

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

MAR. 13 and 20, 1936.*

I.—GENERAL ; PLANT ; MACHINERY.

Heating, cooling, and condensing in the chemical works. W. SEIFERT (Chem.-Ztg., 1935, 59, 902—904).—Various modern types of spiral condensers and heat exchangers are described and illustrated. A. R. P.

Diphenyl and its application in the secondary superheating of steam. E. P. SCHUBIN (Izvest. Teplotekh. Inst., 1934, No. 7, 41—47).—A review of the properties and industrial applications of Ph_2 and Ph_2O .
CH. ABS. (p)

COCl_2 , SO_2 from flue gases.—See VII. **Pigment grinding.** Colour testing.—See XIII.

PATENTS.

Multiple furnace. C. I. HAYES, Assr. to H. C. FIELD (U.S.P. 2,000,664, 7.5.35. Appl., 2.10.29. Renewed 25.4.32).—Two heat-treatment furnaces are connected together by throats and a common entrance passage, the latter being provided with a quenching tank and with means to exclude air when the door is open. B. M. V.

Method of heat transfer. H. H. DOW, Assr. to DOW CHEM. Co. (U.S.P. 2,000,886, 7.5.35. Appl., 2.11.31).— Ph_2O vapour is utilised for heat transfer at 260—400°. B. M. V.

Manufacture of heat-dissipating laminated products. FORMICA INSULATION Co. (B.P. 440,578, 14.9.34. U.S., 16.10.33).—In, e.g., table tops or the like formed of laminated fibrous material bound with heat-reactive resin are inserted on both sides, ≥ 0.025 in. below the surface, thin metal sheets (of Al, approx. 0.005 in. thick) with roughened surfaces and coated with the same resin on both sides. B. M. V.

Apparatus for introducing solid substances in predetermined amounts into closed vessels [to produce pressure therein]. COUTTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 440,661, 5.7.34).—A vessel is provided with a neck or sleeve of known vol. which is closed alternately inside and outside in the manner of an air-lock, but it is not a true lock because the inner end of the sleeve is formed with vent holes, and therefore only one measured quantity of a solid, e.g., CO_2 ice, that produces pressure can be inserted. B. M. V.

Apparatus for drying loose material. K. R. BIXBY, Assr. to MIDLAND ELECTRIC COAL CORP. (U.S.P. 2,000,817, 7.5.35. Appl., 27.6.33).—Coal or other divided material is supported on a no. of perforated floors in a tower. The floors are composed of tilting sectors which are operated in succession to drop the material downwards. B. M. V.

Drying [of cellulosic] materials. W. A. DARRAH, Assr. to UNITED STATES GYPSUM Co. (U.S.P. 2,000,663, 7.5.35. Appl., 15.10.30).—Cellulosic and other articles may be safely dried in hot air containing SO_2 and other acids if an alkaline dust or NH_3 is present, the dust being preferably sprinkled on the wallboards or the like undergoing treatment. B. M. V.

Manufacture of ice. V. VOORHEES and H. V. ATWELL, Assrs. to STANDARD OIL Co. (U.S.P. 1,976,204, 9.10.34. Appl., 8.1.32).— H_2O and cold compressed C_3H_8 or C_4H_{10} are sprayed together into an expansion chamber where the rapid evaporation and/or expansion of the hydrocarbon produces snow which is then compressed into ice, after incorporation of colouring and/or flavouring constituents, if desired. A. R. P.

Disintegrating apparatus, more especially for paper pulp. CARBORUNDUM Co., LTD. From CARBORUNDUM Co. (B.P. 440,568, 2.7.34).—A disintegrator comprising a conical shell and rotating plug which is also capable of axial reciprocation is formed with the grinding elements near the entrance of harder materials than the remainder, e.g., cast SiC or Al_2O_3 . B. M. V.

Mixing machines. F. BEKEN, and E. HUNT & Co., LTD. (B.P. 440,794, 24.7.35).—In a twin-trough apparatus, the central wall is practically non-existent and the paddles rotate at different speeds (2 : 1) and intercalate, effecting a squeezing action. B. M. V.

Pressure filter. B. KELLEY (U.S.P. 2,000,137, 7.5.35. Appl., 19.8.31).—A pressure filter comprises, *inter alia*, a telescoped bag and means for applying filter aid uniformly to the bag, including the folds, to form a cake prior to admission of prefilter. B. M. V.

