prominent points of *P*, leaving the voids empty. B. M. V.

Road tar.—See II. **Fibrous products.**—See V.

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

Principles of design of blast-furnace lines. J. ŠÁREK (Iron & Steel Inst., May, 1934. Advance copy, 25 pp.).—The principles of design are deduced from actual chemical and physical changes of the burden as it descends in the furnace, thus necessitating a knowledge of the character of the constituents of the charge. Dimensions of three furnaces to be worked on Bohemian ores are given. It is noted that lines of widely separated furnaces are very similar, but this need not imply that max. efficiency is attained in every instance. C. A. K.

Study of ingot structures. L. NORTHOTT (Iron & Steel Inst., May, 1934. Advance copy, 11 pp.).—The structures of a slowly poured bottom-chilled ingot, known as the Parsons-Duncan ingot (B., 1929, 435), which had greater longitudinal than vertical dimensions, are described. Small test-ingots of Cu showed columnar crystals when poured at a moderate superheat; equiaxial structure was not attained until the mould was heated to 600°. Complete displacement of segregations in cast Fe was not attained with fully columnar crystals, and the most effective method to give freedom from segregation was to prevent inclusions from coalescing by a rapid solidification of the metal. C. A. K.

Thermodynamic study of the form of the silicon dissolved in molten iron. F. ROBOŘIL (Chim. et Ind., 1934, 31, Spec. No., 480–484).—The influence of Mn on the const. $K_{Si} = [\text{FeO}][\text{Si}]$ and that of Si on the const. $K_{Mn} = [\text{FeO}][\text{Mn}]/[\text{MnO}]$ may be explained by the existence of silicides of Mn and Fe in molten steel. The existence of FeSi in molten Fe is rendered likely from a thermodynamic study of the solidification curves of the system Fe-Si. The fusion diagram of Fe-V alloy has led to the val. 64.2 g.-cal. for the heat of fusion of pure Fe. H. S. P.

Elasticity, deflexion, and resilience of cast iron. J. G. PEARCE (Iron & Steel Inst., May, 1934. Advance copy, 18 pp.).—The transverse deflexion of cast Fe comprises elastic deflexion and permanent set; the former varies directly with the load, whilst the latter increases at a greater rate than the load and varies widely with different specimens. The “energy of rupture” places cast Fe satisfactorily in relation to toughness. C. A. K.

Annealing of thin sheet iron. G. DELBART (Chim. et Ind., 1934, 31, Spec. No., 454–463).—The extreme processes of case-hardening and normalisation of thin sheet Fe are considered, and also the effect of hot- and cold-rolling and of annealing on the secondary crystallisation. A summary of the action of decarburisation and coalescence on the structure and mechanical properties is given. H. S. P.

Non-ageing iron and steel for deep-drawing. A. HAYES and R. O. GRIFFIS (Met. & Alloys, 1934, 5, 110–112).—Two compositions which are capable of being stabilised against ageing are C 0.05 (0.042), Mn 0.03 (0.47), P 0.005 (0.011), S 0.019 (0.014), Si nil (0.073), Ti 0.067 (0.058), and Al 0.042 (0.037)%. After normalising, the material is annealed at 640° for 3 hr. and then cooled at a rate of 5–8° per hr. C. A. K.

Determination of sulphur in iron and steel of low sulphur content. B. HUBERT (Chim. et Ind., 1934, 31, Spec. No., 230–232).—A crit. review of standard gravimetric and volumetric methods. H. J. E.

Aluminium coatings on iron produced by hot-dipping. H. RÖHRIG (Z. Metallk., 1934, 26, 87–90).—Corrosion-resistant adherent coatings of Al on Fe can be readily obtained by a short immersion of the Fe, after thorough cleaning to remove oxide films, in molten Al preferably under a fused chloride or fluoride flux. The surface of the Fe is converted into FeAl₃, the thickness of the layer of which increases with time (*t*) and temp. (*T*) of immersion; since this compound is brittle *T* should be kept low, e.g., 720°, and *t* should not exceed a few sec. Steel wire so coated with Al can readily be bent into narrow coils without flaking of the coating and suffers no loss in strength or ductility in the process. A. R. P.

Conditions of resistance to attack by hydrochloric acid of iron-nickel-tungsten or -molybdenum alloys. A. PORTEVIN, E. PRETET, and H. JOLIVET (Chim. et Ind., 1934, 31, Spec. No., 464–471).—A study has been made of the alloys of Fe-Ni-W and Fe-Ni-Mo containing 20–40% Ni and 10–25% W or Mo. They show a considerable resistance compared

with the unoxidisable alloys ordinarily used. The corrosion diminishes with increase in W and increases rapidly with rise of temp., being less, however, the greater is the content of Ni. It is increased considerably by the presence of certain impurities such as C.

H. S. P.

Importance of physico-chemical equilibrium for the production of a steel containing few inclusions and of uniform composition. C. BENEDICKS and H. LÖFQUIST (Chim. et Ind., 1934, 31, Spec. No., 474—479).—To reduce inclusion of slag in a bath of steel to a min., it is essential to establish a physico-chemical equilibrium between the steel and the slag. This may be accomplished by adding to the steel a deoxidising metal and a quantity of its oxide such that the equilibrium composition of the slag is established. The Bessemer process, as carried out by the Swedish method, gives a slag approximating closely in composition to that indicated by the theoretical diagram. H. S. P.

Influence of prolonged exposure in steam at 450° on the mechanical properties of various steels and alloys. M. SAUVAGEOT (Chim. et Ind., 1934, 31, Spec. No., 519—530).—Various steels, Fe-Ni-Cr (I), and monel metal (II), of importance in boiler construction, have been examined. The hardness of certain steels increased after 1 year, but generally reached a max. before the end of 3 years' exposure. Extra-mild, Ni-Cr-Mo, and Ni-Cr austenitic steels, (I), and (II) showed least change in mechanical properties.

R. S.

Value of Young's modulus for steel. H. H. ABRAM (Iron & Steel Inst., May, 1934. Advance copy, 6 pp.).—Results of tests on Armco iron and mild steel indicate that the val. of Young's modulus (A) for pure Fe would be approx. 30.2×10^6 lb./sq. in., diminishing to 29.7×10^6 lb. at a 0.5% C content. Addition of Mn and Cr raises the val. and of Ni and Si lowers it. Whilst the val. of A is const. in medium- and high-C steels it increases with increase of C in a 13% Cr steel. Heat-treatment is without effect on A provided that no residual stresses are present.

C. A. K.

Thermal conductivity of tool steels. D. HATTORI (Iron & Steel Inst., May, 1934. Advance copy, 18 pp.).—Rise in temp. caused the thermal conductivity (A) of C tool steels to decrease and of high-speed steels to increase. In quenched C steels A increases with the tempering temp., increasing more rapidly at about 250°; it becomes nearly the same at 400° as in annealed steels. A varies with the structure of steels, the order being austenite < α -martensite < β -martensite < pearlite. A of high-speed steels decreases greatly by quenching the steel, and on tempering it increases slightly at 300°, considerably at 550°, and still more at 700—800°, hence the greater durability of tools tempered at the higher temp. (500—600°).

C. A. K.

Manufacture of full-finished steel sheets. E. R. MORR (Iron & Steel Inst., May, 1934. Advance copy, 39 pp.).—The present forms of sheet mills and their probable developments to meet the demands, particularly of the motor-body industry, are discussed.

C. A. K.

[Preventing] corrosion of steel tanks. ANON. (Concrete, 1934, 42, 20).—Two coatings of 1:1 cement-

sand grout on steel H₂O-tanks prevent corrosion of the metal.

T. W. P.

Alkaline anodic pickling of high-speed steel. R. R. ROGERS (Trans. Electrochem. Soc., 1934, 65, 331—334).—In order to secure good adhesion of electro-deposits to high-speed steel (containing Cr, W, and V) it is treated anodically at 2.7 amp. per sq. dm. in a bath containing 115 g. of NaOH and 15 g. of citric acid per litre until gas evolution is uniform over the whole surface, then rinsed with H₂O, dipped momentarily in 6—12N-HCl, and finally washed with H₂O. H. J. T. E.

Determination of molybdenum in steels. L. LOSANA and M. JARACH (L'Ind. Chimica, 1934, 9, 623—625).—Modifications in Falciola's method (A., 1927, 640) render it capable of giving accurate results with steels containing Mn, Ni, and Cr.

T. H. P.

Determination of manganese in chrome steel by photometric titration. S. HIRANO and Y. NAKAMURA (J. Soc. Chem. Ind., Japan, 1934, 37, 147—148 B).—Mn can be determined in presence of Cr, V, and Mo by oxidation with Na bismuthate in HNO₃ and titration with NaNO₂, if the end-point (P) is detected by a photoelectric cell. Two balanced cells are used, the light reaching one through the solution being titrated and the other through a solution having the P colour. The galvanometer reading is plotted against the titre and a break in the curve determines P .

A. G.

Determination of oxygen in alloy steels and its effect on tube piercing. N. HAMILTON (Amer. Inst. Min. Met. Eng. Tech. Pub., 1934, No. 540, 12 pp.).—Apparatus and procedure for determining O, H, and N in steel are described. Total O in two steels (Cr 18, Ni 8, C 0.07%; Cr 5, Mo 0.5%) was directly related to the elevated temp. ductility as determined by seamless-tube piercing. Probably O is combined with Cr. O should be < 0.01%.

CH. ABS.

Rapid determination of oxide in molten steel. A. B. KINZEL, J. J. EGAN, and R. J. PRICE (Met. & Alloys, 1934, 5, 96, 105).—5 g. of fine drillings are dissolved in 250 c.c. of 30% HNO₃ at 30° and 15 g. of (NH₄)₂SO₄. Then 15 c.c. of HCl (d 1.19) and 0.05 g. of ashless lampblack in aq. suspension are stirred in and the mixture is centrifuged and filtered. The residue is ignited in an oxygenated atm. and weighed. The time of determination is given as 7—10 min.

C. A. K.

Simultaneous determination of sulphur and carbon in steels. G. MISSON (Chim. et Ind., 1934, 31, Spec. No., 436—437).—An improved method of absorption of CO₂ due to more efficient stirring is described.

H. S. P.

Tests [of metals or alloys] by colour macroscopy. M. PROT and (MLLE.) GOLDOWSKI (Chim. et Ind., 1934, 31, Spec. No., 442—443).—When a mixture of metals or a heterogeneous alloy is placed in a solution of an electrolyte such as NaCl, electric couples are set up between the different metals or different parts of the alloy and the [H] becomes heterogeneous. By stabilising the solution with gelatin and adding an indicator the difference of [H] becomes visible and discloses heterogeneities which may cause corrosion.

H. S. P.

Apparatus for thermal analysis of metallic samples. J. L. HAUGHTON (Chim. et Ind., 1934, 31, Spec. No., 439—441).—A new apparatus for obtaining the heating or cooling curves of alloys is described. A long, tubular furnace so designed as to give a uniform temp. gradient throughout its length is moved at a const. rate by means of a gramophone motor over the sample, the temp. change being measured by a thermocouple. The apparatus gives good results. H. S. P.

Study of complex phenomena: application to metallurgical researches. R. DE FLEURY and H. PORTER (Chim. et Ind., 1934, 31, Spec. No., 448—453).—Theoretical. The graphical method, depending on the properties of an equilateral triangle used in metallurgy for the study of three variables, has been generalised in order to be applicable to n variables. H. S. P.

Determination of small amounts of bismuth, antimony, tin, and molybdenum in copper. B. PARK (Ind. Eng. Chem. [Anal.], 1934, 6, 189—190).—Bi, Sb, Sn, and Mo are pptd. quantitatively by adding KBrO_3 , KBr , and KMnO_4 to the Cu solution. The ppt. is dissolved in HCl , neutralised with NH_3 , pptd. as sulphide by H_2O , dissolved again in HCl , and used to impregnate graphite electrodes, which are subsequently arced to give spectrograms. The spectrograms obtained are compared with standards. E. S. H.

Rapid determination of antimony and of arsenic in coppers and bronzes. G. MISSON (Chim. et Ind., 1934, 31, Spec. No., 438).—The metal to be analysed is mixed with a little pure Sn and treated with HNO_3 , when the Sb and As are pptd. with the Sn oxide. The ppt. is dissolved in conc. H_2SO_4 , reduced by pure Sn, and the solution titrated with KBrO_3 . H. S. P.

Preparation of sulphur-free bronze alloys. E. T. RICHARDS (Chem.-Ztg., 1934, 58, 402—403).—When bronze is melted in a shaft furnace the S content may be lowered by replacing $\frac{1}{2}$ of the coke by wood charcoal by using a slag of a suitable composition (CaO 15, Fe_2O_3 42, SiO_2 33%), and by adding the correct amount of Mn. The bronze may also be washed 2 or 3 times with an equal wt. of Na_2CO_3 and charcoal in a reverberatory furnace. A. G.

Covering capacity (on water) of aluminium-bronze powder. J. D. EDWARDS and R. B. MASON (Ind. Eng. Chem. [Anal.], 1934, 6, 159—161).—The powder is dusted over the surface of H_2O contained in a shallow Al dish, the area of which can be varied by moving two strips which touch the surface. With proper manipulation a uniform film equal in thickness to one flake can be obtained. The thickness of the flakes is calc. from the wt. of powder used per unit area of surface. Typical vals. are 0.0013—0.0003 mm. E. S. H.

Resistant alloys for the potash industry. V. PERCHKÉ (Chim. et Ind., 1934, 31, Spec. No., 531—535).—Phase diagrams of the systems Cu—Al—Ni—Fe and Cu—Al—Zn—Fe are given. The velocity of corrosion of the binary, ternary, and quaternary alloys in solutions of sylvinit, carnallite, and MgCl_2 has been measured. Corrosion was most rapid in MgCl_2 . Alloys with composition near to regions of solid solution showed greatest resistance. The most resistant contained Cu 82.5,

Al 8.2, Ni 5.1, and Fe 3.8%. The alloys are 5—6 times as resistant as ordinary brasses and bronzes, and possess superior mechanical properties. R. S.

Bearing metals in use on the United States railways and some recent developments (Satco metal). F. WITTE (Z. Metallk., 1934, 26, 69—70).—Satco metal is an alloy of Pb (> 98%) with Sn 1, Ca 0.5, Hg 0.25, Al 0.05, Mg 0.075, K 0.04, and Li 0.04%; it has a much greater bending strength than any of the ordinary bearing metals and retains its hardness better at high temp. It also has a much greater resistance to wear and a much smaller tendency to seize as well as a high resistance to deformation. A. R. P.

Brinell hardness of bearing metals. A. VÄTH (Z. Metallk., 1934, 26, 83—86).—The Brinell hardness (H) of bearing metals (I) depends to a large extent on the time (T) of application of the load (L) and on the magnitude of L , H decreasing with an increase in T and increasing to a max. with increase in L and then decreasing again. It is suggested that H_{max} should be taken as the true hardness in testing (I) and that L should be such that the diam. of the impression is $\frac{1}{4}$ — $\frac{3}{8}$ that of the ball. H diagrams have been constructed for various vals. of L and T from which H_{max} can be interpolated. A. R. P.

Corrosion of electrolytic and refined zinc. O. BAUER and G. SCHIKORR (Z. Metallk., 1934, 26, 73—80).—Corrosion of Zn in H_2O is controlled by the presence of CO_2 , an excess of which prevents or retards formation of a protective layer. Electrolytic Zn (I) behaves better than refined Zn (II) in H_2O , but in acid solutions in which corrosion is accompanied by evolution of H_2 (II) generally dissolves more slowly than (I); no difference between the two grades can, however, be observed in solutions of Na_2CO_3 or "persil" or on exposure to the atm. Atm. corrosion is greater in the neighbourhood of towns and the sea than in pure country air. Corrosion of Zn in contact with moist $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (A) is > in contact with moist cement (B), both grades behaving similarly in A , but (I) being slightly more rapidly attacked than (II) in B . In contact with moist wood Zn is corroded most rapidly by basswood and least by beechwood, (I) generally being more readily attacked than (II). A. R. P.

Behaviour of coloured zinc sheets in alternate immersion tests [in salt water]. W. BECK and E. VÖLKER (Z. Metallk., 1934, 26, 56—61).—Rolled Zn sheets were coloured by pickling in (a) aq. FeCl_3 , (b) aq. MnSO_4 , (c) a KClO_3 pickle, (d) ammoniacal CuSO_4 , and (e) aq. $(\text{NH}_4)_2\text{MoO}_4$ and then exposed (i) to corrosion in the atm. for 8 months and (ii) to alternate immersion in 3% NaCl solution containing 0.1% H_2O_2 and exposure to the air for 7 min. In series (i) sheets treated by method (e) were hardly affected, whereas those treated by (a) and (c) were more corroded than untreated sheets. In series (ii) the (e) sheets again behaved best, whereas the others were fairly badly corroded, probably by electrolytic action. During use bath (e) tends to become less acid, its p_{H} rising from 4.9 to 5.7; it can be regenerated satisfactorily by cautious addition of acid. A. R. P.

Zinc die-casting alloy. Ageing data. E. A. ANDERSON and G. L. WERLEY (*Met. & Alloys*, 1934, 5, 97—99, 102).—All the alloys showed a rapid rate of shrinkage and increased ductility after casting, followed by a much slower rate of change. This shrinkage may be accelerated by annealing at, e.g., 95°. Corresponding changes in mechanical properties occur. C. A. K.

Corrosion of lead-antimony alloy. F. K. FISCHER (*Sci. Mem. Univ. Saratov*, 1934, 10, 91—105).—Differences in the degree of corrosion of Pb-Sb electrodes during electrolysis (I) of aq. NaOAc, HCO₂Na, NaCl, and NaNO₃ are due chiefly to alkalisation of the perianodal fluid during (I). Corrosion of accumulator plates when the electrolyte contains > 0.1% of NaCl is ascribed to the same cause. R. T.

Probability in tinplate practice. C. B. POST (*Met. & Alloys*, 1934, 5, 89—92).—Curves plotted from a large no. of Erichsen vals. for tinplate enable the relative frequency of any particular val. or condition to be observed, and the probability of any abnormal difference may be calc. mathematically. C. A. K.

Effect of heat-treatment in the hardening and of prolonged ageing on the properties of aluminium alloys. W. SCHWINNING and E. DORGERLOH (*Z. Metallk.*, 1934, 26, 91—92).—The best temp. range for quenching Al alloys with Mg (composition not given) is 480—500°; higher temp. up to 530° have only a slight deleterious effect, but temp. < 480° cause a decrease in electrical conductivity. Ageing at 140° produces the best mechanical properties, especially if the quenched metal is stored at room temp. for 7 months prior to ageing. Storage for 2 years produces a slight decline in the endurance strength. A. R. P.

Influence of heat-treatment on the resistance to corrosion by sea-water of age-hardenable rolling alloys of aluminium. H. MANN (*Z. Metallk.*, 1934, 26, 70—71).—The rate of corrosion of duralumin and lantal is unaffected by ageing temp. (T) < 75°, but rapidly increases to a max. with $T = 125$ —135°, then decreases again to almost the original val. with $T = 160$ °, and finally falls slowly with further rise in T . This behaviour is ascribed to the pptn. and subsequent change in the state of aggregation of CuAl₂ with rise in T . A. R. P.

Corrosion of thin test-pieces. M. PROT and (MLLE.) GOLDOWSKI (*Chim. et Ind.*, 1934, 31, Spec. No., 555—556).—The corrosion of duralumin, forming small holes, can be conveniently studied by the immersion of cylindrical sheets, 0.1—0.01 mm. thick, in sea-H₂O saturated with O₂ under pressure. The perforated plate can be photographed or a contact print made from it. R. S.

Use of aluminium kitchen utensils. R. INTONTI (*Giorn. Chim. Ind. Appl.*, 1934, 16, 159—162).—No evidence exists of harmful effects following the use of Al cooking vessels. T. H. P.

Chromium plating of [pottery-]printing plates. J. G. ROBERTS (*Trans. Ceram. Soc.*, 1934, 33, 213—214).—The life of such plates is extended greatly by plating them with Cr under suitable conditions. When worn the plates may be stripped and replated for further service. C. A. K.

Ductility and adhesion of nickel [electro-] deposits. F. P. ROMANOFF (*Trans. Electrochem. Soc.*, 1934, 65, 251—266).—In the absence of adsorbed gases or entrapped basic salts which may cause hardness, Ni deposits of conical or pyramidal crystal structure are very ductile, whereas those of acicular or columnar structure are non-ductile or "hard" in any case. Ductile Ni deposits up to 0.01 in. thick cause no apparent variation in the ductility of the basis metal (Cu), but the non-ductile, fibrous deposits cause an apparent hardening attributed to notch propagation through the Cu by transmission from fractures in the Ni deposit when deformed. When the Ni deposit is removed, the Cu is found to have its original ductility. A ductile Ni deposit on Cu can be embrittled by cathodic treatment in alkaline electrolytes, whereas unplated Cu is not appreciably affected by such treatment. Cr may be deposited on ductile Ni without causing embrittlement. A test for adhesion and ductility of electrolytic Ni on sheet metal, involving stamping out a flanged cap, is described. H. J. T. E.

