

# BRITISH CHEMICAL ABSTRACTS

## B.—APPLIED CHEMISTRY

JAN. 31 and FEB. 7, 1936.\*

### I.—GENERAL ; PLANT ; MACHINERY.

**Power transmission in chemical works.** C. R. PLATZMANN (Chem.-Ztg., 1935, 59, 1003—1005).—A survey of the spheres of usefulness of various types of drive and of direct-coupled electric motors. C. I.

**Fire prevention and protection in chemical industries.** B. F. FLOOD (Ind. Eng. Chem., 1935, 27, 1305—1308).—Hazards in chemical industries are dealt with systematically and a brief account is given of fire extinguishers. T. W. P.

**Mineral wool and vermiculite as [thermal] insulation.** J. A. SCHAEFFER (Ind. Eng. Chem., 1935, 27, 1298—1302).—The relationship of thermal insulation to air conditioning is discussed. The characteristics of various insulation materials for domestic and industrial insulation purposes are described and their physical properties compared. T. W. P.

**Testing and evaluation of heat-insulating materials.** W. SCHAIRER (Gas- u. Wasserfach, 1935, 78, 939—943).—The Schmidt-Hencky heat-flow indicator (a calibrated thermocouple-containing wrapping) was used to measure the insulating efficiencies of various materials when applied to a high-pressure steam-pipe. Mathematical and graphical methods for determining the most economical thickness of covering (taking into account both the heat loss and the cost of material and its application etc.) are described in detail and illustrated by an example. Tables for rapid calculation are given. For general use, kieselguhr is the most economical material, and it is possible to limit the heat loss to 140 kg.-cal./sq. m./hr. (for a mean temp. of 200°) without an unduly thick (8-cm.) covering. The deterioration of the insulating efficiency during service is discussed. J. A. S.

**Jacketed cold-storage room.** O. C. YOUNG (Contr. Canad. Biol. Fish., 1933, 7, No. 39, 10 pp.).—A const.-temp. storage room is described and the rate of dehydration of stored material examined. A. G. P.

**Relation between coil area, temperature of cooling medium, and dehydration in a cold-storage room.** O. C. YOUNG (Contr. Canad. Biol. Fish., 1934, 8, No. 33, 13 pp.).—Temp. and heat exchanges, together with dehydration effects, are examined. A. G. P.

**The ultracentrifuge and its applications.** T. SVEDBERG (Current Sci., 1935, 4, 297—303).—A review.

**Entrainment in the multiple-effect evaporator.** J. L. HALPIN (Proc. Queensland Soc. Sugar Cane Tech., 6th Conf., 1935, 167—172; Internat. Sugar J., 1935, 37, 489).—The "umbrella" type of entrainment preventer is recommended, and a drawing is given. It

consists of a horizontal base-plate fitted with an attached tube over which is supported a centrally-mounted plate in the form of an umbrella, by which the rising vapour is deflected outwardly and downwardly to an area where its velocity is greatly reduced. In this way the entrained liquor falls by gravity upon the horizontal plate, from which it is drained. J. P. O.

**Possibilities and difficulties of measuring air and gas volumes by the "inoculation" method.** G. NEUMANN (Arch. Eisenhüttenw., 1935—6, 9, 179—183).—The method consists in adding to a stream of gas (*A*) a measured current of another gas (*B*), well mixing the two, and determining the content of *B* in a measured vol. of the mixture. Using  $H_2$  as *B*, accurate results are obtained when *A* is any of the ordinary flue gases, but the method is tedious and relatively costly. A. R. P.

**Pt thermocouples.**—See X.

### PATENTS.

**Heat-treating furnace.** E. G. DE CORIOLIS and H. W. SCHRAMM, Assrs. to SURFACE COMBUSTION CORP. (U.S.P. 1,997,680, 16.4.35. Appl., 9.10.31).—The mouth of a muffle is provided with, in addition to a door, a screen of upwardly moving gases taken from the combustion chamber underneath after only one longitudinal pass from the burner at the back. B. M. V.

**Production of heat and cold.** A. F. LEBRE (B.P. 437,757, 15.5.34. Fr., 7.3.34. Addn. to B.P. 427,957; B., 1935, 609).—Modifications are made to the scavenging stage of the pressure-exchange apparatus described in the prior patent. B. M. V.

**Thimble-tube heat exchanger.** E. F. SPANNER (B.P. 437,313, 14.5.35).—The ratio of length to diam. of the thimbles is about 6 : 1, and baffles for causing the internal fluid to flow to the end and back are provided. B. M. V.

**Tubular apparatus for transfer of heat between fluids.** J. H. WEST (B.P. 437,280, 26.4.34 and 2.4.35).—Apparatus embodying a very large no. of short tubes of small bore conveying liquid in parallel and surrounded by gas flowing perpendicularly to them is described. B. M. V.

**Water-softening apparatus.** H. M. MARSH (B.P. 437,863, 18.2.35).—After backwashing with  $H_2O$ , the brine is fed to a point just above the zeolite and drawn down by a  $H_2O$ -operated ejector below; used brine is next forced out by fresh  $H_2O$ , the first part of the brine being rejected and the other part stored for use in the next round, the diversion being effected by a device sensitive to *d*, e.g., a counterbalanced bucket. B. M. V.

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



**Water-softening apparatus of the base-exchange type, and filter.** UNITED WATER SOFTENERS, LTD. (B.P. 437,856—7, 18.1.35. U.S., 27.1.34).—Electro-hydraulic means for operating a no. of softeners or filters in turn and out of phase are described.

B. M. V.

**Manufacture of boiler and steam-pipe lagging.** E. W. S. PRESS (B.P. 437,458, 9.5.34).—Machine or CaO sludge from paper manufacture, especially from esparto, is dried and mixed with kieselguhr, asbestos, cork dust for low temp. or Al powder for high,  $\text{Al}_2(\text{SO}_4)_3$ , and NaCl.

B. M. V.

**Desiccating apparatus.** BARR & STROUD, LTD., and J. W. FRENCH (B.P. 438,366, 14.5.34).—A desiccating material of the type which does not become moist when saturated, *e.g.*,  $\text{SiO}_2$  gel, is surrounded by fibrous filter material to arrest dust and, to allow for change of attitude or even jarring, the inlet ports are arranged so that the ingoing gas must pass through absorbent even when the latter does not completely fill the vessel.

B. M. V.

**Drying apparatus.** H. S. WOOD (B.P. 438,209, 30.5.34).—A carrier and cabinet for drying-boards, such as are used by furriers, is described.

B. M. V.

**Cooling or drying of lump or granular materials.** J. D. LAIDLAW, and SCOTTISH AGRICULTURAL INDUSTRIES, LTD. (B.P. 437,301, 27.4.34).—Material is dragged over a perforated bottom or carried by perforated trays of a conveyor and is supplied with cool or warm air from above, the exhaust air being removed by vac. from a chamber extending substantially the whole length below the conveyor.

B. M. V.

**Cooling towers.** L. G. MOUCHEL & PARTNERS, LTD., and J. H. HOME (B.P. 437,282, 26.4.34).—Pptn. of  $\text{H}_2\text{O}$  on the outside of the tower is prevented by the provision of sprays of cold  $\text{H}_2\text{O}$  within the tower, above the normal cooling zone.

B. M. V.

**Manufacture of fire-extinguishing foam.** KOMET KOMP. F. OPTIK, MECHANIK, U. ELEKTRO-TECHNIK GES. M.B.H. (B.P. 438,416, 10.5.34. Ger., 10.5.33).— $\text{H}_2\text{O}$  is taken from the pressure side of the main pump (cf. B.P. 424,995; B., 1935, 434) and passed through an injector-mixer back to the suction of the pump, drawing in foam-forming agent at the injector.

B. M. V.

**Thermophoric compositions [for heat accumulators].** E. SANDER (U.S.P. 1,971,660, 28.8.34. Appl., 29.10.30. Ger., 2.11.29).—Claim is made for a 6:3:1 mixture of anhyd.  $\text{AlCl}_3$ , NaCl, and  $\text{FeCl}_3$  which has m.p. 147—150° and no action on ferrous materials at 1000°, and is therefore useful in storing heat in oil-cracking operations.

A. R. P.

**Ball mill.** A. DREYER (U.S.P. 1,992,742, 26.2.35. Appl., 21.8.31. Ger., 13.5.29).—A mill, substantially as described in B.P. 413,969 (B., 1934, 816), is operated without venting to air, except when stopped.

B. M. V.

**Jaw crushers.** T. W. KEET (B.P. 438,700, 31.5.35. South Afr., 18.9.34 and 15.5.35).—One jaw is given a motion similar to that of the connecting rod of a reciprocating engine, the eccentric shaft being at the top; the other jaw is swung about a pivot at the top. Provision is made for uncrushable pieces.

B. M. V.

**Rock crusher.** W. W. GUEST (U.S.P. 1,997,214, 9.4.35. Appl., 27.11.29).—An inverted "pestle" or double-faced swing jaw is oscillated about an upper axle by means of a lower eccentric shaft and is embraced by fixed jaws which are individually adjustable and are spring-mounted to avoid damage. A feed device is also described.

B. M. V.

**Colloid mill.** C. P. TOLMAN, ASSR. to NOBLE & WOOD MACHINE CO. (U.S.P. 1,993,762, 12.3.35. Appl., 8.11.30).—In a mill of the film-shearing type, whether of disc, conical, or curved tapering form, the stator surface is divided up by grooves which are connected alternately to inlets and outlets provided with valves and connecting pipes so that the material may be transferred from one zone to another, forward or back as desired.

B. M. V.

**Mixing and grinding mill with grinding rollers.** F. B. LEHMANN (J. M. LEHMANN) (B.P. 437,506, 22.5.35. Ger., 14.6.34).—A pair of rolls is rotated about their individual and common axes, making contact with an outer casing and with each other.

B. M. V.

**Sieving machines.** H. SIMON, LTD., and G. WATTS (B.P. 437,751, 5.5.34).—The screens are set at a small angle to the vertical, and adjacent to them, preferably between a pair of them, are rebounding surfaces, the screens and surfaces being reciprocated horizontally 180° out of phase.

B. M. V.

**Sifting apparatus.** A. MORRIS (B.P. 438,220, 3.7.34).—Two superposed riddles are supported on a pair each of spring arms so that they may be vibrated horizontally at 90° to each other.

B. M. V.

**Pneumatic separation of materials comprising elements of different specific weight.** F. ALLARD (B.P. 437,702, 12.1.35. Fr., 16.1.34).—A trough-like sloping table is provided with a no. of obstructions producing zones of alternate expansion and contraction in the path of the ore or the like, the obstructions being preferably vertically-inclined rods or tubes of pear-shaped or equiv. section and adjustable as regards width.

B. M. V.

**Separation of foreign bodies from powdered materials.** E. SOYEZ and M. CHÉROUVRIER (U.S.P. 1,997,125, 9.4.35. Appl., 26.7.32. Fr., 6.8.31).—The cyclone separators (of diam.  $d$ ) of the apparatus described in B.P. 372,648 (B., 1932, 726) are provided with axial outlets of diam.  $0.625-0.875d$  and placed  $2.5d$  above the bottom. The nearly clean air from the expansion chamber is "filtered" through, *e.g.*, an electrostatic separator.

B. M. V.

**Separation of solid materials of different specific gravities.** G. A. VISSAC (B.P. 437,375, 25.4.34. Can., 27.4.33).—The mixed materials are conveyed by a minor stream of  $\text{H}_2\text{O}$  horizontally across a surge chamber in which a larger, upward-surging current of  $\text{H}_2\text{O}$  is produced by an air chamber and rotary valve; the heavier constituent drops out into a conveyor, and the lighter is carried on by the combined stream of  $\text{H}_2\text{O}$ .

B. M. V.

**Mixing and measuring devices.** MARTINI-HÜNEKE U. SALZKOTTEN MASCHINEN U. APPARATEBAU-A.-G. (B.P. 438,310, 7.2.35. Ger., 7.2.34).—Two (or more) piston meters are coupled together so that they may have



different strokes but always make an equal no. of strokes, the strokes being counted by means which will read less in proportion to the reduction of the strokes. B. M. V.

**Centrifugal separators.** GEN. ELECTRIC CO., LTD., and B. V. LAMBERT (B.P. 438,229, 29.8.34).—A pneumatic separator having tangential inlet is divided into a no. of separating chambers by transverse plates having a central aperture and forming with the outer casing annular spaces which are adjustable by various means. B. M. V.

**Apparatus for removal of supernatant liquid from solids in containers.** SHELVOKE & DREWRY, LTD., and J. S. DREWRY (B.P. 437,424, 30.4.35).—In a tank for emptying gullies and the like a flexible pipe leads from a draw-off head inside to the outlet cock and the head is adjusted as to level by a lever outside. B. M. V.

**Combined press and filter device.** R. M. THOMPSON, ASSR. to THOMPSON CONTINUOUSLY OPERATING FILTER PRESS CO. (U.S.P. 1,997,611, 16.4.35. Appl., 19.1.31).—Details of construction are claimed for an apparatus of the type in which two filter belts travel in the same direction and converge. B. M. V.

**[Sand] filter.** C. HUNGERFORD, ASSR. to HUNGERFORD & TERRY, INC. (U.S.P. 1,998,279, 16.4.35. Appl., 30.3.34).—Construction of the outlets of aeration pipes is described. B. M. V.

**Centrifuge.** G. J. STREZYNSKI, ASSR. to DE LAVAL SEPARATOR CO. (U.S.P. 1,997,919, 16.4.35. Appl., 3.10.32).—In a bottle centrifuge the cups are supported by collars formed thereon, and allowed to drop 15–20° below the horizontal only when stationary, that angle being sufficient to prevent disturbance of the collected solids. B. M. V.

**Centrifugal machines.** G. AITKEN, and WATSON, LAIDLAW & CO., LTD. (B.P. 437,691, 11.9.34).—A device for locking the cover whenever the basket is rotating is described. B. M. V.

**Centrifugal basket construction.** E. ROBERTS, ASSR. to WESTERN STATES MACHINE CO. (U.S.P. 1,992,964, 5.3.35. Appl., 25.2.33).—An all-welded construction of cylindrical basket is described. The sheet-metal wall is perforated uniformly, is of uniform thickness, and is supported outside by hoops at uniform intervals. B. M. V.

**Separation of suspended solids from liquid.** W. W. TRIGGS. From GEN. ZEOLITE CO. (B.P. 437,544, 24.7.34).—The feed of liquid is maintained uniform by gentle agitation and is passed over a no. of superposed settling surfaces of length sufficient to produce complete settling. The settled solid matter is removed by rakes travelling very slowly at right-angles to the direction of flow of liquid, and is discharged into pockets out of the flow of the main stream. B. M. V.

**Atomisers for liquids.** S. M. MILBOURNE, F. FRANKS, and C. & W. WALKER, LTD. (B.P. 436,950, 16.4.34).—The liquid is allowed to flow over a circular weir in a thin film down a conical surface, and converges to meet a conc. jet of compressed gas. B. M. V.

**Apparatus for treating one liquid with another.** H. MOORE (B.P. 437,089, 26.3.35).—The system com-

prises continuous countercurrent washing in  $\nless 2$  units. Each unit comprises a pump which mainly pumps back into itself through an orifice to create pressure, and on the pressure side is provided with a bleed line to a tangential entry at an intermediate level of a separating vessel; the latter is provided with draw-off lines from top and bottom to the next pump in each direction, respectively. B. M. V.

**Treatment of flowing supplies of liquid with treating reagents.** F. C. GRIFFIN (B.P. 437,461, 28.5.34).—The main flow is caused to pass quietly through a float chamber the outlet of which is regulated by the float; the latter also alters the level of a dropping device for the reagent. B. M. V.

**Pasteurisation, sterilisation, or like treatment for milk and other liquids.** W. G. TARBET, and ALUMINIUM PLANT & VESSEL CO., LTD. (B.P. 438,146, 17.5.34).—For pasteurisation purposes the heating is effected in steps of rapid heating with short holding periods between each, the final steps being 69–71° (at 20-sec. intervals) followed by immediate cooling. B. M. V.

**Apparatus for converting milky liquid, latices, solutions, dispersions, and emulsions into a finely-divided solid condition by centrifugal spraying and drying.** RUBBER-LATEX-POEDER-COMP. N.V., and M. J. STAM (B.P. 438,249, 8.4.35).—The drying gas is supplied uniformly through the bottom of the drying chamber (arrangement of perforations and passages described) and passes upwards past the spraying device, comprising a centrifugal disc within a trumpet from which the spray is projected horizontally, the waste gas and fine material leaving in an upward direction. B. M. V.

**Apparatus for distilling or concentrating liquids.** E. M. F. L. GUIGNARD (B.P. 438,423, 17.4.34).—A closed (but ventilated) helical channel carrying the liquid to be evaporated is rotated in a vessel containing heat-transferring fluid which may be heated by fire or electricity. Combination with a power plant is claimed. B. M. V.

**Evaporating apparatus for liquids.** G. H. LIMPET (U.S.P. 1,997,643, 16.4.35. Appl., 13.11.33).—Air is passed spirally up and liquid down through a vertical cylindrical chamber which is centrifugally rotated and provided with interior circular ribs to spread the liquid. B. M. V.

**Apparatus for use in testing solutions. [Laboratory evaporator.]** M. W. BADEN (U.S.P. 1,992,458, 26.2.35. Appl., 4.9.31).—Rapid evaporation of liquid in a dish is effected by downwardly-directed radiant heat only, produced electrically, in conjunction with a current of air which is supplied through a coil surrounding the heater. B. M. V.

**Sampling of liquors containing suspended solids.** G. NONHEBEL, R. A. BELL, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 437,211, 25.4.34).—The liquid is admitted tangentially into a cylindro-conical tank near the top (base) of the cone; outlets are provided through the apex and by an overflow. The assays, *e.g.*, determination of [H], are effected in the zone between the inlet and overflow. B. M. V.



**Periodic and controllable distribution of liquids.**

SOC. ANON. DES MANUF. DES GLACES ET PROD. CHIM. DE ST.-GOBAIN, CHAUNY & CIREY (B.P. 438,087, 8.11.34. Fr., 8.11.33).—A suspension of abrasive in liquid which is to be delivered to a no. of working stations for the polishing of glass is pumped continuously through a special arrangement of flow-and-return bus pipes, branch pipes, and tanks. B. M. V.

**Air and other [pneumatic] separators.**

G. H. FRASER (U.S.P. 1,922,942, 5.3.35. Appl., 9.6.30).—In a pneumatic separator with internal fan for circulation, the speed of the fan (in the upper part) and of the feed distributor (in the lower part) is substantially const. The degree of separation is varied by varying the vol. of the upward-current separating chamber by means of a conical-cylindrical-conical false bottom, and also the cross-section of the annular upward passage near the feeding point, one of these adjustments being effected by hand and the other automatically by the wt. of the coarse tailings sliding down the conical collecting shoot for it. B. M. V.

**Apparatus for atomising particles in suspension.**

AKTIEB. SEPARATOR (B.P. 437,555, 21.11.34. Swed., 22.11.3).—The liquid is fed through a hollow shaft to both faces of a rotating disc situated between a pair of adjustable stationary discs. B. M. V.

**Manufacture of friction elements.**

W. A. BLUME. ASSR. to AMER. BRAKEBLOK CORP. (U.S.P. 1,992,601. 26.2.35. Appl., 16.4.32).—A method of manufacture of the linings described in U.S.P. 1,924,021 (B., 1934, 483) is claimed. B. M. V.

**Friction material.** S. COLLIER, ASSR. to JOHNS-MANVILLE CORP. (U.S.P. 1,994,979, 19.3.35. Appl., 14.7.30).—A facing of low  $d$  composed of hardened rubber and short asbestos fibres in random directions is vulcanised to a backing of higher  $d$  composed of several plies of rubber and fibrous asbestos mostly laid in pre-determined direction. B. M. V.

**[Vacuum-driven] compressor for gaseous fluids.**

R. R. STITT (B.P. 438,134, 12.5.34).

**Classifiers for fine coals.**—See II. **F.-p. depressant.**—See III. **Gas bottle.**—See X. **Furnaces.** **Controlling physical conditions.**—See XI.

**II.—FUEL; GAS; TAR; MINERAL OILS.**

**New Rumanian fuel.** J. ABUAY (Petroleum, 1935, 31, No. 42, 6—8).— $C_{14}H_{10}$  (I) is now recovered from the uncondensable gases of petroleum distillation, the Astra Romana Co. possessing a plant at Ploesti which produces annually 7000 tons of liquid (I). The properties of (I) and its suitability as a domestic and industrial fuel are briefly discussed. A. B. M.

**Geological aspects of recent research on coal.**

H. G. A. HICKLING (Fuel, 1935, 14, 322—331).—Present-day knowledge of the structure of coal as revealed by recent microscopical study is reviewed. The nature of the "uniform brown substance" ("vitrinite") and the other coal constituents (fusain, resistant plant remains, etc.), the variation of composition with rank, and the geological significance of rank are discussed. A. B. M.

**Benzenoid constitution of coal.** W. A. BONE (Chem. & Ind., 1935, 1048).—The progressive development of benzenoid structure throughout the lignin-peat-coal-anthracite series has been proved (cf. B., 1935, 435). D. K. M.

**Fusibility of coal ash.** Y. KOSAKA (J. Fuel Soc. Japan, 1935, 14, 119—124).—A modified Bunte-Baum method (B., 1928, 322) of determining the fusibility includes automatic recording of the sintering, softening, and fusion points by a rod resting on a pellet of ash in an automatically controlled electric furnace. An expression has been found for the average  $\eta$  of the slag formed between the softening and fusion points, and the effect of reducing, oxidising, and medium atm. noted. Ashes tested fall into four broad groups for an oxidising atm. and three for a reducing atm. with differing possibilities of clinker formation. Data obtained by this method would be valuable in assessing the clinkering proclivities of a coal and the nature of the slag. D. M. M.

**Rapid determination of hydrogen in solid and liquid fuels.**

G. LAMBRI (Angew. Chem., 1935, 48, 679—683).—About 1 g. of the fuel is burned with  $O_2$  under pressure in the calorimetric bomb. A small quantity (0.3—0.4 g.) of  $BaCO_3$  is introduced into the bomb in order to convert any  $HNO_3$  or  $H_2SO_4$  formed into  $H_2O$ . After releasing the pressure the bomb is washed out with a measured vol. of EtOH, in which, after filtration from the  $BaCO_3$  etc., the  $H_2O$  is determined by measuring its crit. solution temp. in admixture with an equal vol. of light petroleum (cf. B., 1931, 97; 1932, 486). A correction is made for the  $H_2O$  lost as vapour in the released gas. The variation between duplicate determinations of the % of H in coal, tar, oil, pure org. compounds, etc. was 0.04—0.09; it was slightly higher (0.1—0.2) if methylated spirit was used instead of pure EtOH. The method also permits determination of the  $HNO_3$  and  $H_2SO_4$  formed during combustion, and therefore of the S content of the fuel. It is preferable to burn materials of very high S content in admixture with a material (of known composition) of high H content. A. B. M.

**Caking and expanding of coals.**

K. N. SCHISCHKIN and WASSERMAN (Koks i Chim., 1933, No. 7, 51—56).—The fusing properties of coal depend not on bitumen, but on the reactions between one of its decomp. products and the coal substance. Bitumen sol. in  $CHCl_3$  affects the expanding properties of coal; that sol. in  $COMe_2$  does not. CH. ABS. (e)

**Changes in coking properties of Karaganda coals with increasing layer depth.** F. A. POPUTNIKOV and E. M. TAİTZ (Koks i Chim., 1934, 4, No. 11, 39—41).—Coals from lower strata contained less O and  $H_2O$ , and had better coking properties. CH. ABS. (e)

**Petrographic factors which affect the coking properties of coal.** M. A. STEPANENKO and L. E. TZUKERMAN (Koks i Chim., 1933, 3, No. 10, 59—69).—The presence of fusain in the highly carbonised vitrain, though reducing the agglutination power slightly, increases the hardness of the coke. The swelling and fluidity of the coal are directly related. CH. ABS. (e)



**Low-temperature carbonisation of Ukrainian brown coals with catalytic cracking of the carbonisation products in gaseous phase.** G. I. DESCHALIT (Koks i Chim., 1934, 4, No. 11, 42—44).—

Results on the carbonisation of brown coals at 500° with and without cracking of the carbonisation products at 700° are recorded. Greater yields of  $C_6H_6$  and kerosene were obtained by using catalysts,  $SiO_2$  gel being more active than C. CH. ABS. (e)

**Modern applications of the Salerno retort for low-temperature carbonisation.** ANON. (Ind. Chem., 1935, 11, 495—499).—The Salerno process, and especially the plant recently installed at the Southall Station of the Gas Light & Coke Co. and the retorts being erected in South Africa to deal with native torbanite, is described. D. M. M.

**Steaming in horizontal retorts.** G. L. BRAIDWOOD (Gas J., 1935, 212, 701—706).—Experiments carried out at Beckton show that, for effective operation, a path above the charge, superheated steam, and a tight retort are necessary. Control is effected by regular gas analysis. Quality of coal carbonised greatly influences the results. A comprehensive series of test results is given. The economics of the process are discussed, and it is emphasised that these depend largely on local conditions. The influence of steaming on gas purification, and the comparative merits of steaming and benzol recovery, are briefly reviewed. J. W.

**Hydrogenation of coal.** H. ISOBE (Bull. Inst. Phys. Chem. Res. Japan, 1935, 14, 1177—1196).—A mixture of heavy oil and coal is catalytically hydrogenated to heavy and light oil; the latter is refined and tested as a motor fuel. E. W. W.

**[Economics of] hydrogenation.** F. G. LAUPICHLER (Gas J., 1935, 212, 727—729).—The economics of tar hydrogenation are discussed. J. W.

**Separation of acenaphthene from coal tar, and its purification.** P. P. KARPUCHIN and L. I. SLOMINSKI (Ukrain. Chem. J., 1935, 10, 392—411).—Fractional distillation of heavy oil gives most of the acenaphthene (I) in the fraction of b.p. 260—275°, the yield amounting to 2.52%. A further 0.14% is obtained by redistilling the mother-liquor together with the 275—290° fraction. The first anthracene oil fraction yields 5.84% of (I) (triple distillation), chiefly in the fractions of b.p. 275—279°; < 79% of heavy oil and < 44% of anthracene oil has to be distilled over for complete recovery of (I). Crude (I) is conveniently purified by recrystallisation from benzene. R. T.

**Colour-testing of bitumen.** D. M. WILSON (Chem. & Ind., 1935, 1040—1042).—Some bitumens show different colours according to the solvent in which they are dissolved. To test the colour of bitumen in samples cut from the road it is preferable to dissolve the bitumen direct from the sample. All mineral matter should be removed (cf. B., 1931, 1051). Solvents containing Cl, e.g.,  $C_2H_5Cl_3$ , should be purified. The colour is best determined by measuring the change in electric output of a photo-cell by interposing a cube (3-cm. side) of a solution (0.5 g. of bitumen in 100 c.c. of  $C_6H_6$ ) between a light source and the cells; or the vol. of solution

required to give the same effect as a given vol. of a standard bitumen solution may be determined. The use of colour-testing for showing compliance with specification is indicated. D. K. M.

**Catalytic air-oxidation of petroleum in the vapour phase.** R. KLATT and H. JELINEK (Petroleum, 1935, 31, No. 42, 1—6; cf. B., 1934, 438).—Air-oxidation (in presence of steam) at 440° of a Russian kerosene, high in naphthenes, with a  $V_2O_5$ -pumice catalyst, gave: (i) a  $H_2O$ -insol. fraction (83.4%) consisting principally of unchanged kerosene, (ii) an aq. layer containing lower fatty acids, aldehydes, and ketones, and (iii) a solid product consisting principally of fatty acids. The total yield of fatty acids was about 7.5% of the kerosene decomposed. The activity of the catalyst rose to a max. after 15 hrs.' use, remained const. for 30 hr., and then fell off slowly. A. B. M.

**Analysis of acid sludge from mineral oil treatment.** E. HOLZMAN and S. SUKNAROWSKI (Ind. Eng. Chem. [Anal.], 1935, 7, 378—380).—A scheme for the determination of mineral oil, sulphonic acids,  $H_2SO_4$ , and insol. matter, applicable to acid sludges, is outlined, known methods being used. F. R. G.

**Use of the analytical quartz lamp in the mineral oil industry.** A. BALADA (Petroleum, 1935, 31, No. 48, 11—12).—In general, the fluorescence of naphthenic oils is blue, of asphaltic oils brown, and of paraffin-base oils light yellow. The difference is marked with fractions of higher  $\eta$ , and Pennsylvanian oils can be detected in mixtures, paraffin-base oils giving a milky-yellow fluorescence. By comparison with standard samples, the % of asphalt in cylinder oils can be determined and the oxidation of insulating oils and formation of asphalt in motor lubricating oils can be followed. C. C.

**Critical solution temperature of mineral oils.** E. VELLINGER and J. D. HERRENSCHMIDT (Compt. rend., 1935, 201, 780—782).—The temp. of turbidity of mineral oils dissolved in  $COMe_2$  + amyl acetate (I) is a linear function of the % of (I). Using as solvent  $COMe_2$ : (I) = 9 : 1 the crit. solution temp. ( $T$ ) of refined oils of different origin is approx. the same, but refining by  $H_2SO_4$  raises  $T$  considerably to an approx. const. val. with increasing % of  $H_2SO_4$ . After service at moderate temp. refined oil gives a decrease in  $T$  owing to oxidation, whereas unrefined oil gives no change in  $T$ . Lubricating oil used in combustion engines exhibits a decrease in  $T$  already after 50 hrs.' service.  $T$  is a useful guide to the alteration of oil during service and to its degree of refining. R. S. B.

**Waxes in the candle industry.** L. W. GELLER (Oil & Soap, 1935, 12, 263—265).—Addition of stearic acid, although it lowers the m.p. of the paraffin wax, raises the softening (bending) point of the candle; other natural or synthetic waxes are not satisfactory and may spoil the burning properties. Hydrogenated oils may serve as hardening agents, especially for scale paraffin wax, in candles of the night-light type. E. L.

**Knocking characteristics of fuels and engines.** M. MARDER (Oel u. Kohle, 1935, 11, 923—928).—The  $C_8H_{18}$  no. obtained with a fuel varies with the engine conditions and with different engines. A correction involving the Ostwald "boiling index" is applied to



calculate the  $C_8H_{18}$  no. corresponding to a boiling index of 110; curves are given relating the val. thus obtained with a no. of engines to the  $d$  and the parachor. It is considered that in evaluating the knocking characteristics, the physical properties of the fuel must be taken into account.

C. C.

## PATENTS.

**Treatment of coal.** N. CUNNINGHAM and C. L. PECK, Assrs. to CHAMPION FIBRE CO. (U.S.P. 1,988,999, 22.1.35. Appl., 28.12.32).—Coal is sprayed with a dust-laying composition formed by emulsifying oil (60 gals.) with  $H_2O$  (55 gals.) in presence of a by-product (50 lb.) which separates from the alkaline black liquor of pulp mills on keeping or on reduction of the  $H_2O$  content.

A. B. M.

**Manufacture of briquettes.** W. L. HOERNLE (U.S.P. 1,990,405, 5.2.35. Appl., 22.8.30. Renewed 10.7.34).—Finely-divided material, *e.g.*, anthracite, ore, is briquetted, using as binder a tar or pitch of low m.p., *e.g.*,  $< 50^\circ$ , and the briquettes are then heated at  $< 230^\circ$  in presence of air, whereby the tar is converted into a non-coked binder of high m.p., from which the smoke-producing constituents have been removed.

A. B. M.

**Air cleaners and classifiers for fine coals.** G. A. VISSAC (B.P. 438,204, 15.5.34. Can., 10.6.33).—The apparatus comprises a combination of pneumatic shaking tables and screens, the top layer from the first table being re-treated on another table and the lower layer classified on screens with riffles.

B. M. V.

**Coke ovens and like apparatus.** H. A. BRASSERT & CO., LTD., and T. P. COLCLOUGH (B.P. 435,938, 29.3.34).—Ovens for the coking of coal, pitch, petroleum residues, etc., which are heated from below, have the combustion flues arranged in parallel in the floor, adjacent flues being fired from opposite directions. Below the combustion flues and appropriately connected therewith is an arrangement of adjacent waste-gas flues and air-delivery flues designed to give efficient heat transfer from the waste gases to the air for combustion.

A. B. M.

**Coke oven.** H. LEITHÄUSER, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,986,830, 8.1.35. Appl., 13.11.31. Ger., 10.11.30).—In an oven in which the vertical flues are connected in pairs or groups both at the top and the bottom, so that part of the waste gas is automatically recirculated, the upper and lower connexions are provided with adjustable dampers for controlling the flow of the gases. The dampers of the upper connexion are of such a size that the openings can never be entirely closed; those of the lower connexion are so constructed that the lower opening is always  $<$  (preferably about  $3/5$  of) the upper.

A. B. M.

(A) **Coke oven.** (B) **Regenerative coke-oven battery.** F. TOTZEK, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,986,903—4, 8.1.35. Appl., [A] 16.1.31. [B] 8.4.31. Ger., [A] 31.8.28, [B] 10.4.30).—(A) Below each oven chamber of the battery and parallel thereto are two regenerators ( $G$ ), situated on opposite sides of a central wall, each of the pair being connected to a passageway extending over the companion regenerator. The vertical flues are connected at their upper ends so as to form two sets operable alternately for inflow and

outflow. The flues of one set are connected with one  $G$  of a pair directly and with the companion  $G$  through the extension passageway; the flues of the other set are similarly connected with an adjacent pair of  $G$ . (B) The vertical-flame flues of the heating walls of the battery ( $B$ ) are connected at their upper ends so as to provide two sets of flues operable alternately for inflow and outflow. Two groups of regenerators ( $R$ ), separated by a central wall, extend transversely to the longitudinal axis of  $B$ ; each group of  $R$  is connected to one of the sets of flues. Below each  $R$  and connected therewith is a collecting channel ( $C$ ). A series of  $< 4$  base flues, running parallel to the longitudinal axis of  $B$ , lie below  $R$ ; the two outer base flues are connected at the outer sides of  $B$  only to the  $C$  of one group of  $R$ , whilst the inner base flues are connected at the middle part of  $B$  only to the  $C$  of the other group of  $R$ . Inequality in the gas passages and non-uniformity of heating are thereby avoided. Cooling channels through which air is passed are provided between the waste-heat and air channels and the base of  $B$ .

A. B. M.

**Coking retort oven.** R. CHRISTIANSON, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,989,505, 29.1.35. Appl., 9.1.31).—The oven is provided with a series of cross-wise regenerators ( $R_1$ ) which extend the entire width of the battery, whilst between each pair of  $R_1$  is a series of smaller regenerators ( $R_2$ ), triangular in horizontal cross-section, so arranged that their apices are adjacent alternately to the  $R_1$  on either side of them. The  $R_1$  and  $R_2$  are connected to the sole flues and to the vertical flame flues in such a manner that the alternate  $R_2$  carry air and waste gases while the  $R_1$  carry fuel gas. The wall between the apex of each  $R_2$  and the adjacent  $R_1$  is provided with a slot filled with comminuted refractory material. Leakage between conduits for fuels and waste gas is thus reduced to a min.

A. B. M.

**Low-temperature carbonisation of coal and other materials.** C. B. WINZER (B.P. 437,033, 23.4.34).—The coal is covered with a layer of pulverulent refractory material, *e.g.*, powdered cement, and submitted to low-temp. carbonisation, the coke being subsequently separated from the cement by sieving. If desired, some cement may also be admixed with the coal. Carbonisation may be effected in an externally-heated tunnel oven through which the coal is conveyed on trays, the rest of the space within the tunnel being filled with the refractory. Another form of apparatus comprises a horizontal cylindrical retort having a diametral perforated partition, so that by rotating the retort when carbonisation is complete the coke and refractory are separated, and the hot refractory can be utilised for the next charge.

A. B. M.

**Treatment of coke.** A. R. POWELL, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,989,526, 29.1.35. Appl., 9.10.28).—Coke is rendered dustless and is given a distinctive appearance, odour, and flame colour by applying a thin film of mineral oil containing a vegetable or aromatic oil, *e.g.*, pine oil, and a finely-communited metal, *e.g.*, bronze powder.

A. B. M.

**Production of non-structural (A) adsorptive, (B) activated, carbon.** J. C. MORRELL (U.S.P. 1,989,107—8, 29.1.35. Appl., [A] 22.7.32, [B] 22.5.33).—



(A) Charcoal, a mixture thereof with petroleum coke, or other C base is mixed with a bituminous binder, *e.g.*, an emulsion of wood or coal-tar pitch, the mixture, in the uncompressed state, is carbonised, and the product activated by heating in presence of steam. (B) "Sol. wood tar" or the corresponding pitch is used as the binder. A. B. M.

**Manufacture of carbon black.** G. A. FRENKEL, ASSR. to SHELL DEVELOPMENT Co. (U.S.P. 1,990,228, 5.2.35. Appl., 24.10.32).—C black produced by the thermal decomp. of a hydrocarbon gas is mixed with distilled  $H_2O$  and the mixture is injected in a finely-divided state and under high pressure into a hot, non-oxidising, gaseous medium. Flash evaporation of the  $H_2O$  occurs and the C which is subsequently separated from the gas is obtained in very finely-divided form, *e.g.*, of particle size  $< 1 \mu$ . A. B. M.

**Destructive hydrogenation of carbonaceous materials.** M. PIER, ASSR. to STANDARD-I. G. Co. (U.S.P. 1,989,822, 5.2.35. Appl., 8.8.29. Ger., 25.9.28).—The gases and vapours leaving the plant, after condensation of the hydrocarbons liquid at the ordinary temp., are scrubbed with oil under pressure. The mixture of gases and vapours evolved on releasing the pressure on the solution thus obtained is separated into its constituents ( $C_5H_{12}$ ,  $C_4H_{10}$ ,  $C_3H_8$ , etc.) by subjecting it in stages to increased pressure and lower temp. The compressed  $H_2$  (containing a small proportion of gaseous hydrocarbons) remaining after this operation is returned to the hydrogenation reaction. A. B. M.

**Treatment of combustion and distillation gases [to recover ammonium sulphate].** R. LESSING (B.P. 437,278, 25.4.34).—Combustion gases are washed with an aq. solution of  $(NH_4)_2SO_4$  (I) containing  $CaCO_3$  (II) and  $CaSO_4 \cdot 2H_2O$  (III) in suspension; oxides of S are absorbed with partial conversion of (II) into (III). Excess of (III) is removed by continuously separating a portion of the sludge, a suspension of which is used for scrubbing distillation gases containing  $NH_3$  and  $CO_2$ . These gases are absorbed with the production of (I) and (II); the (II) is separated and returned to the first stage of the process. A. B. M.

**Controlling temperature in horizontal gas-retort settings.** GAS LIGHT & COKE Co., and J. A. NICHOLS (B.P. 436,960, 18.4.34).—In a setting in which the retort chamber is subdivided by transverse partitions, the fuel gas and secondary air being admitted centrally to each combustion chamber thus formed so that the combustion gases can ascend between the retorts (R) and pass over the upper R to descend the down-take flues (F) between the R and the sides of the chamber, a return passage is provided between each F and the corresponding chamber in such a position that the injector action of the gases entering suffices to draw back a portion of the combustion gases into the chamber. A. B. M.

**Recovery of phenols from gas liquors.** W. TIDY, ASSR. to SEMET-SOLVAY ENG. CORP. (U.S.P. 1,989,177, 29.1.35. Appl., 20.5.31).— $H_2S$ ,  $CO_2$ , and free  $NH_3$  are distilled off (in the vapour at 93–98°) from dil. gas liquor, the phenols (I) are extracted from

the residual liquid by agitation with an inert solvent (light oil,  $C_6H_6$ ), and the fixed  $NH_3$  is removed from the aq. liquor by treatment with  $Ca(OH)_2$  in the usual way. (I) are extracted from their solutions in oil by aq. alkali and purified as usual. This process renders the effluent innocuous and reduces the amount of alkali used in the prep. of (I). Apparatus is described. E. J. B.

**Gas meter and diaphragm therefor.** W. H. FULWEILER and C. W. JORDAN, ASSRS. to UNITED GAS IMPROVEMENT Co. (U.S.P. 1,990,320, 5.2.35. Appl., 3.4.30).—The leather used for gas-meter diaphragms is stuffed with a metallic soap, *e.g.*, an Al compound of saponified coconut oil, which is insol. in  $H_2O$ ,  $C_6H_6$ , or other hydrocarbons which may separate from the gas. A. B. M.

**Manufacture of (A) benzene from light oil, (B) chemically pure benzene.** R. W. CAMPBELL and F. W. WAGNER, ASSRS. to JONES & LAUGHLIN STEEL CORP. (U.S.P. 1,991,843—4, 19.2.35. Appl., [A] 16.6.33, [B] 7.6.34).—(A) Light oil rich in  $C_6H_6$  is treated with  $H_2SO_4$  ( $> 93 \cdot 2\%$ ) to react with unsaturates free from S. The product after removal of sludge is neutralised and the distillate (*e.g.*, 68–115°) treated with 94–100%  $H_2SO_4$  to remove hydrocarbons containing S. (B) Industrial "pure"  $C_6H_6$ , b.p. 77·5–82·5°, is fractionally crystallised at a rate  $> 5\%$  per hr., being agitated by air during freezing. Liquid impurities are drained off and the solidified  $C_6H_6$  is melted. C. C.

**Production of asphalt.** (A) U. B. BRAY and L. B. BECKWITH, (B) B. G. ALDRIDGE, ASSRS. to UNION OIL Co. of CALIFORNIA (U.S.P. 1,988,715 and 1,988,766, 22.1.35. Appl., [A] 7.8.33, [B] 9.1.33).—(A) An air-blown asphalt is separated into its oil and bitumen constituents by means of a solvent, *e.g.*, liquid  $C_3H_8$ , and the bitumen is then rebled with a selected fraction of the oil and/or other oils. By suitable choice of blending oil an asphalt can be produced having any desired properties, *e.g.*, a lower or higher penetration at 25° for the same m.p. than that of the original oxidised asphalt. (B) Oil is intimately mixed with air, the oxidation temp. being controlled by the regulated addition of a liquid heat-absorbing medium, *e.g.*, a volatile oil or  $H_2O$ , having a b.p.  $<$  the desired temp. of oxidation. The apparatus comprises an externally-heated, vertical cylindrical drum containing an inner cylinder open at the top and provided with a circulating pump at its lower end; the air and cooling medium are introduced through suitably arranged pipes provided with jets. A. B. M.