Rotary disc filters. SOC. ALSACIENNE DE CONSTRUCTIONS MÉCANIQUES (B.P. 440,784, 17.6.35. Fr., 16.6.34 and 7.1.35).—The segmental supporting members for the filter cloth are double-convex in cross-section. B. M. V.

Slit filter. T. F. MANDAHIL, Assr. to SVENSKA ACKUMULATOR AKTIEB. JUNGNER (U.S.P. 2,000,490, 7.5.35. Appl., 1.3.33. Swed., 7.3.32).—A helix of ribbon, of trapezium or similar section, is spaced by ridges formed part of the way across one of the sloping sides. B. M. V.

Manufacture of filtering product. C. R. MINTON, Assr. to W. B. PHILLIPS and B. R. ELLS (U.S.P. 2,000,777, 7.5.35. Appl., 18.4.33).—Porous ceramic articles are formed of rice ash or other splintery, feathery form of SiO_2 , a vitreous bond, and clay to absorb the excess of bond so that only the points of the SiO_2 are joined. B. M. V.

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

Manufacture of porous filter bodies. I. G. FARBENIND. A.-G. (B.P. 440,657, 3.7.34. Ger., 12.7. and 28.9.33).—A solid, granulated base is bound with an org. cement which hardens at room temp. and does not fill the voids. The cement may be a synthetic resin and a hardening agent, *e.g.*, $p\text{-C}_6\text{H}_4\text{Me}\cdot\text{SO}_2\text{Cl}$, $\text{H}_2\text{C}_2\text{O}_4$, or neutral metallic oxides. The base material need not be inert to the fluid to be filtered, provided the cement is.

B. M. V.

Centrifugal basket. R. HADDAN. FROM WESTERN STATES MACHINE Co. (B.P. 440,589, 7.1.35).—The basket is formed of a sheet which is uniformly thick in the cylindrical portion and hoopless; the apertures are uniformly spaced and, preferably, countersunk on the outside.

B. M. V.

Self-draining centrifugal bowl. G. J. STREZYNSKI, ASSR. to DE LAVAL SEPARATOR Co. (U.S.P. 2,000,459, 7.5.35. Appl., 29.3.33).—A sloping drain extends from a lowest point on the circumference most of the way across a diam., or as near thereto as the shaft permits.

B. M. V.

Centrifugal treatment [of bacilli] and mechanism therefor. L. D. JONES, ASSR. to SHARPLES SPECIALTY Co. (U.S.P. 2,000,521, 7.5.35. Appl., 13.6.31).—A super-centrifuge is cooled during the operation of separating bacilli by means of external coils or sprays.

B. M. V.

Countercurrent liquid-extraction apparatus. D. F. OTHMER, ASSR. to EASTMAN KODAK Co. (U.S.P. 2,000,606, 7.5.35. Appl., 27.5.30).—A vertical vessel is provided with agitators on a vertical shaft and with conical baffles dividing it into compartments.

B. M. V.

Foam-preventing apparatus for treatment of liquids in vacuum. BRIT. THOMSON-HOUSTON Co., LTD. (B.P. 440,770, 12.4.35. Ger., 13.4.34).—The vac. vessel is converted into a vac.-tube, electric-discharge device (when the vac. becomes high enough) by the provision of a sealed-in electrode, which is connected to a source of high-frequency current.

B. M. V.

Enrichment of air, in particular furnace blast, with oxygen. GES. F. LINDE'S EISMASCHINEN A.-G. (B.P. 440,609, 16.5.35. Ger., 17.5.34).—The apparatus for removal of N_2 is fed with enriched air taken from a point between the blast blower and the furnace, and the very rich air (*e.g.*, 45% of O_2) is fed back into the main stream (*e.g.*, 25% of O_2) before the blast blower. The separation of N_2 is effected by fractional condensation and the use of alternating cold accumulators.

B. M. V.

Apparatus for gas analyses. R. P. BROWN and T. R. HARRISON, ASSRS. to BROWN INSTRUMENT Co. (U.S.P. 2,000,119, 7.5.35. Appl., 11.9.30).—The thermal conductivity of a continuously taken sample is measured by Wheatstone bridge methods before and after a combustion, other reaction, or absorption. Automatic recalibration is effected at intervals so that small differences, in, *e.g.*, CO_2 for determining CO , may be accurate.

B. M. V.

II.—FUEL; GAS; TAR; MINERAL OILS.

Classification chart of typical coals of the United States. A. C. FIELDNER, W. A. SELVIG, and W. H.