Electrodeposition of copper-nickel-zinc alloys from cyanide solutions. I. C. L. FAUST and G. H. MONTILLON (*Trans. Electrochem. Soc.*, 1934, 65, 267—281).—Bright, smooth, adherent deposits of Cu-Ni-Zn alloys were obtained by electrolysis of solutions of the corresponding double cyanides with excess KCN and addition of K₂CO₃ at 25°, 50°, and 70°, using duriron anodes and 0.4—6.0 amp. per sq. dm. at Pt cathodes. The compositions of the alloys were examined in relation to the proportions of the metals in solution under various conditions and are shown on ternary diagrams. The proportion of Cu in the deposit is relatively > that in the bath, but the reverse is true for Ni. Increase of c.d. favours deposition of Zn against Ni, and of both against Cu. Rise in temp. increases the % of Cu, and decreases that of Zn more than that of Ni. Partial cathodic reduction of Ni²⁺ to Ni⁺ causes a red coloration and affects slightly the reproducibility of the results. H. J. T. E.

Hardness of electrolytic metals. GUICHARD, CLAUSMANN, BILLON, and LANTHONY (*Chim. et Ind.*, 1934, 31, Spec. No., 472—473).—A study of Ni, Co, Fe, and Cr shows that there is no relation between the hardness of electrolytic metals and their H content. Their hardness, therefore, is not due to hydrides, but must be attributed to their structure. H. S. P.

Corrosion by C₂H₄Cl₂ and C₂HCl₃.—See III. **Corrosion phenomena in mortars.**—See IX. **Conductivities of slags.**—See XI.

See also A., June, 588, **Effect of cold-working on low-melting metals.** 590, **System Mg-Sb.** Mg-rich Mg-Ni alloys. Solid solution of Al in Ag-Cu-Pd, Pt-Rh, and Fe-C alloys. H-charged Pd-Au alloys. Heusler alloys. 591, **Cu-Fe-Si alloys.** Systems Mg-Bi and Li-Mg. 595, **Mineral flotation.** 600, **System Al-Al₂O₃-Al₄C₃.** Influence of Mg on the Fe-Fe₃C-FeS equilibrium. 602, **Passivity.** 606, **Mechanism of corrosion.** 609, **Electrodeposition of Ni from alkaline electrolytes.** 610, **Oxide coating of Al.** 616, **Slag examination.** 620, **Indicators for metals.** 621, **Electro-analysis of**

alloys of Sb, Cu, and Sn. Spectral analysis of Ni-Fe-Cr-V alloy.

PATENTS.

Recovery of blast-furnace flue dust. A. B. HASWELL and F. G. CUTLER (U.S.P. 1,930,010, 10.10.33. Appl., 23.3.32).—The dust is centrifugally projected with fuel and air into a shaft maintained at fritting temp. and falls on to a hearth maintained at fusing temp., whence it is tapped and re-charged to the blast furnace. B. M. V.

Reduction of metallic oxides [iron ore]. W. H. SMITH, Assr. to GEN. REDUCTION CORP. (U.S.P. 1,928,140, 26.9.33. Appl., 22.10.29).—A mixture of Fe ore (*O*) and fine coal is passed slowly through vertical shafts (*I*) arranged in parallel in a brickwork structure containing three superimposed heating chambers surrounding (*I*), *A* being kept at 500°, *B* at 500–700°, and *C* at 700–900° so that the hot gas rising from *C* effects partial reduction of *O* in *B* and in *A* deposits *C* in the pores of *O*. A. R. P.

Continuous carburising process [for steel etc.]. R. J. COWAN, Assr. to SURFACE COMBUSTION CORP. (U.S.P. 1,932,032, 24.10.33. Appl., 28.1.32).—The articles (*A*) and a hydrocarbon (*I*) gas are passed in one direction through a long, heated chamber (*C*) so that in the cooler zone at the beginning *C* is deposited on *A* from the cracking of (*I*) and in the hotter zone at the end CO_2 reacts with the *C* on *A* which does not diffuse into the steel, and the *A* pass out of *C* in a bright condition. A. R. P.

Heat-treatment of steel rails. J. BRUNNER (U.S.P. 1,929,346, 3.10.33. Appl., 11.6.32).—Treatment is as described in U.S.P. 1,882,115 (B., 1933, 712), quenching being effected on the head and ends only at >200°. B. M. V.

Production of [steel] alloys. W. B. ARNESS, Assr. to ALLOY RESEARCH CORP. (U.S.P. 1,932,252, 24.10.33. Appl., 15.8.31).—Steel scrap is melted and refined in an arc furnace, and the slag is removed and replaced by a very basic slag into which is fed a mixture of the ore or oxide of the metal to be alloyed with the steel and an excess of reducing agent containing Si, e.g. ferrosilicon. A. R. P.

Oxidation-resistant bimetal. H. SCOTT, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING CO. (U.S.P. 1,929,655, 10.10.33. Appl., 17.7.31).—Cr steels of different thermal expansion suitable for thermostats etc. comprise (the figures for the high-expansion alloy being given first): Cr 2.0–9.0, 8.0–23.0; Ni 18.0–25.0, trace; Si 0.1–2.0, 0.1–3.2; Mn 0.4–2.0, 0.2–1.0; C approx. 0.47, 0.10–0.45; Fe remainder in each case. B. M. V.

(A) Apparatus for roasting sulphide ores. (B) **Roasting zinc sulphide ores.** A. L. J. QUENEAU (U.S.P. 1,929,713 and 1,930,370, 10.10.33. Appl., [A] 30.10.30, [B] 25.10.29).—(A) In the roasting of ZnS ores in a multiple-hearth furnace the temp. in the lower hearths (*I*) is raised to 900° to decompose ZnSO_4 by passing a hot air- SO_2 mixture (*II*) from a S burner over (*I*). (B) (*II*) is obtained by passing preheated air over

molten S the combustion of which raises the gas temp. to >1200°. A. R. P.

Zinc-base die-casting alloy. J. R. FREEMAN, JUN., Assr. to AMER. BRASS CO. (U.S.P. 1,930,341, 10.10.33. Appl., 29.8.31).—The alloy contains 0.5–15 (2–6)% Cu and the remainder Zn of greater purity than 99.98%. A. R. P.

[Precious metal] dental alloy for cast dentures. R. R. BAYES, Assr. to BAKER & CO., INC. (U.S.P. 1,930,119, 10.10.33. Appl., 4.2.33).—Claim is made for an alloy of Au 10–20 (15), Pd 20–30 (24), Ag 40–50 (45), Cu 11–18 (15), and Zn 1–4 (1%). A. R. P.

Treatment of wire. C. D. JOHNSON, Assr. to JOHNSON STEEL & WIRE CO., INC. (U.S.P. 1,928,727, 3.10.33. Appl., 24.2.32).—The wire is flexed a no. of times in both directions, resulting in decreased yield point (*Y*) and increased elongation, *Y* is then restored by quick annealing at 430–700°. B. M. V.

Composition [inhibitor] for selectively controlling metal-pickling baths. J. H. GRAVELL (U.S.P. 1,932,015, 24.10.33. Appl., 2.4.31).—Claim is made for a briquette (*I*) consisting of a 4:6:10:1 mixture of an inhibitor, e.g., di-*o*-tolylthiourea, a foaming agent (evaporated waste sulphite-cellulose liquor), NaCl, and an effervescing material (Na_2CO_3), which promotes disintegration of (*I*) when dropped into the acid pickling bath. A. R. P.

Forming [rolling] of aluminium. R. T. WHITZEL, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,931,912, 24.10.33. Appl., 8.4.30).—The metal is passed through rolls at 500°, then through a quenching chamber supplied with H_2O sprays, and finally through cold rolls; the procedure ensures uniform structure throughout the piece. A. R. P.

Metal-working. [Drawing of aluminium wire.] W. T. ENNOR, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,931,913, 24.10.33. Appl., 19.11.32).—The wire is passed through a series of dies at a temp. < the recrystallisation point and, before reaching the finished size, is passed through a cooling chamber and then cold-drawn to the desired diam. A. R. P.

Dyeing oxidised aluminium. L. W. EBERLIN, Assr. to EASTMAN KODAK CO. (U.S.P. 1,929,486, 10.10.33. Appl., 15.9.31).—The metal is anodically oxidised in an org. acid bath ($\text{H}_2\text{C}_2\text{O}_4$) and the oxide film (*I*) is dyed in a bath containing 1% of dye and sufficient (5 g. per litre) of CaCO_3 to neutralise the acid retained in (*I*). A. R. P.

Corrosion-resistant, age-hardenable aluminium composite metal. K. L. MEISSNER (U.S.P. 1,927,945, 26.9.33. Appl., 6.9.32. Ger., 12.9.31).—Claim is made for duralumin (*I*) (Cu 4–4.5, Mg 0.5–0.7, Mn 0.3–0.6%) coated on both sides with a rolled-on layer of an Al alloy containing 0.5–3% Cu and <0.6% Mn; thermal treatment is similar to that of (*I*). A. R. P.

[Aluminium] solders. (A–C) C. C. CALLIS, (A, B) R. B. DEER, and (c) E. J. KRATZ, Assrs. to ALUMINUM CO. OF AMERICA (U.S.P. 1,926,853–5, 12.9.33. Appl., 30.7.32).—The solders consist of (A) Sn 66–69, Zn 27.5–28.5, and Al 2.5–6.5%, (B) Sn 47.5–49, Zn

47.5—49, and Al 2.5—5%, and (c) Sn 37—45 (44), Pb 37—45 (44), Zn 9—21 (10), and Al 1—5 (2)%.

A. R. P.

Aluminium solder. F. S. SMITH, Assr. to J. WEBSTER (U.S.P. 1,927,052, 19.9.33. Appl., 8.4.33).—An alloy of Zn 24, Sn 12, Hg 4 pts., and Al 1 pt. is claimed. No flux is necessary when soldering Al.

A. R. P.

Aluminium-manganese alloy. T. W. BOSSERT, Assr. to ALUMINUM Co. OF AMERICA (U.S.P. 1,928,641, 3.10.33. Appl., 19.6.30).—An Al alloy with a high resistance to corrosion and a fine-grained structure contains 0.75—3 (1—1.5)% Mn and 0.2—0.5 (0.25)% Mg.

A. R. P.

Addition agent [for cadmium plating]. R. TEATS and R. L. HASCHE, Assrs. to AMER. SMELTING & REFINING Co. (U.S.P. 1,931,854, 24.10.33. Appl., 3.12.28. Renewed 16.2.32).—Claim is made for the process of plating articles with Cd from a CdSO_4 bath containing a small quantity of saponin and starch to form a foam with the gas evolved at the insol. anode.

A. R. P.

Leaching [of ores].—See I.

XI.—ELECTROTECHNICS.

Current-conducting properties of slags in electric furnaces. I. A. WEJNARTH (Trans. Electrochem. Soc., 1934, 65, 319—329).—Silicates of the series $2\text{RO}, \text{SiO}_2$, $4\text{RO}, 3\text{SiO}_2$, and RO, SiO_2 , where R is Fe + Ca in various proportions, were prepared by fusion of the pure oxides under N_2 in an electrically heated crucible of pure Fe, and their electrical conductivity, κ , was measured at 1344—900°, using a.c., with the crucible as one electrode and an adjustable vertical electrode just dipping into the silicate melt. With fall in temp. κ decreases regularly to the f.p., where there is a sharp drop. Silicates rich in Fe have higher conductivities, and retain an appreciable val. of κ even in the solid state: increasing proportion of Ca lowers κ progressively. The variation of κ with temp. for the various compositions is shown graphically, and f.p.—composition curves are recorded for the three series of silicates.

H. J. T. E.

Development and application of synthetic liquid dielectrics. F. M. CLARK (Trans. Electrochem. Soc., 1934, 65, 193—204).—For use in condensers pentachlorodiphenyl has advantages over mineral oils in that its dielectric const. is higher (about 5), thus decreasing the bulk of the condenser; its dielectric strength is higher, both for the substance alone and for paper impregnated with it; it yields less acid products and no sludge under severe oxidising conditions; it is non-inflammable, and, in particular, when subjected to arcing it not only yields less gas but the gas which is produced (mainly HCl) is non-inflammable. These advantages are preserved and the disadvantages of high viscosity and relatively high solidification point (about 10^5) are removed by admixture with $\text{C}_6\text{H}_5\text{Cl}_3$. The possibilities of such dielectrics in place of mineral oils in electrical apparatus is discussed.

H. J. T. E.

Voltage-time study of dielectric failure. H. E. MASON (Trans. Electrochem. Soc., 1934, 65, 295—307).—The relation between the time required for the breakdown

of "rubber compound" insulation on Cu wire and the impressed voltage is given by $t_1/t_2 = (V_2/V_1)^n$, where n is 11—16. High dielectric strength does not necessarily mean long life of the insulation, nor does the proportion of rubber in the "compound," its tensile strength, sp. insulation resistance, or dielectric const. have any deciding effect on the voltage-time life ratio.

H. J. T. E.

Cell for routine electrical measurements on insulating oils. W. G. HORSCH and L. J. BERBERICH (Rev. Sci. Instr., 1934, [ii], 5, 194—196).—A guard-ring cell, designed to meet a set of enumerated requirements, is described, and its application to power-factor measurements is discussed.

N. M. B.

Development of gaseous-conduction lamps. L. J. BUTTOLPH (Trans. Electrochem. Soc., 1934, 65, 205—218).—Recent developments are reviewed with special reference to the utilisation of gases and vapours not previously adaptable, the provision of glass of suitable character for the tubes, and the relative energy distribution and relative luminosity of various types.

H. J. T. E.

Automatic and continuous determination of oxygen in technical gases by means of gas cells. A. PARIS (Chim. et Ind., 1934, 31, Spec. No., 253—257).—Relative measurements accurate to 1—2% can be obtained with depolarising cells.

C. W. G.

Regularigraph for yarn.—See V. **Determining carbonate-caustic ratio.**—See VII. **Determinations on optical glass. Removing impurities from materials.** **High-frequency furnace linings.**—See VIII. **Pickling high-speed steel. Determining Mn in chrome-steel. Corrosion of Pb-Sb [electrodes]. Cr-, Cd-, and Ni-plate. Electrodeposits of Cu-Ni-Zn alloy.**—See X. **Determining p_{H} of soils, soil acidity, and nutrients in soils.**—See XVI.

See also A., June, 600, **System Al-Al₂O₃-Al₄C₃. 602, Influence of magnetic fields on electrolysis. 609, Determining the val. of a gas for W lamps. Prep. of NaBO₃. Electrodeposition of Ni from alkaline electrolytes. 610, Oxide coating of Al. Alkaline storage battery. 617, Radioactive methods of research. 621, Analysis of alloys of Sb, Cu, and Sn. 622, Determinations of Sn, Bi, and Au. Separation of Pt metals. Determinations of Pd. 623, Portable ultra-violet intensity meter. 624, Metal-contact photo-cell. Valve-voltmeter for p_{H} measurements. 625, F prep. cell. 650, Electrolysis of BzOH and derivatives.**

PATENTS.

Electrode positive-column lamp. C. H. THOMAS, Assr. to WESTINGHOUSE LAMP Co. (U.S.P. 1,932,025, 24.10.33. Appl., 28.12.29).—The electrodes consist of Th cylinders coated externally with ThO_2 or ZrO_2 , or alternatively of W cylinders coated internally with Th and externally with ThO_2 .

A. R. P.

Electron tube. C. J. R. H. VON WÉDEL, Assr. to ELECTRONS, INC. (U.S.P. 1,929,661, 10.10.33. Appl., 31.8.28).—The cathode is coated with a compound of an alkaline-earth metal, and the grid with a compound of

a metal the oxyacid of which is at least as acid as that of Pt; *e.g.*, the coating may be an oxide of W or Pt.

B. M. V.

[Cathode for valve] resistance. C. ZWIKKER, Assr. to RADIO CORP. OF AMERICA (U.S.P. 1,931,974, 24.10.33. Appl., 9.12.29. Holl., 5.1.29).—An electron-emitting cathode operating at 1000° abs. consists of an alloy (I) of Zr with a small quantity of Al and is coated with BaO or mixtures thereof; (I) has a negative temp. coeff. of resistance and a very high sp. heat in the working range.

A. R. P.

Manufacture of getters. W. W. TRIGGS. From KING LABORATORIES, INC. (B.P. 410,614, 18.5.33).—Getter material, *e.g.*, Ba-Al alloy, supplied at spaced intervals along a ribbon, *e.g.*, of Ni, is die-pressed into the base of an indentation in a support. J. S. G. T.

Carbonising coal.—See II. Dielectric media.—See III. Insulating rubber compound.—See XIV. Antiseptic.—See XX.

XII.—FATS; OILS; WAXES.

Comparative study by fractional crystallisation of the fatty acids of lard, horse fat, and a low-titer tallow. G. WOLFF (Chim. et Ind., 1934, 31, Spec. No., 885—888).—Fractional crystallisation of the acids from aq. EtOH solution affords a rough separation of solid and liquid acids, which may be useful for comparative purposes; in carrying out such crystallisations it is essential to avoid all traces of Ca soaps. E. L.

New synthetic methods in the manufacture of fatty materials. H. H. FRANCK (Chim. et Ind., 1934, 31, Spec. No., 889—893).—German developments concerning the production of higher aliphatic alcohols etc. and synthetic fats from refinery (Wecker process) fatty acids are briefly reviewed. E. L.

Measurement and description of acidity in highly acid fatty materials [oleines]. L. MARGAILLAN and E. ALLEMAND (Chim. et Ind., 1934, 31, Spec. No., 894—895).—Results for free fatty acids determined (1) gravimetrically (*i.e.*, 100—neutral fatty material), and (2) "as oleic acid" by calculation from the acid val., differ by $\geq 5\%$ in the case of oleines and fatty acids from those with ordinary fats (including palm oil), other than fats of the coconut group. E. L.

Use of trichorobenzene in analysis of graphite greases. F. M. BIFFEN (Ind. Eng. Chem. [Anal.], 1934, 6, 169).—Ca stearate and other heavy-metal soaps are separated from C by extracting with C₆H₃Cl₃. E. S. H.

Freezing of castor oil. M. BOURDIOL (Chim. et Ind., 1934, 31, Spec. No., 909—915).—Virgin castor oil can be kept liquid indefinitely at about 0° to -5°, and may not solidify if rapidly cooled to -20° to -80°; if it is chilled for a few hr. at -15° to -20°, and then stored at 0°, crystals are gradually formed so that the oil becomes pasty, even though it may have been liquefied by heating to -15° after the first chilling. Heating to $\leq 60^\circ$ is necessary to restore the original stability of the oil. Dust particles in, *e.g.*, used oils also act as crystallisation nuclei. Pure triricinolein (like castor oil) can be frozen to a hard solid by storage at -20° for 10 days;

it forms an anisotropic liquid at about 3°, becoming an isotropic melt at about 11°. For commercial purposes an oil destearinated at 8° is useful. E. L.

Chinese arachis [seeds] and their oils. L. MARGAILLAN and H. REYBAUD (Chim. et Ind., 1934, 31, Spec. No., 896—897; cf. following abstract).—The I val. and *n* of recent commercial arachis oil tends to be high on account of the appearance on the market of new varieties of Chinese arachis seeds. The kernels have a flat flavour, are relatively low in N, and difficult to press. Three samples of kernels, containing 42.1—43.6% of oil, yielded cold-pressed oils having d^{20} 0.914—0.9146, n^{20} 1.4710, acid val. 1—3, sap. val. 194.5—196.5, I val. 97—98.5, I val. of liquid acids 115—120, unsaponifiable matter 0.36%, arachidic acid 3.6—3.7% (of the oil?), lignoceric acid 0.7—0.8%. E. L.

Arachis [seeds] of the Argentine Republic and their oils. L. MARGAILLAN and R. FAVIER (Chim. et Ind., 1934, 31, Spec. No., 898; cf. preceding abstract).—The pods are large and frequently contain three kernels each (oil content 43.5% of the kernel). Samples of oil obtained (a) by cold-pressing, (b) by extraction with light petroleum, had, respectively, d^{20} 0.9187, 0.9171; n^{20} 1.4717, 1.4718; acid val. 0.7, 1.9; I val. 103, 101. E. L.

Pyrolysis of oil from the physic nut, oil of *Jatropha curcas*, L. [Miles.]. M. T. FRANÇOIS and S. DROIT (Bull. Soc. chim., 1933, [iv], 53, 1564—1572; cf. B., 1933, 1066).—Pyrolysis of this oil (I) at 300—340°/25—70 mm. gives H₂O, CH₂:CH·CHO, neutral and acidic (II) products (44—66% in all). (II) include much palmitic (III), unsaturated aliphatic, and cycloparaffin acids. Oleic acid at 180—200° and linoleic acid at 90—100°/25—30 mm. give neutral products and a similar mixture of acids, but no (III). Pyrolysis of the Na salts obtained by hydrolysis of (I) at 250° gives unsaturated hydrocarbons. R. S. C.

Hydrogen-iodine value of Chinese wood [tung] oil and its hydrogenation products. H. I. WATERMAN, W. J. C. DE KOK, and C. VAN VLOROP (Chim. et Ind., 1934, 31, Spec. No., 899—901; cf. following abstract).—The (Wijs) I val. cannot be used to follow the progress of hydrogenation (*H*) as there are considerable differences between the true H-I val. (*i.e.*, I equiv. of H₂ absorption) and the Wijs val., even when the latter is determined by using 7 days' exposure and 500—1200% excess of I; the differences decrease as the oils become saturated with H₂. E. L.