**Asphalt.** U. B. BRAY, ASSR. to UNION OIL Co. of CALIFORNIA (U.S.P. 1,988,714, 22.1.35. Appl., 29.7.32).—Asphalt is pptd. from a suitably topped residuum by addition of liquid  $C_3H_8$ . The product has a penetration of 1–16 at 25° and a solubility of 70–90% in 86° naphtha. A. B. M.

**Asphalt emulsions.** H. M. STEININGER, ASSR. to STANDARD OIL Co. (INDIANA) (U.S.P. 1,988,879, 22.1.35. Appl., 1.10.30).—Asphalt (2 pts.) is emulsified with  $H_2O$  (1 pt.) containing about 1·5% of a salt, *e.g.*,  $Na_2SO_3$  or  $Na_2CrO_4$ , which has a neutral to basic reaction and serves to reduce the interfacial tension between the  $H_2O$



and the asphalt, and about 1% of triethanolamine oleate or similar soap. Addition of the salt reduces the amount of soap required to give a stable emulsion and imparts useful  $\eta$  characteristics thereto. A. B. M.

**Production of bituminous emulsion.** P. R. SMITH, Assr. to BARBER ASPHALT Co. (U.S.P. 1,989,775, 5.2.35. Appl., 3.6.31).—Bitumen is emulsified with a 0.2–1.6% aq. solution of  $\text{Na}_2\text{SiO}_3 \cdot 5\text{H}_2\text{O}$ . A. B. M.

**Simultaneous dewaxing and refining of mineral oils.** AKTIEB. SEPARATOR-NOBEL, ASSEES. of G. J. STREZYNSKI and W. R. KRONASSER (B.P. 437,483, 23.10.34. U.S., 23.10.33).—Wax-containing mineral oils, e.g., lubricating oil, are chilled (previously diluting, if necessary, with naphtha) and the chilled mixture is treated with  $\text{H}_2\text{SO}_4$ . Wax, acid sludge, and acid are separated together and this mixture is separated into its three components in one operation by centrifuging above the m.p. of the wax, e.g., at 66°. C. C.

**Dewaxing of [hydrocarbon] oils.** SINCLAIR REFINING Co. (B.P. 437,486, 17.11.34. U.S., 21.2.34).—Diluents for use in dewaxing, e.g., lubricating oil by chilling consist of Et esters or mixtures thereof having a b.p. > that of EtOAc (e.g., 85–158°), such as Et isovalerate, propionate, and butyrate. Solvents for asphaltic matter, e.g.,  $\text{CS}_2$ , PhMe,  $\text{CCl}_4$ , or  $\text{C}_5\text{H}_5\text{N}$ , may be blended with the diluent. If the diluent is of high  $d$ , wax may be separated centrifugally. C. C.

**Dewaxing of [petroleum] oils.** (A, B) B. G. ALDRIDGE and (A) B. HOPPER, Assrs. to UNION OIL Co. OF CALIFORNIA (U.S.P. 1,988,767–8, 22.1.35. Appl., 25.7.33).—(A) Uniform chilling of the mixture of oil and liquefied, normally gaseous, hydrocarbons is attained by circulating the chilled mixture by means of a pump. The ratio of diluent to oil is kept const. by automatically introducing further diluent to compensate for the amount lost by evaporation during chilling. (B) Circulation is obtained by injecting such hydrocarbons, e.g.,  $\text{C}_3\text{H}_8$  (in amount = that withdrawn by evaporation), into the lower portion of a vertical tube (open at both ends) inside the main body of chilled diluted oil. C. C.

**Separation of [hydrocarbon] wax.** L. M. HENDERSON, S. W. FERRIS, and H. C. COWLES, JUN., Assrs. to ATLANTIC REFINING Co. (U.S.P. 1,991,389, 19.2.35. Appl., 23.3.32).—The sweatability of wax is improved by adding to the wax a specially prepared wax having a high concn. (> 80%) of needle wax. Needle wax has m.p. > 25° (25–75°) and  $n_{\text{D}}^{20}$  > that derived from  $1.390 + 0.001T$  (where  $T$  = m.p. of the wax), but < 1.480 (preferably < 1.445). C. C.

**Breaking of petroleum emulsions.** (A–D) M. DE GROOTE and (B) B. KEISER, (D) A. F. WIRTEL, Assrs. to TRETOLITE Co. (U.S.P. 1,988,832–5, 22.1.35. Appl., [A] 9.10.33, [B] 6.1.34, [C–D] 15.3.34).—The use of the following de-emulsifying agents is claimed. (A) the sulphonated condensation product of a hydroaromatic alcohol, e.g., cyclohexanol, with an aromatic hydrocarbon, preferably polycyclic, e.g.,  $\text{C}_{10}\text{H}_8$ ; (B) a C-sulphonic acid produced by action of  $\text{ClSO}_3\text{H}$  and  $\text{Et}_2\text{O}$  on oleic acid; (C) an equimol. mixture, which is itself completely pptd. by the alkaline earths (I), of a sulphonated de-emulsifying agent stable to (I), e.g., alkylated

arylsulphonic acids, ligninsulphonic acids, sulphonated fatty acids, higher alkyl H sulphates, and a de-emulsifying agent that is pptd. by (I), e.g., the  $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$  salt of dioxalyltriricinolein; and (D) sulphonic acid derivatives of ricinoleic acid, e.g., the  $\beta$ -sulphoethyl esters of ricinoleic acid, ricinoleyl H phthalate, or its glyceryl ester. H. A. P.

**Production of hydrocarbons.** M. PIER, W. KROENIG, and W. SIMON, Assrs. to STANDARD-I. G. Co. (U.S.P. 1,990,708, 12.2.35. Appl., 17.8.31. Ger., 22.8.30).—Impure gas from degasification of solid bituminous material is purified by passing over a hydrogenating catalyst, e.g., oxides of metals of group VI, Ag, or  $\text{Ag}_2\text{CrO}_4$ , at 350–700°/1 atm. or 180–300°/1 atm. Any  $\text{Fe}(\text{CO})_5$  formed is removed at a convenient stage. Distillable carbonaceous material is then destructively hydrogenated by bringing it in contact with the pure gas prepared as above, in presence of a suitable catalyst. C. C.

**Treatment of hydrocarbons.** S. P. BURKE and C. F. FRYLING, Assrs. to DOHERTY RESEARCH Co. (U.S.P. 1,991,344, 12.2.35. Appl., 23.1.29).—Fluid aliphatic hydrocarbon mixtures, e.g.,  $\text{CH}_4$  and  $\text{C}_3\text{H}_8$ , are passed with 10 vol.-% of free  $\text{O}_2$  (< 50 vol.-% of air) at > 100 (200–1750) lb. per sq. in. and 200–500° (but > 50° above the initial reaction temp. of the mixture) through a narrow, unobstructed reaction zone from which solid contact catalysts are excluded. A homogeneous partial oxidation occurs producing a fluid reaction mixture containing hydrocarbon-O compounds and  $\text{H}_2$ . Aldehydes and acids in this mixture are converted into alcohols by reducing catalysts. C. C.

**Treatment of hydrocarbon oils.** R. T. HASLAM, Assr. to STANDARD-I. G. Co. (U.S.P. 1,988,731, 22.1.35. Appl., 8.8.30).—Hydrocarbon oil containing oxidised hydrocarbons [obtained by air-blowing at > 121° (> 176°), with or without a catalyst, e.g., Mn stearate,  $\text{MnO}_2$ ,  $\text{KMnO}_4$ , or by adding oxidised paraffin wax] is rapidly heated with  $\text{H}_2$  at > 20 atm. and > 260° (but < the hydrogenating temp.). The hot product is transferred with  $\text{H}_2$  to a reaction zone containing a "sulphactive" catalyst. Compounds containing O are deoxygenated, sufficient heat being evolved to raise the oil to the hydrogenating temp. C. C.

**Treatment of hydrocarbon oils.** (A) M. C. SUMPSTER, (B) W. L. BENEDICT, Assrs. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,971,167 and 1,971,172, 21.8.34. Appl., [A] 28.12.31, [B] 18.11.32).—(A) Gasoline vapour is passed up a tower down which is trickled a molten 1:1 mol. mixture of  $\text{AlCl}_3$  with  $\text{ZnCl}_2$  or  $\text{CuCl}_2$ . (B) To remove sulphur compounds the oil, e.g., cracked gasoline, is treated in the vapour phase with  $\text{NH}_3$  and a small quantity of air in presence of active C at 190°/75 lb. per sq. in. to form  $\text{NH}_4\text{HS}$  with the org. S. A. R. P.

**Decolorisation of [hydrocarbon] oil.** S. E. CAMPBELL (U.S.P. 1,991,049, 12.2.35. Appl., 9.10.29).—Cracked hydrocarbon distillates are treated with < 93.2%  $\text{H}_2\text{SO}_4$  countercurrently, in a series of towers filled with contacting material; after separation, the products are similarly treated with 30% aq. NaOH, separated, and again treated with conc.  $\text{H}_2\text{SO}_4$ . The



oil is then separated and treated successively with alkali and  $\text{H}_2\text{O}$ . D. K. M.

**Polymerisation of (A) [unsaturated] hydrocarbon gases, (B) olefines.** (A, B) W. B. PLUMMER, and (B) V. VOORHEES, Assrs. to STANDARD OIL CO. (U.S.P. 1,991,353—4, 12.2.35. Appl., 25.11.31).—During polymerisation to low-boiling liquids, the heat of reaction is removed (A) by indirect heat transfer to hydrocarbon oil under such conditions that cracking takes place, and (B) by a multistage operation with interstage cooling to  $\leq 149^\circ$  and separation of the condensate. D. K. M.

**Conversion of gases and other hydrocarbon materials into motor fuel etc.** R. E. BURK, Assr. to STANDARD OIL CO. (U.S.P. 1,991,593, 19.2.35. Appl., 20.3.30).—Hydrocarbon gases, *e.g.*, refinery gases or vaporised petroleum fractions, are treated with a heating agent, b.p.  $> 700^\circ$ , *e.g.*, the vapour of Zn, Cd, or alloys thereof, or high-boiling salts such as  $\text{PbCl}_2$ .

**Motor fuel product.** T. H. ROGERS and R. E. WILSON, Assrs. to GASOLINE ANTIOXIDANT CO. (U.S.P. 1,992,014, 19.2.35. Appl., 26.1.32).—Colour-instability of cracked (vapour-phase) petroleum products, induced by presence of antioxidants as gum-inhibitors, is rectified by addition of 0.0005—0.05 (0.001—0.005) wt.-% of  $\text{NH}_3$  or an aliphatic amine, *e.g.*,  $\text{NH}_4\text{Et}$ ,  $\text{NBU}_3$ .

A. W. B.

**Manufacture of gum-inhibited motor fuels.** E. AYRES, Assr. to GULF REFINING CO. (U.S.P. 1,991,779, 19.2.35. Appl., 26.10.31).—Gasoline is treated with 0.0005—0.01 wt.-% of an oxidation product of  $\alpha\text{-C}_{10}\text{H}_7\text{-OH}$  (I), *e.g.*, di- $\alpha$ -naphthol or a product believed to be 1:8-naphthylene oxide, m.p.  $> 300^\circ$ , derived from the residue obtained by boiling (I) for 1 hr. with a 20% solution of  $\text{FeCl}_3$ . It is  $\text{C}_6\text{H}_6$ -sol. and non-phenolic.

A. W. B.

**Motor fuels.** (A) R. DE M. TAVEAU, (B) E. F. PEVERE, Assrs. to TEXAS CO. (U.S.P. 1,991,127 and 1,991,333, [A, B] 12.2.35. Appl., [A] 16.8.32, [B] 18.2.32).—The antiknock val. of liquid motor fuels for spark-ignition internal-combustion engines is improved by addition of 0.1—1% (0.2—0.5%) of (A) Li alkyls or aryls, *e.g.*,  $\text{LiBu}^a$ , together with stabilising agents, *e.g.*, higher alcohols and esters, or anti-oxidising catalysts, *e.g.*, amines and phenols or polyhydric phenols, or (B) org. ditellurides, *e.g.*,  $[\text{C}_6\text{H}_4\text{Te}]_2$ .

C. C.

**Motor fuel.** P. BUTI (B.P. 437,484, 25.1.34).—A liquid fuel for internal-combustion engines consists of 50—70 pts. of  $\text{EtOH}$  (94—98%), 22—42 pts. of hydrocarbon distillate (b.p.  $70\text{--}100^\circ$ ), and 0—8 pts. of benzol.  $\text{MeOH}$  or other alcohols may replace part or all of the  $\text{EtOH}$ .

C. C.

**Production of lubricating oil.** (A) D. R. MERRILL, (B) R. E. HAYLETT, Assrs. to UNION OIL CO. OF CALIFORNIA (U.S.P. 1,988,793 and 1,988,803, 22.1.35. Appl., [A] 22.10.32, [B] 30.10.33).—(A) The raffinate from extraction of hydrocarbon oil with  $\text{SO}_2$  is further extracted with a solvent of the type  $\beta\beta\text{-(C}_2\text{H}_4\text{Cl)}_2\text{O}$ . The resulting raffinate is a high-grade lubricating oil. (B) The hydrocarbon fraction is extracted with a solvent, *e.g.*,  $\text{SO}_2$ ,  $\text{PhNO}_2$ , and the raffinate further extracted with a mixture of the same solvent and a modifying agent, *e.g.*,  $\text{CS}_2$ ,  $\text{C}_6\text{H}_6$ , or with the same solvent

at a high temp. This raffinate is a high-quality lubricating oil. D. K. M.

**Reclaiming used lubricating oils.** F. G. BAENDER (U.S.P. 1,988,773, 22.1.35. Appl., 11.4.32).—The oil is heated to  $176^\circ$  under pressure and the pressure then slowly released to atm. pressure to permit steam to escape. The oil is then heated to  $232^\circ$  and while at that temp. small jets of  $\text{H}_2\text{O}$  are introduced into the oil. After cooling, the oil is filtered. D. K. M.

(A) **Method of oil-fog lubrication.** (B) **Gas manufacture.** (c) **Production of oil fog.** (A, c) W. L. SHIVELY, (B, c) O. H. BLACKWOOD, Assrs. to (A—c) KOPPERS CO. OF DELAWARE (U.S.P. 1,993,311 and 1,993,315—6, 5.3.35. Appl., [A] 11.1.30, [B] 12.7.29, [c] 14.9.31).—(A) Oil is boiled into a gas main at sufficient pressure to effect the transfer, the quantity being  $>$  that required for saturation, so that oil mist is formed by condensation in the gas main. (B) Gas is withdrawn from the main and blown through a device of the scent-spray type to which oil is automatically lifted; the mixture is passed into a whirling pot, whence coarse entrained oil falls back to the reservoir and saturated gas passes back to the main. Heating is optional. (c) The oil is heated and a by-pass of a by-pass flow of gas is bubbled through it, the mixture is superheated and mixed with the gas in the larger by-pass, and the larger mixture is cooled in a centrifugal device to produce mist and separate coarse drops, the very fine spray passing into the gas main. The whole apparatus is operated by drops in gas pressure produced by obstructions in the main and the first by-pass. B. M. V.

**Manufacture of benzine jelly.** KERASIN, LTD. (B.P. 438,085, 2.11.34. Ger., 2.11.33 and 21.6.34).—Beeswax (1—5%) is dissolved in benzine to which has been added 3—10% of xylene, and the product is thoroughly mixed at, *e.g.*,  $45^\circ$ , with a conc.  $\text{EtOH}$  solution of soap containing  $\text{C}_5\text{H}_5\text{N}$ . A hard jelly is obtained by adding 0.1—1% of a 2% solution of latex in  $\text{Et}_2\text{O}$ , or by substituting soda lye and small amounts of an alkali salt of a soap from fatty acids in place of the soap, *e.g.*, 0.5—3% of the  $\text{NH}_4$  salt. [Stat. ref.]

C. C.

**Thermophoric compositions.**—See I. **Treating olefines.** **Textile lubricants.** **Dry-cleaning solvent.** **Cyclic compounds.**—See III.  $(\text{NH}_4)_2\text{SO}_4$  from gases. **Catalyst for prep. of  $\text{H}_2$ .**—See VII. **Bituminous paint.** **Colouring coal.** **Oil-acid and asphaltene varnishes.** **Asphalt coating.** **Petroleum plastic.**—See XIII. **Insecticide.**—See XVI. **Germicide.**—See XX.  $\text{CH}_4$ .—See XXIII.

### III.—ORGANIC INTERMEDIATES.

**Polarographic studies with the dropping mercury cathode.** LVI. **Purity of ethyl ether.** B. A. GOSMAN (Coll. Czech. Chem. Comm., 1935, 7, 467—475).—Peroxidic and aldehydic impurities in  $\text{Et}_2\text{O}$  (I) may be determined by shaking with 0.01N-LiOH and studying the “waves” on polarograms obtained with the aq. layer, using a dropping Hg cathode. These impurities are electro-reduced at the same p.d. as  $\text{H}_2\text{O}_2$  and  $\text{MeCHO}$ . The partition coeffs. of the peroxidic and aldehydic impurities between (I) and 0.01N-LiOH are



0.46 and 0.63, respectively, at room temp.; such impurities are detectable in the purest surgical (I). After shaking with Hg, the concn. of peroxides decreases and of aldehydes increases. This agrees with the view that a peroxide is the primary product formed by the action of light and  $O_2$  on (I), and that this decomposes, giving  $MeCHO$ . On passing air through (I), any aldehyde present is removed by volatilisation; with  $O_3$  the peroxide/aldehyde ratio is increased. Oxidation of (I) by air in contact with red-hot Pt increases both types of impurity and also the above ratio. R. S. B.

**Solvents and plasticisers.** V. E. YARSLEY (Synth. Appl. Fin., 1935, 6, 226—227, 235).—A review of recent progress, with special reference to cellulose acetate.

**Kauri-butanol test for solvent power.** E. L. BALDESCHWIELER, W. J. TROELLER, and M. D. MORGAN (Ind. Eng. Chem. [Anal.], 1935, 7, 374—377).—Stewart's method (B., 1931, 451) is modified by referring the vals. obtained with separate samples of kauri gum to a particular solution taken as standard. F. R. G.

**Acenaphthene from coal tar.** [Products from] air-oxidation of petroleum.—See II.

#### PATENTS.

**Treatment of olefines.** B. T. BROOKS, Assr. to STANDARD ALCOHOL CO. (U.S.P. 1,988,479, 22.1.35. Appl., 30.6.31).—The diolefines (I) in the liquid fraction from vapour-phase cracked petroleum products, which consist largely of  $C_4$ — $C_5$  olefines, are separated by treatment with an aq. solution of  $NH_4Cl$  and  $CuCl_2$  (II), in presence of excess of (II), in an autoclave at  $< 10^\circ$ . A solid additive compound is formed from (I) and (II) and is separated and heated at  $60^\circ$  to liberate (I). The mono-olefines are then converted into alkyl sulphates  $\rightarrow$  alcohols in known manner, improved yields resulting from absence of (I), whilst (I), e.g., butadiene, is available for the manufacture of rubber-like polymerides. Apparatus is described. A. W. B.

**Reaction of olefines with sulphuric acid.** K. B. LACY, Assr. to VAN SCHAACK BROS. CHEM. WORKS, INC. (U.S.P. 1,991,948, 19.2.35. Appl., 17.1.31).—Olefines,  $> C_2$  from vapour-phase cracked petroleum, are passed up a tower against a countercurrent of 60—87%  $H_2SO_4$  while maintaining a temp. of 35—65°. The acid at the bottom of the tower is separated from polymerides and recirculated until its alcohol content is about 40%. It is claimed that only slight polymerisation occurs. A. W. B.

**Production of acetylene.** W. GRIMME and H. TRAMM (U.S.P. 1,989,273, 29.1.35. Appl., 27.1.33. Ger., 5.2.32).—Diacetylene (I) is removed from gaseous mixtures containing also  $C_2H_2$  (II) by washing at  $-40^\circ$  to  $0^\circ$  with insufficient ketone, e.g.,  $COMe_2$ , to dissolve the major portion of the (II). The (II) is then washed out by more solvent at  $-80^\circ$  and recovered. The (I) can be recovered or hydrogenated directly and the solvent re-used. Apparatus is described. E. J. B.

**Production of ethylidene chloride.** J. P. WIBAUT and J. VAN DALFSEN, Assrs. to DOW CHEM. CO. (U.S.P. 1,990,968, 12.2.35. Appl., 5.9.33).— $HgCl_2$  and  $ZnCl_2$  (anhyd., finely-divided) are claimed as catalysts for

addition of  $HCl$  (I) to  $C_2H_2$  (II) and  $CH_2:CHCl$ , respectively. (I) and (II) are passed over the catalysts, simultaneously or consecutively, at 25—200° (75—175°).

A. W. B.

**Fluorination in presence of chlorine as catalyst.** A. L. HENNE, Assr. to GEN. MOTORS CORP. (U.S.P. 1,990,692, 12.2.35. Appl., 30.1.31).—Part or all of the halogen in F-free aliphatic halides, e.g.,  $CCl_4$ ,  $C_2Cl_6$ , is replaced by F, by fluorination, e.g.,  $SbF_3$ , in presence of  $Cl_2$ . Apparatus is described. A. W. B.

**Catalytic oxidation of unsaturated alcohols.** N.V. DE BATAAFSCHE PETROLEUM MAATS., Assees. of H. P. A. GROLL and H. W. DE JONG (B.P. 436,840, 10.4.35. U.S., 18.4.34).—Mono-olefinic primary or sec.-alcohols having  $\leq C_4$  are converted into unsaturated aldehydes or ketones by air-oxidation at 300—550° over a catalyst containing an element of group III (Cu). E.g.,  $\beta$ -methyl- $\Delta^8$ -propen- $\alpha$ -ol and air are passed over Cu at 400° to give the corresponding aldehyde; similarly,  $CHPh:CH\cdot CH_2\cdot OH$  and  $O_2$  over Ni at 450° give  $CHPh:CH\cdot CHO$ , and  $CH_3\cdot CMe\cdot CHPh\cdot OH$  and air over  $(VO)_2(SO_4)_3$  at 410° give *Ph isopropenyl ketone*, b.p. 200°. H. A. P.

**Manufacture of condensation products [poly-alkylene glycol ethers].** J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 437,590, 26.2.34).—Org. SH-compounds (except where SH is directly linked to CO or a heterocyclic nucleus) are condensed with alkylene oxides or their eqivs. in such a manner that the group introduced has  $\leq 1$  ether-O and  $\leq C_4$ . The process of B.P. 409,030 (B., 1934, 534) is disclaimed. E.g.,  $n$ - $C_{12}H_{25}\cdot SH$  is heated with  $(CH_2)_2O$  (5 eqivs.) at 140° in presence of  $NaOMe$  (0.5%). Similar condensation products are obtained from  $C_{18}H_{35}\cdot SH$ ,  $C_{16}H_{33}\cdot SH$ , and  $C_{10}H_{21}\cdot SH$  and  $(CH_2)_2O$  (5—20 eqivs.), and from  $C_{10}H_{21}\cdot SH$  and polyglycerol chlorohydrin or epichlorohydrin and  $KOH$  in  $EtOH$ . The products are sol. in  $H_2O$  and are claimed to be scouring, dispersing, wetting, and emulsifying agents. H. A. P.

**[Preparation of alkylene] glycol ester derivatives.** [Plasticisers.] CARBIDE & CARBON CHEMICALS CORP., Assees. of H. L. COX and T. F. CARRUTHERS (B.P. 437,790, 30.3.35. U.S., 11.4.34).—An alkoxyalkyl ester of an acyloxy-carboxylic acid is prepared by first forming the ester of the OH-acid and heating this with the appropriate monocarboxylic acid or anhydride. E.g., tartaric acid is heated with  $OH\cdot C_2H_4\cdot OBu$  and 0.1%  $H_2SO_4$ , the  $H_2O$  formed being distilled off azeotropically ( $C_6H_6$ ); the product is heated with  $Ac_2O$  at 130° to give *di- $\beta$ -butoxyethyl diacetyl tartrate*, b.p. 236°/5 mm. Other examples are *tri- $\beta$ -methoxyethyl acetyl citrate* and  *$\beta\beta'$ -ethoxyethoxyethyl butyryl-lactate*. H. A. P.

**Manufacture of cyclic esters.** E. I. DU PONT DE NEMOURS & Co. (B.P. 433,632, 19.2.34. U.S., 18.2.33).—Linear polyesters of dihydric alcohols and dibasic acids are depolymerised to cyclic mono- or di-merides by distillation at  $< 30$  mm. in presence of alkali or alkaline-earth oxides, hydroxides, carbonates, or alkoxides, or of finely-divided Sn (cf. A., 1934, 171). H. A. P.

**Manufacture of polyvinyl esters.** I. G. FARBENIND. A.-G. (B.P. 438,050, 11.5.34. Ger., 12.5.33).—An emulsion of the vinyl ester in an aq. solution of a



neutral electrolyte (I) is polymerised by known means. The presence of (I) is claimed to inhibit hydrolysis. *E.g.*, vinyl acetate (40 pts.) and dichloroacetate (10 pts.) are emulsified in 25% aq. NaCl (200 pts.),  $\text{BzO}_2\text{H}$  (0.25 pt.) is added, and the emulsion maintained at  $80^\circ$  for 2 hr. The product is sol. in org. solvents (esters, ketones,  $\text{C}_6\text{H}_6$ , etc., and chlorinated hydrocarbons). H. A. P.

**Esters of polycarboxylic acids.** E. F. IZARD, ASSR. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,991,391, 19.2.35. Appl., 11.7.31).—Alkoxyalkyl esters of aliphatic ( $\text{C}_{6-10}$ ) dibasic acids, prepared by known methods, are claimed as plasticisers for ethers or esters of cellulose. Examples include: *di- $\beta$ -ethoxyethyl*, b.p.  $200-220^\circ/10$  mm., *di- $\beta$ -ethoxy- $\beta$ -ethoxyethyl*, b.p.  $250-300^\circ/6$  mm., *adipate*; *ethyl  $\beta$ -butoxyethyl*, *di- $\beta$ -butoxyethyl*, b.p.  $240-250^\circ/2$  mm., and *di-“diethylin,”* b.p.  $260-265^\circ/2$  mm., *sebacate*. A. W. B.

**Production of sulpho-acids and their salts having capillary-active properties.** E. A. MAUERSBERGER (B.P. 437,143, 4.10.34. Ger., 29.11.33).—The (ortho)-borate of an alcohol (of  $\angle \text{C}_{10}$ ) is condensed with an aromatic hydrocarbon or its derivatives (including sulphonic acids) in  $\text{H}_2\text{SO}_4$ . *E.g.*, a solution of  $\text{C}_{10}\text{H}_8$  in trioleyl orthoborate is treated with conc.  $\text{H}_2\text{SO}_4$  at  $30-40^\circ$ , or the orthoborate of sperm-oil alcohols is added to  $\text{C}_{10}\text{H}_7\text{SO}_3\text{H}$  in  $\text{H}_2\text{SO}_4$  at  $50^\circ$ . A. W. B.

**Manufacture of glyoxylic acid.** I. G. FARBENIND. A.-G. (B.P. 437,649, 2.5.34. Ger., 4.5.33).—A dil. solution of  $\text{CHCl}_2\cdot\text{CO}_2\text{Na}$  is boiled with  $\angle 2$  mols. of the salt of another org. acid to yield glyoxylic acid (I). *E.g.*, 500 g. of  $\text{CHCl}_2\cdot\text{CO}_2\text{H}$  as the Na salt in 6 litres of  $\text{H}_2\text{O}$  are boiled for  $36-60$  (48) hr. with 1100 g. of NaOAc. The liquor is then evaporated and (I) extracted in the usual manner in 90% yield. E. J. B.

(A) **Pyrolytic treatment of higher fatty acid substances.** (B) **Fatty acid cracking in presence of aromatic amines.** A. W. RALSTON, ASSR. to ARMOUR & Co. (U.S.P. 1,991,995-6, 19.2.35. Appl., [A] 13.4.34, [B] 25.5.34).—(A) A higher fatty acid (*e.g.*, lauric, stearic), its ester (*e.g.*, glyceride) or nitrile, plus  $\text{NH}_3$  or an aliphatic amine, and (B) a fatty acid, its ester, or arylamide plus an arylamine, are passed over a dehydrating catalyst ( $\text{Al}_2\text{O}_3$ ) at  $\angle 400^\circ$  ( $400-600^\circ$ ). The products consist mainly of unsaturated nitriles and hydrocarbons of low mol. wt., mixed with unconverted nitrile and small amounts of basic products. H. A. P.

**Preparation of xanthates.** N. V. DE BATAAFSCHE PETROLEUM MAATS. (B.P. 437,431, 15.5.35. U.S., 22.5.34).—An alkali hydroxide (1 mol.) is dissolved or suspended in a large excess of a primary or *sec.*-alcohol, and rendered approx. anhyd. by distillation. Slightly  $> 1$  mol. of  $\text{CS}_2$  is passed into the mixture at a speed adjusted to cause vigorous boiling (at  $25-125^\circ$ , this temp. being determined by the pressure and external heating). The  $\text{H}_2\text{O}$  formed distils off, usually as the azeotropic mixture with the alcohol, and pure anhyd. xanthate is obtained. Inert diluents may be used. E. J. B.

**Aldehyde-hydrogen sulphide reaction product.** B. M. MARKS, ASSR. to DUPONT VISCOLOID Co. (U.S.P. 1,991,765, 19.2.35. Appl., 23.1.32).— $\text{H}_2\text{S}$  is passed into aq. solutions of aldehydes ( $\text{CH}_2\text{O}$ ) at  $p_{\text{H}}$  2-12

(4-7.5) and at  $20-100^\circ$  ( $40-50^\circ$ ). The solutions obtained or the solid products pptd. at  $\text{H}_2\text{S}$ -saturation point form resins with urea. A. W. B.

**Preparation of ketones.** E. J. CARDARELLI, ASSR. to STANDARD ALCOHOL Co. (U.S.P. 1,988,481, 22.1.35. Appl., 11.9.31).—*sec.*-Alcohols mixed with the theoretical requirement of  $\text{O}_2$  are passed through a catalytic (Cu) reaction zone maintained at  $225-350^\circ$ , cooled by contact with a stable org. compound of b.p. between  $225^\circ$  and  $350^\circ$ , *e.g.*,  $\text{CH}_2\text{Ph}_2$ ,  $\text{Ph}_2\text{O}$ ,  $\text{C}_{10}\text{H}_7\text{NH}_2$ ,  $\text{Ph}_2$ . Apparatus is described. A. W. B.

**Manufacture of ketones from alcohols.** W. W. TRIGGS. From COMMERCIAL SOLVENTS CORP. (B.P. 437,315, 7.7.34).—The use of a mixture of easily and difficultly reducible metal oxides, *e.g.*,  $\text{ZnO}$  and  $\text{Cr}_2\text{O}_3$ , in presence of a metal halide, *e.g.*,  $\text{ZnCl}_2$ , as disclosed in U.S.P. 1,625,924-5 and 1,625,927-9 (B., 1927, 540), in the vapour-phase reaction between alcohols and  $\text{H}_2\text{O}$  at  $250-650^\circ$  ( $400-500^\circ$ ), is claimed. A. W. B.

**Manufacture of alkylamines.** A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 437,530, 5.5.34).—An alkyl ( $> \text{C}_8$ ) halide is heated at  $120-170^\circ$  in a closed vessel with 60-65% aq.  $\text{NH}_3$  or a 10% EtOH solution of a momoalkylamine for some hr. The corresponding *sec.*-amine is formed, contaminated only by the alcohol, and is readily purified. E. J. B.

**Recovery of ammonia and amines from their salts with organic acids.** BRIT. CELANESE, LTD., H. F. OXLEY, E. B. THOMAS, and H. DREYFUS (B.P. 436,224, 4.4.34).—The salts (in aq. solution) are heated at  $> 80^\circ$  ( $125-160^\circ$ ), the volatilised  $\text{NH}_3$  or base being condensed or absorbed in  $\text{H}_2\text{O}$ . The acid, *e.g.*, AcOH, may then be distilled or withdrawn; the process may be operated continuously. A. W. B.

**Production of amino-alcohols.** W. H. HARTUNG, ASSR. to SHARP & DOHME, INC. (U.S.P. 1,989,093, 29.1.35. Appl., 2.5.29).—The presence of a strong acid, *e.g.*, HCl, during the catalytic ( $\text{H}_2$ -Pd) reduction of compounds containing the  $\text{C:N}$  group (1 mol. of HCl) or the  $\text{C:N}\cdot\text{OH}$  and  $\text{O:C}\cdot\text{C:N}\cdot\text{OH}$  groups (3 mols. of HCl) in EtOH solution prevents the formation of *sec.*- and *tert.*-amines, and the pure primary amine (salt) is obtained in almost quant. yield.  $\text{:CO}$  is reduced to  $\text{:CH}\cdot\text{OH}$  or  $\text{:CH}_2$ . E. J. B.

**[Preparation of] amino-acids.** H. M. BARNETT, ASSR. to S.M.A. CORP. (U.S.P. 1,990,769, 12.2.35. Appl., 16.1.30).—The several  $\text{NH}_2$ -acids obtained on hydrolysis of a protein are isolated singly by adjusting the hydrolysate in turn to their individual isoelectric points, *e.g.*, glutamic acid at  $p_{\text{H}}$  3.2. A. W. B.

**Manufacture of organic sulphur compounds.** E. I. DU PONT DE NEMOURS & Co. (B.P. 437,653, 2.5.34. U.S., 2.5.33).—The oxidation of di- or tri-thio-acids to the corresponding sulphides with CN halides, *e.g.*, of  $\text{NMe}_2\cdot\text{CS}\cdot\text{SNa}$  to  $\text{S}(\text{CS}\cdot\text{NMe}_2)_2$  with  $\text{CNCl}$ , is carried out in aq. solution in presence of an alkali-stable dispersing agent, *e.g.*, Na or  $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$  oleate, Na caseinate. H. A. P.

**Manufacture of thiourea.** R. V. HEUSER, ASSR. to AMER. CYANAMID Co. (U.S.P. 1,991,852, 19.2.35. Appl., 21.1.31).— $\text{CaCN}_2$  is dissolved in  $\text{H}_2\text{O}$ , filtered from



Ca(OH)<sub>2</sub>, and made just acid (Me-red,  $p_H$  5.0) with dil. H<sub>2</sub>SO<sub>4</sub> to yield a solution of free CN·NH<sub>2</sub> (I) of max. stability at this  $p_H$ . NH<sub>3</sub>, or a hydroxide capable of forming polysulphides (II) in  $\geq$  10% of the amount theoretically required to react [as (II) with all the (I)], is added and the solution treated with H<sub>2</sub>S to keep the  $p_H$  at  $< 8.3$ . This excess H<sub>2</sub>S and a temp.  $< 50^\circ$  (30°) inhibit polymerisation of (I) by NH<sub>3</sub>, and cryst. CS(NH<sub>2</sub>)<sub>2</sub> is obtained in good yield after concn. of the liquors.

E. J. B.

#### Preparation of imidols [hydroxyalkylamides].

W. J. HUND and L. ROSENSTEIN, Assrs. to SHELL DEVELOPMENT CO. (U.S.P. 1,990,453, 5.2.35. Appl., 9.10.33).—The prep. of condensation products (amides) from primary or sec.-hydroxyalkylamines and fatty acids, or their esters or glycerides, is claimed. Examples are *oleo-β-hydroxyethylamide*, m.p. 91–92.2°, and the *β-hydroxyethylamide*, m.p. 91–92°, of the total fatty acids of sardine oil.

H. A. P.

**Reduction of nitroguanidine.** J. A. WYLER, Assr. to TROJAN POWDER CO. (U.S.P. 1,990,511, 12.2.35. Appl., 13.9.33).—The reduction is carried out at 40–45° with Zn and Zn(OAc)<sub>2</sub> in H<sub>2</sub>O in absence of free AcOH and in presence of salts of Cu (CuSO<sub>4</sub>), Ni, Co, Mn, or Cd to give approx. 90% of theory of aminoguanidine.

H. A. P.

**Manufacture of aroylbiurets.** J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 436,657, 16.4.34).—Allophanyl chloride is condensed with an aromatic hydrocarbon in presence of an acid condensing agent (AlCl<sub>3</sub>). Examples are benzoyl-, m.p. 214–215°, (2) *p*-toluoyl-, m.p. 218–219°, and *naphthoyl-biuret*.

H. A. P.

**Improving the wetting and like properties of aqueous liquids employed in textile, fur, and leather industries.** W. J. TENNANT. From HENKEL & CO., G.M.B.H. (B.P. 436,862, 11.4.34).—The use of sulphonated sulphonamides of higher fatty or cycloaliphatic amines is claimed. *E.g.*, *β*-chloroethane- $\alpha$ -sulphondodecylamide is heated with Na<sub>2</sub>SO<sub>3</sub> in aq. EtOH to give the *β*-sulpho-compound; a sulphonic acid is similarly prepared from 4-chloro-3-nitrobenzene-1-sulphondodecylamide (I), or (I) is condensed with  $\beta$ -NH<sub>2</sub>-C<sub>2</sub>H<sub>4</sub>-SO<sub>3</sub>H in presence of NPhMe<sub>2</sub> in 40% EtOH at 160–170°. The products are claimed to be stable to acids, alkalis, and hard H<sub>2</sub>O.

H. A. P.

**[Preparation of] wetting, cleansing, dispersing, and like agents.** IMPERIAL CHEM. INDUSTRIES, LTD., A. W. BALDWIN, H. M. BUNBURY, and I. M. HEILBRON (B.P. 436,209, 5.3.34. Addn. to B.P. 398,818; B., 1933, 955).—*β*-Monoalkyl ethers of glycerol in which the alkyl group has C<sub>13–20</sub>, *e.g.*, the *β*-cetyl ether, are treated with sulphonating agents. With Na<sub>2</sub>S<sub>2</sub>O<sub>7</sub>-C<sub>5</sub>H<sub>5</sub>N or ClSO<sub>3</sub>H the monosulphate is formed.

H. A. P.

**Wetting, emulsifying, and washing agent.** C. A. THOMAS, Assr. to SHARPLES SOLVENTS CORP. (U.S.P. 1,992,160, 19.2.35. Appl., 23.8.33).—The use of sulphonated products of condensation of aromatic hydrocarbons, *e.g.*, C<sub>6</sub>H<sub>6</sub>, C<sub>10</sub>H<sub>8</sub>, with olefine polymerides (C<sub>8–20</sub>), *e.g.*, diamylene, or halides therefrom, is claimed.

A. W. B.

**[Preparation of] lubricants for textiles.** KAMMGARNSPINNEREI STÖHR & CO. A.-G. (B.P. 436,956, 17.4.34. Ger., 18.4.33).—The preps. are aq. emulsions of paraffin wax (which may be mixed with other fats or waxes, *e.g.*, wool grease, spermaceti) containing a H<sub>2</sub>O-insol. aliphatic alcohol to facilitate its removal from the fibre by scouring. *E.g.*, paraffin wax, m.p. 40–42° (9 pts.), and *n*-C<sub>16</sub>H<sub>33</sub>·OH (7 pts.) are melted together and stirred at 50° with C<sub>14</sub>H<sub>29</sub>·O·SO<sub>3</sub>Na (3 pts.) in H<sub>2</sub>O (70 pts.).

H. A. P.

**[Dry-cleaning] solvent composition.** J. J. GREBE, S. M. STOESSER, and L. E. MILLS, Assrs. to DOW CHEM. CO. (U.S.P. 1,989,478, 29.1.35. Appl., 2.3.32).—Mixtures (in vol.-%) of petroleum naphtha (I) [b.p. 70–110° (70–85°), 10–20], C<sub>3</sub>Cl<sub>4</sub> (2–10), and CCl<sub>4</sub> (70–88), or of (I) (b.p. 86–134°, 10–20), C<sub>2</sub>Cl<sub>4</sub> 50–70, and CCl<sub>4</sub> 20–30, are non-inflammable, -toxic, and -corrosive and possess superior detergent properties.

E. J. B.

**Production of phosphatide preparations.** HANSEATISCHE MÜHLENWERKE A.-G. (B.P. 436,859, 9.4.34. Ger., 8.6.33).—Ordinary phosphatide preps., oil-free or dehydrated phosphatides are triturated with powdered (caustic) alkali to yield a pulverulent product which readily disperses in H<sub>2</sub>O to form stable emulsions.

E. L.

**Manufacture of homogeneous composition [f.-p. depressant].** L. I. DANA and G. W. GEORGI, Assrs. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,988,584, 22.1.35. Appl., 12.11.32).—A f.-p. depressant is prepared by adding to [CH<sub>2</sub>·OH]<sub>2</sub> about 1.0% of lard oil containing 10–15% of free fatty acid, 0.2% of mineral oil, 0.5% of mixed ethanolamines, and 0.02% of Ca(OAc)<sub>2</sub>, and passing the mixture through a defined colloid mill.