FREDERIC (U.S. Bur. Mines Rept. Invest. 3296, 1935, 22 pp.).—For a large no. of coals B.Th.U. per lb. (moist, mineral-matter-free) is plotted against fixed C (dry, mineral-matter-free).

J. W.

Microscopic and petrographic studies of certain American coals. R. THIESSEN and G. C. SPRUNK (U.S. Bur. Mines, Tech. Paper 564, 1935, 71 pp.).—Petrographic analyses (proportions and detailed characteristics of the anthraxylon, translucent attritus, opaque attritus, fusain, etc.), chemical analyses, agglutinating vals., and yields of by-products (Fischer low-temp. assay) for representative samples of coal from the Green River, Upper Freeport, Pittsburgh, Pratt, and Sewell coal beds, respectively, are recorded and discussed.

A. B. M.

Separation of plant remains from durain by mechanical means. J. C. MACRAE and A. M. WANDLESS (J.S.C.I., 1936, 55, 15—19 τ).—The product from grinding spore-bearing durain in a coffee mill contained almost no free plant remains. A vac. percussion disintegrator, consisting of a cone bearing 5 series of short radial arms rotating in an airtight cover, gave a product containing the bulk of the megaspore exines as fragments free from associated material. A H_2O elutriator treating intermittent charges (100—150 g.) gave fractions varying in d by 0.01 for each 60 ml. per min. (6 cm. per min.) increase in H_2O speed. Durain prepared in a coffee mill gave a light fraction (8%) containing few free plant remains, whilst a disintegrator product gave a first fraction (1%) consisting of pure plant remains and a second fraction (8%) containing > 90% of plant remains. The combined fractions had volatile matter (dry, ash-free) 65% and H 6.9%.

Application of the theory of sampling to coal sampling. A. B. MANNING (J. Inst. Fuel, 1935, 9, 132—136).—A theory is developed whereby an estimate can be made of the wt. of sample it is necessary to take to ensure a predetermined degree of accuracy in the ash determination when the approx. size and ash distributions in the coal are known.

A. B. M.

Direct simultaneous micro-determination of carbon, hydrogen, and oxygen. IV. Analysis of bituminous coals and derived products. W. R. KIRNER (Ind. Eng. Chem. [Anal.], 1936, 8, 57—61; cf. A., 1936, 218).—The procedure described previously has been applied to coal, alkali-treated coal residue, nitro-humic acid (I), and coke. It is deduced that the N in bituminous coal is present, not as NH_2 , but probably in a heterocyclic linking. Investigation of (I) confirms the view that treatment of bituminous coal with HNO_3 introduces N in the form of an oximino-ketone linking. With coke the best results are obtained on the assumption that all N is evolved as N_2 during combustion.

E. S. H.

Analyses and softening temperatures of coal ash from coals in the Northern anthracite field. D. J. JONES and E. L. BULLER (Ind. Eng. Chem. [Anal.], 1936, 8, 25—27).—The analyses show that the ash-softening temp. depends primarily on the content of Fe compounds and to a less extent on CaO , MgO , and alkalis. A method for the approx. determination of softening temp. from ash analysis is given.

E. S. H.

Resistance to grinding of coals. H. HEYWOOD (J. Inst. Fuel, 1935, 9, 94—105).—Using the energy required to produce unit area of fresh surface as a measure of the efficiency of various methods of disintegrating coal, the highest efficiency was given by the compression test on cubes of the material; crushing by impact of a falling wt. or between crushing rolls had approx. equal efficiency under certain conditions, but, in general, the efficiency of these processes decreased as the energy applied was increased. An attrition test carried out in a cast-Fe pestle and mortar had a low efficiency compared with the other methods, but placed the materials examined (six different types of coal, two anthracites, shale, and pyrites) in approx. the same order of resistance to grinding. Hardness was measured by the scratch test and by the resistance to abrasion. These tests placed the majority of the brittle materials in the same order as the other tests, but tough materials such as cannel and carbonaceous shale showed exceptionally high resistance to abrasion. Sp.-surface calculations are too complicated for industrial testing, but sufficient accuracy for most purposes is obtained by taking as a measure of the fineness the % of the product passing a specified sieve. The results of all the tests are compared by taking one coal (Barnsley softs) as a standard.