Hardening [hydrogenation] of Chinese wood [tung] oil. H. I. WATERMAN and C. VAN VLOROP (Chim. et Ind., 1934, 31, Spec. No., 902—908).—The progress of hydrogenation (*H*) of tung oil (I) varies according to conditions as in the case of other oils, low temp. and high pressures favouring the production of saturated acids at an early stage. For products of like I val., the sp. refraction is higher when *H* is conducted at low temp. (I) can be hydrogenated at 50—180° without any polymerisation. E. L.

Stand oil. J. VAN LOON (Verfkroniek, 1934, 7, 142—145).—A lecture. D. R. D.

Fatty oils. R. ZSCHUNKE (Diss., Leipzig, 1931; Bied. Zentr., 1934, A, 4, 443).—High vals. obtained by Scheiber and Klinger's method for determining wood oils in varnishes etc. are probably due to partial transformation during heating of linseed and poppy-seed oils into substances resembling wood oils. This rearrangement of double linkings in the glycerides is catalysed by I, Br, ZnCl₂, and certain metals and also occurs with the free acids. The extent of the change is a function of the temp. employed. A. G. P.

Semi-quantitative modification of the elaidin test. H. N. GRIFFITHS and T. P. HILDITCH (Analyst, 1934, 59, 312—318; cf. A., 1932, 1111).—Trielaidin (I) is quantitatively separated from triolein (II) by crystallisation from COMe₂. Only 30% of the calc. (I) is obtained from (II) by the Poutet reaction. The % of mixed elaidins (III) obtained from various oils (IV), their m.p., I val., and sap. val., are given, and correlated with the composition and drying properties of (IV). Indications of adulteration of olive oil with (IV) are given by deviations in the properties of (III) from the mean vals. for (III) from pure oil. E. C. S.

Composition and vitamin-A value of some New Zealand fish-liver oils. F. A. DENZ and F. B. SHORLAND (New Zealand J. Sci. Tech., 1934, 15, 327—331).—The vitamin-A content, sap. val., I val., colour, and unsaponifiable matter in the liver oils of groper, bass, ling, English hake, eel, and cod are recorded. The vitamin-A potency of the oils was not appreciably affected by the method of extraction. Notably high vals. were obtained with bass and groper oils. A. G. P.

Arsenic content of American cod-liver oil. A. D. HOLMES and R. REMINGTON (Ind. Eng. Chem., 1934, 26, 573—574).—The average As content was 2.6 ± 0.13 p.p.m., which is of the same order as for marine vertebrate fish. H. G. R.

Determination of inorganic salts in sulphonated oils. R. HART (Ind. Eng. Chem. [Anal.], 1934, 6, 220—223).—Alkali sulphates and chlorides in sulphonated oils (I) are determined by dehydrating (I) mixed with an equal wt. of oleic acid and a little NaOH (soap prevents charring during dehydration) by heat, dissolving the residue in CCl₄ at 50—55°, and collecting the insol. salts. Titration methods are detailed for determination of NaOAc and Na₂CO₃, alone or together, in (I). R. S. C.

Determination of paraffin [wax] or ceresine in beeswax. M. VIZERN and GUILLOT (Chim. et Ind., 1934, 31, Spec. No., 932—934).—The wax (10 g.) is saponified with 50 c.c. of EtOH-KOH (40 g. KOH/litre), and the product is evaporated, mixed with 2 g. of NaHCO₃ and 50 g. of sand, dried at 105°, and powdered. After extraction by percolation with five 25-c.c. portions of light petroleum, the powder is again dried, powdered and re-extracted with three 25-c.c. portions, the process being repeated with a further two extractions. The united extracts are kept at 15—18° for 1 hr., filtered if necessary, evaporated, and weighed. 12 samples of various beeswaxes yielded 16.9—21.8% of extract (*E*; i.e., hydrocarbons and some alcohols). Addition of extraneous hydrocarbons *H* can be excluded if *E* is < 17%,

and suspected if *E* is > 22%. In the latter case *E* is acetylated, and *H* insol. in Ac₂O are separated and measured volumetrically (aver. *d* 0.73) or weighed (convenient apparatus described). *H* ranged from 14.5 to 16.1% (aver. 15.5%) of the wax for the 12 samples and had I vals. 18.9—28.1. 17% (max.) for *H* and 18 (min.) for the I val. of *H* are suggested as criteria of adulteration. E. L.

Decolorising clays.—See II. Dyed Viscacelle [for preventing rancidity].—See VI.

See also A., June, 631, Prep. of elæostearic acids from tung oil. 637, Unsaponifiable fraction of spinach fat. 676, Eel fat. Menuke oil. 697, Fat produced by *Penicillium javanicum*. Lipins of *Aspergillus sydowi*. 703—8, Vitamins (various). 710, Coffee-bean oil.

PATENTS.

Drier for oils. H. A. BRUSON (U.S.P. 1,927,867, 26.9.33. Appl., 27.7.29).—The driers consist of the heavy-metal (Co, Pb, or Mn) salts of derivatives of a toluic acid, in which one H of the Me group has been replaced by alkyl, aryl, aralkyl, or a polynuclear aromatic group, or by such systems as Ph₂O, carbazole, CH₂Ph₂, chrysene, etc. The salts are conveniently prepared by reducing the appropriate (*o*-)acylbenzoic acid, which in turn is formed by condensing a suitable org. compound with phthalic anhydride in presence of AlCl₃ and hydrolysing the product. The hydrogenation may be extended to the side-chain or toluic nucleus if desired. E. L.

Production of storable mixtures of lecithin and oil. NOBLEE & THÖRL G.M.B.H. (B.P. 410,357, 28.7.33. Ger., 21.11.32, 13.12.32, 8.3.33).—A lecithin-oil mixture which is stable on storage is obtained by dehydrating fresh soya-bean sludge with glycerol (I), thick sugar syrup, capillar syrup, etc., especially with a solution (*d* 1.35—1.4) of sugar in anhyd. (I). E. L.

Manufacture of high-melting wax products. W. SCHRAUTH (U.S.P. 1,928,438, 26.9.33. Appl., 1.6.31. Ger., 15.2.30).—A product resembling carnauba wax consists of hydrogenated castor oil (I) (80 pts.) and hydrocarbon derivatives (20 pts.), m.p. < 70° (especially the oxy-, OH-, or Cl-derivatives), e.g., behenone, montanone, ceryl palmitate, naphthalene tetrachloride; a small amount (e.g., 3 pts.) of a solvent may be added, and glycol or glycerol esters of λ-hydroxystearic acid may replace (I). E. L.

Solvent extraction.—See I. Fatty acid derivatives of mineral oil.—See II. Wetting etc. agents.—See III. Drying oleaginous seeds.—See XIX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Metallic soaps in paint and varnish industries. T. RUEMELE (Paint and Var. Prod. Man., 1934, 10, No. 6, 26).—A review of their uses. D. R. D.

Bactericidal paints and a new method for their preparation. M. J. VALLÉE (Chim. et Ind., 1934, 31, Spec. No., 962—968).—Oil paints do not possess any antiseptic or inhibitory power towards bacteria. Many antiseptics which are very active *in vitro* are almost useless when introduced into paints. A

gelled emulsion of a mixture of appropriate insol. antiseptics, however, is immediately miscible with all types of paint and does not impair their ordinary qualities, but exercises a powerful bactericidal action in the paint. The proportion of antiseptic used is approx. 2% (or 5% of emulsion). D. F. T.

Preparation of chrome-yellow. E. SCHÜRMANN and K. CHARISIUS (Farben-Chem., 1934, 5, 134—135, 165—169).—Pb-chromes can be prepared directly from CrCl_3 , K Cr alum (I), and other Cr^{III} salts and a Pb compound. *E.g.*, $\text{Ca}(\text{OCl})_2$ is made into a paste with H_2O , the mol. proportion of Na_2CO_3 is stirred in, and the mixture added in a thin stream to an approx. 10% solution of (I); the product is heated to 50—60° to complete the oxidation and a solution of the Pb salt or a slurry of finely-divided PbO is introduced. The pptd. pigment is approx. $\text{PbCrO}_4 \cdot 2\text{PbSO}_4$ and its cryst. particles are much smaller than those of the usual Pb-chrome (photomicrographs given). Cl_2 , bleaching powder, and KMnO_4 may also be used as oxidising agents. The reactions are discussed. S. M.

Darkening of chromium oxide green at high temperatures. J. F. SACHER (Farben-Chem., 1934, 5, 49—50; cf. B., 1934, 156).—Several Cr_2O_3 greens prepared by different methods become permanently grey or brown when strongly heated, due to formation of a dark cryst. form (cf. lit.). Comparatively soft leaves of Cr_2O_3 are obtained when a stream of dry Cl_2 is passed over neutral K_2CrO_4 at a red heat; at higher temp. very hard, small crystals are produced. S. M.

Cause of yellow spots on canvas painted with chrome-greens. A. J. SNYDER (Ind. Eng. Chem., 1934, 26, 579—580).—Chrome-greens are destroyed by the production of free alkali by amine- or NH_3 -forming bacteria which derive their food from the H_2O -sol. N products present in the canvas. The correct H_2O content and temp. are the important factors governing mould growth, which may be retarded by painting the canvas on both sides. D. A. C.

[Anti-rust paints containing] basic lead chromate [and red lead]. II. ANON. (Paint and Var. Prod. Man., 1934, 10, No. 6, 18—20).—A review of work on the rust-inhibitive properties of red-Pb paints, with special reference to the influence of the composition and physical state of the pigment. D. R. D.

Resistance to cheese of printing colours. W. KÜHN (Farben-Chem., 1934, 5, 205—207).—Printed matter on cheese wrappers is subject to the action of NH_2 - and free volatile acids, NH_3 , and NH_4 compounds. The linoxyn (I) in the dried film is attacked by the acids and may be saponified by the NH_3 ; the pigment particles are thereupon liberated. In addition the fatty matter of the cheese may exert a solvent action on (I), and ripe Camembert (II) and Limburger (III) evolve H_2S which discolours any Pb pigments present. The action of 10 sorts of cheese (acid vals. tabulated) on various pigments was investigated by (a) direct contact with the print, and (b) subjecting the cheese to steam and testing the action of the distillate, which was usually acidic. The increasing order of attack was: (1) hard cheeses of comparatively low acid val.,

e.g., Emmenthaler; (2) soft cheeses of higher acid val., *e.g.*, Gervais; (3) those which may act in an acidic or alkaline manner, viz., (II), (III), Harzer, and frequently, Roquefort; (4) Kräuter cheese, in the prep. of which the fermentation of the butter acids plays a more important part. S. M.

Micrography of pigments. Black pigments. H. WAGNER and G. HOFFMANN (Veröff. Fachaussch. f. Anstrichtech., 1934, No. 9; Farben-Ztg., 1934, 39, 549—551).—A classified list of 31 natural and manufactured black pigments is given with their chemical compositions, *d*, microscopical appearance, particle size, settling properties, undertones, effects on flow and drying of paints, oil absorption, and tendency to promote or retard corrosion. Simple tests are given for their recognition. G. H. C.

Chlorinated rubber [for lacquers]. L. ROSENTHAL and G. SCHULTZE (Farben-Chem., 1934, 5, 53—56).—Chlorinated rubber (I) lacquers, when properly prepared from the most stable products, possess good durability and resistance to H_2O , Cl_2 , alkalis, and acids, but are not heat-resistant. For outside exposure plasticisers are added, *e.g.*, drying oils (II), chlorinated Ph_2 , $(\text{C}_6\text{H}_4\text{Me})_3\text{PO}_4$. For protecting metals 25—75%, and for wood > 150%, of linseed oil (III) [calc. on wt. of (I)] is added; even with 100% of (III) the film is hard and mechanically strong. The disadvantage of adding (II) is that the film remains sensitive to H_2O until drying is complete. In consequence of the action on (I) of ultra-violet light only pigmented films are of practical use; TiO_2 , Cr_2O_3 -green, Fe oxide pigments, and graphite are recommended. For H_2O immersion or prolonged exposure to moisture the lacquers should not contain saponifiable matter or synthetic plasticisers, otherwise blistering ensues. With the exception of "Alkydal" products, addition of resins is generally without improvement. Stability tests for (I) are described; exposed films slowly lose a small proportion of Cl_2 and become insol. S. M.

Influence of solvent on viscosity of oil varnishes. C. BOLLER (Farben-Chem., 1934, 5, 126—127).—The Engler apparatus used to obtain the η data which were criticised by Scheiber (B., 1934, 210) was fitted with a special 5-mm. delivery exit, whereas the normal width is only 2.8 mm. It is suggested that this explains the different results. Further measurements have been made of the abs. η of stand oil dispersed in equal vols. of 7 solvents in a viscosimeter provided with a horizontal capillary tube; the η of the solution divided by the η of the pure solvent gives a const. S. M.

Application of iodine values in varnish analysis. W. RUZICZKA (Farben-Chem., 1934, 5, 85—88).—The use of 2 c.c. of Et_2O as solvent instead of 10 c.c. of EtOH (cf. B., 1927, 228) was found to be satisfactory for the rapid determination of I val. of (a) linseed, tung, and oilcica oils, (b) several varnishes and enamels, and (c) French, Russian, and Austrian turpentine. For (a) the data were slightly > with EtOH and in good agreement with the Hanus results; the Hübl figures were lower. For (b) the I val. is mainly dependent on the amount and origin of (c) used as diluent; the

relative proportions of resin and oily matter present could not be determined, but the I val. of the total varnish constituents can be calc. (formula given) from the data obtained separately for the varnish and the diluent. The "Plussäure" vals. (B., 1927, 371) increased, within certain limits, with increase in the resin content if the amount of (c) present was const., but the results were reduced by any active ZnO present. They were invariably higher if, instead of adding KIO₃ after the I val. determination and titrating immediately with 0.1N-Na₂S₂O₃, the reaction mixture was treated with KIO₃ and excess of 0.1N-Na₂S₂O₃ and back-titrated after ½ hr. with 0.1N-I. S. M.

Influence of synthetic resins in varnish formulation. E. FONROBERT (Farben-Ztg., 1934, 39, 548—549, 577—579). G. H. C.

Adhesion of protective films. P. NETTMANN (Farben-Chem., 1934, 5, 45—48, 88—90, 129—130).—The protective film (*F*) consists of (a) an upper and (b) a lower layer in contact with the air and covered surface (*S*), respectively, and (c) a middle layer. The mechanism of adhesion is discussed with particular reference to the effects of irregular distribution of the pigment particles in the oil in (c) and to the provision of anchoring points by the mol. structures of *F* and *S*. Adhesion is also dependent on cohesive forces and on the distribution of energy in the layers. Apparatus for measuring the wetting power of a substance, the adhesiveness of a film, and atm. R.H. are outlined. S. M.

Resin distillation and products. H. HADERT (Farben-Chem., 1934, 5, 130—134).—A detailed description is given of the distillation of pine resins, the apparatus, and the separation and uses of the products. S. M.

Darkening of shellac solutions. ANON. (Paint and Var. Prod. Man., 1934, 10, No. 6, 11).—The darkening of shellac varnish by reaction with the metal parts of plant or storage containers may be prevented by adding ¼ oz. of H₂C₂O₄ (I) or ¼ oz. of borax and 2 fluid oz. of glycerin to 1 gal. of varnish. (I) also serves to bleach varnish which has already become discoloured. The use of terne-plate (Pb-coated steel) containers is recommended. For most purposes, it is essential that shellac should contain < 5% of wax, to give the necessary "body." D. R. D.

Some chemical aspects of phenol-formaldehyde resins. G. DRING (Chem. & Ind., 1934, 417—424).—A historical account of the development of such resins, a survey of explanatory theories of the course of such condensations, and a discussion of the mol. magnitude of the resins is presented. Riley's apparatus for m.-p. determinations is described. E. L. H.

Important synthetic resins and the possibility of skin diseases. F. PABST (Farben-Chem., 1934, 5, 127—128).—The cases reported by Meyer (B., 1934, 156) are attributed to extraordinary sensitiveness of the sufferers to PhOH, CH₂O, or their reaction products; no general precaution is necessary. S. M.

Testing of printed linoleum. A. I. KOGAN and P. A. SIKAR (Farben-Chem., 1934, 5, 50—53).—The suitability for immediate use of printed linoleum (I),

after being heated under various conditions, was determined by measuring the loss in wt. (*L*) sustained through mechanical rubbing with a prepared emery stone (machine described). At 40—45° min. *L* was observed with 5 hr. heating, but this is attributed to a smoothing effect on the rubbing stone of soft particles which fill the interstices; after 18 days' heating no further rise in *L* took place. At 100° min. *L* was obtained after 4 hr., and this was comparable with 11 days' heating at 40—45°. The resistance of various samples of (I) was considerably increased by supplementary heating for 4 hr. at 100°. Testing should not be delayed for > 2—3 days after drying. S. M.

Glycerol ethers as solvents.—See III. **Lake colours.**—See IV. **Painted wood.**—See IX. **Covering capacity of Al-bronze powder.**—See X. **Fatty oils [in varnishes].**—See XII.

PATENTS.

Preparation of composition of matter [varnishes] using China wood oil and cashew nut-shell liquid. V. A. RYAN, ASSR. to HARVEL CORP. (U.S.P. 1,927,220, 19.9.33. Appl., 14.5.27. Cf. U.S.P. 1,921,292; B., 1934, 464).—The gelling of tung oil (I) when heated is prevented by adding cashew nut-shell liquid (II). Gelled (I) can also be redispersed by heating with (II). The products can be used for varnishes; Cu oleate is added as drier. S. M.

Use of lactates in brushing lacquers. C. BOGIN, ASSR. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,927,539, 19.9.33. Appl., 2.10.31).—Nitrocellulose is dispersed in a lactic ester of a monohydric, aliphatic (C₃₋₅) alcohol (I) and a petroleum distillate (II) having evaporation rate slightly > that of (I). The quantity of (II) is adjusted so that it remains < the dilution ratio during drying of the film. S. M.

Making rosin size. J. A. DE CEW, ASSR. to PROCESS ENGINEERS, INC. (U.S.P. 1,929,577, 10.10.33. Appl., 10.7.29).—Molten rosin (4—10 pts.) is emulsified in a dil. aq. alkali (100 pts.) and the emulsion saponified by heating to a temp. < the b.p. S. M.

Sizing composition for paper or the like. E. J. JOHNSTONE (U.S.P. 1,929,115, 3.10.33. Appl., 29.11.29).—The m.p. of rosin size is reduced by the addition of > 30 wt.-% of the resin of refined tallol or of an oleaginous material derived from the Scandinavian tall pine. B. M. V.

Manufacture of shellac substitutes. J. SCHEIBER (U.S.P. 1,927,472, 19.9.33. Appl., 8.3.30. Ger., 21.11.27. Cf. B., 1933, 1021).—Unsaturated acids from a fatty oil, e.g., linseed, and a resin, e.g., Manila copal, containing resinolic acids, are separately chlorinated and the mixed products dechlorinated and converted into lactides by heating, preferably in presence of ZnCl₂. S. M.

(A) **Synthetic resin [from formaldehyde and ammonium thiocyanate].** (B) **Hardening urea [formaldehyde] condensation products.** A. M. HOWARD, ASSR. to TOLEDO SYNTHETIC PRODUCTS, INC. (U.S.P. 1,928,492—3, 26.9.33. Appl., [A] 7.7.30, [B] 26.9.30).—(A) CH₂O (2 mols.) and NH₄CNO (1 mol.) are condensed in aq. neutral or slightly alkaline solution;

the resinous product is dried, mixed with a CH_2O -fixing agent, e.g., urea, and hot-moulded. (B) A dry, fusible urea (1 mol.)- CH_2O (2 mols.) resin is mixed with sufficient resorcinol or other polyhydric phenol to reduce the CH_2O content to 60–64% and hot-moulded. S. M.

Manufacture of polymerisation products [of vinyl halides]. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 410,132, 7.11.32).—Aq. emulsions of vinyl halides together, if desired, with vinyl esters of carboxylic acids (up to C_4), prepared by the use of dispersing and/or emulsifying agents, e.g., Turkey-red oil, Na hydroxyoctadecanesulphonate, are polymerised at 35–80° > 30 atm. in presence of accelerators, preferably O carriers, e.g., H_2O_2 , and the polymerised products are treated with aq. NH_3 or alkali hydroxides. S. S. W.

Manufacture of plastic of high sulphur content. C. ELLIS, Assr. to ELLIS-FOSTER Co. (U.S.P. 1,927,929, 26.9.33. Appl., 22.4.29).— $\text{s-C}_2\text{H}_4\text{Cl}_2$ is heated for several hr. under reflux with an aq. solution of an alkaline polysulphide, e.g., Na_2S_x , and a phenol which has been made to react with S_2Cl_2 to give a product containing, preferably, 40–60% of combined S. The final product is kneaded under H_2O and may be deodorised by steam. S. M.

Plastic composition containing cellulose derivatives. J. F. WALSH, H. E. SMITH, and A. F. CAPRIO, Assrs. to CELLULOID CORP. (U.S.P. 1,927,143, 19.9.33. Appl., 12.5.30).— Me_2C , Et_2 , and Me Et phthalates are used to plasticise thick, e.g., photographic, films and plastic compositions of nitrocellulose; they also retard exudation of other plasticisers present. S. M.

Plastic material containing derivatives of cellulose. J. F. WALSH and A. F. CAPRIO (U.S.P. 1,930,069, 10.10.33. Appl., 24.7.30. Cf. U.S.P. 1,927,143; preceding abstract).—To prevent exudation of a plasticiser (I) from compositions of cellulose acetate or other org. cellulose ester, 4–20% [calc. on wt. of (I)] of a toluene-sulphonamide- CH_2O or other synthetic resin is incorporated. S. M.