A. W. B.

(A–C) **Manufacture of quaternary ammonium compounds, and (B) disinfecting media containing the same.** I. G. FARBENIND. A.-G. (B.P. 436,725–6 and 436,793, [A–C] 13.4.34. Ger., 13.4.33).—The manufacture by known methods of bactericidal and fungicidal quaternary NH<sub>4</sub> salts having an aliphatic radical of  $\leq$  C<sub>8</sub>, (A) “interrupted” by S or N, (B) interrupted by O, and (C) in conjunction with an *N*-aralkyl group is claimed. Examples are: (A) *trimethyl-*, m.p. 180°, *dimethyldodecyl-*, m.p. 164–165°, and *dimethyl-β-hydroxyethyl-dodecylthiomethylammonium chloride* (*dodecylthiomethyl chloride*, b.p. 157–160°/7 mm., is prepared from C<sub>12</sub>H<sub>25</sub>·SH, CH<sub>2</sub>O, and HCl); *methyl-diethyldodecylthioethylammonium iodide* (from C<sub>12</sub>H<sub>25</sub>·SH,  $\beta$ -NEt<sub>2</sub>·C<sub>2</sub>H<sub>4</sub>Cl, and MeI); *trimethyl-β-methyldodecylaminoethylammonium bromide*, and *β-methyldodecylaminoethylammonium iodide* (C<sub>12</sub>H<sub>25</sub>·NHMe,  $\beta$ -NMe<sub>2</sub>·C<sub>2</sub>H<sub>4</sub>Cl, and MeI); (B) *trimethyl-β-hydroxy-γ-dodecoxypropylammonium chloride* [ $\alpha$ -chloro- $\beta$ -hydroxy- $\gamma$ -dodecoxypropane (I), b.p. 168°/1 mm., and NMe<sub>3</sub>] and *bromide* [(I), NHMe<sub>2</sub>, and MeBr], and *methylethylcyclohexyl-β-hydroxy-γ-dodecoxypropylammonium iodide* [(I), C<sub>6</sub>H<sub>11</sub>·NHMe, and MeI]; (C) *benzyl-diethyl-n-octyl-, -dodecyl-, m.p. 110–111°, and -β-hydroxy-γ-dodecoxypropylammonium chloride, benzyl-dimethyldodecylammonium chloride, bromide, m.p. 42°, and iodide, and benzyl-diethyl-β-dodecylthioethylammonium bromide. Diethyl-octyl- and -dodecyl-amine, b.p. 130–131°/6 mm., are described.*

H. A. P.



**Manufacture of cyclic compounds.** N.V. DE BATAAFSCHE PETROLEUM MAATS., Assees. of B. MALISHER (B.P. 437,072, 30.11.34. U.S., 2.12.33).—The use of  $P_2O_5$  to aid condensation between olefines (I), e.g.,  $C_2H_4$  or cracked petroleum distillates, and unsaturated non-hydroxylated cyclic compounds (II), e.g.,  $C_6H_6$ ,  $C_{10}H_8$ ,  $C_5H_5N$ , is claimed. Thus (I) (vapour) are passed into (II), or a liquid containing (II), in which  $P_2O_5$  is suspended, then peptised, e.g., with bitumen or Cu oleate, and stabilised, e.g., with lampblack or fuller's earth, at 150–300° /  $\geq$  50 atm. A. W. B.

**Manufacture of *tert.*-alkyl-substituted aromatic derivatives.** R. P. PERKINS, A. J. DIETZLER, and J. T. LUNDQUIST, Assrs. to Dow Chem. Co. (U.S.P. 1,991,332, 12.2.35. Appl., 29.10.31).—The *tert.*-alkyl halide (I), e.g.,  $Bu^tCl$ , carried over in the HCl vapours when (I) reacts with an aromatic compound, e.g.,  $PhOH$ , in presence of, e.g.,  $AlCl_3$ , is recovered by passing the vapours into the *tert.*-alcohol corresponding to (I), e.g.,  $Bu^tOH$ . The HCl is thereby converted into (I) and separation of (I) is therefore unnecessary. A. W. B.

**Manufacture of derivatives of *N*-butylaminobenzene.** I. G. FARBENIND. A.-G. (B.P. 437,296, 27.4.34. Ger., 27.4. and 4.11.33).—Interaction of  $NHPhBu^a$  and epichlorohydrin at 95–100° (1 hr.) and 120–125° (6 hr.), and treatment of the product with  $NaOEt-EtOH$  at the b.p. gives *butyl- $\beta$ -hydroxy- $\gamma$ -ethoxypropylamine*, b.p. 182–183°/12 mm. Other examples are: *m-chlorobutyl- $\beta$ -hydroxy- $\gamma$ -methoxypropylamine*, b.p. 200–202°/12 mm., and *butyl- $\beta$ -hydroxy- $\gamma$ -methoxypropyl-m-toluidine*, b.p. 185–186°/10 mm., and its 4-OMe-derivative, b.p. 186–187°/11 mm. H. A. P.

**Manufacture of glutamine.** I. G. FARBENIND. A.-G. (B.P. 437,873, 15.4.35. Ger., 14.4.34).—A  $\gamma$ -ester of glutamic acid is condensed with an alkyl or aralkyl chloroformate and the  $\gamma$ -ester group is then converted into  $\cdot CO-NH_2$ , e.g., by action of liquid  $NH_3$  at room temp., or of  $N_2H_4$ , followed by  $HNO_2$ , and treatment of the resulting azide with  $NH_3$  in  $Et_2O$ . The product, e.g., *N-carbobenzyloxy-d-glutamine*, is treated with  $H_2-Pd$  (in  $H_2O$ ) with formation of *d*-glutamine,  $CO_2$ , and  $PhMe$ . H. A. P.

**Manufacture of textile assistants.** SOC. CHEM. IND. IN BASLE (B.P. 437,566, 15.2.35. Switz., 16.2. and 10.4.34).—The prep. by standard methods of *N*-oxides of *tert.*-amines having an aliphatic or hydroaromatic residue of  $\leq C_6$  is claimed. E.g., *p*-dimethylaminolaurophenone (I), b.p. 220–260°/12 mm. ( $C_{11}H_{23}\cdot COCl$ ,  $NPhMe_2$ , and  $ZnCl_2$  at 25–30°), is treated with Caro acid in  $H_2O$  to give a  $H_2O$ -sol. oxide. Other examples are the *N*-oxides of *p*-dimethylaminostearophenone, *p*-dimethylaminododecylbenzene [Clemmensen reduction of (I)],  $C_{12}H_{25}\cdot NMe_2$ ,  $C_{16}H_{33}\cdot NMe_2$ , dodecylpiperidine,  $C_{16}H_{33}\cdot NEt_2$ ,  $C_{12}H_{25}\cdot NEt_2$ ,  $C_{17}H_{35}\cdot CO-NH\cdot C_2H_5\cdot NEt_2$ , and the amine from chlorinated paraffin wax (20% Cl) and  $NHMe_2$ . The use of the products in washing wool and as wetting agents and dyeing assistants is described. H. A. P.

**[Manufacture of] alkali trichlorophenolates.** L. E. MILLS, Assr. to Dow Chem. Co. (U.S.P. 1,991,329,

12.2.35. Appl., 2.5.32).—2:4:5-Trichlorophenol is added to an aq. solution of an alkali hydroxide, e.g.,  $NaOH$ . The phenoxides usually crystallise as pentahydrates which are completely dehydrated at 60–80°. The products are  $H_2O$ -sol. fungicides. A. W. B.

**[Production of] halogenated hydroxydiphenyls.** W. G. CHRISTIANSEN, E. MONESS, and S. E. HARRIS, Assrs. to E. R. SQUIBB & SONS (U.S.P. 1,989,081, 29.1.35. Appl., 27.8.30).—A hydroxydiphenyl is treated with halogen ( $Cl_2$ ,  $Br$ ) in a solvent ( $CS_2$ ,  $AcOH$ ). A temp.  $< 20^\circ$  favours monohalogenation, especially the formation of 5-halogeno-2-hydroxydiphenyl. The 3:5-dihalogeno-derivative is also formed. The products are bactericides. E. J. B.

**Preparation of *p*-sec.-alkylaminophenols.** R. T. MAJOR, Assr. to MERCK & Co., INC. (U.S.P. 1,989,707, 5.2.35. Appl., 27.1.34).—*p*-Nitrosophenol is reduced ( $Pt-H_2$ ) in presence of a dialkyl ketone, e.g., in  $COMe_2$  at room temp. *p*-isoPropylaminophenol, m.p. 155–106°, is formed. H. A. P.

**Preparation of arylthioglycollic acids.** H. A. LUBS, A. L. FOX, and R. A. SMITH, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,988,501, 22.1.35. Appl., 27.2.31).—A "xanthate oil," obtained by condensing a diazotised arylamine with an alkali alkylxanthate, e.g., 5:1:2- $ClC_6H_3Me\cdot S\cdot CS\cdot OEt$ , is heated with aq.  $CH_2Cl\cdot CO_2H$  and an alkali in presence of an org. solvent, e.g.,  $EtOH$ , higher alcohols,  $COMe_2$ . H. A. P.

(A) Preparation of aminic acids. (B) Separation of mono- and di-alkylamines of the benzene series. (c) Separation of *sec.*- and *tert.*-amines [of the benzene series]. (A) P. W. CARLETON, (B) J. B. COOK, JUN., and D. HUTTON, (c) F. ZWILGMAYER, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,991,787, 1,991,790, and 1,992,111, 19.2.35. Appl., [A] 14.4.31, [B] 29.10.30, [c] 20.6.31).—Mono- and di-alkylanilines are separated by heating the mixture with the anhydride of a dicarboxylic acid (I) (excess; at  $\geq 65^\circ$ ), adding excess of aq. alkali to dissolve the aminic acid (I) and unchanged (I), separating the *tert.*-amine, and recovering the *sec.*-amine by acid hydrolysis of the (I). (A) Phenyl-ethyl-maleamic and -succinamic acids are claimed but not described. (B) Phthalic and (c) maleic anhydrides are used in the above process (for separation of  $NHPhEt$  and  $NPhEt_2$ ). H. A. P.

**Preparation of aryl alkyl ketones by the Friedel-Crafts reaction.** P. H. GROGGINS, Assr. to U.S.A. (U.S.P. 1,991,743, 19.2.35. Appl., 28.5.34).—Condensation of 1 mol. of an aliphatic anhydride with an aromatic compound in presence of  $\leq 3$  mols. of, e.g.,  $AlCl_3$  at 30–200° affords an aryl alkyl ketone in 150–170% yield (calc. on 1  $CO_2H$  group). E. J. B.

**Preparation of  $\alpha$ -naphthol.** E. C. BRITTON and W. C. STOESELER, Assrs. to Dow Chem. Co. (U.S.P. 1,992,154, 19.2.35. Appl., 10.11.32).—Pure  $\alpha$ - $C_{10}H_7OH$  is obtained in 90–92% yield of theory by heating pure 1- $C_{10}H_7Br$ , which is readily obtained by brominating  $C_{10}H_8$ , with an aq. solution of a hydrolytic base, e.g.,  $NaOH$ , at 180–250° under pressure in presence of a catalyst containing Cu, e.g., Cu,  $CuO$ . A. W. B.



**Manufacture of condensation products of the naphthalene series.** DURAND & HUGUENIN A.-G. (B.P. 437,798, 7.5.35. Ger., 5.5.34).—A naphthol, naphthylamine, or aminonaphthol-sulphonic acid (1 mol.) is condensed with an aminosalicyclic acid, its homologues, or substitution products (< 2 mols.) (Bucherer). *E.g.*, 2 : 7-OH·C<sub>10</sub>H<sub>6</sub>·SO<sub>3</sub>Na (I) (1 mol.) is heated with NH<sub>2</sub>·C<sub>6</sub>H<sub>3</sub>(OH)·CO<sub>2</sub>Na (II) (2 mols.) and NaHSO<sub>3</sub> in H<sub>2</sub>O at the b.p. Similar condensations are described using 2 : 6 : 8-OH·C<sub>10</sub>H<sub>5</sub>(SO<sub>3</sub>H)<sub>2</sub>, 2 : 8 : 6-NH<sub>2</sub>·C<sub>10</sub>H<sub>5</sub>(OH)·SO<sub>3</sub>H, and 1 : 6-NH<sub>2</sub>·C<sub>10</sub>H<sub>6</sub>·SO<sub>3</sub>Na in place of (I); the products contain 2 equivs. of (II) and are of unknown structure. H. A. P.

**Manufacture of 1-nitroanthraquinone-6-carboxylic acid.** E. E. BEARD and R. N. LULEK, Assfs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,991,191, 12.2.35. Appl., 29.3.33).—Anthraquinone-2-carboxylic acid in 10 pts. of H<sub>2</sub>SO<sub>4</sub> at 0–5° is treated with 1.2 pts. of a 32 : 68 mixture of HNO<sub>3</sub> and H<sub>2</sub>SO<sub>4</sub>. The temp. is raised to 20–60° and maintained for 1–2 hr.; the mass is poured into H<sub>2</sub>O and the pptd. product filtered off. A. W. B.

**Preparation of (A) benzanthrone compounds, (B) benzanthronecarboxylic acid.** (A) H. J. WEILAND and V. M. WEINMAYR, (B) V. M. WEINMAYR and J. M. TINKER, Assfs. (A, B) to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,990,506 and 1,990,807, 12.2.35. Appl., [A, B] 19.9.32).—(A) Benzanthrone (I) is condensed with CCl<sub>4</sub> (AlCl<sub>3</sub>–NaCl–KCl) in an autoclave at 95–100° to give dichloro-Bzl : Bzl'-dibenzanthronylmethane, which is hydrolysed by aq. NaOH at the b.p. to Bzl : Bzl'-dibenzanthronyl ketone, m.p. > 360°. (B) The above reaction is carried out, using > 1 (0.5) mol. of AlCl<sub>3</sub>/mol. of (I), at 80–220° (80–185°) for 3–4 hr.; alternatively, Cu-bronze is used as catalyst (at 160–165°/18 hr.). Trichlorobenzanthroxylmethane is formed and is hydrolysed by dil. aq. NaOH at 95–100° to benzanthrone-Bzl-carboxylic acid. H. A. P.

**Manufacture of amino-compounds of the quinoline series.** A. CARPMAEL. From I. G. FARBERIND. A.-G. (B.P. 437,317, 23.7.34).—A quinoline-Py-sulphonic acid is heated with NH<sub>3</sub> or a primary or sec.-amine (+ZnCl<sub>2</sub> or Cu). *E.g.*, quinoline-2-sulphonic acid when heated with excess of 25% aq. NH<sub>3</sub> and ZnCl<sub>2</sub> at 135° gives 2-aminoquinoline, m.p. 127°. Other examples include the prep. of 2-aminolepidine, m.p. 130–131°, 4-amino-, m.p. 70° (+1H<sub>2</sub>O), 2 : 4-diamino-, m.p. 188–190°, 2-dimethylamino-, m.p. 70–71°, 4- (picrate, m.p. 155–157°) and 2-ε-dimethylamino-β-amylamino- (picrate m.p. 159–160°), 4-β-diethylaminoethylamino- (picrate m.p. 189–190°), 4-γ-diethylamino-β-hydroxy-n-propylamino- (picrate, m.p. 162°), 2-cyclohexylamino-4-methyl-, m.p. 116–117°, 2-anilino-4-methyl-, m.p. 128°, and 2-β-naphthylamino-4-methyl-quinoline m.p. 164–165°. H. A. P.

**Manufacture of sulphonic and carboxylic acid derivatives of 1 : 3-diaryl-5-pyrazolones.** I. G. FARBERIND. A.-G. (B.P. 436,516, 5.3.34. Ger., 3.3.33).—An aroylacetic ester is condensed in H<sub>2</sub>O with an arylhydrazine, at least one of the components having < 1 SO<sub>3</sub>H and/or CO<sub>2</sub>H group. 3-Phenyl-1-m- and -p-sulphophenyl-, -2'-chloro-4'- and -5', -2' : 4'-dichloro-4',

and -3' : 4'-dichloro-6'-sulphophenyl-, -2'-hydroxy-3'-carboxy-5'-sulphophenyl-, -p-carboxyphenyl-, -1'-sulpho-β-naphthyl-, -5'-sulpho-o- and 6'-chloro-4'-sulpho-m-tolyl-, and -4'-sulpho-2'-(4"-hydroxy-3"-carboxyphenyl-sulphonyl)phenyl-5-pyrazolone; 1-p-sulphophenyl-3-2' : 4'-dichloro- and -3-4'-carboxyphenyl-, 1-o-sulphophenyl-3-m-nitro- and -3-p-carboxy-phenyl-, 1-1'-sulpho-β-naphthyl-3-α-naphthyl- and -3-p-carboxyphenyl-, 1-phenyl- and 1-m-carboxyphenyl-3-p-carboxyphenyl-, 3-p-carboxyphenyl-1-2'-hydroxy-3'-carboxyphenyl-, 3-p-tolyl-1-2'-chloro-5'-sulphophenyl-, 3-p-anisyl-1-2'-hydroxy-3'-carboxy-5'-sulphophenyl-, 3-α-naphthyl-1-1'-sulpho-β-naphthyl-, 1-3' : 4'-dichloro-6'-sulphophenyl-3-β-naphthyl-, and 1-m-sulphophenyl-3-p-diphenyl-5-pyrazolone; *Et* 2 : 4-dichloro-, m.p. 54–56°, and *p*-phenyl-benzoylacetate, m.p. 53–54°, and *Et* β-naphthoyleacetate, m.p. 32–34°, are described. H. A. P.

**Manufacture of sulphonic and carboxylic acid derivatives of 1 : 1'-diaryl-3 : 3'-arylene-5 : 5'-bispyrazolones.** I. G. FARBERIND. A.-G. (B.P. 436,789, 12.3.34. Ger., 11.3.33. Addn. to B.P. 436,516; cf. preceding abstract).—An aroylenebisacetic ester is condensed in H<sub>2</sub>O with an arylhydrazine, at least one of the components having < 1 SO<sub>3</sub>H and/or CO<sub>2</sub>H group. The condensation to hydrazone is best effected in acid, and the cyclisation in alkaline, medium. Examples are: 1 : 1'-di-o-, -m-, and -p-sulphophenyl-, -2" : 5"-disulphophenyl-, -2"-chloro-4"- and -5"-sulphophenyl-o-carboxyphenyl-, -1"-sulpho-β-naphthyl-, and -2"-hydroxy-3"-carboxy-5"-sulphophenyl-3 : 3'-p-phenylene-5 : 5'-bispyrazolone [from *p*-C<sub>6</sub>H<sub>4</sub>(CO·CH<sub>2</sub>·CO<sub>2</sub>Et)<sub>2</sub>]; 1 : 1'-di-m-sulpho- and -2"-chloro-4"-sulpho-phenyl-, and -4" : 5"-disulpho-o-tolyl-3 : 3'-(chloro-*p*-phenylene)-5 : 5'-bispyrazolone; 1 : 1'-di-p-carboxy- and 4"-nitro-2"-sulpho-phenyl-, and 1"-sulpho-β-naphthyl-3 : 3'-(nitro-*p*-phenylene)-5 : 5'-bispyrazolone; 1 : 1'-di-p-carboxy- and -2"-nitro-4"-sulphophenyl-, and -5"-sulpho-o-tolyl-3 : 3'-m-phenylene-5 : 5'-bispyrazolone; 1 : 1'-di-1"-sulpho-β-naphthyl-3 : 3'-(1" : 4" : 4"-naphthylene)-, 1 : 1'-di-2"-hydroxy-3"-carboxy-5"-sulpho- and -2"-nitro-4"-sulpho-phenyl-3 : 3'-(1" : 5" : 5"-naphthylene)-, 1 : 1'-di-2"-chloro-4"-sulpho- and -2" : 5"-disulpho-phenyl-3 : 3'-(4" : 4" : 4"-diphenylene)-5 : 5'-bispyrazolone. *Et*<sub>2</sub> naphthoyle-1 : 4-, m.p. 114–115°, and -1 : 5-, m.p. 106–107°, and diphenyloyl-4 : 4'-bisacetate, m.p. 98–99°, are described. H. A. P.

**Manufacture of compounds for treatment of textiles.** IMPERIAL CHEM. INDUSTRIES, LTD., and A. W. BALDWIN (B.P. 437,285, 26.4.34).—A 1-alkylthiolbenzthiazole in which the alkyl group has < C<sub>8</sub> is converted into a quaternary NH<sub>4</sub> salt by the action of a lower alkyl ester of an inorg. acid. Examples are: 1-octadecyl- and 1-dodecyl-thiolbenzthiazole methosulphates. The corresponding alkylthiolbenzthiazoles have m.p. 43–44° and b.p. 250–255°/10 mm., respectively. H. A. P.

**Manufacture of aromatic selenium compounds.** A. J. WUERTZ, D. P. GRAHAM, and M. A. PERKINS, Assfs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,991,646, 19.2.35. Appl., 27.3.33).—Aromatic selenols are obtained by treating aryl halides, in alcoholic or aq. suspension, with powdered Se or SeO<sub>2</sub> and Al and adding, at 60–80°, an alkali hydroxide during several hr. followed by refluxing to completion. Examples of selenols of anthra-



quinone are given. The process is claimed to be superior to, and less hazardous than, that of G.P. 264,941 (A., 1914, i, 64). A. W. B.

**Erratum:** On p. 796, col. 2, line 16, of "B" abstracts, 1935, for B.P. 430,778 read B.P. 430,578.

**Phenols from gas liquors. Treating hydrocarbons.**  $C_6H_6$  from light oil. Polymerisation of olefines.—See II. Dielectrics.—See XI. Alcohols from sugars.—See XVII. Glycerol.—See XVIII.  $CH_4$ .—See XXIII.

#### IV.—DYESTUFFS.

##### PATENTS.

**Production of compounds of the cyanine type.** J. D. KENDALL (B.P. 438,420, 8.5.34. Cf. B.P. 424,559; B., 1935, 398).—For preparing cyanine dyes, a quaternary heterocyclic  $NH_4$  salt, containing a reactive Me, is condensed with the alkyl *p*-toluenesulphonate of the *N*-alkylthione of a heterocyclic compound (cf. B.P. 423,792 and 424,559; B., 1935, 298, 398). The nine examples include dyes of the indoxa-, oxa-, oxa-2'-pyrido-, oxazolothia-, oxathia-, 2'-pyridothia-, thia- $\psi$ -, and thiazolo-2'-cyanine types. The sensitising max. of seven, which are sensitisers for chloride emulsions, vary from 394 to 460 m $\mu$ . F. M. H.

**Manufacture of (A) unsymmetrical heptacarbocyanine, (B) hexamethine, dyes.** I. G. FARBERIND. A.-G. (B.P. 438,449 and 438,484, 18.5.34. Ger., 18.5.33).—(A) Unsymmetrical tricarbocyanines are obtained from one of the intermediates of B.P. 438,484 [see (B)] and a quaternary heterocyclic  $NH_4$  salt, containing a reactive Me, in presence of an alkaline condensing agent. The 12 examples include *unsymmetrical thiatricarbocyanines*, of varying complexity, and *seleno-4'*-, *selenathia*-, *selenathiazolo*-, *thia-2'*-, *thia-4'*-, and *thiathiazolo-tricarbocyanines*. (B) In preparing a tricarbocyanine intermediate from a compound  $R_1R_2N:[CH]_5NR_1R_2$  and a quaternary heterocyclic  $NH_4$  salt, containing a reactive Me, an alkaline condensing agent is advantageous (cf. B.P. 355,693; B., 1932, 57). *E.g.*, 1-methylbenzthiazole ethiodide and glutaric aldehyde dianilide hydrobromide, with piperidine in EtOH, yield 6-anilino- $\Delta^4$ -hexatrienebenzthiazolyl ethiodide; four other intermediates of the same type are described. F. M. H.

#### V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

**Isolation of long single silk filaments.** T. LONSDALE (Silk J. and Rayon World, Dec., 1935, 12, 39).—A special form of stainless-steel reel is described on which tram thread can be degummed to allow the separation of up to 3-m. lengths of single filaments.

A. J. H.

**Rapid visual method for determining the amount of lint on cottonseed.** E. FREYER (Oil & Soap, 1935, 12, 259–262; cf. B., 1935, 1038).—Rapid and reasonably accurate ( $\pm 0.6$  on actual val.) determinations of lint on delinted seed can be made by visual comparison of the colour and appearance of the sample with a no. (*e.g.*, 6) of graded standards of known lint content (ascertained by the  $H_2SO_4$  method). Estimates of lint content from readings of bulk *d* do not afford such

accurate results, as both  $H_2O$  and oil content affect the *d*, nor do measurements of bulk compressibility, angle of repose (surface friction), or  $H_2O$ -retaining power of wetted seed afford reliable indications.

E. L.

**[Viscose] staple-fibre yarns [in knitting].** W. DAVIS (Silk J. and Rayon World, Dec., 1935, 12, 26, 54).—Lack of pliability of such yarns is overcome by softening them with paraffin wax. They are especially suitable for knitted fabrics because of their bulkiness.

A. J. H.

**Causes of shrinking in wool [knitted] underwear.**

T. F. HEYES (Text. Rec., Dec., 1935, 53, 43, 45–46).—Shrinkage of well-chlorinated garments may be due to excessive stretching of the wool fabric in finishing before making-up or, more likely, to excessive drying after laundering. A curve is given showing the area contraction suffered by wet wool fabric during drying. Contraction commences when the  $H_2O$  content falls below 48%, and is most rapid about 9%; shrinkage occurs only slightly from 9 to 3%, and thereafter ceases. Dried perspiration produces felting with consequent shrinkage. Worn wool underwear sometimes contains, after washing, wax and oil excreted (1–2 mg. per hr. per sq. ft.) from the human skin, and these can be extracted from the garment with EtOH. Extraction data for 6 garments are given. A. J. H.

**Nature of cellulose.** E. HEUSER (Paper Trade J. 1935, 101; T.A.P.P.I. Sect., 303–310, 317–323, 331–334).—Historical review.

**Chlorination methods of isolating cellulose.** V. I. MINAEV and S. S. FROLOV (Trans. Inst. Chem. Tech. Ivanovo, 1935, 196–203).—The prep. of cellulose from flax refuse is described. R. T.

**Maturation of cellulose solutions.** II. G. TOCCO and E. CERBARO (Boll. R. Staz. Sperim. Ind. Carta Fibre Tess., 1935, 30, 640–642; cf. B., 1934, 1006).—Maturation of cellulose acetate in aq.  $CaBr_2$  is as slow as in  $Ca(CNS)_2$ , but in  $ZnCl_2$  it is much more rapid. The velocity increases with the concn. of cellulose ester and decreases with increase in salt concn.

D. R. D.

(i) Flow of viscose solutions through rectangular channels of small section. (ii) Use of artificial silk waste in the textile industry. (iii) Simple tests of textiles without the aid of the microscope or special apparatus. R. FOCKE ([i] Kunstseide, 1934, 16, 260–263, 297–303; [ii and iii] Deut. Färb.-Ztg., 1934, 70, 541–542, 551–552, 561–562; Chem. Zentr., 1935, i, 1638).—(i) Relationships are established between the rate of flow and the abs.  $\eta$ , head of pressure, length of capillary, and hydraulic radius.

(ii) A process is described.

(iii) The ignition test and the examination of various physical properties of a no. of natural and artificial fibres are considered. A. G. P.

**Preservation of compressed cork rings by [artificial] resin impregnation.** N. J. L. MEGSON (Chem. & Ind., 1935, 1075).—Cork rings etc. impregnated with heat-hardening resin, *e.g.*, of  $PhOH-CH_2O$  type, then heated for 2–3 hr. at 70–80°, and stoved



overnight at 105–150°, acquire improved resistance to H<sub>2</sub>O, brine, etc. and retain considerable elasticity.

S. S. W.

**Determination of the fineness of nitrocellulose by dye absorption.** A. J. PHILLIPS (Ind. Eng. Chem. [Anal.], 1935, 7, 416–419).—The fibres are first dyed with negatively-charged Congo-red and then with positively-charged methylene-blue under controlled conditions. The second dye is quantitatively pptd. by the first, and the extent to which it is taken up is, therefore, a measure of the sp. surface.

E. S. H.

**Micro-beater [for pulp].** G. LAROCQUE (Quart. Rev. Forest Products Lab. Canada, 1934, 20, 22–25).—A small single-rod mill capable of dealing with only 1 g. of pulp is described, and some typical beating curves are given.

H. A. H.

**Groundwood studies.** D. EDWARDS, W. HOLLAND, and H. W. JOHNSTONE (Quart. Rev. Forest Products Lab. Canada, 1935, 22, 11–19).—A model pulp grinder with floating pocket is described.

H. A. H.

**Effect of electrolytes on freeness [of groundwood pulp].** G. SKAPERDAS (Quart. Rev. Forest Products Lab. Canada, 1934, 20, 11–12).—H<sub>2</sub>O of electrical conductivity = that of N/700-KCl, and the hardness of which is 80 p.p.m., is without effect on the freeness of mechanical pulp, by comparison with distilled H<sub>2</sub>O.

H. A. H.

**Rate of pulping of Douglas fir sawdust.** H. ENGLISH, H. GREEN, C. R. MITCHELL, and F. H. YORSTON (Quart. Rev. Forest Products Lab. Canada, 1934, 20, 15–21).—The rate of sulphonation  $\propto$  the amount of unsulphonated lignin present at any instant, and the rate of removal of S (and hence, presumably, of sulphonated lignin)  $\propto$  the amount of the latter present. Sulphonation is slow enough to limit somewhat the over-all rate of pulping. The relation governing the rate of removal of the unsulphonated lignin is not yet clear.

H. A. H.

**Surface area of [wood] pulp.** O. MAASS (Quart. Rev. Forest Products Lab. Canada, 1934, 20, 8–10).—A null method of measurement is described, which gives rapid but accurate results.

H. A. H.

**Electric[al] method for determination of concentration of [wood] pulp in water.** P. E. GISHLER and O. MAASS (Quart. Rev. Forest Products Lab. Canada, 1934, 20, 1–7).—A simple apparatus has been constructed which is capable of making instantaneous determinations of pulp consistency. Between 0 and 1% concn., differences of 0.02% are detectable. Variations in temp. and concn. of dissolved salts do not interfere. The apparatus can readily be inserted in any system where circulation of pulp is taking place.

H. A. H.

**Supposed effect of hydrogen-ion concentration on freeness [of wood pulp].** F. H. YORSTON (Quart. Rev. Forest Products Lab. Canada, 1935, 22, 1–2).—It is believed that the effects noticed by Lary and Davis (B., 1935, 845) depend, not on the  $p_H$  of the stock, but on the way in which the  $p_H$  is adjusted. The observed increases in freeness are a function of the total positive-ion concn. and of the valency of the ions.

H. A. H.

**Combustible sulphur in sulphite[-cellulose] waste liquor.** F. A. KOBE and A. D. CENTENERO (Paper Trade J., 1935, 101, TAPPI Sect., 338).—The amounts of combustible S present in liquor conc. by 8 different processes have been determined. Combustion is held to be feasible. Methods of removing SO<sub>2</sub> from stack gas are also briefly discussed.

H. A. H.

**Reason for increase in [paper] strength on beating.** S. R. H. EDGE (Proc. Tech. Sect. Papermakers' Assoc., 1935, 16, 273–274).—Previously inexplicable results obtained by beating wood pulp in PhMe (B., 1935, 399) are now found to be in agreement with Campbell's theory of the nature of paper strength (B., 1932, 929).

H. A. H.

**Important factors involved in the drying of paper.** F. W. ADAMS (Paper Trade J., 1935, 101, TAPPI Sect., 335–337).—A no. of paper-machine variables are briefly discussed.

H. A. H.

**What the printing process demands of paper.** J. BEKK (Proc. Tech. Sect. Papermakers' Assoc., 1935, 16, 9–43).—Mainly a survey of the author's methods of paper-testing designed for the measurement of printability. These include smoothness, softness, resistance to picking, absorptive power, power of pigmentation and strike-through, dusting tendency, air-permeability, and abrasive action.

H. A. H.

**Does paper quality affect gilt ink?** O. J. SCHIERHOLTZ (Pulp and Paper Canada, 1935, 36, 609–613).—Acidity in paper resulting from the hydrolysis of Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> used in sizing is a primary cause of the tarnishing of gilt (composed of Cu, Zn, and Al) on paper. During tarnishing, SO<sub>2</sub> is evolved which itself is detrimental; indeed, the tarnishing of gilt gum is an extremely delicate test for SO<sub>2</sub>. Treatment of the paper with a solution of alkaline-earth bicarbonates, or with an alkaline-earth hydroxide immediately followed by immersion in CO<sub>2</sub> solution, is an effective remedy, provided the  $p_H$  is thereby raised above 6.7. NaOH is not suitable for this purpose.

H. A. H.

**Ultra-violet light as an aid in papermaking.** J. GRANT (Proc. Tech. Sect. Papermakers' Assoc., 1935, 16, 97–113).—The applications of ultra-violet light in the identification of fibres, fillers, and blemishes in paper, the measurement of sizing, and the examination of various types of falsification problems are discussed.

H. A. H.

**Light-transmittance of oiled and waxed papers.** H. GREEN (Quart. Rev. Forest Products Lab. Canada, 1934, 20, 12–13).—Light-transmittancy, measured by the Ives tintometer, of paper impregnated with paraffin wax is only about half that of the same paper when impregnated with org. liquids of the same  $n$ . This is attributed to the microcryst. nature of the wax, and it is suggested that an isotropic wax of suitable physical properties would give increased transparency.

H. A. H.

**Moistureproofing of cellulose transparent paper.** ANON. (Silk J. and Rayon World, Dec., 1935, 12, 44–45).—Methods and apparatus are described for coating viscose film with cellulose ester, wax, and chlorinated Ph<sub>2</sub> resin products.

A. J. H.



**Solvents etc.**—See III. **Cellulose wrappers.**—See XII. **Paints for the silk etc. industry. Film coverings.**—See XIII. **Uses for maize straw.**—See XIX.

## PATENTS.

**Manufacture of mixed yarns.** I. G. FARBENIND. A.-G. (B.P. 436,560, 20.10.34. Ger., 21.10.33).—Undegummed flax is spun with artificial fibres to a smooth or woolly yarn on wet or dry machines, respectively.

F. R. E.

**Recovery of silk from knit goods.** A. H. ROSENBERG (U.S.P. 1,992,396, 26.2.35. Appl., 9.10.31).—The materials are treated with sufficient HCl vapour at 60–80° to rot the cellulose-fibre seam rapidly without injuring the silk. After pulling open the seam, the silk is unravelled.

F. R. E.

**Utilisation of cotton plant.** G. H. PALMER (U.S.P. 1,991,769, 19.2.35. Appl., 27.5.33).—Subdivided selected portions of the cotton plant are soaked in 1–2% aq. alkali hydroxide at < 100°, and heated for several hr. at > 100° with 1.5% aq. NH<sub>3</sub> containing about 0.5% of N(C<sub>2</sub>H<sub>4</sub>·OH)<sub>3</sub> (I). It is then washed to neutrality, heated at > 100° with an aq. mixture of Na silicate, K oleate, NaOH, and Na<sub>2</sub>CO<sub>3</sub> [and optionally (I)], and washed to neutrality. Finally it is treated in the cold with 1–3% H<sub>2</sub>SO<sub>4</sub> for < 12 hr. and again washed to neutrality. The resultant product may be converted into viscose.

D. A. C.

(A, B) **Manufacture of cellulose.** (C) **Treatment of cellulosic materials.** (D) **Production of cellulose and cellulosic products.** H. DREYFUS (B.P. 438,433–6, [A–D] 16.5.34, [C] 10.7.34).—(A, B) Chemical wood pulp containing residual lignin, pentosan, and/or other encrusting substances is heated (A) at 70–95° with HNO<sub>3</sub> (2–10%), (B) at < 100° with NaOH (< 5%), containing substances resulting from the treatment of a lignocellulose material with (A) HNO<sub>3</sub>, (B) NaOH. In (A) the material may be subsequently heated with dil. alkali. (C, D) Wood is heated (C) at < 95° with HNO<sub>3</sub> (2–10%) and then at 100–130° with NaOH (1–5%), (D) at 100–150° with H<sub>2</sub>O under pressure and then at 75–95° with HNO<sub>3</sub> (2–10%).

F. R. E.

**[Preparation of] cellulose [ester] compositions.** T. S. CARSWELL and W. GUMP, Assrs. to MONSANTO CHEM. CO. (U.S.P. 1,991,012, 12.2.35. Appl., 16.1.29).—Compositions containing as plasticisers arylsulphonyl-acetanilides (*p*-toluenesulphon-acetanilide and -acetethylanilide) are claimed.

H. A. P.

**[Preparation of] cellulose acetate-carbamate.** C. J. MALM and G. F. NADEAU, Assrs. to EASTMAN KODAK CO. (U.S.P. 1,991,107, 12.2.35. Appl., 27.4.32).—Cellulose acetate, propionate, or other lower fatty ester is condensed with PhNCO or PhNCS (in C<sub>5</sub>H<sub>5</sub>N or a solvent, e.g., cyclohexanone). The products are claimed to have superior alkali- and heat-resistance to that of cellulose acetate.

H. A. P.

**Manufacture of highly-esterified soluble mixed cellulose esters.** J. G. JURLING, Assr. to N. V. FABR. VAN CHEM. PRODUCTEN (U.S.P. 1,990,433, 5.2.35. Appl., 24.4.31).—Nitrocellulose is acetylated (> 90%) with Ac<sub>2</sub>O, AcOH, and H<sub>2</sub>SO<sub>4</sub>, and after hydrolysing the

excess of Ac<sub>2</sub>O by addition of H<sub>2</sub>O without diluting the AcOH the mixture is set aside until the H<sub>2</sub>SO<sub>4</sub> in the esterified mol. has been replaced by AcOH without decrease in the degree of esterification. The product is then slightly hydrolysed (> 2%) with a little H<sub>2</sub>O so that films made from the COME<sub>2</sub> solution are perfectly clear.

F. R. E.

**Manufacture of chemical compound [mixed cellulose esters].** G. DE W. GRAVES, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,990,483, 12.2.35. Appl., 20.4.33).—A polyhydric alcohol, e.g., cellulose, is treated with keten and an org. acid other than AcOH, in presence or absence of esterification catalysts and/or diluents or solvents for the resulting ester.

F. R. E.

**Treatment of cellulose esters.** DISTILLERS CO., LTD., H. A. AUDEN, and H. P. STAUDINGER (B.P. 437,907, 30.7.34).—The residual inorg. catalyst (H<sub>2</sub>SO<sub>4</sub>, H<sub>3</sub>PO<sub>4</sub>, HClO<sub>4</sub>) is removed from fibrous cellulose esters by adding to the reaction mass, before or after separation of the esterifying liquor, a substance which is sol. in the non-solvent or in the esterifying mixture and forms an insol. compound with the catalyst, e.g., alkoxides, phenoxides, oleates, etc. of Ca, Pb, or K.

F. R. E.

**Removal of catalyst from a spent liquor resulting from the esterification of cellulose in fibrous form.**

C. J. MALM and G. F. NADEAU, Assrs. to EASTMAN KODAK CO. (U.S.P. 1,991,108, 12.2.35. Appl., 28.7.33).—Mineral acid catalysts are removed by bringing the liquor in contact with an inert absorbent, e.g., by allowing it to percolate through activated charcoal.

F. R. E.

**Manufacture of artificial fibres.** W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 438,199, 9.5.34).—An aq. cellulose solution, e.g., viscose, containing a protein (casein, albumin) which has been treated, before or after incorporation therein, with a fixative (cholic acid, NH<sub>2</sub>Ac, CH<sub>2</sub>O), is spun into a pptg. bath. The products show improved stability to alkalis and are dyed by wool dyes.

F. R. E.

**Manufacture of artificial filaments.** R. ETZKORN, Assr. to NORTH AMER. RAYON CORP. (U.S.P. 1,990,897, 12.2.35. Appl., 11.9.31. Ger., 16.9.30).—Spinning speeds of < 100 m./min. may be employed in wet-spinning processes without splashing of the bath liquids if the diam. of the take-up roller is controlled so that the linear acceleration of its surface is > 2500 cm./sec.<sup>2</sup>

F. R. E.

**Treatment [stretching] of artificial filaments, yarns, films, and similar materials containing organic derivatives of cellulose.** H. DREYFUS (B.P. 437,595, 28.3.34).—The materials are treated under pressure with an org. softening agent in an aq. or non-aq. medium, in the vapour state, or in presence of wet steam, and are simultaneously stretched. The medium containing the softening agent is preferably such that it has no substantial action at room temp. and atm. pressure.

F. R. E.

**Manufacture and use of [crêped] textile threads.** BRIT. CELANESE, LTD. From CELANESE CORP. OF AMERICA (B.P. 437,019, 20.1. and 31.5.34).—Cellulose acetate threads are crêpe-twisted and simultaneously



steamed at  $> 95^\circ$  under conditions such that moisture is present. F. R. E.

**[Manufacture of] crêpe threads and fabrics containing artificial filaments.** (A) BRIT. CELANESE, LTD., H. DREYFUS, R. W. MONCRIEFF, S. J. MENZER, and T. ECCLES, (B) H. DREYFUS (B.P. 437,943—4, [A, B] 8.2.34 and [A] 6.6.34).—Before crêpe-twisting, (A) yarns of org. derivatives of cellulose are uniformly stretched beyond their elastic limit (120%) in presence of an org. softening agent (aq.  $\text{CH}_2\text{O}$ ), (B) yarns having a basis of cellulose ester of  $\eta < 30$ , as determined by the method described, are completely or partly saponified. F. R. E.

**Production of artificial textile materials [yarns of varying denier].** BRIT. CELANESE, LTD., R. W. MONCRIEFF, and C. W. NORTH (B.P. 438,119, 2.5.34).—Cellulose ester yarns are non-uniformly hydrolysed along their length and stretched in presence of a softening medium (e.g., dioxan) which has a greater action on some parts (less hydrolysed) than on others. The softening medium may consist of an org. base, e.g.,  $\text{C}_2\text{H}_4(\text{NH}_2)_2$ , which also serves to hydrolyse the ester or effect further hydrolysis. F. R. E.

**Treatment of textile materials.** BRIT. CELANESE, LTD., A. MELLOR, R. J. MANN, and E. L. GREENWOOD (B.P. 436,463, 11.4.34).—Fabrics composed of org. derivatives of cellulose are treated in open width, while free from tension, for a short time ( $> 10$  min.) with aq. soap solution or other wetting-out agent at  $> 90^\circ$ , whereby creasing is prevented and the crêpe figure is developed in those fabrics containing sized or unsized crêpe threads. They may then be dyed or otherwise wet-treated in rope or other folded form. F. R. E.

**Rendering films of cellulose substances impermeable [to moisture, acids, and alkaline solutions].** ING. A. MAURER, SOC. ANON. (B.P. 436,300, 9.4.34. Fr., 9.6.33).—Films are rendered pliable by treatment in an esterification bath, and given a protective coating with a solution of a non-hygroscopic varnish (cellulose ethers or esters and hydrocarbons) which is either included in the esterification bath or applied subsequently, the ratio of dry varnish to esterifying material being between 1:20 and 3:10. The films are then kept for a time in an atm. oversaturated (containing 2–40%) with vapour of the varnish solvent, and dried by hot air at  $40$ – $100^\circ$  and R.H. 40%. F. R. E.

**Treatment of vegetable fibres.** W. T. REDDISH, ASSR. to TWITCHELL PROCESS CO. (U.S.P. 1,991,335, 12.2.35. Appl., 24.1.30).—Raw cotton, linen, jute, etc. is boiled for about 30 min. at 1 atm. with 1% aq. NaOH containing 0.1–2.0% of mineral oil ("mahogany") sulphonates to remove natural impurities. D. A. C.

**Manufacture of sulphite pulp.** E. HOCHBERGER, ASSR. to CANADIAN INTERNAT. PAPER CO. (U.S.P. 1,971,564, Appl., 28.8.34. Appl., 3.6.33. Can., 24.6.32).—Wood is cooked at  $120$ – $150^\circ$  with sulphite liquor, the sol. impurities are washed away from the pulp, and the fibre is liberated by digesting the pulp with  $\text{H}_2\text{O}$  at  $160$ – $170^\circ$  under pressure to hydrolyse the ligninsulphonates. A. R. P.

**Bleaching and refining of pulp.** C. B. THORNE (U.S.P. 1,989,571, 29.1.35. Appl., 6.5.32).—The process

is carried out, in the apparatus described, in  $< 2$  stages. Pulp is treated first at low  $d$  with  $\text{Cl}_2$ , and then with a hypochlorous bleaching medium at high and also, if desired, at low  $d$ . F. R. E.

**Chlorination [of wood pulp].** C. F. WEITZEL, H. G. POTTS, and J. E. UNDERWOOD, ASSRS. to PENNSYLVANIA SALT MANUFG. CO. (U.S.P. 1,971,241, 21.8.34. Appl., 1.4.33).— $\text{H}_2\text{O}$  supersaturated with  $\text{Cl}_2$  under pressure is sprayed below the surface of a circulating mass of wood pulp suspended in  $\text{H}_2\text{O}$ . A. R. P.

**Filling or coating compositions for paper and textiles.** L. MELLERSH-JACKSON. From R. T. VANDERBILT CO., INC. (B.P. 438,297, 7.12.34).—Powdered clay is intimately mixed in the dry with finely-divided CaO and alum (total wt. of CaO and alum  $> 40\%$  of the wt. of clay), and the mixture allowed to react in  $\text{H}_2\text{O}$ . Small quantities of  $\text{CaCO}_3$  and/or  $\text{Na}_3\text{PO}_4$  may also be added to the dry mix. D. A. C.

**Manufacture of paper.** P. DREWSEN, ASSR. to HINDE & DAUCH PAPER CO. (U.S.P. 1,991,499, 15.2.35. Appl., 8.1.32. Renewed 17.7.34).—The pulp, particularly straw, is mechanically defibred at a high consistency (10–50%) and at  $100^\circ$  in presence of alkalis (e.g., 6–10% of NaOH and 5–8% of CaO on the wt. of straw). The excess alkali may be neutralised during disintegration. D. A. C.

**[Manufacture of] security paper.** D. RUSSELL (B.P. 437,969, 12.5.34).—A finely-divided, chemically reactive metal, e.g., Fe, Cu, Mn or Fe–Mn alloy, or metal oxide, together with other known security ingredients  $[\text{Mn}_2\text{Fe}(\text{CN})_6]$ , are incorporated in the pulp before running on the papermaking machine. F. R. E.

**Manufacture of stencil sheet.** H. P. ELLIOTT, ASSR. to ELLIOTT ADDRESSING MACHINE CO. (U.S.P. 1,990,535, 12.2.35. Appl., 27.10.33).—The base paper is heavily coated on one side with a 5–8% cellulose ester solution containing 50 wt.-% of castor or soya-bean oil and 3–5 wt.-% of a fat (e.g., lard). The other side is thinly coated with an EtOH solution of shellac. The paper in each case is drawn over the surface of the coating bath. D. A. C.

**Control of paper stock.** E. POIRIER (U.S.P. 1,990,501, 12.2.35. Appl., 2.2.34).—A machine is described which simultaneously controls the quantity of stock delivered to the paper machine and its consistency. D. A. C.

**Manufacture of moistureproof material.** (A) W. H. CHARCH, (B) L. L. LEACH and J. C. SIEMANN, (A, B) ASSRS. to DU PONT CELLOPHANE CO., INC. (U.S.P. 1,989,681 and 1,990,080, [A, B] 5.2.35. Appl., [A] 21.2.29, [B] 12.2.32).—(A) Regenerated cellulose sheet in gel form, after removal of  $\text{H}_2\text{O}$  by solvent replacement if desired, is impregnated with a solution or dispersion of a high-m.p. wax (paraffin) and a plasticiser  $[(\text{C}_6\text{H}_4\text{Me})_3\text{PO}_4]$  without impairing the transparency of the ultimate product, dried, and treated with a transparent, non-tacky, surface coating (cellulose ester dope, lacquers, etc.). (B) A sheet of regenerated cellulose having a smooth, dense, non-porous surface is coated with a transparent layer of rubber and drying oil (linseed), vulcanised or not, which serves to anchor the final moistureproof coating



of cellulose derivative, gum or resin, wax, and plasticiser to the sheet. F. R. E.

**Composite [lining] material.** L. W. OLDFIELD (B.P. 438,301, 10.1.35).—Felt is covered on one or both sides with crêpe or corrugated paper which is coated outside with rubber solution in sufficient quantity to penetrate the paper and cause it to adhere to the felt. Intermediately may be a layer of coarsely woven textile. B. M. V.

**Decorative sheet material.** PEINTAL SOC. ANON. (B.P. 438,494, 24.4.35. Switz., 25.4.35).—Surface-oxidised Al foil is coated on to a paper or cardboard base. The foil surface may be dyed or otherwise coloured. D. A. C.

**[Manufacture of] metal foils covered with cellulose foils or films.** J. P. BEMBERG A.-G. (B.P. 437,164, 1.3.35. Ger., 19.3.34).—Metal foils are coated with cellulose hydrate foil, preferably made from cuprammonium cellulose, employing an org. wax-like adhesive which does not swell in  $H_2O$  (paraffin, beeswax, ozokerite, or ceresin). The cellulose foil should be thinner than the metal foil and weigh  $\geq 15$  g./sq. in. F. R. E.

**Method of laminating.** W. H. CHARCH and J. E. SNYDER, Assrs. to DU PONT CELLOPHANE CO., INC. (U.S.P. 1,992,190, 26.2.35. Appl., 21.11.29. Renewed 8.8.34).—Sheets of moistureproof (*e.g.*, wax-coated) regenerated cellulose are cemented together with an adhesive comprised of a gum or resin, and a softener (*e.g.*, castor oil). The adhesive may be applied in a molten state or in an org. solvent. D. A. C.

**[Cement for] laminated material.** J. E. SNYDER, Assr. to DU PONT CELLOPHANE CO., INC. (U.S.P. 1,992,249, 26.2.35. Appl., 28.4.31).—Sheets of regenerated cellulose, moistureproof paper, metal foil, rubber, etc. are cemented together by means of adhesives containing mainly synthetic resins such as the polyhydric alcohol-polybasic acid resins or polymerised terpenes, which are applied in the molten state. It is claimed that sheets so produced will not buckle under varying atm. humidity. D. A. C.

**Manufacture of laminated products.** G. W. SEYMOUR, Assr. to CELANESE CORP. OF AMERICA (U.S.P. 1,990,098, 5.2.35. Appl., 29.11.32).—A condensation product of an aldehyde with a polyhydric alcohol is used as adhesive between a sheet of a cellulose derivative (acetate) and paper or foil. The *methylene ethers* of  $C_2H_4(OH)_2$ , b.p.  $73^\circ$ , glycerol monochlorohydrin, b.p.  $146^\circ$ , and  $O[C_2H_4 \cdot OH]_2$ , b.p.  $180-240^\circ$ , are prepared by heating the glycols with  $(CH_2O)_n$  and HCl. H. A. P.

**Production of flexible sheet materials having a sticky surface.** I. G. FARBERIND. A.-G. (B.P. 437,704, 9.7.34. Ger., 8.7.33).—Branched-chain, aliphatic mono-olefines (*iso*- $C_4H_8$ ) when polymerised at  $-40^\circ$  to  $-80^\circ$  by a Friedel-Crafts reagent ( $AlCl_3$ ,  $BF_3$ ,  $TiCl_4$ ) yield sticky substances which are compounded and used in preparing adhesive flexible sheets, *e.g.*, adhesive plaster, fly-paper. E. J. B.

**(A) Reclaiming pulp from waste paper. (B) Production of paper pulp.** F. H. SNYDER, Assr. to SNYDER MACLAREN PROCESSES, INC. (U.S.P. 1,991,823—4,

19.2.35. Appl., 11.8.33).—(A) Waste news is shredded and dusted, and then beaten in presence of  $Na_2SO_3$  and oleic acid at about  $30^\circ$  for 30 min. It is subsequently washed and filtered. (B) Jute, straw, and particularly mechanical pulp is bleached by addition to the beater furnish of 7—12 lb. of Zn dust per ton of bone-dry fibre, followed almost immediately by an approx. equal quantity of aq.  $SO_2$ . On completion of bleaching (after a few min.) about 50 lb. of finely-divided  $CaCO_3$  are added. D. A. C.

**Treating coal.**—See II. **Bleaching pulp. Moistureproofing cellulosic sheets.**—See VI. **Sheeted polymerisation products.**—See XIII. **Rubber hydrohalide films.**—See XIV.

## VI.—BLEACHING ; DYEING ; PRINTING ; FINISHING.

**Bleaching of cotton piece goods with hydrogen peroxide.** R. E. RUPP (Dyer, 1935, 74, 585—587; cf. B., 1926, 534).—Satisfactory bleaching is obtained by first kiering the fabric with aq. NaOH in the usual manner, and then heating it at  $99-100^\circ$  in a cement- or  $SiO_2$ -lined kier with sufficient  $H_2O$  to cover the fabric completely and containing 40—50 lb. of 100-vol.  $H_2O_2$  per 9000 lb. of fabric and sufficient Na silicate to make the liquor alkaline and stable towards metal impurities. Fabric so bleached has a softer handle than that bleached by the usual methods, using active Cl, since larger amounts of natural fats and waxes are left in the cotton. The tendering effect of Fe during  $H_2O_2$ -bleaching is irregular; Fe wire twisted in the fabric has caused no damage, whereas a stain containing  $\geq 0.01\%$  Fe has caused serious tendering. A. J. H.

**Dyeing of loose wool with rhodamine dyes.** J. WINFIELD (Dyer, 1935, 73, 413—414).—Basic Rhodamine 6G, 3B, and B dyes yield deeper, brighter, and faster-to-fulfilling (with soap) shades when applied from an acid instead of a neutral bath, especially if  $H_2SO_4$  is used instead of AcOH or  $HCO_2H$ . Fe in the acid dye liquor dulls the resulting shade considerably. Slightly duller but faster-to-fulfilling shades are obtained with acid Rhodamine dyes. A. J. H.

**Theory of wool dyeing, with particular reference to acid dyes in colloidal solution.** F. L. GOODALL (J. Soc. Dyers and Col., 1935, 51, 405—414).—The behaviour of aggregated acid dyes on wool, which dye very quickly even without added mineral acid and are not removed by acid stripping, is explained in terms of the fine structure of wool. It is suggested that  $Na$  ions enter the finer pores and split the wool-salt linking, thus giving  $RCO_2Na$  and  $RNH_3^+$ , which latter holds the large anionic micelle across the mouth of the pore by electrical attraction. S. M. N.

**Dyeing of [animal] hair.** L. W. BOOTH (Dyer, 1935, 74, 161—162).—Dyeing processes for camel hair, mohair, alpaca, cashmere, cow-goat-, dog-, deer-, and rabbit-hair, and hogs' bristles are described briefly. Decolorisation of the hair in prep. for dyeing is usually difficult, especially with goat and horse hair, and the relative resistances to useful decolorising agents (*e.g.*,  $KMnO_4$ ,  $Na_2S_2O_4$ , and  $Na_2Cr_2O_7 + H_2SO_4$ ) of the various hairs are tabulated. A. J. H.



**Dyeing of ramie and kapok.** S. H. HORBURY (Text. Colorist, 1935, 57, 823).—Direct dyes are generally used. Ramie has less affinity than cotton or jute for these dyes. In the dyeing of kapok  $\text{Na}_2\text{CO}_3$  is omitted from the dye liquor since it deleteriously affects this fibre, whilst addition of a 1:1 mixture of sulphonated pine oil and a sol. oil is necessary to obtain good penetration. A. J. H.

**Dyeing fast-to-light shades on jute yarn.** H. HAUSMANN (Text. Colorist, 1935, 57, 820—822, 852).—Dyeing methods using Hussong dyeing machines and acid, chrome, and direct dyes, cutch, and logwood are described with special reference to jute in skein form. A. J. H.

**Dyeing cellulose acetate fibres.** J. A. WALLWORK (J. Soc. Dyers and Col., 1935, 51, 415—416).—Typical methods for the dyeing of developed colours on acetate rayon are described. *E.g.*, the material is padded with the colour base and subsequently entered into the Naphthol bath. S. M. N.

**Effect of acid cross-dyeing on Caledon [vat] dyes.** G. H. WORME (Dyer, 1935, 74, 162—163).—Shade changes produced in cotton samples dyed with various Caledon dyes and attached to wool fabric being dyed with various acid dyes ( $\text{Na}_2\text{SO}_4 + \text{HCO}_2\text{H}$  as assistants) are described. A. J. H.

**Machine for testing the fastness to rubbing [of dyed textiles].** C. O. M. STEWARD, and W. & J. WHITEHEAD (LAISTERDYKE), LTD. (Dyer, 1935, 73, 499—500).—A machine especially suitable for black-dyed worsted yarn is described. Much importance is attached to a standard scouring treatment which is applied to the yarn before testing. The intensity of the rubbing stain on the white fabric is measured with a Lovibond tintometer. A. J. H.

**Colour measurement [in textiles].** G. FURLONGER (Dyer, 1935, 74, 577—578).—The Ostwald colour system (B., 1930, 222) is described and criticised on the ground that it is based on Fechner's law, which has been shown to be inaccurate for very bright and dark colours. A. J. H.

**Processing [dyeing and finishing] of velvet for autocar upholstery in shades fast to light and rubbing.** O. P. FLAN (Text. Colorist, 1935, 57, 807—808).—Utrecht velvet (mohair pile) and cross-bred worsted moquette fabrics having a cotton backing are chiefly used; the length of pile is  $> 0.2$  in. since a longer pile is not resistant to crushing. Before dyeing, the fabric is steamed for 1 hr. at 10 lb. pressure in a cottage kier to set and harden the pile fibres, and is then scoured in open width to remove the spinning twist from the pile fibres. Dyeing is effected with easy-levelling acid dyes when the cotton backing is already dyed with S dyes, and with a mixture of direct and neutral-dyeing acid wool dyes when the backing is not already dyed. Lustre and fastness to rubbing of the dyed fabric are increased by impregnating it with an aq. solution of animal glue (10 lb.) and Panama bark extract (10 lb.) per 200 gals. of  $\text{H}_2\text{O}$ , followed by drying in a "beater" apparatus, whereby the formation of hard tufts in the pile is prevented. Rubbing-fastness is also increased by impregnating the pile

fibres with a mixture of a drying oil, turpentine, and clear copal varnish. A. J. H.

**[Dyeing and finishing of] tinsel fabrics.** S. BERGNEON (Text. Colorist, 1935, 57, 663—667).—Softening of the fabric is effected before dyeing by scouring or boiling-off (for silk) at  $> 90^\circ$  while the fabric is in skein form or supported on a star-wheel. Soap scouring liquors containing  $\text{NH}_3$  or S compounds (*e.g.*, those previously used for scouring wool) are unsuitable since they tarnish the tinsel. Tarnish on Cu or Ag tinsel threads is removed by treatment with aq.  $\text{NaCN}$  or  $\text{KHC}_2\text{O}_4$ , or from Ag tinsel with aq.  $\text{NH}_3$ . In finishing, tinsel fabric is not calendered since this flattens and cracks the tinsel threads, thereby exposing its tinted cotton or silk core; it is then rolled but not folded. A final spray with cellulose acetate lacquer prevents tarnishing during storage. A. J. H.

**Direct printing with Rapid Fast colours.** ANON. (Text. Colorist, 1935, 57, 803—806, 852).—Starch-gum tragacanth is recommended for thickening printing pastes containing Rapid Fast colours when sharpness of outline is essential. Practical printing methods are described, with especial reference to development by steaming or ageing with acid after-treatment, "acid steaming," and by passage over drying cylinders. Addition of  $\text{NaOH}$  to the printing paste prevents halo formation where Rapid Fast colours are printed adjacent to chrome or basic dyes. A. J. H.

**[Production of] "seersucker" effects in modern fabrics.** ANON. (Dyer, 1935, 74, 583—584).—Cotton and rayon crimp fabrics having the appearance of seaweed are made by special weaving methods using slack and light yarns, or by printing plain woven fabric with aq.  $\text{NaOH}$  to produce patterned shrinkage effect, or by hot embossing, or by weaving stripes of crêpe yarn which shrink when the fabric is treated with hot  $\text{H}_2\text{O}$ . The  $\text{NaOH}$  crimp is obtained alternatively by first printing the fabric with a resist (albumin or casein coagulated with alkaline aq. Al or Zn salts) and then passing it through aq.  $\text{NaOH}$ . Embossed crimps are not fast to washing. Crimps resulting from the shrinkage of crêpe yarns are most easily produced in all-rayon fabrics; the presence of rough cotton yarns restricts movement of the crêpe yarns so that the crimps are insufficiently pronounced. A. J. H.

**[Detection and estimation of] damage in wool goods.** A. J. HALL (Text. Colorist, 1935, 57, 831—835).—Reference is made to damage produced by exposure of wool to sunlight, alkalis, acids, and chlorine. A. J. H.

**Film coverings.**—See XIII.

#### PATENTS.

**Bleaching and washing agents and the like.** W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 436,235, 21.4.34).—Mixtures of per-compounds, *e.g.*,  $\text{Na}_2\text{O}_2$ , perborates, perphosphates, with phosphates which contain less  $\text{H}_2\text{O}$  than does  $\text{H}_3\text{PO}_4$ , *e.g.*,  $\text{NaPO}_3$  or its polymerides,  $\text{Na}_4\text{P}_2\text{O}_7$ , are stabilised in alkaline media by addition of (0.5—5.0%)  $\text{Al}(\text{OH})_3$  (I) or of salts which form (I). Mixtures with washing, wetting, foaming, or emulsifying agents or with solvents are claimed. A. W. B.



**Compositions useful in the stripping of textiles.**

IMPERIAL CHEM. INDUSTRIES, LTD., and C. DUNBAR (B.P. 437,884, 2.2.34).—Solid shades of the Fast-Brenthol-AS type are stripped by immersion in a solution of a  $H_2O$ -sol. (quaternary) amine salt, one radical of which comprises a chain  $\leq C_{10}$ , a halogen- and/or alkyl-substituted anthraquinone, and a reducing agent (preferably, for animal fibres, and when using other than quaternary amines, in very dil. acid). Final treatment in a bleaching bath ( $NaOCl$ ,  $H_2O_2$ ) may be given to yield white material. *E.g.*, dyed cotton is treated (30 min., 85–90°) in 40 times its wt. of solution of  $NaOH$  1.25,  $Na_2S_2O_4$  1.25, trimethylcetylammmonium bromide 0.5, anthraquinone 0.5, in 1000 pts. of  $H_2O$ . The pale yellow so produced is bleached to white after 30 min. in  $NaOCl$ . 15 suitable compounds are described. E. J. B.

**Bleaching and disinfectant washing and cleansing agents.**

W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 437,128, 11.5.34).—Mixtures containing alkaline substances, per-compounds (*e.g.*, perborates),  $H_2O$ -sol. salts of PV acids having less  $H_2O$  than has  $H_3PO_4$ , and, if desired, soaps, synthetic detergents, etc. are stabilised as regards oxidising power by colourless, sparingly sol. Sn compounds, *e.g.*,  $SnO_2 \cdot nH_2O$ , Sn silicates (0.5–3.0% as  $SnO_2$ ). H. A. P.

**Detergents.** W. J. TENNANT. From HENKEL & Co. G.M.B.H. (B.P. 436,213, 27.3.34).— $H_2O$ -sol. pyrophosphates (principally the alkali salts, but including salts of org. bases such as ethanolamine) are incorporated with alkaline,  $H_2O$ -sol., inorg. alkali salts (other than  $Na_2CO_3$ ; *e.g.*, silicates) which are known detergent agents. [Stat. ref.] E. L.

**Detergents.** J. P. HÄNSEL (B.P. 436,332, 29.11.34).—A non-saponaceous detergent for, *e.g.*, greasy articles is obtained by incorporating  $Na_3PO_4$  (1 mol.) with alkali salts of inorg. or (non-fatty) aliphatic acids which are less strongly dissociated in aq. solution than is  $H_3PO_4$  (*e.g.*,  $NaOAc$  4 mols.,  $Na_2CO_3$  1 mol.,  $Na_2B_2O_7$ ) in such amount (1–5 mols.) as is sufficient almost completely to suppress the hydrolysis of the  $Na_3PO_4$ . E. L.

**Bleaching of pulp.** C. T. HENDERSON (U.S.P. 1,990,942, 12.2.35. Appl., 26.9.33).—Aq.  $Cl_2$  is passed through limestone chips and the resulting mixture of  $HOCl$  and  $CO_2$  agitated with the pulp, the relative quantities being adjusted so that all the available  $Cl_2$  is exhausted and the pulp is only partly bleached. The pulp is then washed with  $H_2O$  or aq.  $CaCO_3$  and finally bleached with  $Ca(OCl)_2$ . Plant is described for making both operations continuous and consecutive. D. A. C.

**Bleaching cellulose-containing fibres, *e.g.*, cotton, by means of solutions of per-compounds.** A. DANZINGER (B.P. 436,268, 25.1.35. Austr., 9.3.34).—Bleaching with the usual agents, *e.g.*,  $Na_2O_2$  or perborates, is conducted at  $> 80^\circ$  (100°)/ $\leq 2.5$  (3–5) atm. Economies in such agents are effected. A. W. B.

**Production of colour effects on terry fabrics.** BURGESS, LEDWARD & Co., LTD., R. W. PENNINGTON, and C. CLARKE (B.P. 437,384, 30.4.34).—The weft or binder-

warp, but not the terry-warp, threads are impregnated, prior to weaving, with dye intermediates (*e.g.*, 2:3-hydroxynaphthoic arylamides, indigosol) or a dischargeable dye. After weaving, the dye is developed or discharged locally to form a pattern. H. A. P.

**Coloration of materials made of or containing organic derivatives of cellulose.** G. H. ELLIS, Assr. to CELANESE CORP. OF AMERICA (U.S.P. 1,989,133, 29.1.35. Appl., 5.2.32).—The use (for cellulose acetate) of 1-acylamido-4-(alkyl)aminoanthraquinones (as aq. dispersions) is claimed. Red to blue-red shades are given by 1-acetamido-4-amino-, -methylamino-, and - $\beta$ -hydroxyethylamino- and by 1-propionamido-4-amino-anthraquinone. H. A. P.

**Production of vat dyeings.** I. G. FARBERIND. A.-G. (B.P. 437,528, 4.5.34. Ger., 6.5.33).—The use as levelling agents (retardants) of condensation products of aliphatic or aliphatic-aromatic carboxylic acids having a radical of  $\leq C_6$  ( $C_{12-18}$ ) with hydrolysis products of albuminous substances is claimed. Examples are the products from oleyl and lauryl chlorides and degraded glue (100°/24 hr. with  $H_2O$ ). H. A. P.

**Dyeing and printing.** H. T. BÖHME A.-G. (B.P. 436,410, 14.8.34. Ger., 23.10.33).—Compounds giving rise to cations capable of reducing surface tension, *e.g.*, quaternary  $NH_4$ , phosphonium, or sulphonium salts containing aliphatic residues of  $\leq C_8$ , such as  $C_{16}H_{33} \cdot NEt_3I$ , are added to oxidation dye baths of, *e.g.*,  $NH_2Ph$ ,  $p-C_6H_4(NH_2)_2$ , or  $m-NH_2 \cdot C_6H_4 \cdot OH$ , to obtain uniform, level effects on undressed, unbleached material, *e.g.*, cotton. A. W. B.

**Testing of yarns and fabrics for the "looseness" (or "fastness") of the dye therein.** C. O. M. STEWARD (B.P. 436,985, 24.7.34).—A rubbing machine is described and claimed. A. W. B.

**[Delustring] treatment of [cellulose acetate rayon] fabrics and composition therefor.** W. M. MITCHELL and H. L. BARTHÉLEMY, Assrs. to TUBIZE CHATILLON CORP. (U.S.P. 1,989,209, 29.1.35. Appl., 2.11.33).—Delustred ornamental patterns are obtained by printing fabric, before or after dyeing, with a thickened paste containing pine or camphor oil and a small amount of  $NaOH$ , and then steaming at  $\leq 100^\circ$  for 30 min. A. J. H.

**Dry cleaning [of textile materials containing water-soluble stains].** A. E. HATFIELD (B.P. 437,491, 25.1.35).—A method and suitable machinery are claimed by means of which fabric is treated first with a dry-cleaning solvent containing about 10% of a product which makes the fabric  $H_2O$ -repellent, *e.g.*, a mixture of paraffin wax (30 pts.), castor oil (30), coconut oil (30), and  $OH \cdot [CH_2]_2 \cdot OBu$ , and then with an org. solvent containing about 1% of  $H_2O$ . A. J. H.

**Treatment of pile fabrics.** BRIT. CELANESE, LTD. (B.P. 437,145, 24.10.34. U.S., 24.10.33).—Pile fabrics of org. esters of cellulose (I), *e.g.*, a velvet having a pile of (I) backed with silk, are locally saponified, *e.g.*, by painting a design on the back with a mixture of dextrin and  $NaOH$ , drying at room temp., and washing out the alkali, finishing with all the pile erect. After wet-brushing, a Jacquard effect is obtained due to the



saponified and unsaponified yarns lying at different angles from the back of the material. A. W. B.

**Weighing of [silk] fibres.** O. BERG, M. IMHOFF, and O. E. HEIBERG (Assr.) (U.S.P. 1,990,449—50, [A, B] 5.2.35. Appl., [A] 24.8.26, [B] 5.3.29).—(A) Silk weighted in the usual manner with  $\text{SnCl}_4$  and  $\text{Na}_2\text{HPO}_4$  is further weighted by one or more successive treatments with an aq. solution of a salt of Zn or Cd with a weak acid [e.g.,  $\text{Zn}(\text{OAc})_2$ ] or an ammoniacal solution of a Zn salt, and aq.  $\text{Na}_2\text{HPO}_4$ . (B) Silk weighted with  $\text{SnCl}_4$ ,  $\text{Na}_2\text{HPO}_4$ , and Na silicate is further weighted by one or more successive treatments with the Zn or Cd solutions described in (A), and aq. Na silicate. Processes (A) and (B) may be combined with Pb-weighting as described in U.S.P. 1,579,628 (B., 1926, 485). A. J. H.

**Treatment of textile materials.** TOOTAL BROADHURST LEE CO., LTD., H. CORTEEN, R. P. FOULDS, and F. C. WOOD (B.P. 437,361 and 437,441, 25.1.34).—(A) Linen, and (B) cotton or regenerated cellulose, which have been rendered crease-proof by impregnation with a synthetic resin, after pretreatment with a wetting agent to assist penetration, are treated with a swelling agent (aq. NaOH) and shrunk to increase the strength and/or durability. F. R. E.

**Treatment of textiles.** DEUTS. HYDRIERWERKE A.-G. (B.P. 437,561, 30.1.35. Ger., 31.1.34).—Furfuryl alcohol and its derivatives, e.g., ethers, esters, are employed; these have a pronounced capacity for dissolving or dispersing materials normally insol. in  $\text{H}_2\text{O}$ , such as pigments, waxes, oils, and resins, and can also be used in conjunction with soaps, soap substitutes, or chlorinated hydrocarbons. The preps. are stable on storage. E. J. B.

**Treatment of fabrics or textile fibres.** CALICO PRINTERS' ASSOC., LTD., L. A. LANTZ, and A. L. MORRISON (B.P. 437,642, 3.2.34).—Insol. amide-aldehyde resins are formed on the fibres by impregnating the latter with an early intermediate condensation product of  $\text{CH}_2\text{O}$  (I) and an amide (II), or with a solution of (II) alone or with (I), and heating at slightly  $> 100^\circ$  in an atm. of steam and (I) obtained by boiling a solution of  $< 10\%$  of (I) in  $\text{H}_2\text{O}$ . Preferably acid should be present, either in the fibres or in the steam. The process is applicable to dyed material, or the dye may be included in the impregnating solution. E. J. B.

**Moistureproofing of cellulosic material in sheet form.** BRIT. "NEW-WRAP" CO., LTD., and M. F. MONBIOT (B.P. 437,140, 21.11.34).—Paper and woven or knitted textiles of cotton and rayon are treated with a solution, e.g., in  $\text{CMe}_2$ , of a mixture of a cellulose ester, e.g., the nitrate or acetate, containing  $< 10\%$  of its wt. of rubber or chlorinated rubber dispersed in a chloroethane, e.g.,  $\text{CMeCl}_3$ , solvent, dried at  $70$ – $95^\circ$ , and deodorised by treatment with moist hot air; plasticisers may also be present. A. W. B.

**Waterproofing of textile fabrics.** W. ANDERSON (B.P. 437,778, 14.2.35).—Textiles are impregnated with the solution claimed in B.P. 413,463 (B., 1934, 799). E. J. B.

**Waterproofing, impregnating, and surfacing of jute and other fabrics.** L. J. SMITH and B. N. BLACK (B.P. 437,083, 4.3.35).—The use of a composition of

rubber latex (10–20), a drying oil (5), casein (2), and  $\text{H}_2\text{O}$  (160 lb.) is claimed. A. W. B.

**Rubber-fabric material.** E. HAZELL, Assr. to UNITED STATES RUBBER CO. (U.S.P. 1,992,665, 26.2.35. Appl., 11.1.33).—A fabric base is treated with a basic coating of rubber from an aq. dispersion of rubber containing NaOH, and then with a skim coating of rubber of less basic character. F. R. E.

**Treatment of textile materials.** BRIT. CELANESE, LTD. (B.P. 437,226, 15.11.34. U.S., 15.11.33).—The use of neutral solutions, in  $\text{H}_2\text{O}$  or org. solvents, of inorg. salts of primary, *sec.*-, or *tert.*-alkylolamines, e.g.,  $\text{N}(\text{C}_2\text{H}_4\text{OH})_3$ , to effect fireproofing, is claimed. Pliability and smoothness for subsequent processing are retained. A. W. B.

**Fireproofing of cellulosic materials.** M. LEATHERMAN (U.S.P. 1,990,292, 5.2.35. Appl., 16.1.33).—Cellulosic material is impregnated with Na stannate, dried, immersed in an aq. solution of a salt of a strong acid and a weak base, the hydroxide of which is  $\text{H}_2\text{O}$ -insol. (salts of Fe, Cr, Ti, Zn, Al, V, etc.), washed with  $\text{H}_2\text{O}$  to remove acid, and dried. It is then impregnated with chlorinated rubber and colouring matter. The resulting fabric is both flame- and glow-proof. F. R. E.

**Polyalkylene glycol ethers. Sulphonic acids. Wet-ting, washing, etc. agents. Dry-cleaning solvent. Textile assistants etc.**—See III. **Bleaching pulp. Treating and coating textiles.**—See V. **Oil-acid and asphaltene varnishes.**—See XIII. **Coating material.**—See XV.

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

**Depression of the vapour pressure of ammonia over solutions of ammonium and calcium nitrate in liquid ammonia.** K. A. ZEIDENBERG and M. A. ILJINSKAJA (J. Chem. Ind. Russ., 1935, 12, 683–687).—The v.p. of solutions containing 347 g. of  $\text{NH}_4\text{NO}_3$  or 247.5 g. of  $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  per 100 g. of  $\text{NH}_3$  is 532 mm. and 419 mm. at  $10^\circ$ , respectively. The latter solution can be applied to the transport of  $\text{NH}_3$ , or be used directly as liquid fertilisers. R. T.

**Titrimetric determination of nitrogen in ammonium salts and foodstuffs.** N. V. SCHIROKOV and V. VOLOVINSKAJA (Z. Unters. Lebensm., 1935, 70, 240–244).—The  $\text{NH}_4$  salt is treated with standard aq.  $\text{AgNO}_3$  and  $\text{Na}_2\text{CO}_3$ . The pptd.  $\text{Ag}_2\text{CO}_3$  is removed by filtration and Ag in the sol.  $[\text{Ag}(\text{NH}_3)_2]$  complex determined by titration with KCNS in acid solution. The method is applied to  $\text{NH}_3$  produced from foodstuffs by Kjeldahl's method. E. C. S.

**Preparation of sodium sulphide by means of gaseous reducing substances.** M. I. NEKRITSCH and I. I. RIVLIN (Ukrain. Chem. J., 1935, 10, 367–374).—84%  $\text{Na}_2\text{S}$  is obtained in 94% yield from  $\text{Na}_2\text{SO}_4$  and generator gas at  $900^\circ$  (100 min.). R. T.

**Analysis and commercial value of the nitrates from Goiás.** V. LUCAS (Bol. Assoc. Brasil. Farm., 1935, 16, 313–317).—A sample of saltpetre from the State of Goiás on analysis gave (%):  $\text{H}_2\text{O}$  2.746,  $\text{H}_2\text{O}$ -insol. matter 0.188, Cl (as KCl) 0.841,  $\text{SO}_3$  (as  $\text{K}_2\text{SO}_4$ ) 1.951,



$\text{CO}_2$  (as  $\text{K}_2\text{CO}_3$ ) 0.345, bicarbonate (as  $\text{KHCO}_3$ ) 0.030, Ca (as  $\text{CaO}$ ) 0.3,  $\text{KNO}_3$  93.59, nitrites, Na,  $\text{NH}_3$ , and org. matter traces. Three other samples contained 97.8–98.6 of  $\text{KNO}_3$ . The economic importance and exploitation of the deposits are discussed. E. L.

**Is sintering the cause of inactivation of barium-vanadium catalysts?** I. E. ADADUROV (Ukrain. Chem. J., 1935, 10, 336–345).—Inactivated catalysts contain much less V, chiefly in the form of lower oxides, than the fresh ones. Inactivation occurs when the reaction mixture is first passed over a Pt catalyst giving too high a conversion of  $\text{SO}_2$  into  $\text{SO}_3$ ; the  $\text{SO}_3$  adsorbed on the Ba-V catalyst liberates  $\text{V}_2\text{O}_5$  from the latter, and the  $\text{V}_2\text{O}_5$  is reduced to  $\text{V}_2\text{O}_3$  and  $\text{V}_2\text{O}_4$  by the  $\text{SO}_2$  not oxidised by the partly inactivated catalyst. The lower oxides of V are then carried away as aerosols by the stream of gas. R. T.

**Platinum catalysts on metallic carriers.** I. E. ADADUROV, A. N. ZEITLIN, and L. M. ORLOVA (Ukrain. Chem. J., 1935, 10, 346–361).—Inactivation of Pt catalysts is in many cases due to local overheating of the carrier, which is usually a non-conductor ( $\text{SiO}_2$  gel, asbestos, porcelain, etc.). Metallic carriers (Al or Ni-Cr steel) with 0.015–0.02% of Pt deposited on their surface do not give this effect; they give > 98% conversion of  $\text{SO}_2$  at 500–550°, are relatively highly resistant to poisoning by As, and may, when poisoned, be reactivated by heating at 600°. The gas should make contact at < 500°, and this is best effected by placing a layer of Ba-V or  $\text{Cr}_2\text{O}_3$ - $\text{SnO}_2$  catalyst above the Pt-metal layer. R. T.

**Determination of sulphur in pyrites.** I. KANGUN and E. DONDIM (Ukrain. Chem. J., 1935, 10, 311–319).—0.5 g. of powdered (100-mesh) pyrites is treated with 10 c.c. of aqua regia, the solution boiled with 30 c.c. of  $\text{H}_2\text{O}$  + 5 c.c. of EtOH added to 250 c.c., Fe pptd. by aq.  $\text{NH}_3$  at 70°, the suspension diluted to 500 c.c. and filtered, and  $\text{SO}_4^{2-}$  determined in 50 c.c. of filtrate by adding 25 c.c. of 2N-BaCl<sub>2</sub> at the b.p. R. T.

**Determination of small quantities of selenium in sulphur.** G. C. MARVIN [with W. C. SCHUMB] (Ind. Eng. Chem. [Anal.], 1935, 7, 423–425).—The sample is burned in a Pyrex glass tube, the Se retained by a solid filter and then converted into  $\text{SeO}_2$ , and this compound titrated with I and  $\text{Na}_2\text{S}_2\text{O}_3$ . The procedure is suitable when the amount of Se is 0.1–0.001%. Equiv. amounts of As or Te do not interfere. E. S. H.

**S in sulphite waste liquor.**—See V. **Water-glass in soaps etc.**—See XII. **Fertilisers.** **Determining Mn and Mg in rocks etc.**—See XVI.

#### PATENTS.

**Catalyst for making contact sulphuric acid.** L. G. SALAZAR, Assr. to CALCO CHEM. CO., INC. (U.S.P. 1,971,465, 28.8.34. Appl., 4.8.31).—Diatomite chips are sprinkled alternately with aq. vanadyl sulphate (1 pt.) and aq.  $\text{TlNO}_3$  (9.8 pts.), dried at 110°, and heated in  $\text{SO}_2$  at 500°. A. R. P.

**Recovery of magnesium hydroxide.** H. W. GREIDER, Assr. to PHILIP CAREY MANUFG. CO. (U.S.P. 1,971,909, 28.8.34. Appl., 7.4.30).—In the manufacture

of basic Mg carbonate (I) by treating a  $\text{Mg(OH)}_2$  suspension with  $\text{CO}_2$  to form  $\text{Mg(HCO}_3)_2$  and boiling the solution to ppt. (I), the filtrate from (I) is treated with NaOH to ppt. the remainder of the Mg. A. R. P.

**Recovery of ammonium sulphate and sulphur from gases containing ammonia and hydrogen sulphide.** H. KOPPERS, Assr. to KOPPERS CO. OF DELAWARE (U.S.P. 1,971,964, 28.8.34. Appl., 16.3.31. Ger., 1.11.29).—The aq. reaction mixture of S and  $(\text{NH}_4)_2\text{SO}_4$  (I) obtained by heating aq.  $\text{NH}_4$  thionates is transferred to a pressure vessel in which it is heated to a temp. at which the S melts and can be drawn off from below the residual aq. (I). A. R. P.

**Manufacture of ammonium phosphates and other salts.** W. HIRSCHKIND and H. BENDER, Assrs. to GREAT WESTERN ELECTRO-CHEM. CO. (U.S.P. 1,971,563, 28.8.34. Appl., 19.2.29).—The acid solution is sprayed into a chamber containing  $\text{NH}_3$  gas, the reaction temp. being maintained at that at which the desired salt is stable and other salts are unstable. A. R. P.

**Manufacture of sodium sulphate.** O. V. MARTIN, Assr. to TEXACO SALT PRODUCTS CO. (U.S.P. 1,971,754, 28.8.34. Appl., 16.9.32).—Brine is mixed with  $\text{MgSO}_4$  and the mixture cooled to –7° to separate  $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ . The mother-liquor is treated with CaO to ppt.  $\text{Mg(OH)}_2$ , which is suspended, together with the equiv.  $\text{CaSO}_4$ , in  $\text{H}_2\text{O}$  and treated with  $\text{CO}_2$ , whereby  $\text{CaCO}_3$  is pptd. and aq.  $\text{MgSO}_4$  recovered for re-use. A. R. P.

**Manufacture of neutral sodium pyrophosphate.** A. REIMANN (U.S.P. 1,972,032, 28.8.34. Appl., 11.5.33. Ger., 9.5.32).— $\text{Na}_2\text{HPO}_4 \cdot 10\text{H}_2\text{O}$  is passed through a rotary furnace divided into two zones, in the first of which it is dehydrated and in the second heated to reaction temp. A. R. P.

**Production of nitrophosphates.** E. LÜSCHER and S. RUOSCH (U.S.P. 1,971,111, 21.8.34. Appl., 20.5.32. Switz., 14.7.27).—A mixed N-P fertiliser is prepared by treating  $\text{Ca}_3(\text{PO}_4)_2$  with 70%  $\text{HNO}_3$  in such proportions that the  $\text{H}_2\text{O}$  content of the mixture is sufficient to supply 1 mol. of  $\text{H}_2\text{O}$  of crystallisation per mol. of  $\text{Ca}(\text{H}_2\text{PO}_4)_2$  and 3 mols. of  $\text{H}_2\text{O}$  per mol. of  $\text{Ca}(\text{NO}_3)_2$ . The mixture is allowed to cool slowly from 70° to 20° over 8 days, then granulated, and the surface strewn with powdered urea. A. R. P.

**Treatment of alunite.** H. G. WILDMAN, Assr. to C. H. FOWLER (U.S.P. 1,971,319, 21.8.34. Appl., 17.4.31. Renewed 31.3.34).—Alunite is digested with aq. KOH, the insol. material removed, and  $\text{Al(OH)}_3$  pptd. from the liquor by saturation with  $\text{CO}_2$ . The filtrate is evaporated to recover  $\text{K}_2\text{SO}_4$ , and the mother-liquor treated with CaO to regenerate KOH for re-use. A. R. P.

**Recovery of alumina from aluminous silicious materials.** A. W. SCHEIDT and R. C. FOLGER, Assrs. to ELECTRIC SMELTING & ALUMINUM CO. (U.S.P. 1,971,354, 28.8.34. Appl., 5.8.31).—Kaolin, leucite, shale, or the like is mixed with  $\text{CaCO}_3$  and the spent lye from the Bayer process so that the  $\text{SiO}_2$ :CaO ratio in the mixture is 1:2 and the  $\text{Al}_2\text{O}_3$ : $\text{Na}_2\text{O}$  ratio 1:1–1.7, and the mixture is sintered to obtain a porous mass



which yields aq.  $\text{NaAlO}_2$  on leaching. From the clarified leach liquor the  $\text{Al}(\text{OH})_3$  is pptd. by the Bayer process. A. R. P.