Moulding composition of fibrous vegetable material and furfural[dehyde.] E. C. SHERRARD and E. BEGLINGER, Ded. to U.S.A. (U.S.P. 1,932,255, 24.10.33. Appl., 15.7.31).—Maple wood chips are hydrolysed in 3% H_2SO_4 for 45 min. at 120 lb./sq. in. steam pressure and the resulting fibre (100) is mixed with furfuraldehyde (5 pts.) and HCl (0.5 pt.) and cooked for 15 min. at 120° under high pressure to form a hard resinous mass. A. R. P.

Curing of pyroxylin plastic material. G. H. MURRAY, Assr. to NIXON NITRATION WORKS (U.S.P. 1,928,260, 26.9.33. Appl., 4.2.31).—The time required to cure pyroxylin is halved by an initial seasoning in H_2O or humid atm. at 32–54°. E. L. H.

Coating materials for preventing adhesion between contacting [bituminous] surfaces. J. H. YOUNG, and H. H. ROBERTSON Co. (B.P. 410,305, 28.3.33).—See U.S.P. 1,904,341; B., 1933, 1019.

Grinding paints etc. Filtering printing inks.—See I. Chrysene.—See III. Oxazine dye [pigments].—See IV. Colouring rubber.—See VI. Drier for oils.—See XII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Guayule rubber in tyres and tubes. Service tests in which the rubber was exclusively guayule. J. H. DOERING (Ind. Eng. Chem., 1934, 26, 541–543).—Motor-tyre covers and tubes were manufactured with guayule as the only form of rubber present. In service tests over 2 years with mileages up to > 10,000, the tubes behaved satisfactorily throughout; the best of the covers, however, gave only approx. 60% of the mileage expected from *Hevea* rubber tyres.

D. F. T.

Fibering of rubber. Time lag and its relation to rubber structure. J. D. LONG, W. E. SINGER, and W. P. DAVEY (Ind. Eng. Chem., 1934, 26, 543–547; cf. B., 1932, 273).—X-Ray experiments on the time lag in the development of the fibre structure in rubber stretched under different conditions indicate that, of the theories as to the possible structure of rubber, the view postulating a tangle of spiral or zig-zag mols. or mol. complexes is the most probable.

D. F. T.

Nature of action of organic accelerators for rubber vulcanisation. VIII. Special properties of organic accelerators. IX. Action of some organic bases on rubber sols. K. SHIMADA (J. Soc. Chem. Ind., Japan, 1934, 37, 126–127 B; 127–128 B; cf. B., 1933, 880).—VIII. Org. accelerators of the “second group,” e.g., diphenyl- or di-*o*-tolyl-guanidine, when added in increasing proportion to a 0.3 g./100 c.c. solution of rubber in C_6H_6 , cause a marked fall in η up to approx. 0.002 pt. per 100 c.c. with relatively little effect by further additions; this action is therefore attributed to disaggregation of rubber micelles rather than to mol. depolymerisation.

IX. The addition of $\text{C}_5\text{H}_5\text{N}$, piperidine, α -picoline, indole, and skatole to a 0.45 g./100 c.c. solution of rubber in C_6H_6 causes a change in η , the time- η curves being of the type given by accelerators of the “second group”; the relative influence falls in the order of the dissociation consts. of the bases in aq. solution. Acridine, however, causes a fall in η , the course of which resembles that for accelerators of the “third group”; its effect is attributed to mol. depolymerisation of the rubber followed by chemical reaction with the depolymerised mols.

D. F. T.

Chemical analysis of vulcanised rubber. A. R. MATTHIS (Chim. et Ind., 1934, 31, Spec. No., 935–942).—In a review of the customary methods, especially the treatment of rubber with an org. solvent of high b.p., for separation of the mineral fillers and C black from the rubber, the lengthy and unsatisfactory character of this procedure is indicated and stress is laid on the greater practical significance of the more rapid and more exact tests as to mechanical qualities and ageing. D. F. T.

Perfumes in the rubber industry. F. JACOBS (Chim. et Ind., 1934, 31, Spec. No., 957–961).—The subject of the suppression of the odour of vulcanised rubber or its masking by a stronger and more acceptable odour, making use of commercial deodorisers and reodorisers, is reviewed. Results are cited of experiments with some of these. Hot vulcanisation in moulds is least harmful to an incorporated perfume, whereas vulcanisation with S_2Cl_2 solution or vapour is most harmful. D. F. T.

Plantation studies of crude rubber variation.

G. A. SACKETT (Ind. Eng. Chem., 1934, 26, 535—543).—Various natural and artificial factors during the prep. of plantation rubber are known to influence its vulcanising behaviour. Previously such variation had been investigated mainly with rubber-S mixtures. It is now shown that, using a mixture accelerated with mercaptobenzthiazole, such factors as large-scale blending, and selection of anti-coagulant, coagulant, latex concn., coagulation period, drying temp., etc. have a similar influence to that observed with an unaccelerated rubber-S mixture. D. F. T.

X-Ray diffraction studies of the Bureau of Standards rubber fractions. G. L. CLARK, W. J. WARREN, and W. H. SMITH (Science, 1934, 79, 433—434).—The purified total hydrocarbon (B., 1933, 641) on stretching behaves exactly as rubber (I). The Et_2O -sol. fraction (II) on stretching gives no evidence of the crystal-fibre structure characteristic of stretched (I). The Et_2O -insol. fraction (III) produces the fibre structure at $> 100\%$ elongation. When vulcanised, (II) begins to show some evidence of crystal interferences when stretched $> 400\%$, showing that S has a structural effect, and (III) gives a fibre pattern at 250% elongation. L. S. T.

Synthesis of chloroprene rubber from acetylene.

N. D. ZELINSKI, N. S. KOZLOV, and R. S. SCHTER (Bull. Acad. Sci. U.R.S.S., 1934, 8, No. 1, 141—151).— C_2H_2 is absorbed by a mixture (I) of 1 kg. of CuCl , 400 g. of NH_4Cl , 100 g. of Cu, 30 g. of conc. HCl, and 425 g. of H_2O at 40—50°. Saturation is attained when about 50 g. of C_2H_2 have been absorbed (3 hr.); the mixture is kept at room temp. for 24 hr., and then distilled from an oil-bath at 140°, when the distillate contains 33% of $\text{CH}_2\text{:CH:C:CH}$ (II), and 67% of higher condensation products, amongst which $[\text{C}\cdot\text{CH}\cdot\text{CH}_2]_2$ and C_8H_8 were identified. The yield of (II) falls with prolongation of the time elapsing between saturation and distillation to 1% after 140 hr. (II) is obtained in 70% yield by passing C_2H_2 through (I) at 80°, and collecting the reaction gases in two receivers, cooled in ice and CO_2 -snow respectively; the liquid in the second receiver contains (II), C_2H_2 , and MeCHO. Chloroprene is obtained in 80% yield by shaking (II) with 70 g. of conc. HCl, 10 g. of CuCl , and 4 g. of NH_4Cl at room temp. during 3 hr. R. T.

Rubber-coated textiles.—See VI. Chlorinated rubber.—See XIII.

PATENTS.

Aqueous dispersions of rubber. L. KIRSCH-BRAUN, Assr. to FLINTKOTE CORP. (U.S.P. 1,929,499, 10.10.33. Appl., 15.11.30).—The rubber during or immediately after incipient attenuation, *e.g.*, by subsection to the action of kneading blades, is treated with a colloid, such as bentonite with or without dextrin, and H_2O , without previously mixing these to a paste, and the whole mass is kneaded until the rubber becomes dispersed, the proportion of H_2O being sufficient throughout to constitute the external phase. D. F. T.

Compounding of oil-resistant rubber stock.

D. J. BEAVER, Assr. to DOHERTY RESEARCH Co. (U.S.P.

1,930,437, 10.10.33. Appl., 27.2.31).—In compounding rubber for oil-resisting qualities, it is possible to secure an enhanced degree of resilience and to control the degree of this characteristic by incorporating before vulcanisation a “soft” C black with a minor proportion of “channel” C black. The total of both forms of C black is conveniently 50—137% (on the rubber). D. F. T.

Manufacture of compositions of or containing rubber or similar material. INTERNAT. LATEX PROCESSES, LTD., E. W. MADGE, and F. J. PAYNE (B.P. 410,271, 25.1.33).—A carded web or webs of fibres is/are treated with an aq. dispersion of rubber, preferably by spraying, coagulant means being provided on the two surfaces of a single web or on the two outermost surfaces of a no. of superposed webs; consolidation is then effected by the application of pressure. The products contain interlocked fibres and rubber. D. F. T.

Treatment of rubber surfaces. P. H. WATKINS, Assr. to NAUGATUCK CHEM. Co. (U.S.P. 1,928,988, 3.10.33. Appl., 3.12.31).—The surface of a rubber article, *e.g.*, one produced by a dipping process from latex, is rendered non-tacky by treatment with an aq. solution of an oxidising agent, *e.g.*, a halogen, dichromate, hypochlorite, permanganate, or H_2CrO_4 , and drying. D. F. T.

Preparation of rubber surfaces. W. C. GEER (B.P. 410,171, 10.11.32. U.S., 31.5.32).—A “rubber” surface, *e.g.*, the cover of a golf ball, is prepared so as to contain a colour stabiliser comprising a protein (glue), an alkaline-earth oxide or hydroxide, *e.g.*, MgO , a basic or org. salt of the alkaline-earth or alkali metals, *e.g.*, Mg or Na stearate, either singly or jointly and with or without urea. The surface is then treated with a halide of an amphoteric element, such as SnCl_4 . Surfaces so prepared retain their original colour for long periods. D. F. T.

Surface-treatment of articles containing gutta-percha, such as games balls. DUNLOP RUBBER Co., LTD., D. F. TWISS, and F. A. JONES (B.P. 410,436, 15.12.33).—The articles are treated with a H_2O -decomposable compound of a halogen with a non-metallic element other than S or B, or with > 1 non-metallic element including S, *e.g.*, an ethylene dichloride solution of PCl_5 or SOCl_2 . D. F. T.

Composition of matter [for reducing adhesive-ness of rubber]. E. H. GORSUCH and A. M. KINNEY, Assrs. to STANDARD OIL Co. of INDIANA (U.S.P. 1,927,066, 19.9.33. Appl., 15.6.27).—An emulsion containing $> 5\%$ of glycerol and 7—25% of mineral oil, together with H_2O , preferentially oil-sol. sulphonates of alkali metals (4%), and possibly also 1% of rosin soap, is used as a dressing for preventing the adhesion of rubber articles to moulding members, such as “air-bags,” during vulcanisation. D. F. T.

Manufacture of rubber compound. F. O. WOODRUFF, Assr. to H. H. BECKWITH (U.S.P. 1,929,544, 10.10.33. Appl., 9.4.30).—A non-sticky, resilient coagulum containing all the rubber (*e.g.*, 50 pts.) and other dispersed material is obtained by adding to the aq. dispersion of rubber successively a diluent including an emulsion of mineral oil (*e.g.*, 10—20 pts.) stabilised

with an emulsifying agent such as gum arabic (*e.g.*, 30–40 pts.) and a small proportion of an aldehyde (*e.g.*, 2 pts. of 40% CH_2O solution). Other compounding ingredients may be introduced with the oil emulsion. The coagulum may be washed, dried, milled, compounded, and vulcanised. D. F. T.

Vulcanisation of rubber. I. WILLIAMS and C. W. CROCO, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,928,773, 3.10.33. Appl., 4.3.32).—If COCl_2 is passed into a salt (*e.g.*, the Na or Zn salt) of mercaptobenzthiazole dissolved or suspended in a suitable liquid, *e.g.*, H_2O , EtOH, or C_6H_6 , dibenzthiazyl 1-SS'-dithiocarbonate, m.p. 134° (decomp.), is formed. This compound and also corresponding products from substituted mercaptobenzthiazoles have the accelerating characteristics of the parent compound at high temp., but are free from tendency to cause prevulcanisation. D. F. T.

Application and vulcanisation of an insulating [rubber] compound. A. N. GRAY and A. R. KEMP, Assrs. to BELL TELEPHONE LABS., INC. (U.S.P. 1,927,400, 19.9.33. Appl., 29.10.32. Can., 21.7.31).—An article, *e.g.*, an electrical conductor, is coated with an insulating material by extruding thereon a vulcanisable rubber compound at a temp. too low to cause prevulcanisation, *e.g.*, at 71° , and is then immediately raised to a temp. such as that corresponding with 170–175 lb. steam pressure, so as to cause substantially complete vulcanisation in < 1 min. D. F. T.

[Rubber] vulcanisation inhibiting process and compound. H. A. MORTON (U.S.P. 1,929,561, 10.10.33. Appl., 29.10.30).—Vulcanisation in presence of an ultraccelerator is retarded at room temp., but is not materially affected at higher temp., by incorporating in the compounded rubber a substance $(\text{BzO})_x\text{R}$, such as BzOH or a benzoate, *e.g.*, of Al, Ca, Fe, or Zn. Wetting the retarding agent with an oil facilitates its incorporation and increases its effectiveness. D. F. T.

Conversion of rubber into compositions suitable as (A) varnishes, lacquers, and moulding material, (B) thermoplastic moulding material. DUNLOP RUBBER CO., LTD., D. F. TWISS, and J. A. WILSON (B.P. 410,249 and 410,270, [A] 30.12.32, [B] 25.1.33).—(A) A solution of unvulcanised rubber with S, preferably $> 5\%$, in an org. solvent such as CCl_4 , is treated with Cl_2 until it becomes uniform; various additions, *e.g.*, oils, softening agents, and synthetic resins or varnishes, may be introduced before, during, or after chlorination. (B) The chlorination product which is pptd. in the earlier stages of (A) is separated instead of being converted into a sol. condition by more prolonged treatment. D. F. T.

[Antioxidant] treatment of rubber. L. H. HOWLAND, Assr. to NAUGATUCK CHEM. CO. (U.S.P. 1,930,051, 10.10.33. Appl., 31.3.30).—A compound of the structure $\text{CRR}'\text{R}''$, in which R and R' are diaminophenyl radicals, R'' is Ph, and R''' is H or OH, *e.g.*, tetra-aminodimethyltriphenylmethane, is applied to the preservation of rubber, preferably by incorporation before vulcanisation. D. F. T.

Preservation of oxidisable organic material such as rubber. B. F. GOODRICH CO., Asses. of D. CRAIG

(B.P. 410,274, 30.1.33. U.S., 10.6.32).—Diarylamines with < 1 aliphatic hydrocarbon group above C_2 substituted in the aromatic nucleus, *e.g.*, *p*-isopropyl- or *pp'*-*di*tert.-butyl-diphenylamine, are effective anti-oxidants for rubber. D. F. T.

Leaching [vulcanised] material.—See I. Recovering solvents.—See III. Rubber-repellent paper.—See V. Colouring rubber.—See VI.

XV.—LEATHER; GLUE.

Drying of East African [raw] hides with reference to the prevention of blister. Report by the Imperial Institute Advisory Committee on Hides and Skins. (Bull. Imp. Inst., 1934, 32, 41–109).—Less putrefactive damage (*P*) was observed in raw hides (*H*) prepared in the dry season than in those prepared in the wet season. Many of the latter were maggot-eaten or badly cured. Greater *P* was produced by delay in drying *H* after they had been flayed. Less *P* was produced if fat and flesh were removed from *H* before drying, but there was increased damage from gouging. Least *P* and blister were shown by *H* dried in the shade, though the results were nearly as good when *H* were exposed to the direct rays of the sun, but stretched out at a short distance from the ground to allow free circulation of air on both sides. Inferior results were given by other methods of sun-drying, including the native method. Free exposure of both sides of *H* was highly beneficial in preventing putrefaction. Blister and *P* were caused wherever the surface of *H* was confined or in contact with poles, or fat and flesh. The above method of drying by exposure to the sun's rays is recommended by the Committee for use in Africa. D. W.

The warble fly [and damage caused to hides]. S. K. SEN (Agric. Live-Stock India, 1934, 4, 189–196).—A review. A. G. P.

Hide defects and tannery damage in sole-leather manufacture. L. A. CUTHBERT (J. Amer. Leather Chem. Assoc., 1934, 29, 233–258).—The usual raw hide defects are described, including insect and parasitic damage, salt stains, putrefaction defects, and other hide damage. High-bred milch cows are especially veiny around the shoulders and bellies. South American hides yield a leather which is mottled along the backbone and over the kidneys. The customary defects arising in the different processes of manufacture are enumerated. D. W.

Degreasing sheepskins by chemical treatment. S. T. LEO and T. N. SHEN (J. Chinese Chem. Soc., 1934, 2, 13–17).—The efficiency of a no. of degreasing agents has been compared. 15% aq. lactic acid (alone or mixed with COMe_2 or CCl_4), 2% aq. Na_2CO_3 , and CCl_4 give the best results. D. R. D.

Procter-Searle method [of determining free mineral acid in leather]. T. F. OBERLANDER and A. C. ORTHMANN (J. Amer. Leather Chem. Assoc., 1924, 29, 259–262).—The p_{H} val. of the leather alone does not show the true condition of the leather, and the following modification of the Procter-Searle method is recommended. The leather- Na_2CO_3 dry residue should be ashed at $600^\circ \pm 10^\circ$ in an electric furnace for 2 hr.,

cooled, moistened with 25 c.c. of H_2O , and heated over an electric heater for 15 min. The residue from this treatment should be ashed and heated (as above) with 40 c.c. of 0.1N- H_2SO_4 for 15 min. and filtered off into the first filtrate. D. W.

Rapid determination of free sulphur in chrome-tanned leather. A. CASTIGLIONI (Annali Chim. Appl., 1934, 24, 206—209).—The leather is extracted with $COMe_2$ into a Soxhlet flask containing excess of KCN. The fat is thus hydrolysed and the S converted into KCNS. The solvent is expelled, the residue dissolved in H_2O , the excess of KCN decomposed by CH_2O , and the solution acidified with HNO_3 and filtered. The KCNS is then determined by Volhard's method. The fat may be determined at the same time by extracting with $COMe_2$ and treating the weighed dried extract (S + fat) with $COMe_2$ and KCN, and so on. T. H. P.

Detecting size in paper.—See V. [Measuring] adhesion.—See XIII.

See also A., June, 672, **Determining gelatin.** 699, **NaCl-tolerant bacilli.** 709, [Tanning] materials in bark of *Lophopetalum toxicum*.

PATENTS.

Preservative for glue and the like. S. W. PUTNAM and N. POFFENBERGER, Assfs. to DOW CHEM. CO. (U.S.P. 1,925,819, 5.9.33. Appl., 2.2.31).—(2-) $C_6H_4Ph\cdot OH$ and its (Na) salts are claimed. H. A. P.

Adhesive to be employed in the manufacture of waterproof abrasive products. J. LEMERLE, Assf. to SOC. ANON. COMP. CENTRALE DES EMERIS ET PRODUITS A POLIR (U.S.P. 1,930,393, 10.10.33. Appl., 21.10.29. Fr., 25.10.28).—The adhesive comprises an oxidised drying oil with about 4% of bitumen; it may be diluted with turpentine, white spirit, or benzol. B. M. V.

XVI.—AGRICULTURE.

Yellow-earth soils. W. HOLLSTEIN (Soil Res., 1934, 4, 51—61).—The ill-defined nature of yellow earths (I) in modern pedology is discussed. Examination of such soils in Turkey indicates (I) to be a subsection of the brown earth or forest soils. A. G. P.

Edaphology of "stink-lakes" of Central Macedonia. G. STATHULOPULOS (Soil Res., 1934, 4, 86—89).—Soils bordering the lakes (which contain much decomposing org. matter in salt H_2O) become encrusted with salts, largely NaCl and Na_2SO_4 . Drainage, treatment with gypsum, and leaching convert these into utilisable soils resembling chernozem types. A. G. P.

Tube for soil-profile sampling. RÖMER (Soil Res., 1934, 4, 84—85).—A new form of core sampler is described. A. G. P.

Genesis of soil structure and methods for its determination. A. F. TIULIN (Proc. Gedroiz Inst. Fert., Moscow, 1933, 2, 5—20).—A discussion. A. M.

Chemical analysis in pedological studies. A. BRUNO (Chim. et Ind., 1934, 31, Spec. No., 1015).—Analyses appropriate for examination of the course of formation in soils are discussed. A. G. P.

Rôle of colloidal sesquioxides in the soil-adsorption complex. A. F. TIULIN (Proc. Gedroiz Inst. Fert., Moscow, 1933, 2, 33—39).—The adsorption of cations and anions by soils is shown to be dependent on the proportions of acidoid and basoid in the coagels in the soils. The removal of sesquioxides by Tamm's oxalate method generally leads to a decrease in adsorption capacity. A. M.

Cation exchange in natural mineral soils. G. BARBIER and R. CHAMINADE (Soil Res., 1934, 4, 1—9).—The colloidal complex of soils cannot absorb mols. of the majority of dissolved salts in soil solutions, but may modify the proportions of cations by ionic exchange. A small change in the adsorbed bases corresponds to a relatively large change in the constitution of the solution with it. A. G. P.

Dependence of amount of cation adsorbed by soil on dilution of the leaching solution. A. M. PRIANISHNIKOV (Proc. Gedroiz Inst. Fert., Moscow, 1933, 2, 111—120).—Deductions made from Gapon's equation for the effect of dilution are confirmed by experimental data. A. M.