**Chloridising ore metal sulphides.** T. A. MITCHELL, ASSR. to HUGHES-MITCHELL PROCESSES, INC. (U.S.P. 1,971,573, 28.8.34. Appl., 18.5.32).—Pb-Zn concentrates are roasted, mixed with bleaching powder containing  $\text{CaO} \equiv \text{the } \text{SO}_4^{2-}$  in the roast, and heated first at  $100^\circ$  and then at  $300^\circ$  in  $\text{HCl}$  to convert the  $\text{ZnO}$  and  $\text{ZnSO}_4$  into  $\text{ZnCl}_2$ , which is leached out with hot  $\text{H}_2\text{O}$ . The residue is treated with hot brine to extract  $\text{PbCl}_2$  and the residual  $\text{Fe}_2\text{O}_3$  and gangue are discarded. A. R. P.

**Manufacture of oxidising catalyst [for carbon monoxide].** J. M. WEISS, ASSR. to DAVIS EMERGENCY EQUIPMENT CO., INC. (U.S.P. 1,971,168, 21.8.34. Appl., 3.9.30).—Claim is made for a catalyst comprising a manganite of a heavy metal, e.g., Ni, Co, or, preferably, Cu, prepared by addition of  $\text{H}_2\text{O}_2$  to mixtures of  $\text{KMnO}_4$  and the metal sulphate. A. R. P.

**Manufacture of solid carbon dioxide.** R. L. HASCHE, ASSR. to CARBONIC DEVELOPMENT CORP. (U.S.P. 1,971,106, 21.8.34. Appl., 31.1.30).—A mixture of  $\text{CO}_2$  and other gases is compressed to 40–50 atm. and cooled to  $-75^\circ$  to liquefy the  $\text{CO}_2$ , the liquid is separated and expanded through a nozzle to 1 atm. to produce  $\text{CO}_2$  snow, and the uncondensed gases are used to cool incoming gas. A. R. P.

**Catalyst for use in the manufacture of hydrogen.** G. H. FREYERMUTH, ASSR. to STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,970,695, 21.8.34. Appl., 23.12.29).—Alundum cement ( $\text{Al}_2\text{O}_3$  90,  $\text{SiO}_2$  5,  $\text{CaO}$  5) is impregnated with  $\text{Ni}(\text{NO}_3)_2$  or  $\text{Co}(\text{NO}_3)_2$ , ignited, and heated in  $\text{H}_2$  to reduce the oxide to metal. The resulting powder is mixed with black  $\text{NiO}$ , the mixture pressed into cubes, and the cubes are sintered in  $\text{H}_2$  at  $1000^\circ$ . The catalyst promotes the reaction between hydrocarbons and steam to give  $\text{H}_2$  and  $\text{CO}$ . A. R. P.

**Purification of sulphur dioxide-bearing gases and manufacture of sulphur trioxide therefrom.** A. A. HEIMROD, ASSR. to INTERNAT. PRECIPITATION CO. (U.S.P. 1,971,855, 28.8.34. Appl., 12.8.30).—Suspended impurities are removed by moistening the gases, adding  $\text{SO}_3$ , cooling the gases, and passing them through an electrostatic plant. A. R. P.

**Production of sulphur trioxide.** W. L. SPALDING, ASSR. to AMER. CYANAMID CO. (U.S.P. 1,970,923, 21.8.34. Appl., 7.7.31).—Roaster gases are passed upwards through a catalyst chamber containing a series of spaced, horizontal trays filled with catalyst material, and a supply of air is fed to the spaces between the trays. A. R. P.

$(\text{NH}_4)_2\text{SO}_4$  from gases.—See II.  $\text{NH}_3$  from org. salts. Washing agents etc.—See III. Washing etc. agents. Detergents.—See VI. Steel gas-bottle.—See X. Brine electrolysis.—See XI. Nutritional I.—See XIX.

## VIII.—GLASS; CERAMICS.

**Extraction and analysis of gases from glass.** R. H. DALTON (J. Amer. Chem. Soc., 1935, 57, 2150–2153).—Apparatus and technique for collection and determination of  $\text{H}_2\text{O}$ ,  $\text{CO}_2$ ,  $\text{SO}_2$ ,  $\text{O}_2$ ,  $\text{H}_2$ ,  $\text{CO}$ , and  $\text{N}_2$  are described. Typical results are given. E. S. H.

**Time law for the action of alkali on glass.** E. BERGER and W. GEFFCKEN (Naturwiss., 1935, 23, 817–818).—Simple diffusion theories for the action of alkali on glass fail to give agreement with experiment. The equation  $dx/dt = Ke^{-Bx}$ , where  $K = Ae^{-E/RT}$ , or  $dt/dx = K - K_1t$ , holds both for this and the washing of glass beads with  $\text{H}_2\text{O}$ . The phenomenon may be ascribed to activated adsorption, for which the above equation also holds. The equation also governs numerous other properties of glasses. A. J. M.

**Glass in building.** R. A. MILLER (Ind. Eng. Chem., 1935, 27, 1291–1293).—An account is given of the development of window, plate, and structural glass. New uses include decorative mirrors, protective glasses, and glass wool etc. for thermal insulation. T. W. P.

**Laboratory control in dry-process enamelling.** R. D. COOKE (Bull. Amer. Ceram. Soc., 1935, 14, 373–374).—Methods used for controlling raw materials and processes for the manufacture of cast-Fe sanitary ware are briefly reviewed. J. A. S.

**One-cover-coat enamel finishes.** F. R. PORTER and G. L. BRYANT (Bull. Amer. Ceram. Soc., 1935, 14, 367–369).—The thickness of the coating has been reduced in order to lessen costs and chipping tendency. Opacity is accordingly increased by (1) finer milling ( $\frac{1}{2}$ –1% on 325-mesh), (2) adding the opacifier,  $\text{SnO}_2$ , towards the end of the milling process, and (3) choosing the correct frit and mill addition (clay). A reflectivity of 70% can be obtained with a thickness of 1.25 oz./sq. ft. The thinner finish necessitates greater uniformity in the preceding processes. J. A. S.

**Method of testing the adherence of ground-coats to metal.** C. J. KINZIE and J. B. MILLER (Bull. Amer. Ceram. Soc., 1935, 14, 371–373).—A steel ball, diam. 1.75 in., is forced against an unsupported area of the specimen. The extent of adhesion is judged by visual inspection. J. A. S.

**Enamel-thickness gauge.** M. A. RUSHER (Bull. Amer. Ceram. Soc., 1935, 14, 365–367).—A portable, a.-c., mains-operated, direct-reading, electromagnetic device is described. J. A. S.

**Minimum radius of curvature for enamelled parts.** H. H. HOLSCHER (Bull. Amer. Ceram. Soc., 1935, 14, 369–371).—Tests on 20-gauge (0.037-in.) metal showed that the enamel fires off the edge and tends to chip if the radius is  $< \frac{9}{64}$  in. J. A. S.

**Use of French refractories in metallurgy.** D. PETIT (Rev. Mét., 1935, 32, 282–301).— $\text{SiO}_2$ ,  $\text{MgO}$ ,  $\text{Al}_2\text{O}_3$ , and sillimanite refractories of French origin are discussed. A new design of instrument for recording the expansion of refractories at temp. up to  $1500^\circ$  is described. W. P. R.

**Effect of insulation on the silica refractories of an open-hearth steel-furnace roof.** L. B. MILLER (Bull. Amer. Ceram. Soc., 1935, 14, 359–364).—In addition to thermal economy, insulation of the roof improves its life and stability by maintaining a higher average temp. and a less steep temp. gradient through the brickwork. A more uniform structure of tridymite and cristobalite is induced by the higher temp., and stresses due to thermal expansion are lower. The



ferruginous slag also penetrates further into the brick, favouring the formation of cristobalite, while the merging of the zone of slagging into the unaffected part of the brick is more gradual and decreases the tendency to crack at the interface of the physically distinct zones. Samples of used brick were examined and discussed in the light of the phase-rule diagrams of  $\text{SiO}_2$  and  $\text{SiO}_2\text{-FeO}$ . J. A. S.

## PATENTS.

**Ultra-violet [light-]transmitting glass.** K. FUWA, ASSR. to GEN. ELECTRIC CO. (U.S.P. 1,971,309, 21.8.34. Appl., 18.9.31. Jap., 18.10.30).—The glass contains  $\text{SiO}_2$  68,  $\text{B}_2\text{O}_3$  16,  $\text{Na}_2\text{O}$  15, and  $\text{KF}$  1%; during melting, about 0.5% of K tartrate is added to reduce any  $\text{Fe}^{\text{III}}$  to  $\text{Fe}^{\text{II}}$ . A. R. P.

**[Manufacture of] laminated glass.** G. B. WATKINS, ASSR. to LIBBEY-OWENS-FORD GLASS CO. (U.S.P. 1,989,959, 5.2.35. Appl., 17.10.29).—A non-brittle membrane, *e.g.*, pyroxylin plastic, is interposed between two sheets of glass the inner sides of which have been sprayed with a mixture of  $\text{Bu}_2$  phthalate,  $\text{O}[\text{C}_2\text{H}_4\text{OH}]_2$  and its Et ether, and nitrocellulose, and the whole is united by heat and pressure. F. R. E.

**Tempering of glass.** PILKINGTON BROS., LTD., and W. B. CLITHEROW (B.P. 438,389, 8.9.34).—In order to render uniform the temp. of a glass plate containing holes, Cu tubes extending beyond the surfaces of the glass are inserted in the holes, whereby heat is conducted into the holes. Plates so treated can be tempered with the ordinary, relatively rapid heating schedule without any tendency to cracking. J. A. S.

**Stationary kilns for burning bricks, blocks, tiles, and like articles.** A. F. BERRY (B.P. 438,377, 18.5.34).—The articles are lowered through an inclined passage by means of a hydraulic ram and detent at the bottom. The passage is divided into the usual 3 stages of temp. for continuous work, the burners being at an intermediate level. B. M. V.

**Clay products for vitreous slips.** C. J. KINZIE, C. H. COMMONS, JUN., and D. S. HAKE, ASSRS. to TITANIUM ALLOY MANUFACTURING CO. (U.S.P. 1,988,800, 22.1.35. Appl., 26.11.32).—The clay-mill addition is wholly or partly replaced by a metal hydroxide, *e.g.*,  $\text{Al}(\text{OH})_3$ ,  $\text{Ti}(\text{OH})_4$ ,  $\text{Zr}(\text{OH})_4$ . Advantages claimed are a lowering of the maturing temp., an increased lustre, and a reduction of the blemishes usually caused by impurities in the clay. J. A. S.

**Tile composition.** A. SCHNEIDER, ASSR. to A. MILLER (U.S.P. 1,970,921, 21.8.34. Appl., 4.6.32).—The body consists of a mixture of quartz or marble dust 60, quick-setting Portland cement 40 lb., casein 7 oz., and  $\text{H}_2\text{O}$  7 gals.; after drying, it is coated with a paste of white cement containing 2% of Ca stearate 10, quartz or marble dust 2, a dye 2, glue  $1\frac{1}{2}$ , and casein  $1\frac{1}{2}$  lb. in 3 gals. of  $\text{H}_2\text{O}$  containing a little  $\text{NH}_4\text{Cl}$ . A. R. P.

**Manufacture of rubber-bonded abrasive products.** J. N. KUZMICK and J. A. LANGE, ASSRS. to RAYBESTOS-MANHATTAN, INC. (U.S.P. 1,990,737, 12.2.35. Appl., 5.2.34).—In order to obviate the crushing of the abrasive particles in an ordinary rubber-mixing process, the rubber is first reduced to a condition resembling

molasses by mixing and heating (200–350°) with a liquefying agent such as  $\text{C}_{10}\text{H}_8$ . After removal of the latter by vaporisation, the residual liquid rubber is mixed with the abrasive particles, a vulcanising agent, and, if desired, synthetic resin; it is then shaped and vulcanised. D. F. T.

**Bricks.** R. LINCOLN (B.P. 438,274, 10.5. and 23.7.34).

**W seal [for glass].**—See X. **Resins from carbohydrates.** Sheeted polymerisation products.—See XIII.

## IX.—BUILDING MATERIALS.

**Compounds in Portland cement.** R. H. BOGUE (Ind. Eng. Chem., 1935, 27, 1312–1316).—A summary of the results of high-temp. phase-rule and of X-ray investigations on the constitution of Portland cement is given, with an account of the improvements in the products arising from research. T. W. P.

**Progressive solubilisation of the silica and  $\text{R}_2\text{O}_3$  in puzzuolanic materials under the action of lime for determination of the hydraulic value of such materials.** C. VITTORI and A. CERESETO (Chim. e l'Ind., 1935, 17, 646–650).—Chemical analyses, insol. residue in Malquori's test (B., 1935, 675), and % of  $\text{SiO}_2$  and metallic sesquioxides passing into the liquid phase and of  $\text{CaO}$  passing into the solid phase on leaving, for varying periods, with milk-of-lime are given for numerous Italian puzzuolanic materials, other siliceous minerals, and pure  $\text{SiO}_2$ , and the data are correlated with their hydraulic properties. D. R. D.

**Surface activity of puzzuolana.** A. MAFFEI (Annali Chim. Appl., 1935, 25, 504–514).—The mechanical resistance of crushed puzzuolana is parallel to the absorptive power for basic dyes and to the heat evolution on immersion. The surface activity is diminished by heating. Relationships between hydraulic characteristics and physical properties are discussed. F. O. H.

**Effects of smoke on building materials.** H. B. MELLER and L. B. SISSON (Ind. Eng. Chem., 1935, 27, 1309–1312).—The effects of tarry matter and S compounds from fuel combustion, the complications caused by smoke in air conditioning, and the development of corrosion-resistant materials and coatings are discussed. T. W. P.

**Influence of preheating of wood in water on rate of delignification by sulphite liquor.** A. J. COREY and O. MAASS (Canad. J. Res., 1935, 13, B, 149–155).—Preheating in liquid  $\text{H}_2\text{O}$  at 130° decreases the rate of delignification by subsequent cooking in aq.  $\text{CaH}_2(\text{SO}_3)_2$ , but the rate is not influenced by preheating at 130° in absence of  $\text{H}_2\text{O}$ . The mechanism is discussed. E. S. H.

**Decay in structural timbers.** F. T. WALKER (Chem. & Ind., 1935, 1048–1049).—It is considered that the evidence given by Rudge and Lewis (B., 1936, 62) does not prove the inorg. infiltration theory of decay. D. K. M.

**Preservatives and antitermite protection of timber.** C. DEMERE (Ind. Eng. Chem., 1935, 27, 1303–1305).—Some new proprietary preservatives containing  $\beta\text{-C}_{10}\text{H}_7\text{OH}$  as toxicant in a fuel oil, and a new method of application, are discussed. T. W. P.



Thermal insulation.—See I. Colour-testing of bitumen.—See II. Glass in building.—See VIII. Construction painting.—See XIII.

## PATENTS.

**Manufacture of products of cement and concrete.** K. I. A. EKLUND (B.P. 437,146, 1.11.34. Swed., 1.11.33).—Finely-dispersed clay is mixed with Portland cement as a binder in hydrothermally-hardened concrete products. Additions of, *e.g.*,  $\text{CaCl}_2$  or sugar may also be made. T. W. P.

**Waterproofing of plaster.** A. K. LAUKEL (U.S.P. 1,970,857, 21.8.34. Appl., 29.7.32).—The moist plaster is treated with petrolatum to prevent impervious crystallisation of salts at the surface during drying, and when dry is impregnated with a wax. A. R. P.

(A, B) **Waterproofing and polishing compound, and (B) fireproof waterproofing and polishing compound, for wood.** (A) H. G. KITTREDGE, (B) A. J. TURNER and H. G. KITTREDGE, Assrs. to KAY & ESS CHEM. CORP. (U.S.P. 1,992,010 and 1,992,020, 19.2.35. Appl., [A] 5.3.34, [B] 31.8.33).—(A) Compositions suitable for wooden lasts and shoe heels are prepared in describep manner from esterified rosin, tung oil, metal driers, petroleum naphtha, turpentine, and paraffin wax. 8 examples are given. (B) S and  $\text{CCl}_4$  are also incorporated. S. M.

**Erratum.**—On p. 1144, col. 1, line 11, of "B" abstracts, 1935, for U.S.P. 1,922,110 read U.S.P. 1,992,110.

**Petroleum plastic. Moulded product.**—See XIII. **Germicide.**—See XX.

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

**Sintering of blast-furnace dust and fine ore in shaft furnaces.** J. W. GILLES (Stahl u. Eisen, 1935, 55, 1188—1190).—A small blast furnace has been successfully used to sinter blast-furnace dust and powdered spathic Fe ore. Details of operation are discussed. W. P. R.

**Hot strength of cast iron, with special reference to thin castings.** W. H. UHLITZSCH and W. LEINEWEBER (Arch. Eisenhüttenw., 1935—6, 9, 185—192).—The tensile strength of plain cast Fe decreases slightly between 250° and 350°, increases again slightly between 350° and 400°, and then falls sharply above 450—550°, the effects being more pronounced with pearlitic Fe than with other forms. The changes below 350° are attributed to the magnetic transformation in the cementite constituent. Addition of Si or Ni decreases the severity of this transformation and the temp.-strength curves are consequently flattened out; Cr and Mo produce a similar flattening by lowering the temp. of the transformation. Annealing for 4 hr. at 300° or for 200 hr. at 550° tends to diminish somewhat the reduction in strength at 300° and makes the temp.-strength curves more regular, especially in the case of pearlitic Fe. The mechanical properties of thin castings do not bear any definite relation to the composition, but are considerably affected by the source of the pig Fe, the method of melting, and the shape and dimensions of the mould. A. R. P.

**Influence of aluminium on the properties of ordinary cast iron.** M. PLOYÉ (Rev. Mét., 1935, 32, 302—320; cf. B., 1935, 853).—Curves indicating the effect of Al additions ( $\gtrsim 15\%$ ) to cast Fe on the Curie point, pearlite transformation, change in dimensions on heating and cooling, and the growth at 800° are given. Corrosion- and heat-resisting properties, the hardness after nitriding, and mechanical properties of the alloys are described. In general, the most marked effect on the properties of cast Fe occurs when 1—2% of Al is added. W. P. R.

**Cast iron for abrasers.** P. P. BERG and A. S. MIKELADZE (Repts. Centr. Inst. Met., 1934, No. 16, 155—157).—Specifications are given for cast Fe used in making abrasive plates for steel-mill rollers by pressing emery into the surface of the plate. The structures recommended are pearlite of Brinell hardness 170, and ferrite of the same hardness but alloyed with Cr. Limits of impurities are: S 0.10, Mn 0.5—0.7, P 0.1—0.2%; if the inclusions are fine and uniformly distributed, permissible P is  $\gtrsim 0.8\%$ . CH. ABS. (e)

**New high permeabilities in hydrogen-treated iron.** P. P. CIOFFI (Physical Rev., 1934, [ii], 45, 742).—The initial and max. permeabilities of  $\text{H}_2$ -treated Fe have been further increased (A., 1932, 324) by using pure  $\text{H}_2$  and avoiding contamination by furnace gases during heating. Introduction of N or S lowers the permeability, which can again be restored by suitable heat-treatment. L. S. T.

**Measurement of the specific heat of iron at high temperatures.** K. MELISS (Arch. Eisenhüttenw., 1935—6, 9, 209—212).—To avoid heat losses and splashing in conveying the hot metal into the calorimeter it is first dropped into a small brass cylinder (silvered inside and surrounded outside by an invar shell) which is immediately covered and plunged below the  $\text{H}_2\text{O}$ . Measurements made in this way give vals. for the sp. heat of Fe reproducible within  $\pm 0.1\%$ ; a curve showing the heat content of Fe (0.06% C) between 600° and 1250° is given. A. R. P.

**Plated sheet metal and its working.** K. HALFMANN (Z. Ver. deuts. Ing., 1934, 78, 1421—1422; Chem. Zentr., 1935, i, 1613).—Welding and hot-rolling processes for the plating of steel sheets with Ni, Ni-Cu, Cu, tombak, or brass are described. H. J. E.

**Structure of armour, ancient and modern.** W. CAMPBELL (Met. & Alloys, 1935, 6, 267—272).—Microscopical examination of 12 samples of armour shows these to range from C-free Fe, containing slag in some cases, to well-carburised material with a martensitic face and a ferrite back; Neumann bands and segregation of P are commonly observed. E. H. B.

**Heat-treatment of steel products in oil and metal baths.** W. HERRMANN (Metallbörse, 1934, 24, 890—891; Chem. Zentr., 1935, i, 1607).—A review of the applications of baths, and of the conditions for operating and cleaning Pb and other metal baths. H. J. E.

**Effects of surface pretreatment of iron articles on resistance to corrosion of the phosphatic coating produced by the "parkerising" process.** E. I.



DUIRMONT and S. D. GOLDENBERG (Repts. Centr. Inst. Met., 1934, No. 16, 158—164).—Mechanical cleaning of the metal surface was better than a pickling treatment followed by mechanical cleaning. Pretreatment with  $\text{H}_2\text{SO}_4$  gave better results than with  $\text{H}_3\text{PO}_4$ .

CH. ABS. (e)

**Non-decarburising salt bath for high-speed tool steels.** I. F. AFONSKI and A. A. KROSHCHIN (Repts. Centr. Inst. Met., 1934, No. 16, 112—126).—Periodic additions of approx. 2% of FeSi or 5—10% of borax to an electrolytic bath of molten  $\text{BaCl}_2$ , used for annealing high-speed tool steel, will prevent decarburisation at the surface. Borax and FeSi combine with oxides of Fe and Ba which form in the bath. When the molten bath is not in action its surface should be covered with a layer of finely-ground C, to prevent oxidation and cooling.

CH. ABS. (e)

**Deep nitriding [of alloy steels].** A. V. SMIRNOV and L. V. BELORUTSCHEV (Repts. Centr. Inst. Met., 1934, No. 16, 127—133).—Tests on the nitriding of Mn—Cr—V—Mo—Al, Mn—Cr—V—Mo, and Mn—Cr—Al steels are described, nitride coatings 1.15—1.46 mm. thick being obtained. The sinusoidal method gives a deep nitrided coat, but lowers the hardness.

CH. ABS. (e)

**High-temperature-resistant chromium-aluminium-iron alloys.** A. GRUNERT, W. HESSENBRUCH, and K. SCHICHEL (Elektrowärme, 1935, 5, 2—11; Chem. Zentr., 1935, i, 1610).—The effect of composition (Al 5, Cr 20—60%; Cr 30, Al 1—12%) on the resistance to heat was studied. Cr—Al—Fe alloys are not sensitive to corrosion at the grain boundaries, as are Cr—Ni alloys. The resistance of the former to heat is > that of the latter, especially at > 1200°.

H. J. E.

**Nickel-aluminium steel "MK."** V. S. MESSKIN, B. E. SOMIN, and J. M. MARGOLIN (Repts. Centr. Inst. Met., 1934, No. 16, 60—76; cf. B., 1935, 310).—The steel contains Ni 10—49, Al 1—20, C < 1.5, Mn < 10, Cr < 5, Co < 40, and W < 8%. It cannot be forged. Its magnetic properties depend on its treatment. It is annealed at 450—700° to obtain structural stability. The increase in magnetic properties is due to formation of a compound of Ni, Al, and Fe, which separates out as a white phase on etching in  $\text{EtOH-HNO}_3$ . The highest coercive force, at a moderate residual magnetism, corresponded to a particle size of the white phase below microscopical visibility. The optimum composition was Ni 25, Al 10%. Metals other than Ni and Al help in fixing the supersaturated solid solution in a state of very fine dispersion.

CH. ABS. (e)

**Decarburisation of some alloy steels by hydrogen.** W. BAUKLOH and H. GUTHMANN (Arch. Eisenhüttenw., 1935—6, 9, 201—202).—With increasing C content the rate of decarburisation of plain C steels in  $\text{H}_2$  decreases slightly below 700° but increases rapidly above 700°, probably owing to the greater rate of diffusion of C out of, and  $\text{H}_2$  into, the metal. With Ni steels the rate at 700—850° decreases with increasing Ni content between 0.5 and 1.5%, but above 850° it is > for steels with < 0.5% Ni. With up to 0.9% Cr practically no loss of C occurs below 900° in  $\text{H}_2$ , but with more Cr the rate of decarburisation increases with the Cr content. With Mn steels loss of C is least with

0.5% Mn. Si, W, Mo, Sn, and Cu appreciably reduce the rate of decarburisation, but not proportionally to the content of alloy metal.

A. R. P.

**Influence of uranium on the structure, hardenability, and temper-stability of plain steels.** H. BENNEK and C. G. HOLZSCHEITER (Arch. Eisenhüttenw., 1935—6, 9, 193—200).—Castings free from segregations can be obtained without serious loss of U only by adding small pieces of low-C ferro-uranium (I) to the well-deoxidised steel in the ladle. High-C (I) cannot be used satisfactorily since the U carbides dissolve in the steel only with difficulty. Addition of U to even low-C steels induces the formation of U carbides as structural constituents, but alloys with up to 5% U can be forged and worked easily. Hardening and tempering tests showed that U is somewhat sol. in the  $\gamma$ -phase, but full use cannot be made of this in heat-treatment hardening since some of the constituents present have relatively low m.p. U improves the depth of hardening and reduces the sensitivity to overheating; in its effect on the structure of steel it resembles Cr, but it has only a small beneficial action on the mechanical properties.

A. R. P.

**Application of the spectrograph to determination of carbon in steel.** F. H. EMERY [with H. S. BOOTH] (Ind. Eng. Chem. [Anal.], 1935, 7, 419—421).—The use of the aperiodic spark is not satisfactory. Sources of more intense excitation are discussed.

E. S. H.

**Determination of oxygen and nitrogen in steel. Improvements in the vacuum-fusion method.** J. CHIPMAN and M. G. FONTANA (Ind. Eng. Chem. [Anal.], 1935, 7, 391—395).—Modified apparatus and technique are described.

E. S. H.

**Recovering zinc from copper smelter products.** O. C. RALSTON, M. G. FOWLER, and C. R. KUZELL (Eng. Min. J., 1935, 136, 167—169).—A method of smelting coarse pyritic Zn—Cu ore directly is described, Zn being recovered as oxide in the vaporised material.

CH. ABS. (e)

**Corrosion of copper.** L. W. HAASE (Metallwirts., 1935, 14, 32—33; Chem. Zentr., 1935, i, 1613).—A discussion of the corrosion of Cu and tinned Cu by hot and cold  $\text{H}_2\text{O}$ .

H. J. E.

**Spectrophotometric determination of copper in ores and mattes.** J. P. MEHLIG (Ind. Eng. Chem. [Anal.], 1935, 7, 387—389).—The transmittancy of light of given  $\lambda$  through a solution of  $\text{Cu}(\text{NH}_3)_4^{++}$  is measured and compared with standards of known Cu content. The accuracy is = that of the KI method.

E. S. H.

**Recent developments in platinum thermocouples.** B. BRENNER (Ind. Eng. Chem. [Anal.], 1935, 7, 438—440).—A discussion of the tolerances that can be met by manufacturers. Flash-annealing the Pt at 600° or Pt—Ir at 1200° is sufficient to stabilise thermocouples of high quality. Intensive annealing does not materially change the e.m.f. and impairs the mechanical properties.

E. S. H.

**Extent of scattering in [examining metals by] transmitted X-rays.** O. VAUPEL (Arch. Eisenhüttenw., 1935—6, 9, 213—214).—The effect of various experimental conditions is discussed mathematically.

A. R. P.



**Cathode-film control and metal deposition.** C. G. FINK (J. Chem. Educ., 1935, 12, 520–524).—Electrolysis at 25° and  $p_H$  5 with a c.d. of 0.3 amp. per sq. dm. and a cathode speed of 3000 r.p.m. yields a deposit of pure Cu from a  $NiSO_4$  solution containing 1 pt. of Cu to  $3 \times 10^4$  pts. of Ni. Recovery of Cu from tails waters containing Cu and many impurities, especially  $Fe^{++}$ , can also be effected by means of the high-speed cathode. Fe present in  $NiSO_4$  heating baths can be similarly recovered, whilst bright, ductile deposits of Fe from chloride baths can be obtained with a c.d. of 15 amp. per sq. dm. with a rotating-disc cathode. With a Ni-disc cathode rotating at 8500 r.p.m. Au can be partly recovered from solutions containing 1 pt. in  $10^6$  pts. In the deposition of binary alloys such as Co-Ni or Zn-Cd, the composition of the alloy can be varied by changing the speed of the rotating cathode and regulating the c.d. A cathode film, which must be held within definite limits as to thickness and  $p_H$ , is essential for successful metal deposition. These limits, which are sp. for each metal, are best maintained by the rotating-cathode method, which often produces satisfactory deposits in cases where no deposit can be obtained with a stationary cathode. The sequence of electrodeposition is not necessarily that of the classical order. L. S. T.

**Pt catalysts.**—See VII. **Enamelling. Adherence of ground-coats to metal. Steel-furnace refractories. French refractories in metallurgy.**—See VIII. **Metals in wineries.**—See XVIII.

## PATENTS.

**Preparation of ores [burnt pyrites] for reduction [to sponge iron].** C. G. MAIER, Assr. to T. B. SWIFT (U.S.P. 1,971,112, 21.8.34. Appl., 28.8.33).—The crushed, burnt ore is sprayed with milk-of-lime and passed directly to the preheating zone of the reduction furnace. The resulting CaO film on the particles prevents sintering during the subsequent reduction to sponge Fe and also absorbs any S present. A. R. P.

**Cast-iron pipe.** N. F. S. RUSSELL and F. C. LANGENBERG, Assrs. to UNITED STATES PIPE & FOUNDRY CO. (U.S.P. 1,971,385, 28.8.34. Appl., 4.5.33).—Claim is made for an annealed pipe made by centrifugally casting an Fe containing C 3–3.85, Si 1.2–3.0, S 0.05–0.15, Mn 0.2–0.8, and P 0.2–2.0%. A. R. P.

**Manufacture of steel gas-bottle for high pressures.** BERLIN-KARLSRUHER INDUSTRIE-WERKE A.-G. (B.P. 438,183, 12.3.35. Ger., 21.3.34).—Steel containing C 0.19, Ni 1.70, and Mo 0.48% is cold-drawn to form a cup with closed bottom; the neck end is then formed by hot-pressing with only local heating, and the whole is tempered. B. M. V.

**Composition for treating [case-hardening ferrous] metals.** E. A. HARDING and D. A. HOLT, Assrs. to E. I. DU PONT DE NEMOURS & CO. (U.S.P. 1,970,852, 21.8.34. Appl., 24.8.31).—The case-hardening bath consists of a fused mixture of  $BaCl_2$  30–60, NaCN 12–20, and alkali and other alkaline-earth chlorides and/or carbonates 58–20%, e.g.,  $BaCl_2$  46, KCl 20, NaCl 17, and NaCN 17%, operated at 830°. A. R. P.

**Recovery of oxidised copper from ores.** H. E. KEYES (U.S.P. 1,971,416, 28.8.34. Appl., 26.7.32).—Oxidised Cu ore is leached with aq.  $Fe_2(SO_4)_3$  and without filtration CaO is added to the pulp until part of the  $Fe^{++}$  is pptd. as  $Fe(OH)_2$ ; the Cu is then recovered by flotation and after filtration of the tailings the aq.  $FeSO_4$  is reoxidised for re-use. A. R. P.

**Purification of molten metal [copper or its alloys].** W. F. ZIMMERLI, Assr. to E. I. DU PONT DE NEMOURS & CO., INC. (U.S.P. 1,971,149, 21.8.34. Appl., 12.9.32).—Treatment of the molten metal with CuCN removes dissolved gases and reduces any oxides present. A. R. P.

**[Nickel] alloy [for electron emission].** H. RABEZANA and O. S. DUFFENDACK, Assrs. to GEN. MOTORS CORP. (U.S.P. 1,970,768, 21.8.34. Appl., 9.11.31. Can., 17.9.28).—Claim is made for an alloy of Ni with Ba 0.01–0.8 (0.03), Mn 0.5–10 (1.8%), and a little Mg as deoxidiser; it has a high resistance to corrosion and prolonged and ready electron emissivity. A. R. P.

**Tungsten seal [for electric-discharge devices].** D. L. ULREY, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING CO. (U.S.P. 1,971,837, 28.8.34. Appl., 19.2.32).—To obtain a gastight seal between a W wire and glass the latter contains  $SiO_2$  < 70,  $B_2O_3$  < 25,  $Na_2O$  < 2,  $Al_2O_3$  < 1, with small amounts of  $As_2O_3$ ,  $K_2O$ , and MgO. A. R. P.

**Selective agent for mineral recovery.** G. D. KRATZ, Assr. to B. BRISCOE (U.S.P. 1,970,701, 21.8.34. Appl., 16.5.32).—In the recovery of Au from ores by concentrating them in sluices or pans, the bottom of the apparatus is coated with a sticky paste of medium-oxidised asphalt saturated with S (5 pts.), hydrogenated vegetable oil (0.5),  $CCl_4$  (1), and  $C_6H_4Cl-OH$  (0.05–0.07 pt.). A. R. P.

**Colouring of aluminium.** M. TOSTERUD, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,971,240, 21.8.34. Appl., 17.12.30).—The surface is oxidised by immersion in a hot solution containing  $Na_2CO_3$  0.5–6 (2) and  $Na_2CrO_4$  0.1–1 (0.5)%, and the oxide film is coloured shades of brown to black by spraying with aq.  $KMnO_4$ ,  $NaMnO_4$ , or  $HMnO_4$ . A. R. P.

**Electroplating bronze.** H. M. BATTEN and C. J. WELCOME, Assrs. to CITY AUTO STAMPING CO. (U.S.P. 1,970,549, 21.8.34. Appl., 14.8.33).—The bath contains CuCN 10–90 (40),  $Na_2SnO_3$  10–90 (20), NaOH 0–30 (7.5), and total NaCN 15–195 (65) g. per litre; the  $p_H$  is maintained at 11.7–13.8. A. R. P.

**Electrodeposition of platinum metals.** E. M. WISE, Assr. to INTERNAT. NICKEL CO., INC. (U.S.P. 1,970,950, 21.8.34. Appl., 20.6.32).—The bath consists of a sol. double nitrite of one or more of the Pt metals with Na, K, Li, Cu, Ba, Sr, or Mg. A. R. P.

**Protection of metals. [Nickel-plating of aluminium.]** W. J. TRAVERS (U.S.P. 1,971,761, 28.8.34. Appl., 5.9.29).—The Al articles are anodically oxidised in  $HNO_3$ , washed, immersed in hot tartaric acid or dil.  $HNO_3$  to remove part of the oxide film, and then plated in the ordinary Ni bath. A. R. P.

**Decorative [Al] sheet. Metal foils.**—See V. **Metallic paint.**—See XIII.



## XI.—ELECTROTECHNICS.

**Power transmission.**—See I. **Colour-testing of bitumen.**—See II. **Determining wood-pulp concn. in H<sub>2</sub>O.**—See V. **Enamel-thickness gauge.**—See VIII. **Determining C in steel.** **Examining metals by transmitted X-rays.** **Metal deposition.**—See X. **Film coverings.**—See XIII. **Sugar-boiling control.** **Determining ash in unfiltered solutions.** **Na lamp in saccharimetry.** **Detecting maple-syrup adulteration.**—See XVII.

## PATENTS.

**Furnaces.** SIEMENS & HALSKE A.-G. (B.P. 438,178, 30.1.35. Ger., 30.1.34).—Induction heating is used in conjunction with gas in an open-hearth furnace, the coils being wound on yokes below the furnace and the magnetic flux taken by vertical extension yokes to pole-pieces below the level of the charging doors, the flux completing the circuit through the charge. B. M. V.

**Induction furnaces.** HERAEUS-VACUUMSCHMELZE A.-G., and W. ROHN (B.P. 436,490, 11.1.35. Ger., 13.1.34. Addn. to B.P. 382,002; B., 1933, 25).—A high-frequency coil (C) wound about a preferably vertical axis is arranged between the hearth and the pancake coils, which are symmetrical about the central axis of the furnace, and the turns of which cross the turns of C. J. S. G. T.

**[Electric] temperature and other regulating means.** REAVELL & CO., LTD., and A. J. D. HUMBY (B.P. 438,195, 13.4.34).—An all-electric system is described in which a first feeble current, *e.g.*, from a thermocouple, swings a moving coil to which is attached the arm of a relay, and so on. B. M. V.

**Apparatus for automatically controlling temperature, pressure, or other physical condition.** V. B. HARLEY-MASON (B.P. 438,273, 8.5.34, 16.8.34, and 18.5.35).—The movement of a pointer is detected by placing on it an Fe armature which normally hangs equidistant between two electromagnets. Equal impulses of current are sent around the magnets at regular time intervals, and should the pointer be deflected nearer to either magnet it will be pulled right over and operate other relays. B. M. V.

**Electrolytic cell [for brine electrolysis].** H. I. ALLEN and D. B. AYERST, Assrs. to ELECTRON CHEM. CO. (U.S.P. 1,971,763, 28.8.34. Appl., 13.9.28).—Mechanical details are claimed. A. R. P.

**Coating a filament with oxide.** E. F. LOWRY, Assr. to WESTINGHOUSE ELECTRIC & MANUFACTURING CO. (U.S.P. 1,971,076, 21.8.34. Appl., 3.3.28).—An alloy of Ni or Co with 5–15% of ferrotitanium is drawn into wire which is annealed in air to oxidise the surface, then drawn through a paste of BaCO<sub>3</sub> or SrCO<sub>3</sub> in 5% aq. Ba(NO<sub>3</sub>)<sub>2</sub>, dried, and baked at 850°. A. R. P.

**Electric [ultra-violet] radiation device.** K. WIEGAND, Assr. to GEN. ELECTRIC CO. (U.S.P. 1,971,887, 28.8.34. Appl., 7.10.27. Ger., 3.11.26).—The tubes contain H<sub>2</sub> and Hg vapour with N<sub>2</sub> (0.05–1 mm. pressure). A. R. P.

**Manufacture of dielectric materials.** F. C. STEPHAN, and TELEGRAPH CONDENSER CO., LTD. (B.P.

438,329, 1.5.35).—Mixtures of the chlorinated compounds described in B.P. 410,008 (B., 1934, 618) with (CHPh:CH<sub>2</sub>)<sub>n</sub> (I), where *n* is < 100, [5–40 wt.-% of (I)] are used for the impregnation of paper-interleaved electrical condensers. A. W. B.

**Purifying SO<sub>2</sub> and prep. of SO<sub>3</sub>.**—See VII. **Ultra-violet light-transmitting glass.**—See VIII. **Ni alloy for electron emission.** **W seal.** **Bronze.** **Pt metals.** **Ni-plated Al.**—See X. **Plastic for cables.** **Moulding powder.**—See XIII. **Alcohols from sugar.**—See XVII. **Producing stable images.**—See XXI.

## XII.—FATS; OILS; WAXES.

**Application of fats and oils to the baking industry.** G. F. GARNATZ (Oil & Soap, 1935, 12, 290–293).—A discussion.

**Water-glass in soaps, soap powders, and self-acting detergents.** F. OHL (Allgem. Oel- u. Fett-Ztg., 1935, 32, 453–456).—Judicious admixture of silicates to all such detergents is advantageous. E. L.

**Determination of soap in refined oils.** R. DURST (Oil & Soap, 1935, 12, 271–273).—The oil (300 g.) is extracted with hot, dil. (1 : 1) HCl, and the NaCl (KCl) derived from the soap is determined in the extract titrimetrically. Alternatively, the oil is burned and the ash examined as above. The results obtained agree well with those derived by the Davidsohn method; the figure for Cl calc. as soap will of course include any free alkali, or Cl in brine-washed oils. E. L.

**Apparatus for drying-oil research.** H. N. BROCKLESBY and O. F. DENSTEDT (Contr. Canad. Biol. Fish., Reprint, 1931, 6, No. 14, 10 pp.).—Apparatus described includes a vac.-distillation receiver, a device for determining the rate of O<sub>2</sub> absorption of oils, and apparatus for automatic determination of the drying time of protective films. A. G. P.

**Modified apparatus for determination of the hexabromide value of oils and fats in tropical countries.** P. S. VARMA, N. N. GOBOLE, and G. M. GARDE (Allgem. Oel- u. Fett-Ztg., 1935, 32, 456–457).—Since at tropical temp. some hexabromide is lost during the washing with cooled Et<sub>2</sub>O in the ordinary method, a cup-like vessel is fitted to the filter-flask, so that the whole Gooch filter and glass holder thereof can be surrounded by a freezing mixture. Normal vals. are obtainable with this apparatus. E. L.

**Products from coconut-oil wax.** S. S. TANCHICO (Philippine J. Sci., 1935, 57, 423–426).—The white substance obtained by purifying and recrystallising the sediment deposited by coconut oil during long storage appears to be a wax, since myricyl alcohol and cerotic acid, but no glycerol, could be identified among its saponification products. The wax is suitable as an ingredient of polishes. E. L.

**Waxes in the candle industry.**—See II. **Lint on cottonseed.**—See V. **Contact insecticides.**—See XVI. **Retarding rancidity.** **Vitamin-A in pilchard oil.**—See XIX.

## PATENTS.

**Refining of crude fats and fatty oils.** E. W. FAWCETT, and IMPERIAL CHEMICAL INDUSTRIES, LTD.



(B.P. 438,056, 11.5.34).—Fats and oils, other than vitamin-containing liver oils or their derivatives (cf. B.P. 415,088; B., 1934, 930), are "broken" by heating or treatment with small amounts of acid or alkali and are subjected to short-path, high-vac. ("mol.") distillation, whereby, after distilling off any fatty acids, colouring matters, etc., the glycerides can be removed at a higher temp. from other non-volatile impurities.

E. L.

**Soap.** D. LACY-HULBERT, and YAMEL, LTD. (B.P. 436,866, 16.4.34).—A product capable of lathering and cleaning in salt (sea-)H<sub>2</sub>O comprises an intimate mixture of soap (e.g., 25% of the whole) and sulphonated lauryl and/or oleyl alcohols (or salts or esters of these).

E. L.

**Manufacture of powdered soap.** W. A. HUTTON, Assr. to W. A. HUTTON & Co. (U.S.P. 1,971,566, 28.8.34. Appl., 22.8.30).—Hot liquid soap is sprayed at 1000–3000 lb. per sq. in. into a centrifugal drying chamber through which is passed a whirling blast of heated air.