Adsorption of cations and anions by soil ampholytoids. E. N. GAPON (Proc. Gedroiz Inst. Fert., Moscow, 1933, 2, 120—133).—Theoretically the adsorption of cations by ampholytoids should increase with increase in p_H , and that of anions should decrease. This is substantiated by Mattson's experimental data. A. M.

Influence of sesquioxides on the stability of soil aggregates. A. F. TIULIN, T. N. ZELENINA, and N. D. PUSTOVOITOV (Proc. Gedroiz Inst. Fert., Moscow, 1933, 2, 20—33).—The stability of artificially prepared aggregates is greatest when these are formed by the coagulation of a negatively charged suspension with Fe hydrosols at the isoelectric point. The stability of non-chernozem soil aggregates is due to this cause, whilst the stability of chernozem aggregates is due to the high content of Ca humate. A. M.

Influence of pressure on formation and alteration of soil aggregates. A. F. TIULIN and A. I. SKLIAP (Proc. Gedroiz Inst. Fert., Moscow, 1933, 2, 40—51).—Mechanical pressure increases the quantity of H_2O -stable aggregates (I) if the soil is ground to pass a 0.1-mm. sieve; if the particles are ≤ 0.5 mm. no increase is observed. The presence of surface-active substances decreases (I). A. M.

Morphological relationships of soil microbes. S. C. VANDECAVEYE and B. R. VILLANUEVA (J. Bact., 1934, 27, 257—269).—Repeated application of manure to soil increased the nos. of both autochthonous (I) and zymogenic (II) organisms. Treatment with 1% $CaCO_3$ further increased the nos. of both types without marked change in the CO_2 produced. Addition of cellulose (filter paper) increased (I) without affecting (II). A. G. P.

Soil respiration and the carbon dioxide concentration of the soil air in agricultural areas. H. WURMBACH (Arch. Pflanzenbau, 1934, 10, 484—532).—Seasonal variations in CO_2 production in soils are recorded. Max. rates of production are associated with warm, moist conditions. Plant growth markedly

increases soil "respiration" (I), lucerne being particularly active in this respect. The proportion of org. matter in soils affects (I) by restricting diffusion of CO_2 as a result of its absorptive properties and its ability to maintain a higher H_2O content in the soil. Injury to plants due to heavy accumulation of CO_2 in soil is examined. A. G. P.

Dynamics of water retention by soil and its importance in practical agricultural investigations. W. VON NITZSCH (Soil Res., 1934, 4, 77—83).—Relationships are discussed between the proportion of H_2O in soil and the energy expended by the plant root system in obtaining it from the pore spaces. The importance is emphasised of data concerning structure and pore space in examining the effects of cultivation on fertility and plant growth. A. G. P.

Amounts of bound and free water in an organic colloid at different degrees of hydration. H. L. CHRYSLER (Plant Physiol., 1934, 9, 143—155).—Of the H_2O imbibed by kelp stipe the % bound decreases with increasing hydration. Experimental data are recorded, showing the proportion of bound and free H_2O over a wide range, and are discussed in relation to the hydration of org. colloids of living cells etc. A. G. P.

Potentiometric determination of p_{H} of soils in the natural condition. (Field method.) H. J. VERWEEL (Soil Res., 1934, 4, 67—72).—The method described involves the use of a Au wire electrode which is dipped into quinhydrone paste and pressed into the soil. A. G. P.

Glass electrode and its application in soil acidity determinations. J. A. NAFFTEL (Soil Res., 1934, 4, 41—50).—A simplified form of apparatus is described for use in the routine examination of soils. Comparison with the quinhydrone electrode indicates that erroneous results recorded by the latter in certain soils result from the presence of MnO , MnO_2 . The use of quinol for determining redox potentials in soils is suggested. A. G. P.

Four-year liming experiments on newly cultivated heath soils. F. BRÜNE (Z. Pflanz. Düng., 1934, B, 13, 193—211).—The effects of additions of CaO in amounts corresponding to varying fractions of the CaO requirement (Tacke-Arnd) on the yield and mineral content of a no. of crops are recorded and discussed. A. G. P.

Is the lime requirement of soil dependent on the method of manuring? E. ERNEST (Landtmannen, 1932, 15, 303—305; Bied. Zentr., 1934, A, 4, 433).—Effects of various physiologically acid and alkaline fertilisers on the response of soils to liming are recorded. A. G. P.

Reactions of phosphates with soils. I. Action of lime on monocalcium phosphate. J. CLARENS and M. BRUNETON (Bull. Soc. chim., 1933, [iv], 53, 1431—1435).—Determination of P_2O_5 with $\text{Ca}(\text{OH})_2$ by the usual alkalimetric methods cannot give correct results. Starting with a solution of $\text{CaH}_4(\text{PO}_4)_2$, the quantities of P_2O_5 pptd. by successive additions of aq. $\text{Ca}(\text{OH})_2$ have been measured. The results can be used in the prep. of pptd. Ca phosphates of different compositions. F. L. U.

Phosphoric acid combined with soil organic matter. N. P. KARPINSKI and V. B. ZAMIATINA (Proc. Gedroiz Inst. Fert., Moscow, 1933, 2, 133—147).—Soil org. matter is destroyed by H_2O_2 and P_2O_5 is leached out with 0.05N-HCl. The P_2O_5 combined with org. matter in chernozems and podzols amounts to 50% of the total. Oxidation with H_2O_2 converts it into a difficultly sol. form. A. M.

Fixation and penetration of phosphates in Vermont soils. V. L. WEISER (Vermont Agric. Exp. Sta. Bull., 1933, No. 356, 31 pp.).—In the soil types examined (podzols from which surface horizons are eroded, exposing B-horizon), fixation of added PO_4''' is largely in the form of Fe and Al compounds. Penetration of Na, NH_4 , and certain org. phosphates is more rapid than that of superphosphate (I). Addition of sulphates and nitrates of Na, K, NH_4 , or Mg facilitates the penetration of (I). Fixation of PO_4''' is decreased by org. matter and mineral silicates. Liming increases the ability of the crop to absorb PO_4''' , but may also increase fixation. The recovery in crops of added PO_4''' from Na phosphates is greater when small and frequent applications are made, but (I) and Ammophos are more effective in large dressings made less frequently. A. G. P.

Potassium in soils. M. ODELIEN (Tidskr. Norske Landbruk., 1931, 38, 270—278; Bied. Zentr., 1934, A, 4, 416).—Easily sol. K in soils is derived from minerals of the mica group, notably biotite, sericite, and flugotite, but not from K feldspars. Factors influencing the easily sol. forms of K in soils are discussed. A. G. P.

Relation of the carbon : nitrogen ratio of a mulch to the accumulation of nitrates in soil. W. J. MOORE, JUN., and A. B. BEAUMONT (J. Amer. Soc. Agron., 1934, 26, 252; cf. B., 1933, 933).—Data recorded confirm that nitrification occurs in the lower layers of the mulch rather than in the soil. Approx. 3 years are required to reduce the C : N ratio of the mulch to the stage at which NO_3' is produced in excess of the requirements of the micro-organisms. A. G. P.

Distribution of fertilisers in soil. T. ROEMER (Ernähr. Pflanze, 1934, 30, 203—205).—The depth distribution resulting from ploughing-in and harrowing-in of fertilisers in soil is compared and the advantage of the former method emphasised. A. G. P.

Influence of acid and basic fertilisers on soils. J. J. VAN DER POEL (Klaten, 1931; Bied. Zentr., 1934, A, 4, 432).—Both acid and alkaline fertiliser mixtures raised the p_{H} of very acid (p_{H} 4.1) soils, the latter type producing the higher p_{H} . Less acid soils (p_{H} 4.6—6.0) behaved normally to both classes of fertilisers. A. G. P.

Determination of the nutrient content of soils by electrodialysis. A. JACOB (Ernähr. Pflanze, 1934, 30, 106—108). Current methods are reviewed. A. G. P.

Determination of the potash status [of soils] by the Mitscherlich and Weissmann methods. F. SCHEFFER (Ernähr. Pflanze, 1934, 30, 101—106).—In both methods the recorded K vals. were dependent on the soil : sand ratio adopted for growing the plants, there being a general tendency for the vals. to rise with

widening ratio, reaching a sustained max. in a no. of cases at 1 : 5. A. G. P.

Effect of fertilisers on soils. O. DIEHL (Ernähr. Pflanze, 1934, 30, 41—45, 61—64).—The action of various neutral salts and of aq. $\text{Ca}(\text{OH})_2$ on the rate of sedimentation (I) of soils is examined and relationships between (I) and salt concn. are established. A. G. P.

Effect of superphosphate, hydrated lime, and straw on the loss of nitrogen from manure during storage. L. S. CARTER and C. E. MILLAR (Mich. Agric. Exp. Sta. Quart. Bull., 1934, 16, 136—146).—Addition of superphosphate to poultry and cattle manure considerably reduced the loss of NH_3 during storage. Best results were obtained by the use of 20% superphosphate in amounts equal to 10 wt.-% of dry poultry manure or 2.5 wt.-% of wet cattle manure. Addition of ground straw to mixed faeces and urine of cattle (180 lb. per ton) reduced both the rate and total loss of NH_3 . A. G. P.

Dynamics of nitrate and phosphoric acid in field trials with mineral fertilisers. T. L. IWANOWSKI (Arb. Transkaukas. Forschungsinst. Baumwollbau Wiss. Ser. Bull., 1932, No. 22; Bied. Zentr., 1934, A, 4, 429).—Seasonal variations in NO_3' content of fallowed and cropped soils are recorded. Vals. decreased rapidly with depth. Applications of org. or inorg. fertilisers increased the total NO_3' in soils, but not the character of the above variations. Occurrence of NO_2' was rare and followed no regular cycle. Variations in H_2O -sol. P (I) were inverse to those of NO_3' . Application of P fertilisers caused a temporary increase in (I) which in approx. 30 days regained the same val. as in unmanured soil. A. G. P.

Water-solubility of basic slag. H. OSWALD (Svensk mosskulturvereins Tidskr., 1932, 46, 141—143; Bied. Zentr., 1934, A, 4, 430).—A large proportion of the total PO_4''' in basic slag may be extracted by H_2O containing CO_2 (up to 85% in 3 successive extractions). With distilled H_2O 30 extractions removed 68—69% of the total, early extracts reacting alkaline but subsequently becoming neutral. A. G. P.

Action of potash [fertilisers]. Lauchstädt experiments. W. SELKE (Ernähr. Pflanze, 1934, 30, 213—218).—Fertiliser trials with a no. of crops are recorded, in which the effects of K with and without farmyard manure (I) are compared. The effect of (I) in conserving supplies of soil-K is demonstrated. A. G. P.

Chlorine-free potash fertilisers for potatoes. T. ELLE (Jahresber. Staatl. Versuchs-stat. Meistad, 1931, 48—49; Bied. Zentr., 1934, A, 4, 431).—K fertilisers containing Cl produced superior gross yields, but tubers had a lower starch content than when K_2SO_4 or KNO_3 was used. Highest dry-matter yields were obtained with KNO_3 . A. G. P.

Preparation of concentrated fertilisers by treating phosphorites with nitric acid. G. I. GORSCHTEIN and T. I. CHACHARINA (J. Chem. Ind. Russ., 1934, 10, No. 1, 39—47).—98% of the P of Kroloviets phosphorite (I) is extracted by adding 25% HNO_3 in amount equiv. to the $\text{Ca}_3(\text{PO}_4)_2 + \text{CaCO}_3$ content of (I); the loss of N is $\gt 1.7\%$ of the HNO_3 added. 95% of the P

of the extract is pptd. at 20° as Ca phosphates (II) [85% assimilable P_2O_5 (III)] by adding the theoretical amount of NH_3 ; the % of (III) falls when the temp. is raised or the amount of NH_3 is increased. The (III) content falls by 3% when (II) is dried at 80° , and by 12% at 100° . The filtrate after pptn. of (II) yields a mixture of NH_4NO_3 and $\text{Ca}(\text{NO}_3)_2$ on evaporation. (II), dried at 80° , contains 35% P_2O_5 [28% of (III)] and 6% N. R. T.

Growth and absorption by oats in relation to varying concentrations of calcium and sodium in the nutrient. C. PHILPSON (Svensk Bot. Tidskr., 24, 155—262; Bied. Zentr., 1934, A, 4, 453—454).—In the first 2 months of growth the rate of increase of total N and ash in the plants closely followed that of dry matter (I). After 2 months the Ca intake was proportional to the $[\text{Ca}']$ of the Na-free nutrient. Production of (I) was directly related to the Ca absorbed. Plant processes controlling relationships between (I) and N intake are not affected by Ca-Na antagonism (II). Differences in Ca utilisation due to (II) are associated with changes in cell walls. A. G. P.

Influence of shorter light rays on absorption of nitrate by the young wheat plant. W. E. TOTTINGHAM, H. L. STEPHENS, and E. J. LEASE (Plant Physiol., 1934, 9, 127—142).—Under carefully controlled conditions 3-week wheat plants after preliminary NO_3' starvation absorbed NO_3' more freely from KNO_3 than from other nitrate solutions. Absorption was increased by exposure to light in which the proportion of blue and ultra-violet rays was artificially increased. A. G. P.

Earliness in northern maize as affected by phosphate fertilisers, manure, and other soil treatments. P. J. OLSON and H. L. WALSTER (J. Amer. Soc. Agron., 1934, 26, 205—213).—On the soils examined, P fertilisers, cattle manure, and, more especially, combinations of these advanced the time of "silking" of maize without definite increases in yield. A. G. P.

Effects of mulched and turned rye in the green and mature stages on the liberation of plant nutrients from a silt-loam soil. H. H. HILL (Virginia [Blacksburg] Agric. Exp. Sta. Tech. Bull., 1934, No. 53, 18 pp.).—In lysimeter experiments, surface-mulching maintained a higher H_2O content in soil than did the turning-in of rye. Nitrification was active in both the mulched (M) and "turned-in" (T) series when green rye (I) was used, but mature rye (II) had a depressive effect. The total vol. of leachate from the M was \gt from the T soils. After the first year of treatment the outgo of NO_3' from soils treated with (I) was \gt that with (II), and that from the M \gt from the T series. The leaching of Ca was increased by treatment with rye, the effect being greater with (I) than with (II) and higher in the first year than in subsequent years. The outgo of S was increased by treatment, but that of Mg and K was not markedly affected. A. G. P.

After-effects of nitrogenous manuring of cereals on the first and second year's yield of the subsequent clover crop. E. ERNEST (Landtmannen, 1931,

14, 823—824; Bied. Zentr., 1934, A, 4, 429).—Application of N fertilisers reduced the yields of clover in both the 1st and 2nd years, the effect being greatest with $(\text{NH}_4)_2\text{SO}_4$ and least with CaCN_2 . Use of N on preceding cereal crops reduced clover yields both by intensifying the withdrawal of K and P and as a result of the residual action of N in restricting the activity of nodule organisms. A. G. P.

Pasture production. VI. Effect of sulphate of ammonia and frequency of cutting on production of pasture under a system of mowing only. VII. Influence on production of continuous mowing on pasture with removal of herbage, compared with a system of alternate mowing and grazing with "feeding back" of herbage on to pasture, over a period of three years. A. W. HUDSON (New Zealand J. Agric., 1934, 48, 17—23, 23—24).—VI. The % dry matter of herbage on soils receiving $(\text{NH}_4)_2\text{SO}_4$ (I) and ground limestone was > that from untreated controls. Cutting at the "cattle" stage resulted in a 10% increase in total yield as compared with more frequent cutting at the "sheep" stage, but the relative efficiency of (I) was unaffected by the frequency of cutting.

VII. The level of pasture production can be maintained as satisfactorily under a system of alternate mowing and grazing as by an intensive scheme of rotational grazing. A. G. P.

Effect of potash manuring on the base ratio in hay. W. LESCH (Z. Pflanz. Düng., 1934, B, 13, 211—225).—Manuring with K salts or KCl increased the K content of hay but reduced that of Na, Ca, and Mg. Use of kainit resulted in somewhat higher vals. for Na, but these were still < in unmanured grass. The effects of manuring on the alkali-alkalinity (I) and alkaline-earth-alkalinity (II) are recorded and compared with those previously established. In the second cut of grass (I) was <, and (II) >, the corresponding vals. in the first cut. A. G. P.

Effects of applications of sodium nitrate on yields of timothy hay and seed. M. W. EVANS (J. Amer. Soc. Agron., 1934, 26, 235—240).—The increased yield of seed resulting from treatment with NaNO_3 was > that of hay for all levels of application examined. A. G. P.

Responses of Kentucky bluegrass to variations in temperature, light, cutting, and fertilising. C. M. HARRISON (Plant Physiol., 1934, 9, 83—106).—Application of N fertilisers combined with close and frequent cutting tended to exhaust the carbohydrate reserves of the grass and restrict yields. The effects of temp., light intensity, and frequency of cutting on the equilibrium between the N and carbohydrate supplies of the plants and the resulting influence of growth are examined. A. G. P.

Effect of nitrogenous fertilisers on growth of lawn grasses. J. W. ZAHNLEY and F. L. DULEY (J. Amer. Soc. Agron., 1934, 26, 231—234).—On Kentucky bluegrass and various bents urea gave slightly higher yields of grass over the year than $(\text{NH}_4)_2\text{SO}_4$ (I) or NaNO_3 (II). Treatments with 1633 lb. of (I)

and 2156 lb. of (II) in 6 applications were made without injury to the grass and with a marked decline in the proportion of dandelions surviving. Changes in p_{H} resulting were small. A. G. P.

Rape (*Brassica napus*). Types offered in New Zealand: their behaviour and chemical composition. R. A. CALDER and B. W. DOAK (New Zealand J. Sci. Tech., 1934, 15, 332—344).—Analyses of rapes cut at varying stages of growth are recorded and the feeding val. of the materials is discussed. A. G. P.

Fertiliser trials with fruit trees in Dirmstein, Palatinate. F. KLINGMANN (Ernähr. Pflanze, 1934, 30, 48—50).—Manurial effects were apparent more in the quality and flavour of the fruit than in increased yields. A. G. P.

Potash-deficiency phenomena in tomatoes and cabbage crops. G. WIMMER and H. LÜDECKE (Ernähr. Pflanze, 1934, 30, 219—220).—Effects on growth and on leaf and stem discoloration due to deficiency of K are described and illustrated. A. G. P.

Carbohydrate contents of the maple tree. C. H. JONES and J. L. BRADLEE (Vermont Agric. Exp. Sta. Bull., 1933, No. 358, 147 pp.).—Seasonal variations in the starch (I), sucrose (II), hexose (III), hemicellulose, H_2O -sol. ash, and protein contents of various sections of bark and roots of maple are recorded. Carbohydrates are translocated as (II). The (I) content of maple wood declines at the end of the storage period and is accompanied by increases in (II) and (III) which are maintained throughout the winter. The reverse change begins in spring. A. G. P.

Analysis of vine leaves for determining nutrient deficiencies of soils and for detecting nutritional disturbances. A. HERSCHLER (Arb. biol. Reichsanst. Land-Forstwirts., 1933, 20, 633—665).—The N, P, and K contents of vine leaves are influenced by the age and quality of the stock and by external conditions and, alone, are not always sufficient to indicate the nutrient status of soils. Nutritional disturbances brought about by extreme deficiency or excess of nutrients are reflected in the composition of the leaves. A. G. P.

Potato-manuring experiments. Effect of width of plots on yield determination. A. W. HUDSON and E. M. BATES (New Zealand J. Agric., 1934, 48, 90—96).—In replicated 3-row plots the effect of differences in fertiliser treatment of adjacent plots on the end rows are recorded. On soil responding to P fertilisers, a comparison of treatments all of which include P is possible with single-row plots, but when P fertilisers are to be compared with untreated controls a min. of 3 rows per plot is necessary and yields from side rows should be discarded. A. G. P.

Determination of hardness in lucerne varieties by their enzymic responses. H. M. TYSDAL (J. Agric. Res., 1934, 48, 219—240).—The diastatic activity (I) per g. of dry matter in lucerne roots is much > that of tops and does not decrease during dormancy. The (I) of tops is closely related to rapidity of growth, but not to hardness even under hardening conditions. The "original activity" [the (I) of fresh root extract] shows no marked seasonal variation although a higher

concn. of sugar can be produced from a limited amount of starch in the spring than in the autumn. Also, in the autumn the harder varieties produced the greater amount of sugar. The "protected activity" (II) [the (I) of extracts after subjection to 70° for 10 min.] shows consistent seasonal and varietal differences. The (II) of extracts is influenced by the concn. of sugar and NH_2 -acids present and by p_{H} . A. G. P.

Chemistry of weed killers. B. C. ASTON and J. A. BRUCE (New Zealand J. Agric., 1934, 48, 172—173).—In the control of ragwort 5% solutions of NH_4CNS gave promising results. Its action is reduced by rain. 5% solution of $\text{Na}_2\text{Cr}_2\text{O}_7$ gave 100% kill and hypochlorites (Na, Ca) were moderately effective. A. G. P.

Bordeaux mixture, its rational preparation and use. G. TRUFFAUT (Chim. et. Ind., 1934, 31, Spec. No., 1020—1026).—Comparison is made of the vals. of Burgundy and Bordeaux mixtures. The importance of strict adherence to the details of prep. of the latter is emphasised, and the appropriate periods of application are given. A. G. P.