A. R. P.

**Preventing soaps from becoming rancid.** V. DABSCH and J. C. VREDENBURG (B.P. 438,231, 14.9.34. Austr., 24.11.33).—Di- and/or tri-hydric alcohols (glycol, glycerin, etc.) and H<sub>2</sub>O-sol. phosphates (Na<sub>3</sub>PO<sub>4</sub>) are added to finished soaps made from oil mixtures containing 25–55% of fluid oils having I val. < 70. E. L.

**Production of fish-liver oils, particularly halibut-liver oils.** J. F. WARD (B.P. 438,349, 9.2.34).—The minced livers (preferably after preheating with H<sub>2</sub>O) are treated with warm dil. alkali (e.g., 5% KOH); the resultant oily emulsion is separated and broken by addition of an org. liquid (e.g., EtOH) which is sol. in H<sub>2</sub>O but not miscible with oils, and the suspended oil, which is caused to separate by the careful addition of H<sub>2</sub>O, is washed with hot brine, settled, and separated mechanically. (Cf. B.P. 381,342; B., 1932, 1090.)

E. L.

**Vitamin-containing material.** A. F. O. GERMANN, Assr. to S. M. A. CORP. (U.S.P. 1,988,969, 22.1.35. Appl., 11.4.31).—A bland, palatable oil containing vitamin-A (or carotene), such as the liquid portion of yellow palm oil, with admixtures of other palatable oils or fats as desired, is treated to impart to it a content of vitamin-D, e.g., by irradiation or by addition of synthetic vitamin-D.

E. L.

**Apparatus for dehydrating oil-containing materials.** GES. ZUR VERWERTUNG FAUTH'SCHER PATENTE M.B.H. (B.P. 438,410, 26.4.35. Ger., 14.5.34. Addn. to B.P. 420,040; B., 1935, 109).—A conveyor screw rotating in a jacketed boiling drum is divided into inner and outer screws by a cylindrical perforated plate.

B. M. V.

**Reduction of acidity in oils, fats, and fat products.** "ELACT" GES. F. ELEKTR. APPARATE GES.M.B.H. (B.P. 436,372, 4.4.34. Austr., 20.4. and 4.8.33).—The acidity of fats and fatty (including dairy) products is reduced by treatment with skimmed or unskimmed milk or dairy residues (whey etc.) which have been treated electrically as in B.P. 433,576 in order to reduce their acidity to a predetermined degree (lying between +6° and –18° Soxhlet-Henkel), which is deduced

from the relation  $x(d - c) = a(b - d)$ , where  $a$  is the quantity of fat to be treated,  $b$  and  $d$  the original and final (desired) degree of acidity of the fat, respectively,  $x$  the quantity of wash liquid, and  $c$  its degree of acidity. The added liquid is separated after the treatment.

E. L.

**Imidols. Washing etc. agents. Textile lubricants. Phosphatide preps.**—See III. **Bleaching etc. agents. Detergents.**—See VI.

### XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

**New products and problems in construction painting.** C. F. RASSWEILER (Ind. Eng. Chem., 1935, 27, 1294–1297).—Speed of drying, min. no. of coats, and retention of appearance in indoor work, and the protection of metal, finishes for frame structures, and retention of good appearance on outdoor exposure, are discussed.

T. W. P.

**Linseed oil and the composition of paints.** E. S. GREIGOV (Peint. Pig. Ver., 1935, 12, 223–226).—A discussion.

**Classification and evaluation of emulsion[paint] vehicles.** H. WAGNER and E. PABST (Farben-Ztg., 1935, 40, 1245–1246, 1267–1268).—Commercial emulsion vehicles fall into "glue," "oil-glue," and "resin varnish-glue" types, and the characteristic film structures and surface properties of these types are illustrated by diagrams and photographs. They exhibit decreasing reversibility in H<sub>2</sub>O, and increasing durability, in the order given. A suggested measure of durability is permeability to CdSO<sub>4</sub> solution of dried films on sheet Zn, as evinced by deposition of Cd on the film. These tests, coupled with microscopical examination of films and observation of stability of emulsions, enable diagnosis of the type to which an emulsion belongs and its general evaluation to be made. It is considered that an economy of oil is achieved by use of oil-in-H<sub>2</sub>O emulsions.

S. S. W.

**Protective paints for the artificial silk, fibro, and film industries.** F. OHL (Farben-Chem., 1935, 6, 445–447).—The use of Pb<sub>3</sub>O<sub>4</sub>, Pb<sub>3</sub>O<sub>4</sub>-Fe<sub>2</sub>O<sub>3</sub>, Al, cellulose esters, bitumens, coumarone and alkyd resins, and chlorinated rubber in coatings for the protection of the plant is discussed.

S. M.

**Use of rubber in the preparation of varnishes.** NORDMANN (Farbe u. Lack, 1935, 579–580).—The use in lacquer formulation of chlorinated rubber, of rubber solutions obtained by prolonged milling, and of rubber which has been depolymerised in presence of *p*-phenol-sulphonic acid or SnCl<sub>4</sub> is discussed. The last-named products are sol. in aromatic and in paraffin hydrocarbons.

S. M.

**Film coverings as applied finishes.** ANON. (Synth. Appl. Fin., 1935, 6, 142–145, 157, 177–181, 183, 198–200, 222–225).—Moisture penetration through various wrapping and covering materials was determined by measuring the gradual increase in wt. of CuSO<sub>4</sub> contained beneath the sealed films in a brass cup (1 in. diam.,  $\frac{5}{8}$  in. depth). The results (tabulated and graphed) show the superiority, in resisting the penetration, of rubber, bitumen-impregnated paper, oiled cambric and



silk to paper (manila and parchment), vulcanised fibre, cellulose acetate (I), nitro- and benzyl-cellulose, and common-grade viscose. (I) was considerably improved by a coating of bitumen, paraffin wax, or Canada balsam. Moistureproof viscose (Cellophane) films (0.0009—0.0018 in.) had high imperviousness even when artificially aged by several methods, thin films being generally the better; the effect of R.H. fluctuations on burst strength was measured. Wt. and dimensional changes in the films on exposure to moisture or heat do not vary with the  $H_2O$  penetration; porosity determinations (described) are also valueless in this respect. Breakdown voltages and mechanical properties of the various materials are tabulated and their uses for electrical insulation and other purposes discussed. S. M.

**Acrylic resins.** K. WÜRTH (Chem.-Ztg., 1935, 59, 1001—1003).—A review.

**Solvents etc.** Test for solvent power.—See III. **Preserving compressed cork.** Paper for gilt ink.—See V. **Drying oils.**—See XII. **Uses for maize flour.**—See XIX.

## PATENTS.

**[Bituminous] metallic paint.** T. C. FORD, ASSR. to AMER. ASPHALT PAINT CO. (U.S.P. 1,992,695, 26.2.35. Appl., 15.1.32).—A powdered metallic bronzing pigment, *e.g.*, Al, is suspended in a vehicle comprising gilsonite, linseed and tung oils, ester gum and/or synthetic resin, driers, and solvents, *e.g.*, mineral spirit, the bitumen constituting 3.5—19.0% of the film-forming materials of the vehicle. S. S. W.

**Manufacture and application of pigment preparations [for colouring rubber].** IMPERIAL CHEM. INDUSTRIES, LTD., M. JONES, W. F. SMITH, and A. STEWART (B.P. 438,192, 8.3.34).—Rubber latex, a dispersing agent, *e.g.*, Turkey-red oil, an aq. suspension of a finely-divided dye or pigment, and a softening agent (which consists of a compound having a long alkyl chain and m.p. preferably about 50°, *e.g.*, stearic acid, tallow, cetyl alcohol) are intimately mixed, dried, and milled. S. M.

**Printing ink.** A. SCHNEIDER (U.S.P. 1,992,016, 19.2.35. Appl., 10.1.31).—To produce embossed effects by sprinkling shellac on wet print and then heating, a suitable ink is prepared from paracoumarone resin (100 pts.),  $Bu_2$  phthalate or  $(C_6H_4Me)_3PO_4$  etc. (100 pts.), a metal drier, *e.g.*, Co linoleate ( $2\frac{1}{2}$  pts.), and a pigment. S. M.

**Colour composition [for coal].** F. D. SNELL (Assee.) and A. H. P. O'CONNOR (U.S.P. 1,991,872, 19.2.35. Appl., 12.11.30).—Mixtures of hide glue (100 pts.), paraffin wax (1—16),  $Al_2(SO_4)_3$  (0.5—1 pt.), soap (0—1),  $CH_2O$  (0.2—0.5), and  $H_2O$ -insol. colouring matter (100—1000 pts. by wt.) are claimed. S. S. W.

**Varnish and resin therefor.** H. A. GARDNER (U.S.P. 1,992,570, 26.2.35. Appl., 15.2.34).—Varnish oil, *e.g.*, tung, is cooked at  $> 232^\circ$  with a heat-convertible synthetic resin (normally rendered insol. under these conditions) that has been treated with a depolymeriser, *e.g.*, S or an org. compound releasing it under heat, *e.g.*, a reaction product of S with chlorinated  $Ph_2$ , or with

turpentine (0.05—0.09 wt.-% on the resin). Gasproof, non-skinning varnishes are obtained. S. S. W.

**Oil-acid varnish and product coated therewith.** A. M. ALVARADO, ASSR. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,990,474, 12.2.35. Appl., 7.3.31).—A finishing coat which is spread on rubber-coated fabrics and baked is prepared from petroleum asphalt, solvent naphtha, drying oil acids, and metal driers. 15 examples are given. S. M.

**Asphaltene varnish.** A. M. ALVARADO, ASSR. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,990,475, 12.2.35. Appl., 20.3.31).—Compositions substantially free from petroleum, comprising asphaltene (derived from asphalt by removal of constituents sol. in petroleum naphtha) together with drying or semi-drying oil fatty acids, as such or incorporated with glyptal resins etc., are claimed, particularly for application to rubber-coated fabric (artificial leather). S. S. W.

**Manufacture of lacquers for brush application.** W. C. WILSON and C. E. FAWKES, ASSRS. to PYROXYLIN PRODUCTS, INC. (U.S.P. 1,991,533, 19.2.35. Appl., 2.8.32).—Brushing cellulose lacquers comprise solutions of cellulose derivatives in slowly volatile org. solvents (such that the film remains tacky for  $< 10$  min.) containing resins and plasticisers as desired and having  $\eta < 8$  poises. Sufficient of an agent imparting plasticity (but not softness), *e.g.*, 1.75 wt.-% (on the unpigmented lacquer) of a metal salt of a fatty acid ( $> C_{12}$ ), *e.g.*, Ca or Al stearate, must be added for the lacquer to be brushable on vertical surfaces without sagging or curtaining. S. S. W.

**Drying oil composition.** V. H. TURKINGTON and W. H. BUTLER, ASSRS. to BAKELITE CORP. (U.S.P. 1,988,615, 22.1.35. Appl., 9.5.30).—An oil-sol.  $PhOH-CH_2O$  type of reaction product which has an accelerating effect on the drying of the oil is heated with an approx. equal wt. of drying oil, *e.g.*, tung, linseed, until a sample remains clear on cooling. Excess of the drying oil is then added and heating continued at  $< 200^\circ$  to the desired  $\eta$ . Vehicles for coatings, adhesives, etc. of improved alkali-resistance, durability, and toughness are thus obtained. S. S. W.

**Floor covering.** V. H. TURKINGTON, ASSR. to FLOOR COVERING PATENTS, INC. (U.S.P. 1,988,616, 22.1.35. Appl., 9.10.30).—Surface coatings for floor coverings comprise such compositions as those described in U.S.P. 1,988,615 (cf. preceding abstract), together with fillers etc. applied to suitable fibrous sheet base and baked to solid condition. S. S. W.

**Crinkled (A) coated surface, (B) surface coating.** K. TOLL, ASSR. to CHADELOID CHEM. CO. (U.S.P. 1,991,527—8, 19.2.35. Appl., 17.11.31).—(A) Crinkle coatings are stoved in successive stages, *e.g.*,  $\frac{1}{2}$  hr. at  $43^\circ$  or 20 min. at  $82^\circ$  to form the pattern, followed by 6 hr. at  $93^\circ$  to harden the film. (B) Batches of tung oil are polymerised to different degrees by appropriate heat-treatment at  $204-316^\circ$  and are then blended in suitable proportions to give a crinkle varnish, pigments, other oils, etc. being incorporated if desired. S. S. W.

**[Emulsified asphalt] coating composition.** L. E. SENG, ASSR. to UNION PRODUCTS CO. (U.S.P. 1,988,921,



22.1.35. Appl., 15.11.32).—0.5% of blue-lead ( $\text{PbS}$ ) concentrate, or its equiv. of  $\text{Pb}_3\text{O}_4$  or  $\text{PbO}$ , is incorporated as rust inhibitor in aq. emulsions of asphalt, containing china clay as emulsifier and, if desired, fibrous material, *e.g.*, asbestos, cotton. S. S. W.

[Non-inflammable] coating composition. E. K. ZIMMERMAN, Assr. to L. E. CARPENTER & Co., INC. (U.S.P. 1,990,811, 12.2.35. Appl., 16.1.31).—Compositions containing pyroxylin (approx. 16% solution), pigment, fireproofing agent [ $\text{H}_3\text{BO}_3$ ,  $\text{KAl}(\text{SO}_4)_2$ ], and plasticiser, *e.g.*,  $\text{Ph}_3\text{PO}_4$ , are claimed. S. S. W.

Colour, plastic, and coating compositions. L. C. DANIELS and A. O. JAEGER, Assrs. to AMER. CYANAMID & CHEM. CORP. (U.S.P. 1,990,818, 12.2.35. Appl., 20.12.30).—To colour a synthetic resin, lacquer, etc. a lake-forming dye, *e.g.*, alizarin (I), is caused to react *in situ* with a non-alkali salt of a keto-acid, *e.g.*,  $\text{o-C}_6\text{H}_4\text{Bz-CO}_2\text{H}$  (II); these salts are sol. in common lacquer solvents, but a mutual solvent may be added. *E.g.*, solutions in linseed oil of (I) and the Al salt of (II) are mixed.  $\text{C}_5\text{H}_5\text{N}$ ,  $\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})_3$ , or other org. base may be added to neutralise the free acid produced. S. M.

[Plasticiser for] cellulose derivative composition. W. E. LAWSON, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,989,701, 5.2.35. Appl., 3.10.31).—An ester of a polycarboxylic acid with tetrahydrofurfuryl alcohol, *e.g.*, ditetrahydrofurfuryl adipate, tetrahydrofurfuryl Bu phthalate, is claimed. F. R. E.

Surfacing of sheet material with pigments, varnishes, lacquers, waterproofing solutions, or the like. W. MELVILLE, A. M. BROWN, and RAYMAKERS SYND., LTD. (B.P. 438,373, 15.5.34).—Wicks are used to conduct the film-forming liquid to the surface of the flotation medium through which the sheet material is passed. Apparatus is claimed. S. M.

Production of [resinous] vinyl derivatives. KODAK, LTD. (B.P. 437,368, 19.4.34. Fr., 19.4.33).—The amount of HCl catalyst present during the condensation of a polyvinyl alcohol (I) and  $\text{CH}_2\text{O}$  or its polymerides to produce a product of the desired  $\eta$ , *i.e.*, 37 sec. (Engler) at 15° in 2% solution in  $\text{CH}_2\text{Cl}_2$ : EtOH (4:1), is crit. and varies with the  $\eta$  of the (I) used and the temp. of condensation; *e.g.*, if  $\eta$  of (I) is 64 sec. (Engler) at 15° in 4%  $\text{H}_2\text{O}$  solution, 8–10% HCl is needed for condensation at 20° or 15.5% at 60–80°. More HCl reduces  $\eta$ , less gives insol. products. E. J. B.

Polymerisation of vinyl compounds. CARBIDE & CARBON CHEMICALS CORP., Assees. of S. D. DOUGLAS (B.P. 437,773, 21.12.34. U.S., 9.1.34).—Mixtures of vinyl esters of aliphatic acids and halides are heated at  $\geq 60^\circ$  with the usual polymerisation catalysts, but without any liquid media, in containers of Fe, steel, or Fe alloys; addition of, *e.g.*,  $\text{COMe}_2$  renders the resin mechanically weak. S. M.

Fractionation of vinyl resins. C. O. YOUNG and S. D. DOUGLAS, Assrs. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,990,685, 12.2.35. Appl., 28.3.31).—Mixtures of vinyl chloride and acetate are heated in presence of catalyst, and a high-m.p. fraction, suitable for use as a moulding plastic, is separated from the

polymerised mass by removal of the remainder by solvents in which this fraction is insol., *e.g.*, PhMe,  $\text{COMe}_2$ . S. S. W.

Manufacture and use of aqueous vinyl resin dispersions or emulsions. F. B. DEHN. From RÖHM & HAAS A.-G. (B.P. 437,446, 26.4.34).—A hydrophilic group, *e.g.*,  $\text{CO}_2\text{Na}$ , is introduced into vinyl or acrylic ester polymerides either by partial saponification or by conducting the polymerisation in presence of a small proportion of, *e.g.*, Na acrylate. An aq. emulsion of the product may be conc. to a stiff paste, containing 65% of solids, by evaporating or centrifuging. S. M.

Manufacture of sheets from [vinyl] polymerisation products. W. W. GROVES. From DEUTS. CELLULOID-FABR. (B.P. 437,604, 27.4.34).—An aq. suspension of, *e.g.*, polyvinyl chloride is dried and pressed (100–130 kg./sq. cm.) at 80–150° between polished metal plates. The products are suitable for laminated glass. Dyes, fillers, etc. may be added to the suspension. S. M.

[Vinyl resin] denture. F. GROFF, Assr. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,990,903, 12.2.35. Appl., 27.12.32).—The use of mixed polymerides of vinyl chloride (87%) and acetate (13%) is claimed. Compounds of low mol. wt. are removed by repeated pptn. of the resin and extraction with, *e.g.*, PhMe. S. M.

[Phenol-alkyd] resinous compositions. E. I. DU PONT DE NEMOURS & Co. (B.P. 437,894, 7.5.34. Appl., 24.7.33).—A solution in a drying oil (tung) of an oil-sol. phenol-aldehyde resin is heated with a polyhydric alcohol (glycerol) in presence of a basic catalyst and, preferably, linseed oil; when the mixture becomes homogeneous a polybasic acid [ $\text{o-C}_6\text{H}_4(\text{CO})_2\text{O}$ ] is incorporated. S. M.

[Preparation of] phenolic condensation products. E. FONROBERT and F. LEMMER, Assrs. to RESINOUS PRODUCTS & CHEM. CO. (U.S.P. 1,990,985, 12.2.35. Appl., 18.12.30. Ger., 19.9.30).— $\text{CH}_2\cdot\text{OH}$  derivatives of phenols are hydroxyalkylated. *E.g.*, the  $(\text{CH}_2\cdot\text{OH})_4$  derivative of 4:4'- $\text{CMe}_2(\text{C}_6\text{H}_4\cdot\text{OH})_2$  is treated with  $\text{C}_2\text{H}_4\text{Cl}\cdot\text{OH}$  or  $\text{OH}\cdot\text{CH}(\text{CH}_2\text{Cl})_2$  in aq. alkali. The products resinify at 150° to clear elastic products. H. A. P.

Manufacture of resins [from carbohydrates] and of [cellulose acetate] plastic compositions containing them. BRIT. CELANESE, LTD. (B.P. 438,069, 12.7.34. U.S., 12.7.33).—A resin is obtained by heating a  $\text{H}_2\text{O}$ -sol. carbohydrate with a dil. acid, *e.g.*, HCl, and extracting the dark mass thereby pptd. with  $\text{COMe}_2$ . It is incorporated into films prepared from cellulose acetate and other esters and others to improve their adhesion to hard, smooth surfaces, *e.g.*, glass. S. M.

Petroleum plastic. D. R. MERRILL, Assr. to UNION OIL CO. OF CALIFORNIA (U.S.P. 1,989,045, 22.1.35. Appl., 25.8.31).—A heavy distillate from a petroleum oil (which contains naphthenes and is preferably free from asphalt) is extracted with liquid  $\text{SO}_2$  or other medium, the solvent removed, and the residue steam-distilled. A light-coloured plastic is obtained which is improved by treating it (or the original distillate) with  $\text{H}_2\text{SO}_4$ . Pigments and fillers may be incorporated for making pavement, roof coverings, etc. S. M.



**Plastic composition [for electric cables].** CALLENDER'S CABLE & CONSTRUCTION CO., LTD., S. BECKINSALE, and H. C. PAGE (B.P. 436,686, 3.8.34).—The composition contains a non-oxidising stearine pitch (14), prepared by distilling North American or Indian cotton seed, an oil-sol. synthetic resin (11), *e.g.*, a  $\text{PhOH-CH}_2\text{O}$  product which is not thermohardening, castor oil (15), and an inert filler (60%), *e.g.*, French chalk. 0.1% of quinol or other anti-oxidant may be incorporated. S. M.

(A, B) **Production of articles from plastic compositions containing vinyl resins.** J. J. V. ARMSTRONG. From NAT. CARBON CO., INC. (B.P. 437,661—2, 4.5.34).—(A) To provide hollow articles (*e.g.*, pipes) with a vinyl resin lining, a preform is extruded from a mixture of a vinyl halide (70—95%) or styrene and a vinyl ester of a lower fatty acid (30—5%), and is applied to the heated pipe by pressure which is maintained until the resin adheres and becomes heat-stable. The usual stabilisers, fillers, etc. may be incorporated. (B) To provide an outer lining which contracts on the article, the hot-extruded preform is rapidly chilled. S. M.

**Production of [rubber] plastic-elastic compositions.** S. PEREZ, Assee. of A. MÜLLER (B.P. 437,655, 3.5.34. Ger., 9.5.33).—Vulcanised rubber and solid polymerides of indene and/or coumarone are kneaded together at 120—130° until a solid solution results; more rubber is then incorporated as a filler, but without producing a homogeneous mixture. S. M.

**Manufacture of corn-gluten plastic.** H. BERLIN, Assr. to RESINOX CORP. (U.S.P. 1,988,475, 22.1.35. Appl., 20.2.31).—The hard, horn-like reaction products of phenolic and aldehydic substances with the residue of corn gluten from which fat and starch have been removed, consisting principally of prolamin and glutelin, are claimed. S. S. W.

**Cellulose ester moulding composition containing a diacyl derivative of 1:4-dioxan.** J. G. McNALLY and J. J. SCHMITT, Assrs. to EASTMAN KODAK CO. (U.S.P. 1,991,109, 12.2.35. Appl., 18.11.33).—The use as plasticiser of 2:3-diacetoxy-1:4-dioxan is described. H. A. P.

**Preparation of moulding powder.** C. N. SMITH, Assr. to NAT. CARBON CO., INC. (U.S.P. 1,992,638, 26.2.35. Appl., 29.7.32).—Mixed vinyl ester polymerides, *e.g.*, chloride and acetate, in dil. solution, *e.g.*, 2.5% in  $\text{COME}_2$ , are rendered colloidal by rapid agitation with aq.  $\text{NH}_3$  or an org. amine, subsequently pptd. as impalpable powder by adding a different electrolyte, *e.g.*, conc.  $\text{HCl}$ , filtered, washed, and dried in vac. The product is particularly suitable for use in brushes for electrical machinery. S. S. W.

**Compositions for plastic moulding.** M. LANDECKER, Assr. to AMER. CYANAMID CO. (U.S.P. 1,991,398, 19.2.35. Appl., 28.6.30. Ger., 2.7.29).—The use of  $(\text{CH}_2)_5\text{S}_2\text{N}_2$  (from  $\text{CH}_3\text{O}$  and  $\text{NH}_4\text{HS}$ ), which may be condensed with urea and enriched with S, is claimed as a binder or plasticiser for synthetic resins etc. S. M.

**[Composite] moulded product.** G. H. MAINS, Assr. to WESTINGHOUSE ELECTRIC & MANUFACT. CO. (U.S.P. 1,991,056, 12.2.35. Appl., 27.12.30).—The surface layers of laminated wooden articles are impregnated with

colourless resins, *e.g.*, an aq. solution of a urea or thiourea resin, and these are superimposed on the inner sheets which have been impregnated with the same or a different binder, *e.g.*,  $\text{PhOH-CH}_2\text{O}$  resin; the composite article is united by moulding under heat and pressure. S. S. W.

**[Pearlescent] moulded products.** WINGFOOT CORP. (B.P. 438,110, 7.2.34. U.S., 7.2.33).—0.1—1% of a metallic powder (250—300-mesh), *e.g.*, Al or Al-bronze, is mixed with the reaction product (prep. described) of rubber and chlorostannic acid and moulded. Dyes and pigments may be added. S. M.

**Moulding of [tubular] articles from plastic moulding compositions.** G. S. HIGGINSON and J. C. VREDENBURG (B.P. 438,350, 9.3.34).

**Plasticisers. Esters of polycarboxylic acids. Aldehyde- $\text{H}_2\text{S}$  reaction products.**—See III. Cellulose ester compositions. Laminated products.—See V. Waterproofing etc. compound for wood.—See IX. Products containing chlorinated rubber.—See XIV.

#### XIV.—INDIA-RUBBER; GUTTA-PERCHA.

**Rôle of  $p_H$  in the [rubber] latex industry.** M. DÉRIBÉRE (Caoutchouc et Gutta-Percha, 1935, 32, 17,333—17,335, 17,365—17,367).—A brief account is given of the variations in the  $p_H$  of latex (fresh and preserved) and their relation to its behaviour, particularly towards coagulation. D. F. T.

**Dispersing and stabilising agents for latex mixtures and the behaviour of latex mixtures on storage.** O. BÄCHLE (Kautschuk, 1935, 11, 219—224).—Dispersing power of a protective agent was measured by the particle size of the introduced  $\text{ZnO}$  or C black and also by the colour of the latex containing the latter. Stabilising power was measured relative to stirring and shaking, to heat, and to  $\eta$  increase on keeping. The greater is the dispersing power of a substance, the smaller generally is its stabilising power, *ceteris paribus*, because it leads to the development of greater surface in the de-stabilising material. With increasing proportions of the protective agent, however, its stabilising effect attains a min. val. and then increases rapidly, while its dispersing action increases continuously; the former irregularity is attributed to the stabilising effect being largely dependent on prior saturation of the filler with the protective agent. In order to ensure good stability as well as good dispersion this min. concn. must be exceeded. The best joint power was shown by a proprietary Na salt of an org. sulphonic acid. Such protective agents must also not cause trouble with the latex mixture by thickening, or by premature vulcanisation, or by encouraging mould-growth. It is found that  $\text{ZnO}$  at 0.3—0.8 pt. per 100 pts. of rubber has a greater influence than have all other proportions in increasing the  $\eta$  of latex; this effect is practically independent of the S content or the type of accelerator. For the production of stable latex mixtures, not only is the selection of a protective agent of importance but so also is the % of  $\text{ZnO}$ . D. F. T.

**Importance of carbon black to the rubber industry.** T. L. GARNER (Ind. Chem., 1935, 11, 487—490).—A review. D. F. T.



**Reinforcement [of rubber] and stearic acid.** H. BARRON (India-Rubber J., 1935, 90, 638—640).—The stress-strain curves for vulcanised mixtures containing rubber 100, ZnO 5,  $\text{NH}_4\text{C}(\text{NHPh})_2$   $1\frac{1}{2}$ , S 3, C black 35, and stearic acid (I) 0—5 pts. show that addition of  $\geq 2\%$  of (I) does not appreciably influence the work of extension, i.e., the reinforcement, but it reduces the work of retraction and consequently the hysteresis loss. The (I) reduces the internal friction and increases the wetting or true reinforcement, but with  $> 2\%$  of (I) the reinforcement is lowered because the lubrication effect decreases that part of reinforcement which arises from internal friction. The "blooming" of (I) is attributed to its effect in reducing the surface tension of the rubber. In the complete absence of (I) (using  $\text{COMe}_2$ -extracted rubber) there is no reinforcement.

D. F. T.

**Determination of true free sulphur in vulcanised rubber. Modification of the thiocyanate method.** S. MINATOYA, I. AOE, and I. NAGAI (Ind. Eng. Chem. [Anal.], 1935, 7, 414—416).—The dried  $\text{COMe}_2$  (I) extract is heated for  $\frac{1}{2}$  hr. with 25 c.c. of EtOH and a fragment of KCN. The KCNS is then removed by shaking the dried mass with (I), and after evaporation of the (I), is dissolved in  $\text{H}_2\text{O}$  and titrated with 0.1N- $\text{AgNO}_3$  in presence of  $\text{HNO}_3$ , using  $\text{Fe}(\text{NO}_3)_3$  as indicator.

D. F. T.

**Determination of total and free selenium in [rubber] vulcanisates.** E. CHERASKOVA and L. VEISBRUTE (Ind. Eng. Chem. [Anal.], 1935, 7, 407—409).—Total Se is determined by reducing the  $\text{HNO}_3$  solution of the rubber with  $\text{N}_2\text{H}_4 \cdot \text{H}_2\text{SO}_4$  or, after evaporative removal of the  $\text{HNO}_3$ , with  $\text{H}_2\text{SO}_3$ . Free Se is determined by heating the rubber with 10%  $\text{Na}_2\text{SO}_3$  (I) solution for 30 hr. and pptg. the dissolved Se with  $\text{CH}_2\text{O}$ ; free S can be determined by subsequent iodometric titration of the (I) solution after pptn. of the Se.

D. F. T.

**Fatigue-cracking test for [rubber] tyre-tread compounds. Some of the laws of fatigue.** E. T. RAINER and R. H. GERKE (Ind. Eng. Chem. [Anal.], 1935, 7, 368—373).—Cracks are started in a grooved moulded test-sample by  $\text{O}_3$  and are caused to grow by bending the specimen through repeated cycles of strain with a suitable machine. The degree of cracking is estimated from the loss of bending moment. The cracks are produced in much the same way as in service, and have a similar appearance to those on tyres. Cracking by  $\text{O}_3$  and by fatigue are shown to be additive. Anti-oxidants decrease the rate of cracking, as also does lowering the temp. The test gives results in good agreement with the behaviour of tyres in actual service.

D. F. T.

**Rubber for varnishes. Film coverings.**—See XIII.

#### PATENTS.

**Creaming of [rubber] latex.** J. MCGAVACK, Assr. to UNITED STATES RUBBER CO. (U.S.P. 1,989,241, 29.1.35. Appl., 24.6.33).—The rate of creaming in presence of a creaming agent is increased by subjecting the latex for a short time to violent shearing stress, e.g., equiv. to that effected by stirring 50 c.c. in a 100-c.c. bottle with a high-speed stirrer (1 in. diam.), having 3 triangular

blades, for  $\geq 1$  min. at 13,000 r.p.m. or  $\geq 2$  min. at 3900 r.p.m. The creaming agent may be added before or  $\geq 3$  hr. after the agitation.

D. F. T.

**Concentration of [rubber] latex.** RUBBER PRODUCERS RESEARCH ASSOC., G. MARTIN, W. S. DAVEY, and H. C. BAKER (B.P. 437,758, 8.6.34).—A  $\text{H}_2\text{O}$ -sol., alkylated derivative of starch or of other food-reserve polysaccharide, obtained, e.g., by the action of  $\text{Me}_2\text{SO}_4$ , is used as a creaming agent. [Stat. ref.]

D. F. T.

**Thickening of [rubber] latex.** J. MCGAVACK, Assr. to UNITED STATES RUBBER CO. (U.S.P. 1,991,402, 19.2.35. Appl., 10.10.33).—A hydrophilic thickening agent is dissolved in a portion of the aq. phase which has been removed from the latex without coagulation, e.g., by creaming, and the solution is then mixed with the rubber-rich portion so that the latex is thickened without substantial dilution.

D. F. T.

**Rubber product [dust from latex].** M. J. STAM, and RUBBER-LATEX-POEDER-CO. N.V. (B.P. 438,230, 12.9.34).—Latex to which a protective substance has been added is atomised into a current of air of high velocity so that the droplets are carried away without agglomeration and form a rubber dust of particle size  $< 75 \mu$ .

D. F. T.

**Manufacture of rubber compositions from rubber latex.** B. WILKINSON (B.P. 437,928, 2.4.35).—After addition of a vulcanising agent (S) and an accelerator (e.g., piperidine pentamethylenedithiocarbamate) and possibly also ZnO, colouring matter, and fillers, the latex is coagulated ( $\text{AcOH}$ ) and the coagulum converted into sheet or crêpe, which is dried (room temp.). Very slow vulcanisation is then effected by storage at room temp. (1 week—6 months at 27—49°). Composite layers may be formed by joining 2 or more of the vulcanised sheets with rubber solution without the application of heat.

D. F. T.

**Softening of raw rubber and preparation of mixtures thereof.** SOC. ITAL. PIRELLI (B.P. 437,869, 15.3.35. Ital., 15.3.34).—The rubber issuing from between the rollers of a masticating mill is distended so as to expose as great a surface as possible for cooling purposes before returning it to the mill, e.g., as an endless loop.

D. F. T.

**Treatment of rubber.** C. COLEMAN, Assr. to UNITED STATES RUBBER CO. (U.S.P. 1,989,226, 29.1.35. Appl., 30.9.32).—Vulcanisation in presence of a metallic oxide (ZnO) is accelerated by incorporating a diamino-diarylmethane as the sole added org. accelerator.

D. F. T.

**Reclaimed rubber.** G. F. LANE, Assr. to PHILADELPHIA RUBBER WORKS CO. (U.S.P. 1,990,658, 12.2.35. Appl., 12.10.33).—Vulcanised scrap containing fibre is heated, e.g., in live steam, with a small proportion (approx. 1%) of NaOH in conc. solution. A plasticiser such as an oil may also be added. The reclaimed rubber produced contains the fibre in an undegenerated condition together with a small proportion of combined alkali.

D. F. T.

**Reclaiming of vulcanised rubber.** G. E. HEYL (B.P. 437,399, 30.8.34).—The disintegrated rubber scrap (e.g., 80—90 pts.), which may contain fibre, is finely ground, e.g., on high-friction rollers at 60—80° in presence



of rubber latex (10–20 pts.) containing 1.5–5% of alkali ( $\text{NH}_3$ ,  $\text{NaOH}$ ). During this frictional milling, about 3% of vegetable oil may also be added.

D. F. T.

**Manufacture of products containing chlorinated rubber.** I. G. FARBENIND. A.-G. (B.P. 438,441, 17.5.34. Addn. to B.P. 436,392; B., 1935, 1105).—Chlorinated rubber is mixed with alkylated polynuclear aromatic hydrocarbons (other than alkylated naphthalenes), *e.g.*, propylated or butylated anthracenes, phenanthrenes, or diphenyls, with or without org. solvents and/or colouring materials. The product can serve as a lacquer or paint.

D. F. T.

**[Production of] transparent films [of rubber hydrohalides].** W. C. CALVERT, ASSR. to WINGFOOT CORP. (U.S.P. 1,989,632, 29.1.35. Appl., 22.12.33. Can., 20.4.33).—The transparency and elasticity of films made from the hydrochloride of caoutchouc (29–30.5% Cl) are preserved by addition of an inhibitor of photochemical action [ $(\text{CH}_2)_6\text{N}_4$ , to which more basic substances, *e.g.*, dicyclohexylamine, may be added].

H. A. P.

**Adhesive [containing rubber].** J. Y. MALONE (U.S.P. 1,990,996, 12.2.35. Appl., 5.4.33).—A transparent, substantially colourless adhesive is obtained by plasticising rubber by two successive milling operations, then adding a resin (paracoumarone resin) of suitable *n*, milling the mixture, and, after a period (24 hr.), remilling and sheeting.

D. F. T.

**Converting latices into solids.**—See I. Treating olefines.—See III. Rubber fabric.—See VI. Rubber-bonded abrasives.—See VIII. Pigments for rubber. Oil-acid and asphaltene varnishes. Plastic-elastic compositions. Moulded products.—See XIII.

## XV.—LEATHER; GLUE.

### PATENTS.

**Synthetic tanning materials.** W. F. HESTER, H. R. RATERINK, and I. C. SOMERVILLE, ASSRS. to ROHM & HAAS Co. (U.S.P. 1,989,802, 5.2.35. Appl., 10.10.32).—Condensation products of an aldehyde, an aromatic sulphonic acid (I), and *o*- (II) or *p*- $\text{OH}\cdot\text{C}_6\text{H}_4\cdot\text{CO}_2\text{H}$  or *p*- $\text{C}_6\text{H}_4\text{Cl}\cdot\text{OH}$  are claimed. *E.g.*,  $\text{C}_{10}\text{H}_8$  is sulphonated (98%  $\text{H}_2\text{SO}_4$  at  $130^\circ$ ), and the product condensed in aq.  $\text{H}_2\text{SO}_4$  with (II) and  $\text{CH}_2\text{O}$ . Other examples of (I) are the sulphonation products of  $\text{PhOH}$ ,  $4\text{-C}_6\text{H}_4\text{Ph}\cdot\text{OH}$ ,  $\beta\text{-C}_{10}\text{H}_7\cdot\text{OH}$ , carbazole, tetrahydronaphthalene,  $4:4'$ - $\text{CMe}_2(\text{C}_6\text{H}_4\cdot\text{OH})_2$ , *p*-cresol, and *p*-*tert*-amyl- and diisobutylphenol.

H. A. P.

**Tanning of hides.** H. M. GUSDORF (U.S.P. 1,988,684—5, 22.1.35. Appl., [A] 17.11.32, [B] 7.3.34. Renewed [A] 12.4.34).—(A) Prepared hides are immersed in solvent naphtha or other liquid of low  $\eta$  and subsequently treated with an aq. tanning solution. (B) Limed hides are completely delimed, coloured in dil. aq. vegetable tan liquors of  $d$  1.01, and immersed first in an oil (light petroleum, lard oil) of  $\eta < 1$ , and then in a conc. tan liquor of  $d$  1.06.

D. W.

**Manufacture of gelatin products and the like.** DEUTS. HYDRIERWERKE A.-G. (B.P. 437,243, 8.4.35.

Ger., 7.4.34).—The temp.-stability of conc. aq. gelatin solutions (25–45%) is improved by addition of hydrogenation products of furfuraldehyde, *e.g.*, furfuryl (2–5%) and tetrahydrofurfuryl alcohol.

H. A. P.

**[Adhesive for nitrocellulose] coating material.** D. W. HANSEN, ASSR. to A. E. STALEY MANUFG. Co. (U.S.P. 1,992,122, 19.2.35. Appl., 22.8.31).—To render a coating of glue etc. adhesive to a surface of nitrocellulose etc., the latter is first coated with a solution of zein or other prolamin which has been extracted (method described) from corn, maize, etc. with aq. EtOH.

S. M.

**Drying apparatus.**—See I. Gas-meter diaphragm.—See II. Wetting of leather etc.—See III. Adhesive.—See XIV.

## XVI.—AGRICULTURE.

**Soils of Tagaytay ridge, Cavite.** D. Z. ROSELL and A. S. ARGÜELLES (Philippine J. Sci., 1935, 57, 409–421).—Analytical data and profile characteristics of these volcanic soils are recorded.

A. G. P.

**Types of alkali soils (solonetz).** V. A. KOVDA (Compt. rend. Acad. Sci. U.R.S.S., 1935, 3, 367–369).—The evolution and profile characteristics of alkali soils are discussed.

A. G. P.

**Relationships between surface area, hygroscopicity, and heat of wetting of soil.** W. U. BEHRENS (Z. Pflanz. Düng., 1935, 40, A, 257–310).—The hygroscopic absorption of  $\text{H}_2\text{O}$  by soils is related to the  $\text{H}_2\text{O}$  tension of the atm. over considerable ranges. The proportional changes in free and total energy caused by wetting soil are much  $>$  for other gels, *e.g.*,  $\text{SiO}_2$ . Heats of wetting of soil, kaolin, and Na-permutit by  $\text{H}_2\text{O}$ ,  $\text{NH}_2\text{Ph}$ , olive oil,  $\text{C}_6\text{H}_6$ ,  $\text{PhMe}$ , and paraffin are determined. Vals. for the different liquids decline in the order named, *i.e.*, inversely with the surface tension. Wheat-starch shows practically no heat of wetting towards org. liquids. The  $\text{H}_2\text{O}$  film on soil particles in equilibrium with the  $\text{H}_2\text{O}$  tension over 10%  $\text{H}_2\text{SO}_4$  is 0.38  $\mu$ .

A. G. P.

**Sorption of liquids by soil colloids. II. Surface behaviour in the hydration of clays.** L. D. BAVER and H. WINTERKORN (Soil Sci., 1935, 40, 403–419; cf. B., 1935, 36).—The rate of intake of  $\text{H}_2\text{O}$  and of swelling of soil colloids saturated with different bases is examined. Comparison with other physical properties of clays indicates that hydration results largely from the orienting effect on dipole mols. of the colloid surface as well as of the adsorbed cations. With bentonite and alkali-saturated org. matter an osmotic type of swelling is concerned.

A. G. P.

**Measuring precipitation waters lost from the soil as surface run-off, percolation, evaporation, and transpiration.** G. W. MUSGRAVE (Soil Sci., 1935, 40, 391–401).—A special arrangement of lysimeter cylinders is described.

A. G. P.

**Chemical nature of organic matter or humus in soils, peat bogs, and composts.** S. A. WAKSMAN (J. Chem. Educ., 1935, 12, 511–519).—A summary.

L. S. T.



**Chemical nature of organic matter in different soil types.** S. A. WAKSMAN and I. J. HUTCHINGS (Soil Sci., 1935, 40, 347—363).—Podsol humus shows high cellulose (I) and hemicellulose (II) and low protein (III) contents. Low base contents in podsoils permit ready dispersion and translocation of humus to lower layers in which reprecipitation occurs in zones of higher base content. In chernozems the humus has a narrower C:N ratio (10:1), high lignin and (III), and low (I) and (II) contents. Leaching of humus is prevented by the Cu and Mg present. Serozem-humus shows C:N averaging 6:1 as a result of high proportions of (III); (I) is absent and the (II) content is small. Chestnut soils are intermediate between chernozems and serozems. High bacterial activity in the latter explains the smaller (I) and greater (III) contents.

A. G. P.

**Urea-decomposing microflora of soils.** I. Description and classification of the organisms. II. Numbers and types of organisms as shown by different methods. T. GIBSON (Zentr. Bakt. Par., 1935, II, 92, 364—380, 414—424).—I. Species are described and biochemical activities recorded.

II. The isolation of urea-decomposing organisms from soil is described. The rate of decomp. of urea in acid soil is not related to the nos. of these organisms present, but probably depends to a large extent on the presence of much org. matter. Fungi and *Actinomyces* are not actively concerned in the process.

A. G. P.

**Potash in Massachusetts soils. Its availability to crops.** F. W. MORSE (Mass. Agric. Exp. Sta. Bull., 1935, No. 324, 16 pp.).—The amount of K extracted from drift soils by HCl ( $d \ 1:12$ ) increases with the fineness of texture. The total K (fusion) content of sands was < that of silts and clays, but the  $H_2O$ -sol. K was higher in the sands.

A. G. P.

**Determination of exchangeable calcium and other bases in non-calcareous soils.** A. N. PURI (Soil Sci., 1935, 40, 383—390).—The method is based on shaking the soil sample with  $0.1N-H_2C_2O_4$  in  $N-NH_4OAc$ , whereby all  $Ca^{++}$  is pptd. as  $CaC_2O_4$ . The decrease in  $[C_2O_4^{--}]$  of the filtered extract is a measure of exchangeable  $Ca^{++}$ . Other bases pass into solution as oxalates or acetates and are determined by evaporating the extract to dryness, igniting, and titrating the residual carbonates.

A. G. P.

**Determination of manganese and magnesium in soils and silicate rocks.** L. A. DEAN and E. TRUOG (Ind. Eng. Chem. [Anal.], 1935, 7, 383—385).—Mn and Mg are pptd. together as phosphates and weighed as such. Mn is then determined by the bismuthate method, and Mg by difference.

E. S. H.

**Colorimetric determination of manganese [in soils] in presence of titanium.** G. J. HOUGH (Ind. Eng. Chem. [Anal.], 1935, 7, 408—409).—The  $(NH_4)_2S_2O_8$  (I) method is useless when the soil contains > 1% of  $TiO_2$ .  $KIO_4$  or Na bismuthate can be used successfully in place of (I).

E. S. H.

**Determination of sodium in fertilisers.** A. NAUNDORF (Chem.-Ztg., 1935, 59, 995—996).—Analytical methods are discussed and possible irregularities in quoted vals. for Rhenania phosphate examined.

A. G. P.

**Availability of soil potassium.** J. LAMB, JUN. (Soil Sci., 1935, 40, 365—381).—On a K-deficient soil, treatment with K salts increased the proportion of exchangeable K until this was utilised by the crop. The  $B_1$ -horizon contained more adsorbed K than  $A_1$  or  $A_3$ . Manuring with K did not affect the exchangeable K of  $A_3$  or  $B_1$ , or the exchangeable Ca of the  $B_1$ -horizon. The total and exchangeable K contents were unrelated. K starvation was associated with low exchangeable K and high exchangeable Ca in the soil. Response to K manuring cannot be correlated with the exchangeable or  $H_2O$ -sol. K in soil. Addition of sugar to a high- $NO_3^-$  soil reduced the  $NO_3^-$  content and the level of electrolytes, but slightly increased the exchangeable K.

A. G. P.

**Manurial action of magnesium.** M. POPP, J. CONTZEN, and F. NIESCHLAG (Z. Pflanz. Düng., 1935, 40, A, 323—357).—Supplementary manuring with  $MgHPO_4$  does not affect the utilisation of K salts by crops. Mg improves crop yields only on abnormal soils in which available Mg is small. In most cases  $Ca^{++}$ ,  $K^+$ , and  $NH_4^+$  applied in fertilisers liberate sufficient Mg for crops.

A. G. P.

**Manurial action of magnesium.** C. BRIOUX and E. JOUIS (Compt. rend. Acad. Agric. France, 1935, 21, 471—480).—Trials with a no. of crops are recorded.  $NH_4MgPO_4$  was as effective as an equiv. mixture of superphosphate and  $(NH_4)_2SO_4$ , and in some cases produced somewhat higher yields. Similarly, mixed Ca and Mg nitrates formed an effective substitute for  $Ca(NO_3)_2$ .

A. G. P.

**Effect of magnesium manuring on [plant] physiology and crop yields.** A. FREY and E. SPINDLER (Bied. Zentr., 1935, A, 5, 481—495).—A review.

A. G. P.

**Potassium, calcium, and magnesium nutrition of plants.** G. BARBIER (Compt. rend. Acad. Agric. France, 1935, 21, 416—422).—Plants vary in their ability to absorb K. Those showing least capacity in this respect respond most effectively to generous applications of K fertilisers. The intake of Mg is affected by the level of Ca supply only when variations in the latter exceed the customary ranges found in soil.

A. G. P.

**Effects of particle size on properties and efficiency of fertilisers.** A. L. MEHRING, L. M. WHITE, W. H. ROSS, and J. E. ADAMS (U.S. Dept. Agric. Tech. Bull., 1935, No. 485, 27 pp.).—Of grained fertilisers examined, those having particles ranging in size from 80- to 150-mesh were the most effective. The increased yield due to superphosphate increased with the fineness of the particles in all ranges applied. Small particles of fertiliser tended to absorb  $H_2O$  and to cake together more readily than did larger particles. Translocation of fertiliser materials from the zone of application in soil varied inversely with particle size, N compounds disappearing more rapidly than did other sol. salts. Decrease in size of P-fertiliser particles was associated with greater reversion to insol. forms in loam soils and more rapid disappearance of total P from the area of application in sandy soils. Germination was accelerated by side-placement of coarse fertilisers and retarded



by that of powdered grades. When mixed with soil below the seed, all grades delayed germination.

A. G. P.

**Efficiency of soil and fertiliser phosphorus as affected by soil reaction.** R. M. SALTER and E. E. BARNES (Ohio Agric. Exp. Sta. Bull., 1935, No. 553, 49 pp.).—The response to P fertilisers tended to decline as the  $p_H$  of soil increased in the range 5.0–7.5. The availability of native soil P, however, increased with rising  $p_H$ .

A. G. P.

**Does the customary treatment with complete mineral fertilisers influence the activity of micro-organisms in soil?** H. ENGEL (Zentr. Bakt. Par., 1935, II, 92, 490–505).—Complete fertilisers accelerate bacterial decomp. of soil org. matter. Deficiency of K or P has a retarding influence. Productivity of soil and microbiological activity are closely related since both are similarly affected by the  $H_2O$  and nutrient status of the soil.

A. G. P.

**Use of artificial farmyard manure in hot beds.** H. GESLIN, M. MARCEL, and J. SERVY (Compt. rend. Acad. Agric. France, 1935, 21, 596–600).—The artificial product is suitable for the prep. of hot-beds.

A. G. P.

**Efficiency of animal manure in correcting inefficiency of potassium [fertilisers], as shown by leaf diagnosis.** H. LAGATU and L. MAUME (Compt. rend. Acad. Agric. France, 1935, 21, 396–404).—On soils in which application of KCl failed to induce an appropriate response from potato crops, manure increased the yield and K content of leaves. The N and P contents were not greatly affected, but that of Ca declined.

A. G. P.

**Cultivation of wheat in Beauce.** GAROLA (Compt. rend. Acad. Agric. France, 1935, 21, 269–276).—The influence of seasonal conditions and manuring on the growth and composition of wheat are examined.

A. G. P.

**Requirement of manurial elements of different varieties of wheat.** VINCENT, HERVIAUX, and SARAZIN (Compt. rend. Acad. Agric. France, 1935, 21, 593–595).—Characteristic differences in yield (total, grain, and straw) and mineral composition of different varieties are shown. In general, the Mg and P contents are paralleled by those of N. The K and Ca contents increase with the straw yield.

A. G. P.

**Nitrogen manuring and variety trials with wheat and oats in Svalöf.** A. ÅKERMANN and I. GRANHALL (Svenskt. Land., 1933, 17, 76–78; Bied. Zentr., 1935, 5, 497).—In all varieties N manuring increased straw yields to approx. the same extent. With winter wheat N fertilisers slightly increased the crude protein content, but did not affect the hectolitre-wt. or wt. per 1000 grains. With summer varieties  $NaNO_3$  decreased the hectolitre-wt., but the wt. per 1000 grains declined only with very heavy dressings. In oats neither characteristic was affected, but the protein content was increased by N manuring.

A. G. P.

**Effect of physiologically acid manuring on the yield of winter rye and wheat on chernozem soils.** J. SAEW (Lein u. Hanf, 1933, 10, 44–49; Bied. Zentr., 1935, 5, 511).—Acid manuring decreased the  $NO_3^-$

and increased the citric acid-sol. P in these soils. Oat yields were also improved.

A. G. P.

**Nitrogen content of wheat as affected by seasonal conditions.** F. T. SHUTT (Trans. Roy. Soc. Canada, 1935, [iii], 29, III, 37–39).—High-protein wheat is largely the result of high temp. and low rainfall during development and ripening of the grain.

A. G. P.

**Pasture top-dressing in the Auckland province.** P. W. SMALLFIELD (New Zealand J. Agric., 1935, 50, 214–222).—Manurial trials on a no. of soil types are described.

A. G. P.

**Garden lawns and playing greens. Establishment and maintenance.** E. A. MADDEN (New Zealand J. Agric., 1935, 50, 201–214).—General culture, manuring, and the control of weeds, grubs, and earth worms are considered.

A. G. P.

**Field trials of lucerne yields after inoculation with bacterial preparations.** F. C. GERRETSEN (Dep. econ. Zaken en Arbied. Direct. Landbouw. Verslag. Lanbowk onderz., 1933, No. 39, A, 77–102; Bied. Zentr., 1935, 5, 501).—In nearly all cases inoculation increased the protein content of lucerne hay. Hay yields also increased after normal N manuring, notably after the first cutting.

A. G. P.

**Direct effect of Bordeaux mixture on early cucumber production.** G. F. WEBER (Phytopath., 1935, 25, 974).—Spraying with 2–4–50 Bordeaux mixture for downy mildew increases yields only when the picking season exceeds 30 days. Unsprayed plants produced more staminate and pistillate flowers and set more fruit than did sprayed plants for 3 consecutive weeks at the beginning of the season. The relationship was reversed after the fourth week, since unsprayed plants were then badly defoliated by diseases.

A. G. P.

**Effect of certain chemicals on the “combination streak” virus of tomatoes.** M. SCHAPOVALOV (Phytopath., 1935, 25, 864–874).—A no. of org. and inorg. substances examined are classified as (i) producing little or no effect on either component of streak, (ii) effecting lysis, preferentially of virus-B, (iii) effecting lysis of -A and -B indifferently.

A. G. P.

**Ripening of sugar cane in Louisiana: effect of topping on yields of cane and sugar per acre.** G. ARCENEUX (U.S. Dept. Agric. Circ., 1935, No. 368, 32 pp.).—Sugar contents of a no. of varieties of cane at intervals during the ripening season and of the stubbles are recorded. The influence of soil type, rainfall, and temp. is examined.

A. G. P.

**Rôle of organic matter in plant nutrition. VII. Economy of carbon during decomposition of molasses in the swamp soil.** G. NARASIMHAMURTHY and V. SUBRAHMANYAN. **VIII. Influence of fermentable organic matter on the transformations of iron in the swamp soil.** B. A. S. IYENGAR and V. SUBRAHMANYAN. **IX. Oxidation of organic matter in the soil and plant assimilation.** G. S. SIDAPPA and V. SUBRAHMANYAN (Proc. Indian Acad. Sci., 1935, 1, B, 823–836, 868–892, 928–937; cf. B., 1935, 165).—VII. Approx. 30% of the C added to swamp soils as molasses remained in the soil sediment. During



puddling, loss of C in gaseous forms fell principally on matter dissolved in the supernatant liquid. Subsequent flooding removed practically all added C. Conditions affecting C losses during fermentation are examined and means of minimising these suggested.

VIII. Following addition of glucose to swamp soils there was a steady increase in the proportion of insol.  $\text{Fe}^{++}$  salts and, in the case of peat and laterite types, an increase in  $\text{Fe}^{++}$  in the supernatant liquid. Larger applications of glucose increased the amount of sol., but not of insol.,  $\text{Fe}^{++}$  produced. Rising temp. accelerated the dissolution and subsequent pptn. of  $\text{Fe}^{++}$ . Addition of  $\text{CaO}$  retarded the dissolution of  $\text{Fe}^{++}$ . S had little effect on the rate of dissolution of  $\text{Fe}^{++}$ , but was reduced to  $\text{H}_2\text{S}$  which eventually caused pptn. of  $\text{FeS}$ . Flooding and appropriate drainage of treated soil removed all sol.  $\text{Fe}^{++}$ . In the supernatant liquid  $\text{Fe}^{++}$  is present as salts of org. acid. Insol.  $\text{Fe}^{++}$  in the soil sediment occurs as carbonate and sulphide.

IX. The beneficial effect of manure on tropical soils is associated more directly with the decomp. process than with any improvement in availability of the original org. matter. Mineral fertilisers may intensify or depress the action of org. manures. Addition of oxidising agents ( $\text{H}_2\text{O}_2$ ,  $\text{KMnO}_4$ ) to soil increased the growth of barley. In soil receiving adequate supplies of farmyard manure the early stages of plant growth are independent of an atm. supply of  $\text{CO}_2$ . A. G. P.

Cold-resistance of vines and fruit trees. A. F. WILHELM (Gartenwiss., 1933, 8, 77—114; Bied. Zentr., 1935, A, 5, 518).—The relative resistance of a no. of varieties is examined. Generous applications of K manures induced high resistance in vines; high N and deficiency of P caused great sensitivity. A. G. P.

Tobacco bed soil disinfection. J. O. ANDES (Phytopath., 1935, 25, 972).—Best results were obtained by treatment with 3% aq.  $\text{NH}_4\text{SCN}$  (2 quarts per sq. ft.) 6 weeks before sowing. A. G. P.

Influence of the harvesting period on the value and germinative power of poppy seeds. M. PROCHASKA (Gartenbauwiss., 1933, 7, 458—461; Bied. Zentr., 1935, 5, 496).—Effects on size, wt., and colour of seeds are examined. Early harvesting is associated with high dry matter and fat contents. Morphine occurs in half-ripe and ripe capsules, but not in seeds. A. G. P.

Culture of mushrooms on artificial farmyard manure. A. DEMOLON, H. BURGEVIN, and N. MARCEL (Compt. rend. Acad. Agric. France, 1935, 21, 464—468).—Artificial manure from straw and added N forms a suitable bed for growth of mushrooms. A. G. P.

Influence of soil temperature on plant growth. J. O. MUSSO (Z. Pflanz. Düng., 1935, 40, A, 311—322).—Effects of soil temp. on differential development of roots and aerial parts of plants and on assimilation are examined. A. G. P.

Plants as sources of raw materials, especially for chemical industries. F. A. HENGLEIN (Chem.-Ztg., 1935, 59, 1041—1043).—A brief review.

Transmission and treatment of cereal rusts in Tunis. A. PETIT (Ann. Serv. Bot. Agron. Tunisie, 1933

9, 201—218; Bied. Zentr., 1935, A, 5, 542—543).—Treatment with Cu compound caused injury to wheat. Paraformaldehyde (1%) and S were less injurious and showed good fungicidal efficiency. Adhesion of fungicides was increased by reducing substances, notably formol. A. G. P.

Mode of action of Bordeaux mixture on *Mycosphærella fragariæ*. A. G. PLAKIDAS (Phytopath., 1935, 25, 970).—The spray does not penetrate to kill the mycelium in the tissue, but inhibits spore production on sprayed spotted leaves. Bordeaux mixture is lethal to ungerminated spores even at great dilution. A. G. P.

Control of pink cob-rot of maize. J. C. NEILL and R. M. BRIEN (New Zealand J. Agric., 1935, 51, 65—69).—Seed infected with *Fusarium moniliforme* may be disinfected by dipping in hot  $\text{H}_2\text{O}$  (about  $60^\circ$ ) for 10 min. Org. Hg dusts also give good control. A. G. P.

Effect of ammonia-nitrogen on growth of cotton root rot, *Phymatotrichum omnivorum*, in field and laboratory experiments. D. C. NEAL (Phytopath., 1935, 25, 967—968; cf. B., 1934, 937).—In culture media having  $\text{NH}_4\text{-N}$  2.8 g. per litre,  $\text{NH}_4\text{H}_2\text{PO}_4$  and  $(\text{NH}_4)_2\text{SO}_4$  prevented growth of mycelium.  $\text{NH}_4\text{NO}_3$  and  $(\text{NH}_4)_2\text{HPO}_4$  (I) permitted delayed growth. When  $\text{NO}_3^-$  was supplied best growth occurred with  $\text{Ca}(\text{NO}_3)_2$  (II). Sclerotia and hyphal strands occurred only in media containing (I) and (II). In Texas blackland soils beneficial effects of  $\text{NH}_4^+$  treatment in reducing root rot persisted for 2 years. A. G. P.

Control of potash hunger and fusarium wilt in cotton. V. A. YOUNG, J. O. WARE, and O. A. POPE (Phytopath., 1935, 25, 969).—Correction of K "hunger" or "rust" by use of K fertilisers results in a marked decrease in attacks of cotton wilt. A. G. P.

Control of diseases of tomato seedlings. F. VAN HALTERN (Phytopath., 1935, 25, 968).—Recommended treatment consists of seed disinfection with aq.  $\text{HgCl}_2$  (1 in 3000), spraying with 2–3–50 Bordeaux mixture in the second rough leaf stage, followed by 3–4–50 sprays at intervals of > 2 weeks. A. G. P.

Disinfection of beet seed. G. FRON (Compt. rend. Acad. Agric. France, 1935, 21, 427—434).—Satisfactory use of 8-hydroxyquinoline (1 in 10,000—20,000) is described. No injury to germination occurred. A. G. P.

Plum-tree borer (*Synanthedon pictipes*, G. and R.). G. I. GILBERTSON (S. Dakota Agric. Exp. Sta. Bull., 1934, No. 288, 22 pp.).—Painting tree trunks with  $p\text{-C}_6\text{H}_4\text{Cl}_2$  dissolved in paraffin or cottonseed oil gives effective control. A. G. P.

Soil amendments for [control of] sclerotium rot of sugar beet. L. D. LEACH and A. E. DAVEY (Phytopath., 1935, 25, 896).—Yields of disease-free beet were increased by application of  $\text{CaCN}_2$ . Manure,  $\text{Ca}(\text{OH})_2$ , and  $(\text{NH}_4)_2\text{SO}_4$  were less effective. Use of  $\text{NH}_3$  in irrigation  $\text{H}_2\text{O}$  killed 6% of the plants, reduced the % of infection, but did not provide a practicable method of control. A. G. P.

*Sclerotium rolfsii*, Sacc., on strawberries and effect of certain chemicals on the sclerotia. R. E.



NOLAN (Phytopath., 1935, 25, 966).— $\text{CS}_2$  and  $\text{CH}_2\text{O}$  killed all sclerotia, whereas  $\text{C}_6\text{H}_6$ ,  $p\text{-C}_6\text{H}_4\text{Cl}_2$ ,  $\text{CHCl}_3$ ,  $\text{Et}_2\text{O}$ ,  $\text{NH}_3$ , and xylol permitted varying amounts of germination. A. G. P.

**Toxicity of low concentrations of ammonia to mycelium and sclerotia of *Sclerotium rolfii*.** L. D. LEACH and A. E. DAVEY (Phytopath., 1935, 25, 957–959).—Aq.  $\text{NH}_3$  (50–150 p.p.m.) killed mycelium in 24–2 hr. Resistant sclerotia were killed by 250 and 150 p.p.m. of  $\text{NH}_3$  in 24 and 72 hr., respectively. At similar concns.  $\text{CH}_2\text{O}$  required a longer period for effective action. Field applications of  $(\text{NH}_4)_2\text{SO}_4$  or anhyd.  $\text{NH}_3$  to sugar beet reduced the incidence of the disease. A. G. P.

**Toxicity of ammonium compounds to *Sclerotium rolfii*.** A. E. DAVEY and L. D. LEACH (Phytopath., 1935, 25, 895).—Solutions of  $\text{NH}_4$  salts when saturated with  $\text{CaCO}_3$  (pH 7.8) are toxic to the mycelium of the fungus. A. G. P.

**Copper fungicides and other new materials as peach sprays.** L. E. MILES (Phytopath., 1935, 25, 972).—Brown rot was almost completely controlled by  $\text{CaO-S}$  (I), wettable S (II), Cu silicate-bentonite- $\text{CaO}$  (III), or Cu oxide-bentonite- $\text{CaO}$  (IV) sprays. Trees treated with (III) showed most scab and spray burn, with (IV) next in order. Spray injury to foliage and fruit by S preps. was negligible. Self-boiled (I) gave best results. A. G. P.

**Contact insecticides from fatty alcohols.** E. W. BOUSQUET, P. L. SALZBURG, and H. F. DIETZ (Ind. Eng. Chem., 1935, 27, 1342–1344).—The toxicity of the higher alkyl thiocyanates towards aphids and red spiders is discussed; it reaches a max. with the lauryl ( $\text{C}_{12}$ ) compound. The lower ( $< \text{C}_6$ ) and the higher ( $> \text{C}_{16}$ ) homologues are practically innocuous. S. C.

**Dusting with barium silicofluoride for vine moth in 1934.** J. VINAS (Compt. rend. Acad. Agric. France, 1935, 21, 507–513).—Satisfactory control is reported. A. G. P.

**Effect of sunlight on [pyrethrum] fly sprays.** D. G. HOYER (Soap, 1935, 11, 105, 107, 109, 111).—Exposure of sprays in airtight flint-glass containers resulted in a 65% loss of toxicity in 2 months, and a further 25% loss in the subsequent 2 months. Loss of pyrethrins is associated with an increase in acidity, thus rendering the customary method of analysis invalid. A. G. P.

**$\text{Ca}(\text{NO}_3)_2$  solutions in liquid  $\text{NH}_3$ .**—See VII. **Cyanoglucosides in white clover.**—See XIX. **Red squill as raticide.**—See XXIII.

#### PATENTS.

**Production of insecticide and the like.** J. W. HORNE and C. P. HOPKINS (U.S.P. 1,990,490, 12.2.35. Appl., 29.6.31).—Pressure distillates from shale oil (freed from gasoline) are heated with 2–5% of unsaturated fatty acid, e.g., oleic acid or the sulphonated wash  $\text{H}_2\text{O}$  obtained from the treatment of  $\text{H}_2\text{SO}_4$  sludge recovered from acid refining of shale oil, and the product is heated with 1–1½% aq. alkali, e.g., KOH. Nitrogenous bases are thus first neutralised and soaps are formed from

the acid constituents so that the final product is miscible with  $\text{H}_2\text{O}$ . C. C.

**Manufacture of insecticidal and fungicidal compositions.** GRASSELLI CHEM. CO. (B.P. 436,327, 29.12.33. U.S., 29.12.32).— $n\text{-C}_{12}\text{H}_{25}\cdot\text{OH}$  or a derivative other than  $\text{C}_{12}\text{H}_{25}\cdot\text{SCN}$ , e.g., the bromide, amine, xanthate, or urethane (I), is used in presence of diluents and/or spreaders, or [except (I)] as an aq. emulsion of its solutions in kerosene. [Stat. ref.] H. A. P.

**Disinfecting media. Alkali trichlorophenoxides.**—See III. **Nitrophosphates.**—See VII. **Germicide.**—See XX. **Disposal of [fruit-pulp] wastes.**—See XXIII.

#### XVII.—SUGARS; STARCHES; GUMS.

**Conductometric determination of soluble and insoluble ash in unfiltered [sugar] solutions.** L. SATTLER, J. E. MULL, and I. LORGE (Facts about Sugar, 1935, 30, 377–378; Internat. Sugar J., 1935, 37, 478–479).—Previous work on the determination of the sol. inorg. matter in filtered raw cane sugars by electrical measurements (cf. B., 1926, 717; 1930, 387, 925; 1931, 692) is reviewed. It is now found that, using unfiltered solutions, results sufficiently accurate for all practical purposes can be obtained. J. P. O.

**Instruments used in the control of sugar boiling.** L. I. A. MICHELI (Internat. Sugar J., 1935, 37, 489–490).—Using the “Brasmoscope,” an attempt is made to apply Thieme’s saturation coeffs. for boilings in an experimental pan; the results were usually vitiated by inaccurate temp. determinations. With the pan refractometer the syrup measured was found not to be representative of the bulk of the pan. In electrical methods it would appear to be more convenient to record the resistance rather than the conductivity between the electrodes, the results obtained then changing in the same direction as the supersaturation and the  $\eta$ . J. P. O.

**Theory of control of sugar boiling by measurements of electrical conductivity.** J. DĚDEK and J. DYKYJ (Chem. Listy, 1935, 29, 324–330).—The equation  $1/\kappa\eta = \mu(T - 20) + V$ , where  $\kappa$  is sp. conductivity,  $\mu$  and  $V$  are consts., and  $T$  is temp., holds over the range 20–90°, and for a wide range of concns. of sucrose; it is concluded that Honig’s conductivity method of controlling the concn. of the syrups is applicable to sugar-factory practice. R. T.

**Refining quality of raw sugar.** R. W. HARMAN (Internat. Sugar J., 1935, 37, 471–473).—Tests developed by the Colonial Sugar Refining Co. here outlined deal with filtration, using an apparatus similar to that described by Zerbán (B., 1934, 420), and with affination, which is carried out in a 12-in. centrifugal under conditions similar to those obtaining in actual practice. An investigation of turbid or “smoky” liquors off char indicated the cause to lie fundamentally with the raw sugar, it being found that carbonatation diminished the trouble more than Supercel filtration. The cause of poor-quality raw-sugar production is attributable to some abnormal condition, such as cane variety, soil, cultivation, climate, or damage; clarification and boiling only help to alleviate it. J. P. O.



**Use of the electrical sodium lamp in saccharimetry.** E. LANDT (Internat. Sugar J., 1935, 37, 474—476).—A polarimeter illuminated with an electric Na lamp giving monochromatic light can serve as a saccharimeter when its circular scale has been engraved with the Ventzke scale; advantages are outlined. It is predicted that the new equipment should find extended use in the sugar industry. J. P. O.

**Direct determination of fructose.** R. SALANI and S. FINESCHI (Ind. Sacc. Ital., 1935, 28, 291—294; Internat. Sugar J., 1935, 37, 483).—Using Ost's solution and applying a correction for the attack on the glucose present, results were obtained which checked very well with the method of obtaining the total reduction by Fehling's solution, and the glucose content by Auerbach and Bodlander's method, the fructose being calc. by diff. J. P. O.

**Detection of adulteration in maple syrup.** A. CONLIN (Ind. Eng. Chem. [Anal.], 1935, 7, 426—427).—A simplified rapid method based on electrical-conductivity measurements (cf. B., 1916, 482) is used. Normal  $\kappa$  for American and Canadian syrups varies with the locality of origin. F. R. G.

**Normal-weight question in the polarisation of sugar-factory products: saccharimetric scale.** C. A. BROWNE (Internat. Sugar J., 1935, 37, 478). J. P. O.

**Entrainment in the multiple-effect evaporator.** See I. Sugar beet and cane.—See XVI. Yeast gum.—See XVIII. Determining reducing sugars in chocolates. Sugar in grapes.—See XIX.

#### PATENTS.

**[Electrolytic] reduction of sugars to alcohols.** H. J. CREIGHTON, ASST. to ATLAS POWDER CO. (U.S.P. 1,990,582, 12.2.35. Appl., 9.7.32).—Improvements on the prior patents U.S.P. 1,612,361, and 1,653,004 (B., 1927, 234; 1928, 207) are claimed. The Hg cathode is replaced by a cathode of Hg amalgamated with a metal which serves to maintain the catholyte at  $p_H \leq 7$ , e.g., Pb. Such a solid amalgam may be used in plate form, economising floor space. A. W. B.

**Glycerol by fermentation.**—See III. Resins from carbohydrates.—See XIII.

#### XVIII.—FERMENTATION INDUSTRIES.

**Deterioration of hops during storage: observations and preliminary experiments.** A. H. BURGESS (J. Inst. Brew., 1935, 41, 467—476).—Loss in preservative power of hops is characterised by a fall in their  $\alpha$ -acid content, usually irregularly accompanied by an increase in  $\beta$ -acid. Loss of  $\alpha$ -acid proceeds at an increased rate in presence of  $O_2$ , but is not avoided in its absence. Treatment of hops with steam to produce a temp. of  $100^\circ$ , maintained for 5 min., as a means of destroying enzymes, has no effect on deterioration, but this is markedly diminished by a sterilisation process involving heating hops at  $100^\circ$  for 30 min. It appears therefore that deterioration is caused by micro-organisms rather than by enzymes. *Mucor spinescens*, *Penicillium expansum*, and *Aspergillus niger*, isolated from deteriorating hops, can cause a rapid decrease in  $\alpha$ -acid of other

samples. Deterioration can take place in hop samples containing as little as 7% of moisture ( $20^\circ$ ). I. A. P.

**Hop pectin and its significance in brewing.** H. FINK (Woch. Brau., 1935, 52, 401—405).—The nature of hop pectin is discussed (cf. B., 1936, 39), and its passage into wort during boiling noted. Pectin has been found in all the wort and beer deposits examined, and also in the finished beer itself. I. A. P.

**Yeast gum. III. Yeast gum in beer.** F. STOCKHAUSEN and K. SILBEREISEN (Woch. Brau., 1935, 52, 393—397; cf. A., 1935, 1281).—Determination of yeast gum by pptn. as the Cu compound from conc. beer or from a KOH solution of the EtOH-pptd. beer solids fails or gives unreliable results. The gum is pptd. quantitatively by glacial AcOH, but this method also fails when applied directly to conc. beer. If  $\leq 0.025$  g. of the gum is added to 100 c.c. of beer, however, an excess determination is obtained (after glacial AcOH treatment, followed by addition of Fehling's solution and hydrolysis of the ppt.) corresponding to 6—18 mg. of gum per litre of beer. If  $< 0.025$  g. is added, the method fails. Previously reported quantities of 20—90 mg. of gum per litre of beer (cf. B., 1927, 567) would necessitate an apparently impossible high diffusion from the yeast. Addition of yeast gum to beer improves its foaming qualities, but the effect is only clearly appreciable with additions of  $\leq 75$  mg. per litre. However, it must be remembered that the colloidal condition of added gum will probably differ from that of any gum originally present. I. A. P.

**Methods for using rye in agricultural distilleries.** W. BRAUN (Z. Spiritusind., 1935, 58, 373).—Rye (whole corns) mixed with  $H_2O$  may be treated with steam at 4 atm., and subsequently saccharified by addition of 1/10 its wt. of green (barley) malt, fermentation following in the usual way. The yield of pure EtOH is 36 litres per 100 kg. of rye. Alternatively, ground rye mixed with  $H_2O$  and adjusted to a suitable  $p_H$  may be heated slowly to  $55^\circ$  and saccharification started at this temp. by adding 1/20 its wt. of malt. The EtOH yield is 32—34 litres per 100 kg. of rye. The use of mixtures of rye and potatoes is also described. I. A. P.

**Carbonic acid washing [in distillery fermentations].** W. KILP (Z. Spiritusind., 1935, 58, 391—392, 394).—During the washing of  $CO_2$  for removing EtOH vapour, small bubbles of the gas should be passed through the wash  $H_2O$ ; it is desirable also for each fermenting vessel to be provided with its own washing apparatus. The effect of the degree of filling of the fermenting vessel on the EtOH content of the  $CO_2$ , the vol. of wash  $H_2O$ , and the val. of frequent changes of wash  $H_2O$  are discussed and illustrated by reference to the working of a no. of distillery installations. I. A. P.

**Cultural characteristics of *Saccharobacillus Pastorianus*.** J. L. SHIMWELL (J. Inst. Brew., 1935, 41, 481—487).—The growth characters of *Sacc. Pastorianus* (S) on wort-gelatin, wort-agar, unhopped beer, and sweet wort are described and in part figured for representative cultures. Microscopically the appearance of S varies between long slender rods and short thick forms depending on the growth medium, the presence



of EtOH in particular favouring elongation. *S* is killed by exposure to  $\leq 51.7$ – $54.4^\circ$  for 5 min. The optimum temp. for acid production on sweet wort is  $29$ – $32^\circ$ , whilst the optimum  $p_H$  for the commencement of growth is approx.  $8.0$ . *S* possesses a high degree of tolerance for EtOH and hop antiseptics, and is capable of attacking a variety of sugars (including arabinose) in presence of suitable nitrogenous material. Cultural differences, particularly temp. relationships, between *S* and *Bact. Delbrücki* are emphasised. I. A. P.

**Vinification in Californian wineries.** E. M. BROWN and V. DE F. HENRIQUES (Ind. Eng. Chem., 1935, 27, 1235–1240).—The methods of manufacture of red and white dry and fortified wines, and wines of the sauterne and sherry type, are described. Treatments for the elimination of unwanted organisms from the must and the use of pure yeast for fermentation are indicated, whilst methods suggested or available for the quick ageing of wines are discussed. I. A. P.

**Effect of filter aids and filter materials on wine composition.** L. G. SAYWELL (Ind. Eng. Chem., 1935, 27, 1245–1250).—Filtration of wine may result in the taking up of variable quantities of Fe and Ca, the extent of this being dependent on the nature of the wine and on the conditions of filtration. The effect of highest-grade cellulose and asbestos pads on Fe and Ca content is negligible, whilst porous  $\text{SiO}_2$  candles give no increase in these metals. Diatomaceous- $\text{SiO}_2$  filtration is effective, economical, and sanitary, but different samples of this material, as of other filter aids, show considerable variations in properties and in their effect on the wine. In general, it is preferable to filter large quantities of wine into a large tank, rather than to divide the filtrate among a no. of vessels, since the effect on composition is greatest in the early stages of filtration. Cloudiness may develop in wine without prior increase in Fe or Ca or pptn. of colloidal materials; the responsible organisms may be removed by diatomaceous- $\text{SiO}_2$  filters. I. A. P.

**Precipitation rate of cream of tartar from wine. Effect of temperature.** G. L. MARSH and M. A. JOSLYN (Ind. Eng. Chem., 1935, 27, 1252–1257).—The period necessary for the deposition of cream of tartar (I) from wine is dependent on the storage temp. and on the nature of the wine. Thus, at  $-17.8^\circ$  deposition decreases in the order: dry white or red wine, sherry material, port; for any given wine, freezing storage gives more rapid deposition than cool storage. Conditions of thawing also affect separation of (I); thus, running  $\text{H}_2\text{O}$  at  $20^\circ$  gave lower separation than air for sherry material, whilst with dry wines air gave lower results than  $\text{H}_2\text{O}$ . Removal of (I) is accompanied by decreases in *d* and ash content and a slight increase in  $p_H$ . I. A. P.

**Pasteurisation of New York State wines.** C. S. PEDERSON, H. E. GORESLINE, and E. A. BEAVENS (Ind. Eng. Chem., 1935, 27, 1257–1265).—The majority of organisms present in wines of sauterne, claret, and burgundy types were killed at relatively low temp.; addition of a little  $\text{SO}_2$  further reduced the lethal temp. by approx.  $3^\circ$ . The organisms of sweet wines were killed at  $43.3$ – $49.4^\circ$ . Effective stabilisation of the

wines was effected by pasteurisation for 20 min. at  $54.4^\circ$ , when carried out under controlled conditions in bulk or in closed or open bottles. Organisms which survived this treatment were apparently of no significance, since they were unable to develop in sterile wine. I. A. P.

**Volatile acids of wine.** M. M. MORRIS (Ind. Eng. Chem., 1935, 27, 1250–1252).—Diseased wines contain AcOH with apparently a little  $\text{HCO}_2\text{H}$ , the latter being produced both by bacteria and by yeasts. Sound wines contain AcOH, together with traces of  $\text{EtCO}_2\text{H}$ . None of the samples examined contained  $\text{PrCO}_2\text{H}$ . I. A. P.

**Metals in wineries.** C. S. ASH (Ind. Eng. Chem., 1935, 27, 1243–1244).—Owing to their resistance to corrosion, Cr steels produce the best carriers for wines etc., but it is doubtful whether, in view of their high cost, their use in place of Cu apparatus is justified. Si-Fe pumps withstand corrosion, but are brittle. The corrosion of bronze or brass is very variable, depending on the sample. Ni apparatus is useful, high concn. of Ni salts being necessary in wine before turbidity is caused, whilst wine tends to produce a protective coating on the metal. Al, Al alloys, wrought Fe, steel, Pb, Sn, and Zn are unsuitable for wine apparatus, though the deposition of Fe tannate and wine stone may give a high measure of protection to wrought Fe or steel. The position of cast Fe with respect to resistance to corrosion is uncertain. I. A. P.

**Micro-determination of arsenic in must and wine.** J. BURKARD and B. WULLHORST (Z. Unters. Lebensm., 1935, 70, 308–315).—As is isolated as  $\text{AsCl}_3$ , converted into  $\text{H}_3\text{AsO}_4$ , and determined colorimetrically by Zinzadze's method (A., 1930, 725). A modification is described for amounts of As between  $0.01$  and  $0.05$  mg. which adds considerably to the accuracy. The method is suitable for serial determinations on food-stuffs etc. E. C. S.

**Manufacture of champagne and sparkling burgundy.** F. M. CHAMPLIN, H. E. GORESLINE, and D. K. TRESSLER (Ind. Eng. Chem., 1935, 27, 1240–1243).—The blending of champagne base (cuvée) is discussed, and the methods of secondary fermentation, of clearing, and for the removal of deposit ("disgorging") are described. Preliminary studies indicate that various highly purified sugars may replace "rock candy" (a form of cane sugar) for the secondary fermentation, whilst cane sugar hydrolysed by tartaric acid gives the most desirable flavour when used for sweetening after disgorging. I. A. P.

**Sugar etc. in grapes. Sauerkraut.**—See XIX.

#### PATENTS.

**Making an invertase preparation.** L. WALLERSTEIN, Assr. to WALLERSTEIN Co., Inc. (U.S.P. 1,990,505, 12.2.35. Appl., 30.8.29).—Yeast (as paste, or compressed) is mixed with 2 pts. of a  $\text{H}_2\text{O}$ -sol. saturated aliphatic alcohol of mol. wt.  $>$  that of EtOH; after  $15$ – $30$  min. at  $15.5^\circ$  the devitalised yeast is separated by pressing or centrifuging, and dried at  $> 37.8^\circ$ . The dry product is stable and without objectionable taste or odour; its high invertase activity can be adjusted as required by admixture with sugar, starch, etc. I. A. P.



**Production of glycerol by fermentation.** W. F. KRUG, JUN., and F. A. McDERMOTT, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,990,908, 12.2.35. Appl. 4.5.32).—A suitable yeast [e.g., "No. 16" of U.S.P. 1,551,997 (B., 1925, 937)] is cultivated in one or more sugar solutions in presence of mineral nutrients till sufficient is available for addition to the main mash, prepared, e.g., from molasses. When fermentation of this at 30° has become active (approx. 5–8 hr.),  $\text{NH}_3$  is added to adjust the  $p_{\text{H}}$  to 7–8, and one or more similar further additions are made as required during the fermentation to maintain a slightly alkaline reaction.  $\text{EtOH}$  and  $\text{AcOH}$ , together with part of the  $\text{NH}_3$  used, may be recovered from the fermented mixture, whilst the relatively low concn. of ash materials in the wash facilitates the separation of glycerol by any of the usual methods. I. A. P.

### XIX.—FOODS.

**Retarding rancidity—[use of] coloured transparent cellulose wrappers.** W. L. MORGAN (Ind. Eng. Chem., 1935, 27, 1287–1290).—Blue and invisible ultra-violet light accelerates the development of rancidity in such materials as potato chips, cakes, butter, soaps, etc. whilst light of  $\lambda > 4900 \text{ m}\mu$  is without effect. Exposure tests and absorption curves with various coloured wrappings are described. Under the same exposure conditions, a variety of foodstuffs which gave a negative Kreis test developed rancidity at widely different rates. A yellow, rancidity-retarding, transparent cellulose sheeting is described. S. C.

**New uses for maize flour and straw.** E. BELANI (Chem.-Ztg., 1935, 59, 984–985).—Applications of the flour in the plastics industry and of the straw in the paper, artificial silk, and explosives industries are described. E. C. S.

**Determination of ergot in baked bread.** V. R. CHERTOK and N. V. BERESOVSKA (Problems of Nutrition, Kharkov, 1934, 3, No. 5, 21–25).—A volumetric method employing  $\text{Co}(\text{NO}_3)_2$  and  $\text{K}_2\text{Cr}_2\text{O}_7$  is described.

NUTR. ABS. (m)

**Colloid chemistry of rice starch and rice boiling.** IV. I. SAKURADA, T. KITANO, and Y. MATSUSHITA. V. I. SAKURADA and K. HUTINO (Bull. Inst. Phys. Chem. Res. Japan, 1935, 14, 1127–1143, 1144–1149).—IV. The change  $\beta$ -starch  $\rightarrow$   $\alpha$ -starch in rice from different parts of the grain has been investigated chemically and by X-rays.

V. Puffed rice has been studied by X-rays. R. S.

**Calcium phosphates in milk.** J. BRIGANDO, CHAMP, and CLOSSON (Lait, 1935, 15, 382–386).—"Acid milk" has a low concn. of  $\text{Ca}_3(\text{PO}_4)_2$  (I) and in cheese making forms a "rubbery" curd, which can be avoided by addition of (I). "Lazy milk," which gives a soft curd, is low in Ca phosphate and caseinate and high in albumin and globulin. Addition of  $\text{Ca}(\text{H}_2\text{PO}_4)_2$  (II) +  $\text{CaHPO}_4$  (III) produces milk giving a normal curd. "Heated milk" (e.g., pasteurised) does not coagulate well under pressure and is low in sol. Ca phosphates and high in insol. phosphates. By addition of (II) + (III) the quality of the milk curd is improved. Cheese made from milks treated as above is much superior to that made from untreated milks. NUTR. ABS. (m)

**Detection of formaldehyde in milk.** T. McLACHLAN (Analyst, 1935, 60, 752).—Pure  $\text{H}_2\text{SO}_4$  with a trace of a  $\text{Fe}^{\text{III}}$  salt must be used, commercial acid frequently giving negative results. J. S. A.

**Phosphatase test for pasteurised milk.** H. D. KAY and W. R. GRAHAM, JUN. (J. Dairy Res., 1935, 6, 191–203).—A rapid phosphatase test serves to indicate gross errors of pasteurisation. A more detailed technique permits the detection of small discrepancies in the temp. or period of heating, or of additions of raw milk after pasteurisation (cf. A., 1934, 796). A. G. P.