Pyrethrum investigations in Colorado. I. Factors affecting pyrethrin content. C. B. GNADINGER, L. E. EVANS, and C. S. CORL (Colorado Agric. Exp. Sta. Bull., 1933, No. 401, 19 pp.).—Considerable variations occur in the pyrethrin (I) content of flowers (0.90—2.07%, average 1.27%). A seasonal effect is also apparent. Complete shading of flowers during the picking season lowered the (I) content. The method of drying (outdoors in sun and shade, in thermostats with or without forced draught, or *in vacuo*) had no appreciable influence on the (I) content. Ground flowers stored in airtight containers during 10 days between picking and analysis showed ∇ normal loss of (I). The latter was entirely prevented for 6 months by storage at -2° to -5° . A. G. P.

Use of fluorine derivatives as insecticides. J. DARIC (Chim. et. Ind., 1934, 31, Spec. No., 1016—1019).—A review and discussion of the application of fluosilicates to insect control. A. G. P.

Mango hoppers and their control in the Konkan, Bombay Presidency. P. V. WAGLE (Agric. Live-Stock India, 1934, 4, 176—188).—Dusting with S at 3 fortnightly intervals proved an effective deterrent. A. G. P.

Constitution of phenols and their anticryptogamic action. I. PASTAC (Chim. et. Ind., 1934, 31, Spec. No., 1027—1032).—The activity of various phenolic substances is discussed in relation to their chemical constitution. A. G. P.

Control of cereal diseases by seed dusting. J. C. NEILL (New Zealand J. Agric., 1934, 48, 234—237).—Oat smut was not effectively controlled by Cu carbonate (I) or oxychloride dusts (II). Org. Hg dusts (III) were satisfactory. Among barley diseases, loose smut was eliminated only by hot- H_2O treatment. (I) and (II) reduced covered smut and stripe, but these were more satisfactorily controlled by (III). A. G. P.

Control of stinking smut of wheat. Seed treatment with various dusts. J. C. NEILL (New Zealand J. Agric., 1934, 48, 170—171).—No correlation was

apparent between the Hg content and fungicidal val. of organo-Hg dusts. Among Cu dusts, the oxychloride gave best results followed by carbonates in the order of their Cu content. A. G. P.

Effect of excess of disinfectant dusts on field germination of seed wheat. J. C. NEILL (New Zealand J. Agric., 1934, 48, 174).—Excessive Cu carbonate had no effect on germination, but excess of "Ceresan" reduced this. A. G. P.

Effect on apple trees of lime-sulphur following Bordeaux mixture. G. H. CUNNINGHAM (New Zealand J. Agric., 1934, 48, 15—17).—No injury resulted from spraying mixtures of CuSO_4 solution or Bordeaux mixture with CaO-S unless the last-named was in considerable excess. Use of 5-4-50 Bordeaux mixture at the "green tip" stage and CaO-S as a "pink" spray caused no apparent damage. A. G. P.

Biology and control of the cherry fruit fly. O. JANCKE and W. BOHMEL (Arb. biol. Reichsanst. Land- u. Forstwirts., 1933, 20, 443—455).—Best results were obtained with NaF (1 in 250), *Derris* extract (1 in 250), or pyrethrum (1 in 500) preferably with additions of sugar or molasses. A. G. P.

Treatment of deciduous fruit trees and nut trees infected by *Phymatotrichum omnivorum* with ammonium compounds. R. B. STREETS (Science, 1934, 79, 417—418).—Cotton root-rot has been checked in certain trees by applications of $(\text{NH}_4)_2\text{SO}_4$ or aq. NH_3 to the soil. L. S. T.

Potato flea-beetle control. L. B. DANIELS (Colorado Agric. Exp. Sta. Bull., 1933, No. 400, 34 pp.).—Satisfactory results were obtained with Ca arsenate-CaO (1 : 8) or Na fluoaluminate (kalite) dust applied at the rate of 20—30 lb. per acre. The most effective wet spray was Zn arsenite (1 lb. per 50 gals.). A. G. P.

CaS solution. Insecto-fungicides.—See VII. ***Derris* root. Pyrethrum extracts.**—See XX.

See also A., June, 619, H_3PO_4 and phosphates. 629, Soils (various).

PATENTS.

General-utility manure. H. SMETHAM (B.P. 410,487, 16.11.32).—A mixture of sewage sludge (50), chalk (15), $\text{Ca}(\text{OH})_2$ (5), and towns' refuse (30%) is dried and ground for use as a fertiliser. C. J.

Manufacture of insecticides. H. A. JONES, Ded. to U.S.A. (U.S.P. 1,928,256 and 1,928,968, [A] 26.9.33, [B] 3.10.33. Appl., [A, B] 23.8.30).—(A) A solution of rotenone or a plant extract containing it in $\text{C}_5\text{H}_5\text{N}$ or a $\text{C}_5\text{H}_5\text{N}$ base is added to H_2O to produce a suspension. (B) A ketone, e.g., COMe_2 , solution of rotenone, or plant extract containing it, is added to H_2O in presence of tannic acid. E. H. S.

XVII.—SUGARS; STARCHES; GUMS.

Double-acid method of optical analysis of beet products. S. J. OSBORN and J. H. ZISCH (Ind. Eng. Chem. [Anal.], 1934, 6, 193—200).—Crude solutions of sucrose (S) and raffinose (R), e.g., molasses, are determined by measuring α in the de-leaded solution (P),

after inversion in 0.634*N*-HCl (*I*), and after neutralisation of the inverted solution by NH₃ (*I'*). *I'* is corr. to *I''* for the effect of neutralisation on the α of the sugars. Since the non-sugars (*N*) are optically inactive in conc. acid solution, (*I*—*I''*) then gives the α of *N*. Also *P*—*I*+*I''* gives the correct α of the *S*+*R*. This "double-acid" method gives vals. in agreement with the double-enzyme method, if the amount of invert sugar or its decomp. products present is not large. The val. *I*—*I''* is large, thus rendering the single-acid method grossly inaccurate. R. S. C.

Turbidity in sugar products. II. Effect of independent variation of suspended and colouring matter on transmittancy and Tyndall-beam intensity. F. W. ZERBAN, L. SATTLER, and I. LORGE (Ind. Eng. Chem. [Anal.], 1934, 6, 178—183; cf. B., 1931, 1116).—Equations are derived and graphs given for the systems Filter Cel + caramel solution (II), and unfiltered + filtered sugar syrups, by means of which colouring matter (*I*) and turbidity can be determined in presence of each other by measurement of transmittancy and Tyndall-beam intensity. Since the relations are not the same for both systems, the method, but not the results, can be applied to other systems. Bentonite adsorbs (*I*) from (II). R. S. C.

Purification of sweet and white potato starches. F. H. THURBER and H. S. PAINE (Ind. Eng. Chem., 1934, 26, 567—569).—Satisfactory purification was obtained with a hydroseparator followed by SO₃ treatment. The best results were obtained when conc. suspensions were used and the overflow was maintained in the cloudy middle zone. H. G. R.

Microscopy of food products. IV. Starches and their characteristics (contd.). C. H. BUTCHER (Food, 1934, 3, 341—342; cf. B., 1934, 470).—The nature of the surface, shape, and size of the granules and the appearance and position of the hilum and striæ are recorded in tabular form for 23 starches viewed microscopically in oblique light, with H₂O as mounting medium. J. G.

Determination of viscosity of dilute solutions of cassava flour and other starches. G. G. PIERSON (Ind. Eng. Chem. [Anal.], 1934, 6, 183—187).—Apparatus and procedure are described. E. S. H.

Comparison of karaya gum and tragacanth. L. F. GABEL (J. Amer. Pharm. Assoc., 1934, 23, 341—344).—Tragacanth (*I*) has greater mucilaginous properties than karaya (*II*). Max. η is obtained from (*II*) without heating, and from (*I*) by boiling for 2 min. The greater acidity of (*II*) is a possible source of incompatibility in pharmaceutical preps. (*I*) mucilage becomes thicker, (*II*) mucilage thinner, on ageing. (*II*) is more readily sol. than (*I*), and has the further advantage of producing a softer effect when applied to the skin. A. E. O.

Cane molasses as cattle feed.—See XIX.

See also A., June, 636, **Prep. of tetramethylglucose, and of d-mannose.**

PATENTS.

Apparatus for purging crystal masecuties. C. J. COPLAND and W. B. NEWKIRK, Assrs. to INTERNAT.

PATENTS DEVELOPMENT CO. (U.S.P. 1,928,881, 3.10.33. Appl., 20.8.30).—An automatic valve mechanism for applying sweet-H₂O (*I*) and fresh H₂O to a centrifuge, with collection of mother-liquor and (*I*), is described.

B. M. V.

Apparatus for drying starch. C. HAGEN and W. J. ROWE, Assrs. to INTERNAT. PATENTS DEVELOPMENT CO. (U.S.P. 1,927,313, 19.9.33. Appl., 13.7.31).—The starch pulp is dried in two stages in rotary drums, passing concurrent to warm air in the stages, but counter-current in general direction. Sticking to the conveyors etc. is prevented by dusting with dry starch removed by cyclones from the air stream. B. M. V.

Impregnating materials [starch lumps] with liquid.—See I.

XVIII.—FERMENTATION INDUSTRIES.

The viscosimeter as an instrument of control in brewing and malting. F. HÖPPLER (Woch. Brau., 1934, 51, 161—165, 169—171).—The viscosity (η) of a fermenting wort falls, roughly, parallel to the fall in extract content. Different mashing processes lead to worts differing in η , whether measured at pitching, at racking, or at time of sending out. η is apparently uninfluenced by filtration through folded papers, but falls on filtration through cellulose in the brewery. There is no strict linear relationship between η and % of the original worts; a mean curve can be plotted, but there are wide variations in η . Of the beer constituents investigated, dextrin has the greatest influence on η , but the effect of the alcohol is also important, whilst colloidal nitrogenous constituents apparently have enormous effect. Of a no. of malts examined, coloured malt gave the wort of highest η . I. A. P.

Kuban fermented milk. V. M. BOGDANOFF (J. Dairy Res., 1934, 5, 153—159).—Lactic and alcoholic types of fermentation are distinguished and the sp. organisms concerned are examined. Symbiosis occurs between lactic bacteria and yeasts which impart a definite taste to the fermented milk. Undesirable flavours are produced by inoculation of the starter culture with *S. lactis* (due to excessive acid formation) or by using raw instead of heated milk. A. G. P.

Assay of pancreatin. F. E. WILLSON (J. Amer. Pharm. Assoc., 1934, 23, 295—302).—The U.S.P., B.P., and modified Smith-Sørensen (*I*) methods for the assay of trypsin are compared. (*I*) might be improved by use of 0.02*N*-NaOH and a digestion temp. of 52°. The U.S.P. and B.P. methods for the assay of amylase and the B.P. method for lipase are discussed and compared. A. E. O.

Determination of acetone and ethyl, butyl, and isopropyl alcohols in fermentation liquors. G. L. STAHLY, O. L. OSBURN, and C. H. WERKMAN (Analyst, 1934, 59, 319—325).—The neutral or slightly alkaline liquor is distilled directly, COMe₂ is determined in an aliquot part, and the alcohols are oxidised in a second part, of the distillate: EtOH \rightarrow AcOH, BuOH \rightarrow PrCO₂H (89.6%) + AcOH (10.4%) (cf. B., 1931, 1117), and Pr²OH \rightarrow COMe₂ (94%). The resulting mixture is distilled, COMe₂ determined iodometrically, and the acids are determined by the partition method

(A., 1930, 1161). A nomogram is given from which the % of EtOH and BuOH may be calc., in solutions containing 0.02—0.05*N*-acid after oxidation.

E. C. S.

Colour of wine. F. MONTEQUI (Anal. Fís. Quím., 1933, 31, 663—668).—The absorption curves of red wines (determined with a Zeiss-Pulfrich photometer) show characteristic changes on addition of HCl or NaOH, particularly an increase of absorption in the red and violet, which distinguish them readily from Bordeaux-red solution. Wines obey Beer's law. The point of neutralisation of wine by NaOH in presence of phenolphthalein may be determined photometrically, using Zeiss filter S₅₃.

R. K. C.

Detection and determination of citric acid in wines. J. SCHINDLER and J. KOZÁK (Chem. Listy, 1934, 28, 95—97).—Wines contain $> 0.05\%$ of citric acid, which is best detected by oxidising to $\text{CO}(\text{CH}_2\text{CO}_2\text{H})_2$, which affords difficultly sol. $\text{CHBr}_2\text{CO}\cdot\text{CBr}_3$ (I) with Br, and is best determined by boiling 50 c.c. of wine with 0.5 g. of animal C, filtering, concentrating the filtrate to 25 c.c., and adding 5 c.c. of 50% H_2SO_4 , 1.5 c.c. of 35% KBr, and 10 c.c. of 5% KMnO_4 , at 40°. 8 min. later excess of Br is removed by adding FeSO_4 , and the solution is allowed to cool, when (I) is quantitatively pptd., collected, and weighed.

R. T.

Colorimetric determination of arsenic in wines. M. SCHLUTY (Chim. et Ind., 1934, 31, Spec. No., 244—246).—Org. matter is destroyed. As in the residue is converted into AsH_3 by $\text{Zn} + \text{H}_2\text{SO}_4$, and this is passed into 2 c.c. of glycerin containing a few drops aq. AgNO_3 ; colloidal Ag formed is determined colorimetrically.

H. J. E.

Determination of volatile acid in sulphite-treated wines. C. BERTIN (Ann. Falsif., 1934, 28, 172—174).—Both free and bound SO_2 are almost completely expelled from wine by boiling under reflux for 30 min. Any SO_2 that may remain can be removed by adding H_2O_2 and continuing to boil for 5 min.

E. C. S.

Irradiated yeast.—See XIX.

See also A., June, 694, **Determining sol. enzymes.** 696, **Direct fermentation of maltose.** 698, **Acetaldehyde in cider and perry.**

PATENTS.

Filtration of beer and the like. E. F. STANILAND (B.P. 410,369, 26.8. and 2.11.33).—To maintain the filter in operation when bottling or racking has to stop for any reason, filtrate is returned by a separate pump to the inlet of the filter.

B. M. V.

Purified mucins.—See XX.

XIX.—FOODS.

Quality of home-grown [German] wheats. P. PELSSENKE (Mühlenlab., 1934, 4, 1—8).—An account is given of the success which has been attained in the breeding of high-quality, high-yielding wheats in Germany (G), and a table summarises the quality characteristics of the wheat varieties cultivated in G at the present time.

E. A. F.

Characterisation of flour from denatured wheat. **Investigation of the colouring matter.** J. MEYER

(Ann. Falsif., 1934, 28, 174—175; cf. B., 1934, 424).—Flour from wheat denatured with methylene-blue or eosin is spread on glass to a thickness of 2—3 mm., compressed to 1 mm., and moistened with aq. EtOH and glycerol. Stains of dye are visible by reflected or transmitted light.

E. C. S.

Colorimetric determination of manganese applied to the evaluation of flour and bread. P. BRUÈRE (Ann. Falsif., 1934, 28, 150—157; cf. A., 1934, 336).—The Mn content of wheat varies from 2.5 to 4 mg. per 100 g. of dry product, according to quality. The % admixture with low-grade flour can be determined more exactly, both in the flour and in the bread, by calculating from % Mn in the ash (A) (determined colorimetrically) than from the wt. of A or from the % N in the flour.

E. C. S.

Determination of the ash of salt bread. D. ECCHER DALL'ECO (Annali Chim. Appl., 1934, 24, 112—128).—Two procedures are described for determining the salt-free ash of salt bread, after treatment with (1) NaOH and MgOAc or (2) MgCl_2 .

T. H. P.

Heat-denaturation of albumin and globulin in milk. S. J. ROWLAND (J. Dairy Res., 1933, 5, 46—53).—The extent of the denaturation (I) is dependent on the temp. and duration of heating. Data showing the rates of (I) at various temp. are recorded and discussed.

A. G. P.

Control of stannisation of milk. P. DOTER (Chim. et Ind., 1934, 31, Spec. No., 1000—1003; cf. B., 1917, 904).—Milk (I) pasteurised at 70° by Stassano's method was unchanged in appearance, odour, taste, and in respect of ease of clotting and separation of cream. Aërobic bacteria were reduced from 553×10^6 to 2000 per c.c., and organisms of the *coli-aërogenes* group from 2000 to nil. Only 13.5% of the sol. albumin was coagulated. Unpasteurised (I) coagulated in 42 hr. at room temp. whereas stannised (I) coagulated in 144 hr.

E. C. S.

Determination of citric acid in milk. Mathieu-Ferré constant and variation of the citric acid content. G. BUOGO (Annali Chim. Appl., 1934, 24, 213—217; cf. B., 1934, 345).—For 10 milks with lactose gradually diminishing from 53.75 to 51.75 (g. per litre of acetic serum) the simplified mol.-concn. const. fell from 73.70 to 71.40 and the citric acid (by Kogan's method, A., 1930, 743) rose from 1.85 to 2.45, the Cl' remaining about const. at 1.64—1.71.

T. H. P.

Simplified molecular constant and solids-not-fat of the milk of Flemish cows in the north [of France]. M. PAGET and GÉNEL (Ann. Falsif., 1934, 28, 157—167).—Data are given for the simplified mol. const. (I), the solids-not-fat (II), and (II) corr. according to Porcher, in the milk of individual cows, and the mixed milk (III) from groups of 2 to > 30 cows of various ages, at different times of the day, and at different seasons. There is no parallelism between (I) and (II). In (III), the mean (I) was 73.5 and the mean (II) 93.5.

E. C. S.

Analysis of condensed milks. I. Determination of sucrose. A. FOSCHINI (L'Ind. Chimica, 1934, 9,

611—615).—The errors involved in the polarimetric determination of sucrose in condensed and other milk are discussed, and conditions are established which result in trustworthy figures. T. H. P.

Chemical control in the manufacture of condensed milk. W. L. DAVIES (Food, 1934, 3, 290—292, 335—338).—Official and rapid control analytical methods for the raw milk and for sweetened-condensed and evaporated milks are given. A tendency of raw milk to coagulate at $> 100^\circ$ influences final sterilisation and behaviour during the condensing process owing to pptn. on hot surfaces in the pan; heat-unstable milks produce marked coagulation on addition of an equal vol. of 75% EtOH in the cold or of 0.2 ml. of 0.5M-KH₂PO₄ to 2 ml. of milk after 5 min. on the H₂O-bath. Details and typical calculations are given for adjusting the ratio of solids not fat (I) fat (II) to 0.41 before concentrating, and for ensuring that the ratio of total solids of conc. milk/raw milk is correct. Na citrate and Na₂HPO₄ (2—10 oz./1000 lb. of evaporated milk) are added to raise the coagulation point, which, with browning, is controlled by small-scale pilot tests. The composition of evaporated milk is adjusted when (I) is high and (II) low by adding cream and H₂O; for low (I) and high (II), by condensed whole or skim milk and H₂O; and for low (I) and (II) by condensed whole milk and cream. J. G.

Preparation of an infant food, a soya-bean milk-egg powder. E. REID (Chinese J. Physiol., 1934, 8, 53—64). C. G. A.

Control of mould fungi in dairy factories and meat works. J. C. NEILL (New Zealand J. Agric., 1934, 48, 70—75).—Customary Cl-disinfectants were unsuitable for removal of *Cladosporium* and *Penicillium* from wood surfaces. CuSO₄ and CH₂O were effective. Treatment with hot H₂O ($> 57^\circ$) and rubbing gave best practical control. A. G. P.

Nutritive value of proteins for milk production. II. Comparison of the proteins of blood meal, pea meal, decorticated earthnut cake, and flaked maize. S. MORRIS and N. C. WRIGHT. **III. Determination of the amino-acids of various feeds.** S. MORRIS (J. Dairy Res., 1933, 5, 1—14; 1934, 5, 108—112; cf. A., 1934, 205).—In production rations containing minimal amounts of protein a deficiency of lysine (I) or tryptophan (II) caused a marked reduction in milk yield and was associated with an increase in urinary N. The greater proportion of creatinine, and the ratio of the excess S and N excreted under such conditions, indicate the utilisation of reserve N. During the feeding of minimal protein rations the absorption of N from, and re-excretion of N into, the gut is dependent on the nature of the protein supplied. Variations in N balances are such as to render this val. unsatisfactory as a measure of protein utilisation. Biological vals. of a no. of N concentrates are calc. and shown to be closely correlated with the (I) or (II) contents.

III. The method for determining NH₂-acids is modified and data, so obtained, for a large no. of feeding-stuffs are recorded. A. G. P.

Factors influencing the keeping quality of salted butters in cold storage. G. LOFTUS-HILLS and L. R.

SCHARP (J. Dairy Res., 1934, 5, 124—136).—Acidity and Cu content of butter are probably the chief factors associated with keeping quality. Microbiological and enzyme activity, variations in curd or NaCl content, fat hydrolysis, or oxidation were of little or no significance in this respect. A. G. P.

(A) Treatment of timber, (B) lining materials, for butter boxes. W. RIDDET, G. M. VALENTINE, and F. H. McDOWALL (New Zealand J. Sci. Tech., 1934, 15, 309—317, 318—326).—(A) Application of casein-CH₂O spray to timber markedly reduced the risk of timber taint in butter. Parchment linings were superior to Sn or Al foil in protecting butter from taint.

(B) All parchment papers examined permitted the development of a "primrose" colour (I) and an "off-flavour" (II), the appearance of which is possibly related to the Fe and Cu content of the paper. Waxed parchments were unsatisfactory as regards (I) and (II). Sn and Al foils pasted on to greaseproof paper preserved colour and flavour, but were difficult to remove from the butter surface. Foils waxed to thin parchment and used with paper in contact with butter gave good results. A. G. P.

Cheddar cheese. II. Effect of controlled oxidation-reduction potential on ripening. III. Rôle of rennin, pepsin, and lactobacilli. W. L. DAVIES, J. G. DAVIS, D. V. DEARDEN, and A. T. R. MATTICK (J. Dairy Res., 1934, 5, 144—152; cf. B., 1932, 1052).—II. Addition of 36 p.p.m. of Cu to cheese retarded the ripening process. Other oxidants (KNO₃, KClO₃, KClO₄) maintained the cheese at a higher potential and decreased proteolysis (I). KCN did not affect (I) or the oxidation-reduction potential (II). Normally the cheese flora controls (II) in such a manner that (I) is retarded if the potential is changed towards the oxidative side.

III. The amount of rennin or pepsin used had little influence on the flavour, texture, body, or ripening of cheese and no relationship was apparent between clotting time and extent of proteolysis. Addition of lactobacilli to starter cultures accelerated protein degradation in the early stages of ripening. A. G. P.

Protein decomposition and melting of Emmenthaler cheese. K. VAS (Kisérlet. Közl., 1931, 34, 33; Bied. Zentr., 1934, A, 4, 372—373).—Cheeses containing up to 25% of H₂O-sol. N (I) melt without separation of fat. Melting is facilitated by Na citrate. The melting process results in increased (I), but the N compounds formed differ from those produced during the ageing of cheese. Melted cheese shows increased digestibility. A. G. P.

Arsenic mould in cheese manufacture. K. TEICHERT (Milch. Zentr., 1934, 63, 131—132).—The use of *Penicillium brevicauli* provides a very delicate test for As by producing an org. As compound with a decided garlic odour. This test has failed to detect As in metal foils used by German manufacturers for wrapping cheese. E. B. H.

Proteolysis in stored eggs. A. K. BALLS and T. L. SWENSON (Ind. Eng. Chem., 1934, 26, 570—572).—The disappearance of thick white from eggs on storage

is probably due to breakdown of the mucin, liberating previously bound H_2O . H. G. R.

Analyses of meats. V. A. TOSCANI, V. R. RUPP, and W. S. MCCLELLAN (J. Nutrition, 1934, 7, 473—480).—Complete analyses of numerous samples are recorded and the significance of certain of the data in assessing food vals. is discussed. A. G. P.

Filtering fruit juices and plant extracts. J. A. HALL and W. E. BAIER (Ind. Eng. Chem. [Anal.], 1934, 6, 208).—Clear solutions are readily obtained by filtration with suction through a filter-bed composed of alternate layers of paper pulp and Filter Cel on filter cloth or muslin in a Buchner funnel. R. S. C.

Coffee as a drink and as a source of other products. C. FONTOURA (J. Pharm. Chim., 1934, [viii], 19, 386—391).—Notes on the physiological action of the infusion, the isolation of caffeine by sublimation, and the prep. of 20 products from the bean and plant are given. E. H. S.

Influence of roughage on protein digestibility. W. H. ADOLPH and M. Y. WU (J. Nutrition, 1934, 7, 381—393).—Additions of filter paper, china clay, or rice chaff in amounts $\geq 50\%$ of the ration did not appreciably affect the protein digestibility (I) for rats. With higher proportions a slight reduction of (I) was indicated. In human subjects addition of cabbage fibre to the diet lowered the (I) of a meat-rice ration only when supplied in abnormal amounts. Reduction of (I) by roughage is apparent only when food passes the alimentary tract with unusual rapidity. A. G. P.

Chemical composition of pasture grasses in Vermont. J. A. NEWLANDER, C. H. JONES, and H. B. ELLENBERGER (Vermont Agric. Exp. Sta. Bull., 1933, No. 362, 19 pp.).—Analyses of a large no. of samples of herbage are recorded. In timothy meadows, cutting every 2—4 weeks produced feed approximating in composition to that of a concentrate. The % of Ca and P in the herbage increased with the frequency of cutting. A. G. P.

Feeding value of artificially dried young grass. II. O. M. CAMBURN (Vermont Agric. Exp. Sta. Bull., 1933, No. 359, 14 pp.; cf. Newlander, B., 1933, 364).—On the basis of total digestible nutrients consumed by milch cows, dried grass effectively replaced grain in the ration without change in the total milk yield or the fat and solids-not-fat contents of the milk. A. G. P.

Feeding trials with irradiated and non-irradiated dried yeast. A. GOLF and K. SEELING (Bied. Zentr. [Tierernähr.], 1934, B, 6, 65—70).—Dried yeast satisfactorily replaced groundnut cake (in amounts to yield the same wt. of protein) in mixed rations for cows. The total milk and milk fat yields were similar whether the yeast was irradiated or not. Irradiation improves the antirachitic properties of yeast and the utilisation of the protein of the ration. A. G. P.

Feeding value of marrow-stem kale. W. WÖHLBIER and W. SCHRAMM (Bied. Zentr. [Tierernähr.], 1934, B, 6, 1—13).—Leaves of marrow-stem kale contain 3—4 times as much digestible protein as do stems, and also have a higher starch equiv. A. G. P.

Cane molasses as a cattle feed. S. L. SINGH and S. G. SINGH (Agric. Live-Stock India, 1934, 4, 156—175).—Moderate proportions (2 lb. daily) of molasses successfully replaced maize or wheat bran in rations without change in live-wt. maintenance or milk yield of cows, provided free access to NaCl was permitted. A. G. P.

Application of Viscacelle [to foods].—See V. Al kitchen utensils.—See X. Printing colours and cheese.—See XIII. Rape [as feed].—See XVI. Microscopy of starches.—See XVII. Fermented milk.—See XVIII. Spring H_2O for butter factory.—See XXIII.

See also A., June, 597, Proteins etc. as emulsifiers. 633, Synthesis of vitamin-C. 676, P, S, and alkali content of hens' eggs. 678, Determining milk-proteins. 685, Food val. of seeds of *Cicer arietinum* and of corn-cockle. New dietary principle in liver. 697, Growth of *Penicillium roqueforti* on synthetic media. 698, Effect of temp. of incubation on plate count of milk. 703—8, Vitamins (various).

PATENTS.

Apparatus for treating material [disinfecting grain]. T. C. MANNING (U.S.P. 1,928,903, 3.10.33. Appl., 27.4.31).—Compressed air is bubbled through disinfectant liquid, e.g., CS_2 or CCl_4 , and the saturated air admitted to the grain by means of a perforated stand-pipe, through the aperture of which the air is projected horizontally among the grain. B. M. V.

Alimentary substance [condensed milk] and its manufacture. F. S. BEVERLEY, Assr. to KRAFT-PHENIX CHEESE CORP. (U.S.P. 1,931,813, 24.10.33. Appl., 3.3.33).—Sucrose (I) is dissolved in milk and the solution evaporated at 55° under vac. to obtain a dough-like product containing milk solids 65, H_2O 15, and (I) 20%. A. R. P.

Preservation of eggs. P. EVERAERT (U.S.P. 1,929,735, 10.10.33. Appl., 3.11.32. Belg., 11.3.32).—The eggs are refrigerated in an autoclave containing CO_2 , the cooling of the upper part of the wall of the vessel, but not overhanging the eggs, being sufficient to condense H_2O exhaled by the eggs; the formation of dissolved and pptd. $CaCO_3$ is thereby prevented. B. M. V.

Drying and preserving process for fruit and vegetables. A. H. McCOMB, Assr. to E. R. PEACOCK (U.S.P. 1,929,437, 10.10.33. Appl., 7.1.28).—Approx. half the moisture is removed by contact with warm air at atm. pressure and the remainder by heating in a vac. at temp. progressively falling from "steam temp." to one at which the goods, e.g., onions, are cool enough to remove without oxidation in the atm. B. M. V.

Drying of oleaginous seeds and fruits. H. J. HUTTEMAN (U.S.P. 1,929,691, 10.10.33. Appl., 25.3.31. Holl., 16.4.30).—The material is submerged, by, e.g., a stepped series of conveyors, in oil which is maintained above the b.p. of H_2O under the vac. which is applied. B. M. V.

[Concentrated] food products and their manufacture. SARDIK, INC., Assees. of J. D. SARTAKOFF (B.P. 409,727, 4.11.32. U.S., 23.12.31).—Foods, fruits,

and most vegetables are first finely divided and then dried by a modified "roller process." Apparatus is claimed.
E. B. H.

Treatment of raw coffee. W. V. GILBERT. FROM E. ORNO-ORNFELDT and O. M. LOEW (B.P. 409,750, 5.11.32).—The quality of raw coffee is improved by treating the agitated beans with gaseous CH_2O at room temp., or at 100° , with or without steam. The elimination of drying, as required after a soaking process, is an advantage.
E. B. H.

Mixing and conching cacao etc. Separators for liquids [milk].—See I. [Foods containing] viable bacilli.—See XX.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Determination of alcohol in anæsthetic chloroform. M. FRANÇOIS (J. Pharm. Chim., 1934, [viii], 19, 383—385; cf. Fabre and Brard, B., 1934, 380).—A bibliographical note referring to the work of Béhal and François.
E. H. S.

Detection of carbon tetrachloride in chloroform. G. CROGOLEA (J. Pharm. Chim., 1934, [viii], 19, 377—383).—Accurate results are obtained by Sivadjan's method (B., 1929, 622) only after modification. It is still difficult to apply, but serves as a confirmatory method to the following modification of the French Codex (1908) method. To 100 c.c. of a mixture (I) of 100 g. of H_2O and 140 g. of H_2O saturated with CCl_4 (prepared in a 200-c.c. flask at 20°) is added 0.67 g. of CHCl_3 , and after agitation for 30 min. 20 c.c. more of (I) are added. After further shaking for 30 min., pure CHCl_3 will dissolve completely; if CCl_4 is present it will be indicated by an opalescence.
E. H. S.

Evaluation of *Derris* root. P. W. DANCKWORTT, H. BUDDE, and G. BAUMGARTEN (Arch. Pharm., 1934, 272, 561—569).—Determination of rotenone (I) in *Derris* root (II) by crystallisation from Et_2O or CCl_4 is inaccurate owing to incomplete separation. Takei's method is sounder, but complicated. (I) can be approx. determined by the α of a C_6H_6 extract of (II), since its $[\alpha]$ is much higher than that of the other constituents. The CCl_4 solvate separating from crude (II) is only 85—90% pure, as judged by its α . Leaching of (II) with H_2O and soap for prep. of an anti-warble spray extracts only a portion of the (I) present. (I) gives an orange-yellow colour in conc. H_2SO_4 , changed slowly by NaNO_2 to a fairly stable violet. The test can be applied to crude extracts of (II), but is not sp. for (I).
R. S. C.

Technical preparation of pyrethrum extracts. D. MANN (Chem.-Ztg., 1934, 58, 401—402).—Various solvents are used for the extraction of pyrethrum blossoms. When ethylene chloride is used the solvent is distilled off, the residue which contains oleoresin is dissolved in EtOH , COMe_2 , CCl_4 , or a petroleum fraction, and the solution cooled to 0° to ppt. traces of resin.
A. G.

Cortex poelai. W. PEYER (Pharm. Zentr., 1934, 75, 329—331).—A qual. examination of extracts in H_2O , EtOH , Et_2O , and light petroleum, in ultra-violet light, has been made.
S. C.

[Medicinal value of] *Coptis occidentalis*. C. E. MOLLETT and B. V. CHRISTENSEN (J. Amer. Pharm. Assoc., 1934, 23, 310—316).—*C. occidentalis* (I) contains the same active constituents in about the same amounts as *C. trifolia* (II). (I), because of its abundance in Montana and Idaho, is suggested as a commercial source of coptine and berberine in preference to (II).
A. E. O.

Structure and synthesis of new anti-malarials.

I. Plasmoquin. I. L. KNUNJANTZ, K. S. TOPTSCHIEV, and G. V. TSHELINTZEV. **III. Atebrin.** I. L. KNUNJANTZ, G. V. TSHELINTZEV, Z. V. BENEVOLENSKAJA, E. D. OSETOVA, and A. I. KURANOVA (Bull. Acad. Sci. U.R.S.S., 1934, 8, No. 1, 153—164, 165—176).—I. Bayer's "Plasmoquin" (I) is shown to be a compound, m.p. $102\text{--}105^\circ$, of 1:1'-methylene-2:2'-dinaphthyl-3:3'-dicarboxylic acid and 8- δ -diethylamino- α -methylbutylamino-6-methoxyquinoline (II), b.p. $200\text{--}205^\circ/2$ mm. (*Ac* derivative, b.p. $236^\circ/1.7$ mm.). (I) on treatment successively with MeI and AgOH yields 8-dimethylamino-6-methoxyquinoline (*picrate*, m.p. 224°), and on acid KMnO_4 oxidation quinolinic acid and δ -amino- α -diethylaminopentane (III), b.p. $195\text{--}198^\circ$ (*aurate*, m.p. 155° ; *Ac* derivative, b.p. $145^\circ/5$ mm.), synthesised as follows. $\text{CHAcNa}\cdot\text{CO}_2\text{Et}$ and ethylene oxide in EtOH are kept at 0° for 12 hr., the EtOH is removed, and the residue is converted into $\text{Ac}\cdot[\text{CH}_2]_2\cdot\text{CH}_2\cdot\text{OH}$ (IV) by boiling for 3 hr. with 38% HCl . (IV) and HBr at 0° yield $\text{Ac}\cdot[\text{CH}_2]_2\cdot\text{CH}_2\text{Br}$, which with NHEt_2 affords $\text{Ac}\cdot[\text{CH}_2]_2\cdot\text{CH}_2\cdot\text{NEt}_2$, the *oxime*, b.p. $137\text{--}138^\circ/10$ mm., of which yields (III) on reduction. (III) and 8-iodo-6-methoxyquinoline condense in presence of Cu bronze at 150° to yield (II).

III. 2:4:1- $\text{C}_6\text{H}_3(\text{NH}_2)_2\text{Me}$ affords 2:4:1- $\text{C}_6\text{H}_3\text{Cl}_2\text{Me}$ by the Sandmeyer reaction, and this with KMnO_4 yields 2:4:1- $\text{C}_6\text{H}_3\text{Cl}_2\cdot\text{CO}_2\text{H}$, from which, by condensation with *p*- $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{OMe}$, followed by ring-closure (POCl_3), 6:9-dichloro-2-methoxyacridine (V) is obtained. (V), on condensation in PhOH with (III), affords 6-chloro-9- δ -diethylamino- α -methylbutylamino-2-methoxyacridine, identical with Bayer's "Atebrin."
R. T.

Determination of arsenic in certain organic arsenical products. F. MONFORTE (Annali Chim. Appl., 1934, 24, 105—112).—Indirect control of the purity of compounds like Na cacodylate (I) and methylarsinate by hydrolysis with HCl is unsatisfactory. The D.A.B. method for determining the As gives good results only in exceptional cases, owing to (1) the difficulty of removing all the As from the org. mol. by $\text{KMnO}_4 + \text{H}_2\text{SO}_4$ and (2) inaccuracy in the conditions specified for the iodometric determination of the resultant As_2O_5 . Good results are obtained by treating (I) with fused NaOH or arrhenal (II) with either fused NaOH or fuming HNO_3 , pptg. the As with either Bettendorf's or Bougault's reagent, and determining the As iodometrically. For (II), theoretical results are obtained by destroying the org. matter as above, reducing with Cu and SnCl_2 , and determining the As colorimetrically with $(\text{NH}_4)_2\text{MoO}_4$ in H_2SO_4 .
T. H. P.

Determination of mercury in pharmaceutical preparations. F. REIMERS (Arch. Pharm., 1934, 272, 546—559).—The $\text{KI}\text{--}\text{CuSO}_4\text{--}[\cdot\text{CH}_2\text{NH}_2]_2\cdot 2\text{HCl}$ method

of determining Hg^{++} is modified and applied to a no. of pharmaceutical products. R. S. C.

Essential oil of American pine, *Picea alba*, Lk (*P. canadensis*, Sarg.). G. KOMPPA (Suomen Kem., 1934, 7, 86B).—The oil, yield 0.3%, d_{20}^{20} 0.9235, n_D^{20} 1.47330, $[\alpha]_D^{20}$ +18.32°, acid val. 1.87, ester val. 46.67, ester content 16.33%, consists of β -pinene, *l*-limonene, dipentene, 5–8% of camphor, *d*-bornyl acetate, active fenchyl alcohol, and cadinene. S. C.

Principal constituents of rose and geranium oils. C. LAGNEAU (Ann. Falsif., 1934, 28, 134–149; cf. B., 1932, 864).—The "dispersion ratio," $[\alpha]_i/[\alpha]_j$ (I), where *i* is 436.0 and *j* is 578.0 m μ , of *d*-citronellol from citronella oil is the same as (I) of *l*-rhodinol from rose oil (II) (viz., 2.03), so that these alcohols are optical isomerides. The (I) of *l*-rhodinol (III) and *l*-citronellol from geranium oil are 2.44 and 2.41, respectively. Adulteration of Bulgarian (II) with (III) cannot be detected by differences in $[\alpha]$, but can be detected by determining the (I) of the fraction distilling between 100° and 120°/15 mm. Adulteration with geraniol is detected by determination of the proportion of $C_{10}H_{20}O$ alcohols present. The (I) of 5 samples of oil are calc. from Angla's data (Parfum. Moderne, 1932, 582).

E. C. S.

CaS solution.—See VII. **Perfumes in the rubber industry.**—See XIV. **Pyrethrin.**—See XVI. **Karaya gum and tragacanth.**—See XVII. **Products from coffee.**—See XIX.

See also A., June, 622, **Determining Bi.** 633, **Synthesis of vitamin-C.** 650, **Synthesis of adrenaline.** **Bactericides.** 652, **Synthesis of anthelmintics.** 663, **Laxatives.** 664, **Germicides and antiseptics.** 665, **Methylthiolatophan and 4-methylthiolantipyrine.** ***N*-Aminobarbituric acids.** 667–9, **Alkaloids (various).** 669, **Synthesis of papaverine and tetrahydropapaverine.** 670, **Substances derived from unsymmetrical Ph_2 compounds.** 672, **Detection and determination of alkaloids.** 676, **Extractives of liver.** 689, **Local anæsthetics.** **Thiomorpholine derivatives.** 692, **Laxative principle in prunes.** 700, **Filtering hormone solutions.** **Lymphoganglin.** 701, **Prep. of pancreatropic substance from the anterior pituitary lobe, and of an antithyrotropic substance.** 703–8, **Vitamins (various).** 703, **Carotene preps.** 706, **Antiscorbutic principles of fir-needles.** 709, ***Orthosiphon stamineus*.** ***Lophopetalum toxicum* bark.** 710, **Curing of tobacco leaves.**

PATENTS.

Preparation of an electrolysed antiseptic. R. DESPLAT, and COMP. "ELECTRO SALVATOR" (B.P. 410,161, 5.11.32).—Antiseptic solution is electrolysed in an airtight chamber (C), and means are provided for maintaining the solution at 37–40° and for delivering the electrolysed solution from C. J. S. G. T.

Conversion of coca alkaloids into alkylated derivatives of ecgonine and ψ -ecgonine. A. TIRARD, Assr. to Soc. ANON. ETABL. ROQUES (U.S.P. 1,925,472, 5.9.33. Appl., 10.7.30. Fr., 25.6.30).—The alkaloids,

dissolved in an alcohol (MeOH), are treated with small amounts of bases (NaOH). Alcoholysis first results in formation of *l*-methylecgonine, which under the influence of alkali is isomerised to *d*- ψ -methylecgonine.

H. A. P.

Preparation of camomile extracts. A. ABELMANN, Assr. to CHEM.-PHARM. A.-G. BAD HOMBURG (U.S.P. 1,926,929, 12.9.33. Appl., 17.4.28. Ger., 2.7.27).—Camomile is extracted with aq. EtOH in presence of a base (NH_3) and essential oils (of camomile or thyme) are added.

H. A. P.

Preparing purified mucins and solutions thereof. Soc. ANON. DES LABORATOIRES ROBERT & CARRIÈRE, and R. H. MONCEAUX (B.P. 410,649, 8.8.33).—Animal viscera are treated first with dil. acid (HCl) to remove diastases, then with alkali (NaOH) for a time insufficient to remove diastases, and then with alkali (NaOH) for a time insufficient to cause hydrolysis; the mucins are pptd. from the alkaline solution by acidifying to p_H 6.

E. H. S.

Preparation of chondroitin compounds. A. E. MEYER, Assr. to CHAPPEL BROS., INC. (U.S.P. 1,929,786, 10.10.33. Appl., 20.3.33).—Animal cartilage, after treatment with aq. aldehyde, e.g., CH_2O , is extracted with aq. alkali, the extract acidified and filtered, and the filtrate mixed with an adsorbent. The mixture is neutralised and filtered and the chondroitin compounds are pptd. from the filtrate by addition of EtOH.

E. H. S.

Preservation of viable bacilli. E. A. A. SUEHS (U.S.P. 1,929,085, 3.10.33. Appl., 1.12.32).—Aciduric bacteria, e.g., *B. acidophilus* or *bulgaricus*, are separated from the liquid medium and then either frozen or added to a food product, e.g., ice cream, which is maintained in the frozen state.