**Effect of the reaction of milk on the destruction of micro-organisms by heat.** A. T. R. MATTICK and A. A. NICHOLS (J. Dairy Res., 1935, 6, 125–129).—The no. of bacteria surviving pasteurisation at 63° for 30 min. decreases with the  $p_{\text{H}}$  of the milk. A. G. P.

**Feed flavour in butter. Correlation of pasture type and stage of growth with intensity of feed flavour.** E. B. LEVY (New Zealand J. Agric., 1935, 50, 135–147).—The cause of "feed flavour" is probably related to the rapid change in carbohydrate and protein matter in young, rapidly-growing pasturage. Manuring practice should be directed towards maintenance of a grass-dominant, rather than a clover-dominant, pasture. High-clover feeds should be grazed  $\leq$  3–4 hr. prior to milking. A. G. P.

**Cyanoglucosides in white clover.** B. W. DOAK (New Zealand J. Agric., 1935, 51, 159–162).—It is unlikely that cyanogenic substances in strains of white clover are related to the occurrence of "feed flavours" in cream or to any other stock troubles in New Zealand. A. G. P.

**Mycological problems of dairying. I. Surface moulding of butter. II. Internal and subsurface discolorations.** T. R. VERNON (J. Dairy Res., 1935, 6, 154–167, 168–174).—I. Various types of moulding depend on weather conditions and on the ability of the organisms to obtain nutrient matter from butter or packing material (notably boxwood). Softening of parchment coverings with glycerin tends to increase moulding. Softening with NaCl does not prevent attack.

II. Conditions influencing the growth of *Cladosporium herbarum* are examined. Internal spotting is retarded by NaCl. A. G. P.

**Differences in the lactic acid percentages in butters.** E. O. WHITTIER and C. S. TRIMBLE (Ind. Eng. Chem. [Anal.], 1935, 7, 389–390).—The apparent lactic acid content of butter varies with the amount of titratable acid in the cream. F. R. G.

**Cheddar cheese. IV. Lactic acid flora of Cheddar cheese made from clean milk.** J. G. DAVIS (J. Dairy Res., 1935, 6, 175–190).—Typical organisms are classified. Neither streptococci nor streptobacteria can oxidise sugars. The sequence of species developing during cheese-making is not controlled by titratable acidity,  $\text{O}_2$  tension, or C source. The concn. of lactate, the degree of protein degradation, and osmotic pressure are probably responsible for the gradual replacement of streptococci by rod forms. A. G. P.



**Rôle of rennet in the ripening of Cheddar cheese.**

I. R. SHERWOOD (J. Dairy Res., 1935, 6, 204—217; cf. B., 1934, 1081).—Comparison of protein degradation in normal and in chloroformed cheeses indicates that rennet is the principal agent concerned in the process. Cheese ripened in presence of  $\text{CHCl}_3$  contains no volatile acids and has no "cheese" flavour. A. G. P.

**Refractometric determination of total solids of whole eggs and of yolks.** M. I. BAILEY (Ind. Eng. Chem. [Anal.], 1935, 7, 385—386).—A simple relation exists between total solids and  $n$ . E. S. H.

**Changes in colloids during acid treatment and cooking of meat.** W. HEUPKE (Arch. Verdauungskr., 1935, 57, 243—250).—When beef and veal were soaked in  $\text{H}_2\text{O}$ , saline, and 1% aq.  $\text{AcOH}$  for varying times at room temp. swelling was negligible except in  $\text{AcOH}$ , in which increases to about twice the original wt. were noted. Connective tissue of the older animals increased up to  $1\frac{1}{2}$  times the original wt. in  $\text{H}_2\text{O}$  and saline, and up to 20 times in acid. Calves' connective tissue swelled < this. On heating the tissues, loss of wt. took place whether they had been soaked in acid or not. In acid the final wt. was approx. the same as before soaking. Connective tissue altered its shape on heating, and contracted lengthwise. Liver and kidney did not swell on soaking in acid, but lost wt. on cooking.

NUTR. ABS. (m)

**Determination of starch in sausage.** N. V. SCHIROKOV and M. K. MILOVIDOVA (Z. Unters. Lebensm., 1935, 70, 251—255).—The starch is hydrolysed directly and determined by Cu reduction. E. C. S.

**Determination of lead in meat preserves.** N. V. SCHIROKOV and D. S. MINDLINA (Z. Unters. Lebensm., 1935, 70, 245—251).—The material is ashed, the ash dissolved in aq.  $\text{HCl}$ , and Pb determined colorimetrically as  $\text{PbS}$ . Fe, Sn, Cu, and Zn, which interfere, are rendered inert as follows: Sn is converted into  $\text{SnO}_3^{2-}$ ;  $\text{Fe}^{\text{III}}$  is reduced to  $\text{Fe}^{\text{II}}$ , and, with Cu and Zn, converted into complex cyanides. E. C. S.

**Microbiology of certain canned meat products.** E. H. RUYLE and F. W. TANNER (Zentr. Bakt. Par., II, 92, 436—449).—The occurrence of viable bacteria, notably *Cl. botulinum*, in a variety of products is examined. Spoilage of underprocessed material is prevented only by adequate refrigeration. A. G. P.

**Sources of vitamin-[C]. XI. Preserved spinach.**

**XII. Onions.** N. E. SCHEPILEVSKAJA and T. L. ISUMRUDOVA (Z. Unters. Lebensm., 1935, 70, 274—276, 277—279). **XIII. Vitamin-C in dried onions.**

**XIV. Antiscorbutic properties of *Brassica napus*.** **XV. Antiscorbutic properties of sulphited, dried white cabbage.** S. N. MATZKO (*Ibid.*, 279—280, 280—282, 283—284). **XVI. Action of certain extractants on antiscorbutic activity of pine-needle extract.** N. J. ORLOV (*Ibid.*, 285—288; cf. B., 1935, 171, 747).—XI. The vitamin-C content varies, some samples having no -C activity, whilst in others the activity  $\approx$  200 units per kg. of spinach.

**XII.** The -C content of onion juice was 67 units per litre, and that of the onion 40—50 units per kg., decreasing during prolonged storage.

**XIII.** Various vals. are recorded (cf. XII).

**XIV.** The juice of *Brassica napus* (winter rape), expressed after autumn storage, contained 570 units of -C per litre, decreasing during further storage.

**XV.** See A., 1936, 120.

**XVI.** Treatment of pine needles with  $\text{Et}_2\text{O}$  before extraction decreases the -C activity of the extract to approx.  $\frac{1}{2}$  of the normal val., but treatment with  $\text{CHCl}_3$  scarcely affects the activity. E. C. S.

**(A) Relation between temperature and rate of fermentation of commercial sauerkraut.** **(B) Effect of inoculation on the quality, chemical composition, and bacterial flora of sauerkraut.** C. S. PEDERSON (Zentr. Bakt. Par., 1935, II, 92, 338—342, 342—348).—**(A)** It is not possible to predict the time required for fermentation from room temp. alone.

**(B)** Abnormal sauerkraut, characterised by notably high or low acidity, is produced whether the inoculum is predominantly *Lactobacillus plantarum* or *L. pentosaceticus*. Normal kraut is formed when *Streptococcus lactis* or *Leuconostoc mesenteroides* is the predominating organism. If the acidity of the starter culture from old kraut fluid is  $> 0.30\%$ , the product is inferior. A. G. P.

**Composition of Hungarian beans.** I. SZANYI (Z. Unters. Lebensm., 1935, 70, 269—274). E. C. S.

**Sugar, acidity, and juice-colour determinations in grapes.** J. S. SHOEMAKER (Ohio Agric. Exp. Sta. Bull., 1935, No. 550, 18 pp.).—Quality gradation of grapes for eating or for wine-making is based on sugar content, acidity, and colour. The refractometer gives more reliable sugar data than do determinations of  $d$  of juice. A. G. P.

**Concentrated Californian grape juice.** E. VOGT (Z. Unters. Lebensm., 1935, 70, 307—308).—The  $d$ , and % extractives, reducing substances, ash, total and volatile acids, tartaric acid, and  $\text{EtOH}$ , and the alkalinity of the ash of Riesling-, Muscatel-, and Burgundy-type conc. fruit juice are tabulated. E. C. S.

**Detection of cacao husks in cacao.** W. PLAHL (Z. Unters. Lebensm., 1935, 70, 289—296).—The defatted material is treated with aq.  $\text{FeCl}_3$ , washed, and stained with  $\text{K}_4\text{Fe}(\text{CN})_6$  and Congo-red. The mucous cells of the husks are stained blue. E. C. S.

**Determination of reducing sugars in chocolates.** (MLE.) M. ALLINNE (J. Pharm. Chim., 1935, 22, [viii], 456—462; cf. A., 1919, ii, 308; 1933, 1217).—Application of a slightly modified Folin's method gives best results. J. L. D.

**Preservation of silage.** W. D. REID (New Zealand J. Agric., 1935, 51, 139—143).—The quality of rye-grass silage was materially improved by addition of lactic acid bacteria (notably *B. bulgaricus*) with whey and/or molasses. The production of  $\text{AcOH}$  and  $\text{PrCO}_2\text{H}$  was thereby restricted. Additions of  $\text{HCl}$  were only slightly more effective. A. G. P.

**Conservation of grass. Hay, silage, or dried grass.** A. CRICHTON (Trans. Highl. Agric. Soc. Scot., 1935, 47, 50—63).—In Scotland the most efficient methods of conserving grass for winter feeding appear to be storage in tower silos, and a system of making hay on frames which permit good ventilation (the



Proctor Tripod system). Artificially dried grass has a high nutritive val. The time of cutting is most important, as the protein content of grass is at its max. just prior to flowering, and the method most easily applicable in any district at that season will probably give the best results. NUTR. ABS. (m)

**Indigenous hays, their content of protein, calcium, magnesium, phosphorus, and vitamin-D.** O. WELLMANN (Köztelek, 1935, 45, 241—242).—Results of analysing 538 hay samples from 14 Hungarian Comitats are given. Mean vals. are recorded of % of digestible protein, CaO, and  $P_2O_5$ , for *Setaria italica*, vetch oats, meadow hay, aftermath, sainfoin, red clover, and lucerne hay. Vetch oats contained the least Mg, red clover the most. The effect of the hay meal on rats suffering from rickets was determined. NUTR. ABS. (m)

**Effect of addition of acid on conservation processes in green crops with special reference to lactic acid production and protein decomposition.** S. MERTINS (Z. Züchtung, 1935, 32, B, 109—132).—Small-scale silage trials were conducted with clover and with marrowstem kale leaves, without addition of acid, with addition of varying amounts of HCl, and in some cases with addition of sugar. Full data are reported for total acids, lactic acid free and total, AcOH free and combined,  $P_2CO_3H$ ,  $p_H$ , and protein breakdown. Addition of acid sufficient to produce  $p_H$  3.5 at the commencement inhibited fermentation in clover and also markedly reduced protein breakdown. NUTR. ABS. (m)

**Hydrolysis of seed proteins.** A. MAZZARON (Boll. Soc. eustach., 1935, 33, 29).—With the exception of lupins, which cook more readily in an acid medium, and grains, which cook equally well in acid or alkaline fluid, edible seeds cook most rapidly in alkaline medium. The behaviour may depend on the nature of the protein present. NUTR. ABS. (m)

**Nutrient value of marine products. IV. Vitamin-A content of commercial pilchard oil.** D. B. FINN (Contr. Canad. Biol. Fish., Reprint, 1931, 6, No. 13, 9 pp.).—The oil contains a substance promoting the growth of rats receiving a vitamin-A-deficient diet. A. G. P.

**Comparative metabolism of several calcareous materials used in poultry-feeding.** W. C. TULLY and K. W. FRANKE (S. Dakota Agric. Exp. Sta. Bull., 1934, No. 287, 32 pp.).—Stimulation of the Ca-secreting parts of the oviduct in Ca-deficient hens followed 24 hr. after supplying a Ca supplement. No significant difference of efficiency between a no. of commonly used supplements was apparent. A. G. P.

**Detection of mastitis in dairy herds.** J. H. JACOBSEN and T. M. OLSON (S. Dakota Agric. Exp. Sta. Bull., 1935, No. 290, 15 pp.).—The bromothymol-blue and catalase tests, together with the cell count, afford a satisfactory means of detecting abnormal milk. A. G. P.

**Determining N in foodstuffs.**—See VII. **Fats and oils for baking industry.**—See XII. **Micro-determination of As.**—See XVIII.

## PATENTS.

**Treatment and stabilisation of wheat germ.** CEROBREX, LTD., Assees. of P. J. DONK and A. R. MACDONALD (B.P. 436,765, 6.11.34. Can., 13.11.33).—Finely-ground wheat germ is mixed with 5—8% of NaCl and 15—20% of a filler such as potato flour, and the mixture is heated, without free access of air or in a current of inert gas, at 93—107° for 20 min. and is packed, while still warm, in airtight containers. The product is free from rancidity, has good keeping qualities, and is in a suitable form for addition to bread. E. B. H.

**Manufacture of rolled buckwheat.** R. SASAKI, ASSR. to ZAIDAN HOJIN RYOSHOKU KENKYU-KWAI (U.S.P. 1,992,582, 26.2.35. Appl., 24.10.32. Jap., 26.2.32).—The husk is removed, and the  $H_2O$ -sol. protein of the endosperm coagulated by acids and/or alcohols, e.g., AcOH, EtOH. The acid is neutralised by  $CaCO_3$  and the grains are rolled. E. B. H.

**Chemical leavening agent.** A. SCHULTZ, J. FREILICH, and C. N. FREY, ASSRS. to STANDARD BRANDS, INC. (U.S.P. 1,988,464, 22.1.35. Appl., 3.4.31).—Carbamide mixed with soya-bean meal or similar legume containing urease (I) is decomposed by the (I) into  $NH_3$  and  $CO_2$ , during fermentation of a dough and subsequent baking. The speed of gas production is regulated by the amount of (I) present, and a relatively insol. org. acid, such as mucic acid, is added to neutralise the excess of  $NH_3$  after baking and give a slightly acid reaction to the finished product. E. B. H.

**Manufacture of bakery products.** PROCTER & GAMBLE CO. (B.P. 437,737, 30.4.34. U.S., 16.10.33).—The stability of cake mixes containing a high sugar: flour ratio and an excess of egg-white over the normal proportion occurring in whole egg is improved by addition of 0.1—0.3% of lecithin. The fatty acid content of the shortening used should be adjusted to 0.2—4%. E. B. H.

**Manufacture of [acid-precipitated] casein.** F. L. CHAPPELL, ASSR. to SHEFFIELD FARMS CO., INC. (U.S.P. 1,992,002, 19.2.35. Appl., 21.1.33).—Equipment capable of mixing milk and acid intimately to give improved conditions for casein flocculation separation, etc. is described. Less acid than usual is used and it is claimed that the product has lower acidity and lower ash content than have many high-class commercial preps. E. B. H.

**Canning of eggs.** STANDARD BRANDS, INC. (B.P. 438,233, 26.10.34. U.S., 13.2.34).—Egg material is drawn from a supply tank at a level which is below the upper surface of the liquid and forced through a filter of which the effective surface is many times the cross-section of the supply conduit and from which the liquid is discharged against superatm. pressure. The filter is preferably a cylinder along the inside of which the prefil flows, the filtrate leaving in the same direction outside. B. M. V.

**Treatment of meat [e.g., hams].** SWIFT & CO., ASSEES. of H. H. MCKEE (B.P. 436,855, 12.1.34. U.S., 6.5.33).—An exceptionally tender product with an unusual but desirable flavour is obtained if hams, after pickling and subsequent soaking, are simultaneously



cooked and smoked. A saturated atm. is maintained in the oven, to which smoke is supplied; the temp. is then kept at 88–91° for 3–6 hr., until the ham has reached 52° at its centre and is coated with natural gelatin, and then at 71–74° for a further 10–13 hr., until the internal temp. of the ham has reached 69–73°.

E. B. H.

**Production of a readily digested meat-protein preparation.** W. W. TRIGGS. From CHAPPEL BROS., INC. (B.P. 437,492, 1.2.35).—Minced meat (held on 40-mesh) is extracted with H<sub>2</sub>O at 7–11° for about 2 hr., placed on a screen, and washed free from red colour. The residue is ground (ball mill) with H<sub>2</sub>O at 7–11° for 2 hr. and then strained through 40-mesh, which retains the connective tissue. The protein sludge which settles in the filtrate is spray-dried either alone or with milk, raw egg, or a suspension of chocolate in milk.

E. B. H.

**Treatment of fresh fruit, vegetable, and similar juices.** E. SCHOOP (B.P. 437,852, 5.12.34. Switz., 5.12.33).—The juice is mixed with  $\frac{1}{4}$ –1% of a 0.5–6% NaCl solution under reduced pressure to ppt. the mucilaginous and resinous substances and to prevent oxidation; 3–9% of an enzymic vegetable or fruit juice is then added to react with the pectose and protein matters (pawpaw or pineapple juice, or juices from other plants of the *Bromeliaceae*). The juice is cleared by centrifuging, clarified by filtration, and freed from yeast and bacteria by a sterilising filter.

E. B. H.

**Manufacture of extracts or essences of coffee, chicory, cocoa, and the like beverages.** S. V. POULTNEY (B.P. 438,280, 2.7.34 and 21.2.35).—The material is roasted, autoclaved with H<sub>2</sub>O, pressed, and extracted. The extract is conc., added to the press liquor, and sweetened.

E. B. H.

**Production of extracts from coffee and tea.** O. EBNER (B.P. 438,184, 20.3.35. Switz., 26.1.35).—Finely-ground tea or coffee is placed in a closed filter vessel, and hot H<sub>2</sub>O in amount determined by an automatic valve is added; after infusion, the solution is forced out by high-pressure steam.

B. M. V.

**Manufacture of flavouring materials.** H. M. BARNETT, Assr. to S.M.A. CORP. (U.S.P. 1,992,462, 26.2.35. Appl., 9.6.33).—Wheat gluten or casein (1 pt.) is added to HCl (3 pts., of *d* 1.135) and maintained at 70° for 2 hr. The acid solution, now of approx. const. b.p., is boiled under reflux for 12 hr. and conc. under reduced pressure until the temp. reaches 120°. The residue is diluted (1:1 by vol.) with hot H<sub>2</sub>O, cooled, and neutralised slowly to pH 5.2–5.8 with 30–35% NaOH. After clearing with 0.5–1% of activated C, the product, containing 14% of NaCl and 20% of org. matter, may be bottled.

E. B. H.

**Solid flavouring composition.** C. L. GRIFFITH, Assr. to GRIFFITH LABS., INC. (U.S.P. 1,971,910, 28.8.34. Appl., 2.3.31).—A mixture of powdered sugar, a hygroscopic agent (glycol or glycerin), a non-volatile fixative oil (corn oil), and small quantities of volatile flavouring oils is claimed.

A. R. P.

**Nutritional iodine.** E. V. MOORMAN, Assr. to MOORMAN MANUFG. CO. (U.S.P. 1,992,673, 26.2.35. Appl., 10.4.33).—I adsorbed on C and then added to

an animal feed enables very small amounts of I to be evenly distributed in the feed.

E. B. H.

**Milk pasteurisation.**—See I. **Reducing acidity of fats etc.** **Vitamin products.**—See XII. **Corn-gluten plastic.**—See XIII. **Disposal of [fruit-pulp] wastes.**—See XXIII.

## XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

**[Determination of sulphur in] sulphur ointment.**

L. C. BRITT (J. Amer. Pharm. Assoc., 1935, 24, 854–856).—S is determined gravimetrically by boiling with 10% KOH, oxidising the sulphide formed by H<sub>2</sub>O<sub>2</sub>, removing fatty acids by acidifying, boiling, cooling, and filtering, and pptg. SO<sub>4</sub><sup>2-</sup> as BaSO<sub>4</sub> from the filtrate.

F. O. H.

**Analysis of iodine ointments.** F. W. EDWARDS, E. B. PARKES, and H. R. NANJİ (Analyst, 1935, 60, 747–748).—Total I is determined by refluxing the ointment with conc. H<sub>2</sub>SO<sub>4</sub>, issuing gases being absorbed in H<sub>2</sub>O. HI passes over and is pptd. with AgNO<sub>3</sub> from the filtered solution.

J. S. A.

**Assay of phenol in official preparations.** G. L. JENKINS and M. F. W. DUNKER (J. Amer. Pharm. Assoc., 1935, 24, 840–842).—A modified Koppeschaar method (U.S.P. X, p. 238) is applied to glycerite of PhOH and phenolated solution of I directly after dilution and, after extraction of PhOH with H<sub>2</sub>O, to camphorated PhOH, phenolated oil, and ointment of PhOH. The proposed U.S.P. XI method for assay of PhOH ointments is unsatisfactory.

F. O. H.

**Cherry-laurel water obtained by distillation.** L. VAN ITALLIE (J. Pharm. Chim., 1935, 22, [viii], 452–454).—A good sample should have the ratio free HCN/combined HCN < 1/4.5.

J. L. D.

**Characteristics of tinctures produced by six different methods after storage for one year.** S. VON BARI (Pharm. Ztg., 1935, 80, 1265–1270 cf. B., 1935, 877).—A redetermination of the properties showed that all the tinctures had deteriorated and the necessity for re-examination every 3 months is emphasised.

E. H. S.

**Drug extraction. V. Extraction of belladonna root with glycerolic menstrua.** W. J. HUSA and L. MAGID (J. Amer. Pharm. Assoc., 1935, 24, 839–840; cf. B., 1935, 1068).—Presence of glycerol (I) in aq. EtOH percolation menstrua retards the extraction of alkaloids from powdered belladonna root to an extent increasing with increasing (I) or decreasing EtOH content.

F. O. H.

**Assay of ergotocin.** E. E. SWANSON, C. C. HARGREAVES, and K. K. CHEN (J. Amer. Pharm. Assoc., 1935, 24, 835–839).—Concordant data are obtained by the isolated rabbit's uterus, U.S.P. cock's-comb, polarimetric, colorimetric, and *post partum* dog's and human uterus methods. The Broom-Clark method (J. Pharm. Exp. Ther., 1923, 22, 59) is useless.

F. O. H.

**Tobacco products.** I. C. PYRIKI and H. DITTMAR (Z. Unters. Lebensm., 1935, 70, 297–306).—The % nicotine, total reduction, mono- and di-ac harides, and



polyphenols, and the polyphenol coeffs. of a large no. of cigarette, cigar, and pipe tobaccos, are recorded.

E. C. S.

**Examination of rubbed spearmint.** W. A. N. MARKWELL and A. E. CROSS (Analyst, 1935, 60, 748—749).—Microscopical data are given for distinguishing *Ailanthus glandulosa* from striated leaf epidermis of true spearmint.

J. S. A.

**Purity of Et<sub>2</sub>O.**—See III. **Tobacco.**—See XVI. **Determining ergot in baked bread.** **Vitamin-C.**—See XIX.

#### PATENTS.

**Production of [therapeutic] preparations of 6-methylamino-2-methyl-2-heptene [methyl-β-(ζ-methyl-Δ<sup>4</sup>-heptenyl)amine].** KNOLL A.-G. CHEM. FABR. (B.P. 437,004, 21.2.35. Ger., 27.4.34).—Salts of methyl-β-(ζ-methyl-Δ<sup>4</sup>-heptenyl)amine [bitartrate, m.p. 83—85°; diethylbarbiturate (I), m.p. 65° (decomp.)] form readily H<sub>2</sub>O-sol. compounds with 4-dimethylamino-1-phenyl-2:3-dimethyl-5-pyrazolone (II) even when they themselves are only slightly sol. in H<sub>2</sub>O. The compound of (I) (3 mols.) with (II) (2 mols.), m.p. 86°, forms a stable, 70% aq. solution.

H. A. P.

**Germicide.** W. J. YATES, ASSR. to SHELL DEVELOPMENT Co. (U.S.P. 1,991,590, 19.2.35. Appl., 6.10.30).—The mixture of naphthenic acids (I) and complex phenols (II) obtained (0.1%) by acidifying the aq. alkaline extract of that portion of a mineral oil (particularly kerosene and gasoline) sol. in liquid SO<sub>2</sub> is highly germicidal [PhOH coeffs. (I) 3.3, (II) 15.5]. (II) can be extracted by EtOH from an alkaline solution and is useful in medicine, whilst oil solutions of (I) and (II) can be used as poultry sprays and for impregnating wood.

E. J. B.

**[Preparation and] purification of alkylated phenyl- [benzene-]azoaminopyridines. [Germicides.]** E. T. TISZA and B. JOOS, ASSRS. to PYRIDINE CORP. (U.S.P. 1,990,923, 12.2.35. Appl., 16.6.30).—Diazotised *o*-, *m*-, or *p*-C<sub>6</sub>H<sub>4</sub>Me-NH<sub>2</sub> is coupled with 2:6-diaminopyridine; the products are freed from phenolic impurities by conversion into free base, dissolution in COMe<sub>2</sub> or a similar solvent, and pptn. as hydrochlorides. 2:6-Diamino-3-*o*-, m.p. 184—185°, -*m*-, 124.5°, and -*p*-tolueneazopyridine, m.p. 154—155°, are described.

H. A. P.

**Manufacture of compounds of sulphydrylkeratinic acid and similar reduced degradation products of keratin with organic compounds containing arsenic. [Pharmaceuticals.]** R. VON WÜLFING and E. MÖLLER (J. A. WÜLFING), E. STRUM, and R. FLEISCHMANN (B.P. 437,769, 27.11.34).—Neutral or weakly alkaline solutions of keratinates or non-dialysable keratoses (produced by acid hydrolysis of keratin) are treated with alkali salts of 3:3'-diamino-4:4'-dihydroxy- or 4:4'-dihydroxy-arsenobenzenes (As:S of keratinates = 1:1.2) and the product is pptd. by an org. medium (EtOH or MeOH). The products obtained are identical with those of B.P. 412,366 (B., 1934, 781).

H. A. P.

**Treatment of tobacco.** KATADYN A.-G. (B.P. 436,445, 4.4.34. Ger., 5.4.33).—Tobacco is treated with

oligodynamically activated H<sub>2</sub>O, *e.g.*, with an aq. suspension or colloidal solution of Ag. E. H. S.

**Production of an ergot preparation.** E. LILLY & Co., Assees. of M. S. KHARASCH and R. R. LEGAULT (B.P. 438,486, 15.3.35. U.S., 17.3.34).—Ergot, preferably defatted, is extracted with dry, liquid SO<sub>2</sub>. After removal of the SO<sub>2</sub> from the extract the residue may be extracted with ligroin.

E. H. S.

**Manufacture of readily-soluble complex theophylline compounds.** P. R. GRÜTER (B.P. 438,408, 10.4.35).—Complex products are prepared by addition of 2–0.2 mol. of a CC-di- or CCN-tri-substituted, *e.g.*, 5:5-phenylethyl-, CC-diethyl-, or CC-phenylethyl-N-methyl-barbituric acid derivative to 1 mol. of equimol. theophylline-C<sub>2</sub>H<sub>4</sub>(NH<sub>2</sub>)<sub>2</sub> or its hydrate. The products are diuretics of improved spasmolytic, antispasmodic action.

A. W. B.

**Manufacture of a therapeutically active preparation for treatment of malignant tumors.** A. CARPMAEL. From I. G. FARBERIND. A.-G. (B.P. 436,292, 4.4.34).—The organs or body fluids of animals which have been inoculated with virulent tumour cells or with extracts prepared as in B.P. 366,503 (B., 1932, 449) and have remained tumour-free are extracted (at 0°) with H<sub>2</sub>O, aq. org. solvents, or aq. NaCl. The extracts or fluids may be purified by treatment with org. solvents and/or adsorbents to remove ballast substances, and finally mixed with physiological saline and sterilised.

E. H. S.

**Manufacture of therapeutic compounds [for treatment of pernicious anaemia].** E. LILLY & Co., Assees. of G. B. WALDEN (B.P. 438,126, 7.5.34. U.S., 27.5.33 and 14.3.34. Addn. to B.P. 411,179; B., 1934, 652).—The products of the prior patent are improved by addition of Fe (reduced), Fe salts, and substances containing vitamin-B.

A. W. B.

**Manufacture of therapeutically valuable antimony compounds [antimoniothiomalates].** L. S. E. ELLIS. From SOC. USINES CHIM. RHÔNE-POULENC (B.P. 436,742, 9.5.34 and 7.2.35).—SbCl<sub>3</sub> in CHCl<sub>3</sub> is added to an alkaline aq. solution of Na or Li thiomalate; the product is pptd. with 96% EtOH, redissolved in anhyd. C<sub>2</sub>H<sub>4</sub>(OH)<sub>2</sub>, and repptd. with MeOH and EtOH, respectively. The salts Sb[S·CH(CO<sub>2</sub>Na)·CH<sub>2</sub>·CO<sub>2</sub>Na]<sub>3</sub>·3H<sub>2</sub>O and Sb[S·CH(CO<sub>2</sub>Li)·CH<sub>2</sub>·CO<sub>2</sub>Li]<sub>3</sub>·9H<sub>2</sub>O are thus obtained.

H. A. P.

**Halogenated hydroxydiphenyls.**—See III.

#### XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

**Minimum useful gradient as a criterion of photographic speed.** L. A. JONES and M. E. RUSSELL (Phot. J., 1935, 75, 657—675).—An apparatus has been designed for measuring gradient directly from the difference in density of two small areas 1.5 cm. apart on a sensitometric strip which varies continuously, not stepwise, having an exposure scale of 0.2 (log *E*) per cm. It is recommended that speed shall be measured as 10(1—log *E<sub>G</sub>*) on a logarithmic scale, or 1/*E<sub>G</sub>* on an arithmetic scale, where *E<sub>G</sub>* is the exposure corresponding to the point of 1 min. useful gradient, which it is



recommended shall be 0.5 max. gradient of the emulsion. The theory and practical details are fully discussed, and trial and comparative figures given for many emulsions.

J. L.

## PATENTS.

**Sensitisation of photographic emulsions.** KODAK, LTD., Assees. of L. G. S. BROOKER (B.P. 437,807, 6.3.34. U.S., 6.3.33).—By use of a strong base as condensing agent (cf. B.P. 408,569 and 408,571; B., 1934, 537) are prepared pyridocyanines with two mononuclear nuclei linked by methenyl, *e.g.*, 1:1'-dimethyl-2:2'-pyridocyanine iodide, 4:1'-dimethyl-3-ethylthiazolo-, 3:4:1'-trimethylselenazolo-, and 3:1'-dimethylthiazolino-2'-pyridocyanine iodide. These are applied as sensitisers for blue or blue-green light.

F. M. H.

**Sensitisation of photographic silver halide emulsions.** I. G. FARBENIND. A.-G. (B.P. 438,450, 18.5.34. Ger., 18.5.33).—The unsymmetrical tricarbo-cyanines of B.P. 438,449 (B., 1936, 93) are valuable as infra-red sensitisers because almost any desired max. may be attained. The sensitising max. of the 14 examples range from 740 to 865 mμ.

F. M. H.

**Manufacture of photographic emulsion.** J. G. CAPSTAFF, Assr. to EASTMAN KODAK Co. (U.S.P. 1,991,136, 12.2.35. Appl., 5.7.23. Renewed 30.10.28).—Emulsions of a gelatin solution of a Ag halide on which is adsorbed a basic dye, and sufficient alkali to make the final emulsion alkaline, are claimed. The dye (or leuco-base) and AgNO<sub>3</sub> solution are mixed, and then KI solution is added; iodides of the dyes may also be used. Such emulsions are rendered developable after exposure by first bathing in 0.1% aq. NaOH. If AgBr emulsions are required, K<sub>4</sub>Fe(CN)<sub>6</sub> or K<sub>3</sub>Fe(CN)<sub>6</sub> is added to the AgNO<sub>3</sub> and dye mixture, followed by NH<sub>4</sub>Br, this process helping to fix the dye. Emulsions of three colours, each dye being complementary to the colour light to which the Ag halide is predominantly sensitive, may be mixed, forming one emulsion suitable for colour photography. The developed image may be treated to give either a positive, by removing the Ag with CrO<sub>3</sub>, or a negative, by fixing and then removing the Ag.

J. L.

**Production of photographic material for multi-colour screen pictures.** H. WILMS (B.P. 436,723, 12.4.34. Ger., 21.4.33, 19.12.33, and 3.12.34).—In processes in which emulsions under multicolour screens are selectively sensitised according to the respective screen elements (cf. B.P. 393,797 and 402,231; B., 1933, 685; 1934, 123), areas under the first-applied screen elements are protected from the action of subsequent colouring matters or other selective sensitisers by application of a hardening, tanning, or mordanting agent, mixed with the first screen elements, or applied subsequently. Alternatively, extra coatings of fatty resist may be applied to selected areas, and removed again when so required.

J. L.

(A, B) **Photographic antihalation and (B) filter layers.** I. G. FARBENIND. A.-G. (B.P. 437,451 and 437,386, [A, B] 30.4.34. Addns. [A] to B.P. 397,740, and [B] to B.P. 399,713; B., 1933, 940, 1085).—The reverse side of a photographic plate or film is coated with (A) an alkali-sol. polymeride of, or interpolymers derived from, an unsaturated carboxylic acid, and (B) a layer having

a polymeride of above type as binder (and dyes etc. as filter materials). Examples are polystyrene-acrylic and -maleic acids and (CH<sub>2</sub>:CH·CN—CH<sub>2</sub>:CH·CO<sub>2</sub>H)<sub>n</sub>.

H. A. P.

**Printing or reproducing colour photographs.** G. B. HARRISON and S. D. THREADGOLD (B.P. 437,888, 2.5.34).—Colour photographs embodying a colour screen with regularly-ruled colours are copied by printing with a no. of corresponding colours so arranged as to give spread of one colour element over several in the copy. A mask to aid this result is described.

J. L.

**Photographic production of pictures in one or more colours.** W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 436,587, 5.4.34).—One or more light-sensitive layers, *e.g.*, gelatin + Ag halide, is/are "dyed" with one or more azo-dye components substantive in regard to the material of the layer. By choice of suitable components the primary colours are produced on development.

H. A. P.

**Electrochemical production of stable images and characters.** V. BAUSCH, JUN. (U.S.P. 1,970,539, 21.8.34. Appl., 16.2.32. Ger., 21.2.31).—In the production of telegraphically transmitted pictures the paper on which the current acts is impregnated with < 1 substance of the following groups: OH-derivatives of C<sub>6</sub>H<sub>6</sub> or C<sub>10</sub>H<sub>8</sub>, arylamines, light-sensitive diazo compounds of the *p*-aminodiphenylamine type, together with a compound which reacts with these substances to produce a coloured product under the influence of the current. The colours can be developed by anodic oxidation, cathodic reduction, or the liberation of substances, *e.g.*, acids, alkalis, or NH<sub>3</sub>, by the current which induce coupling of the diazo compounds with other substances in the mixture.

A. R. P.

**Hexamethine and heptacarbocyanine dyes. Cyanine-type compounds.**—See IV.

## XXII.—EXPLOSIVES; MATCHES.

**Uses for maize straw.**—See XIX.

## PATENTS.

**Gelatine dynamite composition.** F. F. CHAPMAN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,992,189, 26.2.35. Appl., 24.6.32).—Low-*d* vegetable piths, *e.g.*, those of corn or sunflower stalks, or of bagasse, in the form of particles passing 6-mesh and of *d* > 0.3, are used with a gelatinised liquid explosive and other materials, the proportion of pith being 0.5–15%.

W. J. W.

**Low-density dynamite composition.** H. A. LEWIS, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,992,224, 26.2.35. Appl., 22.12.31).—Disintegrated sunflower stalks (1–20%) form the low-*d* combustible. The *d* of the explosive composition is such that a 1½ × 8-in. cartridge weighs < 181 g.

W. J. W.

**Fuse powder for metal delays.** J. PICCARD, Assr. to HERCULES POWDER Co. (U.S.P. 1,971,502, 28.8.34. Appl., 5.5.32).—The powder consists of a mixture of graded granules of S, Te, or Se with BaO<sub>2</sub> or other oxidising agent, the granules being coated with a shellac or resin lacquer prior to mixing. The preferred composition is Se 15, BaO<sub>2</sub> 85%.

A. R. P.



**Manufacture of explosive.** W. M. BURDEN, C. G. JACKSON, J. N. PRING, and G. ROTTER (B.P. 438,218, 22.6.34).—To lessen the risk in transmitting liquid explosive, it is emulsified with  $H_2O$  or other inert liquid. The conduit through which the emulsion flows is provided at its inner wall with a helical ridge or other device, whereby a high degree of turbulence is produced in the liquid mixture and its state of emulsion is maintained.

W. J. W.

### XXIII.—SANITATION; WATER PURIFICATION.

**Determination of reducing power of impure air.** L. W. WINKLER (Z. anal. Chem., 1935, 103, 183—186).—Reducing impurities are condensed out with dew in a cooled flask. 1 c.c. of condensate is treated with 10 c.c. of 0.01N- $KMnO_4$ , and the excess of  $KMnO_4$  remaining after a day is titrated back iodometrically. J. S. A.

**Red squill [as a raticide].** M. G. O'CONNOR, R. E. BUCK, and C. R. FELLERS (Ind. Eng. Chem., 1935, 27, 1377—1380).—The biological assay of red squill (*Urginea maritima*), using white rats, is described. The concn. required is higher for large rats. Animals recovered from sublethal doses will not again eat powder, but will readily consume extracts in EtOH or glycerin. Rats prefer meat, fish, or oat baits. The toxic principle is not affected by heat in the canning process, and canned baits are satisfactory. S. C.

**Coagulating the water of the Delaware River at Easton, Penn.** R. W. HAYWOOD, JUN. (J. Amer. Water Works Assoc., 1935, 27, 1572—1580).—Experience during 1934 indicates that the alkalinity, turbidity, and org. load of the raw  $H_2O$  are the three main factors governing coagulation, stated in order of importance. Wide variations in the  $pH$  val. in warm weather are attributed to the presence of micro-organisms, but have no measurable effect on coagulant requirements. No advantage was found by creating artificial turbidity by the addition of carbonised clay. C. J.

**Filter-washing experiments at the Chicago experimental filtration plant.** H. E. HUDSON, JUN. (J. Amer. Water Works Assoc., 1935, 27, 1547—1565).—Surface-washing as an adjunct to back-washing is economical and effective in keeping the sand clean. The results obtained with a total rate of wash of 15 gals. per sq. ft. per min. are better than with any vol. up to 23 gals. for back-washing alone. The filter runs of surface-washed filters were shorter, but the effluents were better, when the  $H_2O$  was weakly coagulated. C. J.

**Ammonia dosage in ammonia-chlorine treatment of water.** M. L. KOSHKIN (J. Amer. Water Works Assoc., 1935, 27, 1477—1491).—As the  $NH_3$  dose increases there is an increased lag in sterilisation and, up to a certain limit, an increased  $Cl_2$  absorption. The  $NH_3$  dose required to prevent chlorophenolic tastes and odours increases with the  $[PhOH]$  and is greater at  $pH$  6.7 than at  $pH$  7.2. Methods are suggested for the determination of the precise dose of  $NH_3$  to use in plant operation. C. J.

**Experience with fluorine in water.** J. H. RIDER (J. Amer. Water Works Assoc., 1935, 27, 1516—1524).—A lecture. C. J.

**Pyrethrum fly sprays.**—See XVI.

### PATENTS.

**Purifying and otherwise treating air by washing.** INTERNAT. ANEMOSTAT HOLDING CO., LTD., and F. J. KURTH (B.P. 438,115, 4.4.34).—Air for ventilating purposes is conditioned by horizontal flow through vertical filters filled with metallic, ceramic, or other "hygroscopic" bodies, the various filters being sprayed with  $H_2O$  at various temp. to cool the air progressively; one filter may be of absorbent material sprayed with reagent to effect a chemical reaction. Initially it may be provided with a spraying chamber to saturate and remove coarse dust from the air. B. M. V.

**Treatment of sewage sludge.** A. L. GENTER (B.P. 437,469, 23.7.34. U.S., 21.8.33).—A reduced amount of coagulant is required for conditioning digested sludge prior to dewatering if the sol. decomp. products be first removed by washing with  $H_2O$  or by chemical decomp. Further reduction of the proportion of such sol. products by admixture with fresh activated or sedimentation-tank sludge, using compressed air for agitation, is advantageous. C. J.

**Production of methane [by bacterial decomposition].** A. M. BUSWELL and C. S. BORUFF (U.S.P. 1,990,523, 12.2.35. Appl., 9.6.32).—Comminuted waste material containing a large proportion of cellulose, e.g., cornstalks, sewage screenings, etc., may be fermented anaerobically to produce gas rich in  $CH_4$ , especially if the  $NH_3$  content be raised to 240—600 p.p.m. The material is delivered into a submerged perforated drum which can be revolved so as to bring any floating particles back into the region of active digestion. C. J.

**Disposal of industrial wastes.** G. M. COLE and H. W. HALL, ASSRS. to CALIFORNIA FRUIT GROWERS' EXCHANGE (U.S.P. 1,991,242, 12.2.35. Appl., 15.8.30).—The acidity of waste fruit pulp is reduced to 0.3% (as citric acid) by  $Ca(OH)_2$  and the pasty mass, after dilution, is treated with pectase-containing material, e.g., lucerne meal (2%), at 45—55°, whereby pectous substances are coagulated and the material is rendered more easily dewatered and prepared for use as a feeding-stuff or fertiliser. A portion of the  $H_2O$  removed may be used again as diluent. C. J.

**Incineration furnaces.** OMNIUM D'ASSAINISSEMENT (B.P. 437,915, 21.11.34. Fr., 1.12.33).—Inclined firegrates, a pair together forming a V-shaped bottom of a refuse furnace, are provided with attached ash-pans for forced draught and are suspended by long pendulum rods outside the furnace so that they can be pulled apart for cleaning without exertion. B. M. V.

**Manufacture of fused material from substances comprising domestic and industrial refuse.** W. W. TRIGGS. From GUTEHOFFNUNGSHÜTTE OBERHAUSEN A.-G. (B.P. 437,445, 26.4.34).—The refuse is charged intermittently into a rotary-drum furnace and incinerated, batch by batch, by heated air until the furnace is full; it is then fired by fuel of high calorific val. and the charge tapped as a liquid melt. Addition of any desired extra  $CaO$ , phosphates, or K salts may be made at any desired stage. B. M. V.

**Recovering phenols from gas liquors.**—See II.  
**Disinfectants.**—See III.