E. H. S.

Neurosyphilis treatment and material therefor. P. J. HANZLIK, Assr. to LEYLAND STANFORD JUNIOR UNIV. (U.S.P. 1,927,210, 19.9.33. Appl., 14.3.32).—A salt containing anionic Bi and I together with a non-toxic glycol and an iodide, e.g., $Na_2BiI_5 \cdot 4H_2O$ (double-refracting crystals) 6%, NaI 12%, and propylene or ethylene glycol 82%, is injected intramuscularly.

E. H. S.

Treatment of pine oil for the separation of components therefrom. I. W. HUMPHREY, Assr. to HERCULES POWDER Co. (U.S.P. 1,928,020, 26.9.33. Appl., 12.6.28).—Terpin hydrate is separated from a pine oil fraction having b.p. 210–220° by addition of dil. H_2SO_4 or other hydrating agent, and the residual oil, which is preferably steam-distilled, is treated with a dehydrating agent, e.g., I, to convert the retained *tert.* alcohols into terpenes having b.p. 170–190°; borneol, fenchyl alcohol, methylchavicol, etc. have b.p. > 195° and can then be separated by distillation and refrigeration.

S. M.

Separation of certain components from pine oil. I. W. HUMPHREY, Assr. to HERCULES POWDER Co. (U.S.P. 1,932,183, 24.10.33. Appl., 19.4.27).—*tert.*-Alcohols, e.g., terpineols, are removed by conversion into low-b.p. hydrocarbons and H_2O , e.g., by means of I or surface catalysts, and the residue is fractionated and refrigerated for isolation of borneol, fenchyl alcohol, etc. E. H. S.

[Production of] therapeutic compounds [for treatment of pernicious anæmia]. E. LILLY & Co. (B.P. 411,179, 7.12.32. U.S., 9.1.32).—See U.S.P. 1,894,247; B., 1933, 765.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Formation of silver bromide emulsions for photography. I—III. M. MIYATA (J. Soc. Chem. Ind., Japan, 1934, 37, 140—142 B).—After digestion of emulsions containing AgBr and AgI the no. of well-developed crystals is proportional to the % of AgI. During pptn. the grains of AgI act as nuclei for the pptn. of AgBr, and it is only grains of this type that can act as mother-crystals for the growth of AgBr during digestion. A. G.

Developers containing acetone for obtaining fine-grain images. A. SEYEWETZ (Chim. et Ind., 1934, 31, Spec. No., 870; cf., B., 1933, 940).—Fine-grain developers containing $p\text{-C}_6\text{H}_4(\text{OH})_2$, or pyrogallol, and COMe_2 in mol. proportion, and no $p\text{-C}_6\text{H}_4(\text{NH}_2)_2$ are described. The images are similar to those obtained previously, but the time of development is longer. A. A. L.

Technical applications of photochemistry. G. EMSCHWILLER (Chim. et Ind., 1934, 31, Spec. No., 878—884).—A review. A. A. L.

See also A., June, 606, Reaction between AgBr and sensitisers. 610, Electrolytic desensitisation. Destruction of nuclei by developing agents. Premature image reversal. Blackening of photographic layers by electrons etc. 612, Light-sensitive crystals. 623, Recording time-settle curves with elutriation.

PATENTS.

Sensitising agent for photographic emulsions. C. J. STAUD and C. S. WEBBER, Assrs. to EASTMAN KODAK Co. (U.S.P. 1,925,508, 5.9.33. Appl., 11.3.31).—A (*tert.*-)hydroxyalkylamine [$\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$] is added to photographic Ag halide emulsion layers. H. A. P.

Sensitisation of photographic emulsions. KODAK, LTD., and L. G. S. BROOKER (B.P. 408,272, 30.6.32. U.S., 30.6.31).—The 7-substituted thiazolocarboxyanines and the neothiazolocarboxyanines of B.P. 408,273 (B., 1934, 619) sensitise in the region 540—710 μ . C. H.

Sensitisation of photographic silver halide emulsions. I. G. FARBENIND. A.-G. (B.P. 410,481, 9.9.32. Ger., 9.9.31).—Use of benzelenocarboxyanines substituted in the central $\cdot\text{CH}\cdot$ (8-position) and also in the C_6H_4 nuclei (4:4'- or 5:5'-) is claimed. The dyes are prepared in every case by condensing the corresponding 2-methylbenzelenazole alkylo-salt and ortho-ester in $\text{C}_5\text{H}_5\text{N}$. The following are described: 5:5'-dimethoxy-8-phenyl-1:1'-dimethyl- (bromide), 4:4'-bisacetamido-8-methyl-1:1'-diethyl- (bromide), 5:5'-dimethoxy-1:8:1'-triethyl- (perchlorate), 4:4'-bispropionamido-1:1'-dimethyl-8-ethyl- (bromide), 5:5'-bisallyloxy-8-methyl-1:1'-diethyl- (iodide), 5:5'-bisallyloxy-1:8:1'-triethyl- (perchlorate), 5:5'-diphenyl-1:8:1'-triethyl- (iodide), 5:5'-dihydroxy-1:1'-dimethyl-8-ethyl- (iodide), 5:5'-dihydroxy-8-methyl-1:1'-diethyl- (iodide), 5:5'-bisbenzoyloxy-8-methyl-1:1'-diethyl- (iodide), and

5:5'-diacetoxy-1:8:1'-triethyl-benzelenocarboxyanine (iodide). H. A. P.

Photographic developer with alkali substitute. M. L. DUNDON, Assr. to EASTMAN KODAK Co. (U.S.P. 1,925,557, 5.9.33. Appl., 2.2.32).—A *tert.*-hydroxyalkylamine [$\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$] is used as basic constituent. H. A. P.

Colour photography. P. REHLÄNDER (U.S.P. 1,927,805, 19.9.33. Appl., 19.11.30. Ger., 19.11.29).—A black and white line screen (*S*) is provided either on the back of the emulsion (*E*) support, or underneath the *E*, separated from it by a layer of celluloid or other waterproof varnish. In either case the distance of *S* from *E* should be < 0.1 mm., and the ratio of the *S* period to the *S* distance should be $>$ the aperture of the objective used. A diaphragm of 3-coloured strips is used in front of the lens; photographs are taken through *S* on *E*, and after development are shown by projection through the same lens and diaphragm. J. L.

Obtaining images of two different contrasts on a single film with a single development. J. G. CAPSTAFF, Assr. to EASTMAN KODAK Co. (U.S.P. 1,930,141, 10.10.33. Appl., 12.11.31).—After one image has been printed, the film is treated with a dil. solution of an oxidising agent (I), e.g., CrO_3 or aq. $\text{CuSO}_4\text{-NaCl}$, rinsed, and dried. The second image is printed on the film, and the whole developed. The contrast of the image printed before treatment is lowered, the effect increasing with the concn. of (I); the other image is not affected. J. L.

Reclamation of [dyed photographic] film scrap with permanganate solutions. T. F. MURRAY, JUN., and C. J. STAUD, Assrs. to EASTMAN KODAK Co. (U.S.P. 1,925,564, 5.9.33. Appl., 24.5.30).—The scrap is first leached with 30—70% aq. MeOH or EtOH and the porous residue oxidised by 0.1—1.0% aq. KMnO_4 ; the MnO_2 deposited is removed (by H_2SO_3). H. A. P.

Colour photography. [Copying of colour-record photographs on lenticular films.] C. NORDMANN (B.P. 410,609, 1.5.33. Fr., 27.5.32).

Carboxyanine dyes.—See IV. Plastic composition [for films].—See XIII.

XXII.—EXPLOSIVES; MATCHES.

Ageing of certain smoke-producing devices. M. MÉTIVIER (Chim. et Ind., 1934, 31, Spec. No., 251—252).—Evaporation of volatile liquids and separation of the constituents may occur. C. W. G.

Brisance and its determination. III. A. HAID and H. KOENEN (Z. ges. Schiess- u. Sprengstoffw., 1934, 29, 168—171; cf. B., 1934, 350).—The effect of tamping and of the type of detonator shows more divergence in the upper than in the lower portion of the Pb block. The expansion (*E*) is affected by rate of pressure drop rather than by time to reach max. pressure. Tests with $\text{C}_6\text{H}_2(\text{NO}_2)_3\cdot\text{OH}$ of different *d* showed no appreciable differences, as determined by measuring the diam. in the normal block and in one of 255 mm. diam.; the 139-mm. block was too weak. For brisant explosives of high *d* the normal block is not strong enough. The ratios of the *E* vals., produced with four explosives, to the *E* of

of Dynamit 1 were the same with both the 200- and 255-mm. blocks. Increased height of charge increases E . With T.N.T. charges measuring 15, 25, 35, and 50 mm., all of d 1.0; the vals. for c.c./g. were 30.2, 33.2, 35.5, and 38.5, respectively. This quotient tends to increase slightly with rising d , provided sensitiveness to detonation remains unaffected. In comparison with the pronounced effect of the wt. of the charge in developing pressure, detonation velocity is of less importance.

W. J. W.

Thermal explosion of explosive substances. I. C. C. ANDREEV and J. B. CHARITON. II. H. MURAOUR (Chim. et Ind., 1934, 31, Spec. No., 1040—1043, 1043—1045).—I. On Muraour's theory (A., 1933, 915) the time of heating necessary to obtain an explosion should be inversely \propto the mass of explosive material, and the probability of an explosion in a certain time interval should decrease exponentially with increasing time interval. Experiments with PbN_6 and tetryl do not confirm these predictions.

II. A reply. The author's theory neglects factors such as self-heating in the explosive, and reaction chains. Additional data for Ag_2C_2 are recorded.

H. J. E.

See also A., June, 604, **Thermal analysis of alkali and alkaline-earth picrates.** 605, **Ionisation by explosion of solid explosives.** **Detonation of PbN_6 .** **Combustion in a vac. of compressed Hg fulminate.** 607, **Stability of cellulose nitrates.** 637, **Nitration and denitration of nitrocellulose.**

PATENT.

Black powder composition. B. A. GILLIE, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,927,870, 26.9.33. Appl., 4.3.30).—The rate of combustion of black powder is retarded by incorporating with it 0.1—2.0% of a non-drying vegetable oil, preferably castor oil, the abs. η of which is > 0.5 dyne/sq. cm. at 40°. The oil may be added in solution or as an emulsion.

W. J. W.

XXIII.—SANITATION; WATER PURIFICATION.

Biological examination of air in connexion with air-purifying plant. I. JANENSCH (Woch. Brau., 1934, 51, 165—167).—Petri dishes containing yeast- H_2O -agar-gelatin are exposed to air entering or leaving the purifying plant, or in the cooling rooms, duration of exposure, E , being so chosen that approx. the same vol. of air passes over each plate. In order to determine E it is necessary to measure the air velocity, using an anemometer for this purpose. The exposed plates are set aside for < 6 days at room temp., the no. of organisms developing on each is counted, and the results are expressed as organisms per cu.m. of air.

I. A. P.

Analyser for carbon monoxide in air. H. W. FREVERT and E. H. FRANCIS (Ind. Eng. Chem. [Anal.], 1934, 6, 226—228).—The H_2SO_4 drying-trains of the usual form of analyser are replaced by duplicate absorbers (H_2O -cooled), using either SiO_2 gel or activated Al_2O_3 .

E. S. H.

Atmospheric dust recorder. W. G. HAZARD (J. Franklin Inst., 1934, 217, 571—590).—A direct-reading apparatus is described, having a range of approx. 120×10^6 particles per cu. ft. of air, in which dust

impinges on a slowly moving strip of transparent film, the deposit being measured by comparison of two beams of light, one passing through the dusty film and the other through clean film.

N. M. B.

Nitrification in sewage mixtures. E. J. THERIAULT and P. D. McNAMEE (Ind. Eng. Chem., 1934, 26, 547—549).—Diluted sewage mixtures seeded with nitrifying organisms do not show formation of nitrates until after the sixth day of incubation at 20°. Their subsequent production is influenced by the relative p_H of the diluted sewage and that to which the organisms have been accustomed; a p_H difference of 1.0 is sufficient to delay nitrification for over 20 days. In order to reduce the possibility of obtaining erroneous results when dealing with partly nitrified effluents the p_H of the dilution H_2O should be roughly adjusted to that of the optimum for the prevailing nitrifying organisms.

C. J.

Efficiency of chlorine in sewage disinfection as affected by certain environmental factors. W. RUDOLFS and J. V. ZIEMBA (J. Bact., 1934, 27, 419—442).—Chlorination of sewage to extents $<$ the total Cl_2 consumption (I) results in a reduction of bacterial no. (II) varying with the % of (I) applied and with the actual amount of Cl_2 necessary to provide this %. Chloro-peptones and -proteins are neither inhibitory to bacterial growth nor germicidal. Addition to sewage of peptone, lactose, $(NH_4)_2CO_3$, or NH_4HCO_3 in amounts up to 50 p.p.m. had no appreciable effect on the proportional reduction in (II) after chlorinating for 10 min. with 50% of (I). Addition of urine markedly interfered with the chlorination process. Chloro-products are produced in sewage under all conditions of Cl_2 treatment and reduce (II) to extents which increase with the period of contact.

A. G. P.

Importance of ammonia in the chlorine consumption of water. III. **Pre-ammoniation with ammonium salts.** M. L. KOSCHKIN (Z. Hyg., 1934, 116, 86—94; cf. B., 1933, 654).—Pre-ammoniation with NH_4Cl , $(NH_4)_2CO_3$, $(NH_4)_2SO_4$, or $(NH_4)_2C_2O_4$ reduces the Cl_2 consumption of H_2O by approx. the same amount as when aq. NH_3 is used, and also increases the bactericidal action (I) of the Cl_2 . Addition of NH_4 salts to chlorinated H_2O reduces the I titration and simultaneously the (I) of the mixture. NH_4 salts also minimise the taste and odour of chlorophenols in the treated H_2O .

A. G. P.

Eliminating false chlorine tests [in water], R. D. SCOTT (J. Amer. Water Works Assoc., 1934, 26, 634—640).—In chlorinated H_2O containing only traces of Mn or < 0.01 p.p.m. of nitrite-N (I) the standard *o*-tolidine test is satisfactory. In presence of Mn^{++} , but with < 0.3 p.p.m. of (I), the Mn should be completely removed by centrifuging after pptn. with $MgSO_4$ and NaOH and the *o*-tolidine solution used should contain additional HCl. If (I) is > 0.3 p.p.m., the residual Cl_2 is most safely determined with a starch-iodide solution containing $ZnCl_2$. Free Cl_2 may be distinguished from chloramines by its decolorisation of Me-orange in acid solution.

C. J.

Sterilisation of spring water [for butter factory]. W. GRIMMER and A. GRENZ (Milch. Forsch., 1934, 16, 195—199).— H_2O containing a large no. of organisms

treated with bleaching powder (5–10 mg./litre) and then with active charcoal gave usable H_2O free from *B. coli* and with, at most, few other organisms. $KMnO_4$ was not so satisfactory. E. B. H.

Treatment of waste from dyeing and printing. F. D. SNELL (Ind. Eng. Chem., 1934, 26, 580–581).—Laboratory examination of wastes from dyeing and printing of silk, rayon, and cotton indicates that, with the exception of boil-off and printing wastes, which should be diverted, the effluent can be rendered suitable for discharge into H_2O containing fish etc. by pptn. with 4 lb. each of copperas and CaO per 1000 gals. at a cost of < 5 cents. C. J.

Removal of bacterial flora from water in settling basins by added clay dispersions. E. M. SLOCUM (J. Amer. Water Works Assoc., 1934, 26, 645–652).—The use of bleaching clay is recommended to aid the settlement of Al flocs and thus improve the mechanical screening out of bacterial flora and of colloidal matter with a consequent reduction in the Cl_2 demand. The clay also adsorbs Cl_2 without destroying it, so that it is available for the production of a sterile sludge. C. J.

Correlation of the α -methylglucoside test for the colon-aërogenes groups [in water]. C. F. POE (J. Amer. Water Works Assoc., 1934, 26, 641–644).—From studies made using a large no. of cultures from widely different sources it is concluded that though this test does not give satisfactory correlation with the Mered and Voges-Proskauer reactions for members of the *Escherichia* group, correlation with the *Aërobacter* group is almost perfect. Correlation with the cellobiose test is less satisfactory than with the Na citrate test, and it seems to correlate with the sanitary survey of the sources of the different waters used so far as faecal contamination is concerned. C. J.

Photometric micro-analysis of drinking and service water. X. Determination of sulphate. XI. Determination of lead. C. URBACH (Mikrochem., 1934, 14, 321–330, 331–340; cf. B., 1934, 430).—X. A 100-c.c. sample is boiled with 1 c.c. of 10% $NaOH$, filtered, and acidified with about 0.3 c.c. of conc. HCl . The solution is evaporated and made up to 50 or 100 c.c. 1 or 2 c.c. are taken in a centrifuge glass and 5 c.c. of 0.01N- $BaCrO_4$ in $N-HCl$ added, followed by 1 c.c. of aq. NH_3 (1 vol. of NH_3 , d 0.903, + 3 vols. of H_2O and saturated with CaO), and the vol. is made up to 10 c.c. It is centrifuged for 2–3 min., 2 c.c. are taken, and 2 c.c. of 1% diphenylcarbazine in $EtOH$ added, after which it is made up to 25 c.c. After 10 min. the sample is tested photometrically alongside a blank test (film thickness 5 mm., filter S53).

XI. 1–2 litres of the sample are acidified (Morange) with HCl and evaporated to 30 c.c. The solution is neutralised with about 5 c.c. of 20% $NaOH$, air excluded, and set aside for 1–2 hr. It is filtered and made up to 100 c.c. with hot dil. $NaOH$ washed through the filter. 15 c.c. are treated with 1 c.c. of 1% gum arabic solution and 6 c.c. of 15% $Na_2S_9H_2O$ solution, and made to 25 c.c. The brownish-yellow product is tested (filter S43, film thickness 30 mm.) against pure H_2O , or against 15 c.c. of the filtrate diluted to 25 c.c., if this were coloured yellow. J. W. S.

Determination of small amounts of nitrates in waters rich in organic matter. F. DIÉNET and F. VILLEMARINE (Compt. rend., 1934, 198, 1611–1612).—To avoid loss of NO_3^- or oxidation of NH_3 or NH_2 -compounds, 14% of KOH is added to the H_2O and the solution is heated at 120° for 2 hr., and then half of it is distilled off. 2 g. of Devarda's alloy (I) per 100 c.c. are added and NH_3 is distilled into aq. H_3BO_3 . A blank determination on (I) is necessary. NO_2^- is best determined in the original H_2O . B. W. B.

Sulphate residue: contribution to water analysis. H. BARSCH (Pharm. Zentr., 1934, 75, 351–352).—Conversion of total inorg. solids into sulphates avoids errors due to volatilisation of chlorides or incomplete combustion of org. matter. J. S. A.

Synthetic resins and skin diseases.—See XIII.
Control of mould fungi.—See XIX.

See also A., June, 593, $CaSO_4$ in sea- H_2O . 618, Determining F' in H_2O . Equilibrium between carbonate hardness and free CO_2 in natural waters. 691, Toxicology of solvents. 698, Isolation of colon bacilli from H_2O .

PATENTS.

Treatment of sewage or other waste liquor containing putrescible matter. M., S. R., and S. GUGGENHEIM, E. A. C. SMITH, S. W. HOWLAND, and M. G. M. WHELPLEY (GUGGENHEIM BROS.), Assees. of G. H. GLEASON and A. C. LOONAM (B.P. 410,607, 26.4.33, U.S., 7.5.32).—Screened and detritus-free sewage is treated with $FeSO_4$ and $Ca(OH)_2$ (pH 6–8) and allowed to settle. The sludge produced is incinerated and treated with H_2SO_4 to recover $FeSO_4$ for re-use as the precipitant. The clear liquor is dealt with on zeolite filters which remove NH_3 and putrescible bases, which later may be recovered from the brine used in regenerating the zeolite. C. J.

Sewage disposal. W. M. PIATT (U.S.P. 1,929,179, 3.10.33, Appl., 6.11.30).—In a closed digestion system the yield of CH_4 is increased by keeping the sewage alkaline, and the gas is utilised, e.g., to drive a gas engine, the heat extracted from the H_2O -jacket and the exhaust being transferred to the sewage under treatment. B. M. V.

Germicidal products or articles. G. A. KRAUSE (B.P. 410,838, 15.9.32, Ger., 15.9.31).—The material is coated with an oligodynamically active metal, e.g., Cu or Ag , which may be activated by corroding the surface with H_2O_2 , $NaOCl$, or Cl_2 , but not by igniting or calcining. [Stat. ref.] C. J.

(A) Purification of water for household or industrial uses. (B) Adsorptive agent for use in the treatment of water and its preparation. H. FERGUSON (B.P. 410,739 and Addn. B.P. 410,800, 13.10.32).—(A) Peaty and similar H_2O is decolorised by treatment with a relatively insol., mild neutralising agent, e.g., $CaCO_3$, and an adsorptive agent (A), e.g., colloidal $Al_2(OH)_6$ (I), in the form of an adherent film on particles of an inert substance, e.g., sand. (B) The A is prepared by mixing the (I) obtained from 1 lb. of $Al_2(SO_4)_3$ with 16 lb. of fine quartz sand and drying at 40° . C. J.

Manure.—See XVI.