A. B. M.

Action of nitric acid on bituminous coal. B. JUETTNER, R. C. SMITH, and H. C. HOWARD (J. Amer. Chem. Soc., 1935, 57, 2322—2336).—A Pittsburgh bituminous coal is almost completely oxidised by hot $N-HNO_3$ in 5 days, the amount of acid-insol. acids being a max. after 48 hr. The OH:C ratio of the resulting humic acids is 0.3—0.4, and 30—50% of the O (about = the O content of original coal) is present in ether linkings, which form fundamental units in coal and are destroyed only by prolonged oxidation. Prolonged oxidation gives acids, about $C_6H_3.6O_{4.8}$, with equiv. wt. 68 and with very little OH. Decarboxylation of the Na salts in H_2O at 450° gives C_6H_6 , Ph_2 (a secondary product), cresols, CH_4 , H_2 , C_2H_6 , etc.

R. S. C.

Solid smokeless fuel. Production by carbonisation of Utah and Wyoming coals. S. C. JACOBSEN and G. W. CARTER (Mech. Eng., 1935, 57, 305—308).—The coal was treated with superheated steam (10 lb. pressure) at $538-732^\circ$. The yield of semi-coke decreased, and of gas increased, with rise in temp. The oil yield was best at 650° .

CH. ABS. (e)

Reactivity of coke. Determination of reactivity of coke in carbon dioxide. D. A. REYNOLDS and J. D. DAVIS (Ind. Eng. Chem. [Anal.], 1936, 58, 33—36).—Modified apparatus and technique are described and results of tests discussed.

E. S. H.

Carbon black. I. Its production by thermal decomposition of hydrocarbon gases. L. M. PIDGEON (Canad. J. Res., 1935, 13, B, 351—369).—In the process described, which is continuous, C black is produced by thermal decomp. of CH_4 and similar gases under conditions such that yields as high as 60% of the available C in the gas may be obtained. It is essential to provide a "wall-free" reaction space by the use of a porous refractory tube (T) through which a certain amount of inert gas may be passed. By this

means the reacting gas is unable to touch the walls of the system, deposition of C thereon is prevented, and efficient heat transfer between the source of heat and the reacting gases is thereby maintained. In the experiments described, T was heated to $1300-1400^\circ$ in a gas-fired furnace in which the pressure was $>$ in T . Diffusion of flue gases through T supplied on the inside walls a "blanket" the thickness of which could be adjusted by controlling the pressure difference across the walls. The C so produced, like "soft" blacks, has a high d , low sorptive power, gives similar resistance to ageing and abrasion, and accelerates the cure in a rubber stock.

H. C. M.

Development of coal hydrogenation by Imperial Chemical Industries, Ltd. K. GORDON (J. Inst. Fuel, 1935, 9, 69—89).—After an outline of the chemistry and history of the process the large-scale plant at Billingham is described and illustrated. The coal, cleaned by the Chance process to $> 2\frac{1}{2}\%$ of ash, is ground and mixed with the pasting oil (50:50) and catalyst (an org. Sn compound), and the paste, mixed with H_2 under 250 atm. pressure, is heated to reaction temp. in a gas-fired preheater and passed through the converters in series. The process is preferably carried out in presence of free HCl, which, however, is neutralised before the vapours leave the converter by the introduction of a suspension of alkali in oil. On leaving the last converter the gases and vapours are separated from the residual heavy oil which contains the ash and unconverted coal. The gases and vapours pass to the heat exchangers and coolers; the liquid oils are separated under pressure and the gases, after washing out any excess hydrocarbon constituents, are recirculated. Part of the heavy oil let down from the hot separators is returned to the paste-prep. plant and part to the sludge-recovery plant, where it is converted into coke, which is used under the boilers, and oil, which is returned for making paste. The light-oil products from the cold separators are released in pressure in three stages. Part of the heavy oil is treated in a second liquid-phase stage, and then, after separation of the liquid-phase petrol, the middle oil in the product is treated in a final vapour-phase stage. The vapour-phase petrol requires no refining after its soda wash; the liquid-phase petrol is washed with H_2SO_4 and aq. NaOH and finally re-run. The yield of petrol from coal, on an ash and H_2O -free basis, is $> 60\%$, but accurate figures are not yet available; the yield from tar and tar oils is 80—90 wt.-%. The overall consumption of raw coal is estimated at 3.5—4 tons per ton of petrol produced, corresponding to a thermal efficiency of 40%.

A. B. M.

Heat of reaction of destructive hydrogenation. A. V. AGAFONOV and J. I. ZARDALISCHVILI (Neft. Choz., 1934, 26, No. 10, 46—47).—A discussion. Results are tabulated.

CH. ABS. (e)

Processes in dry purification [of gas]. K. BUNTE (Gas- u. Wasserfach, 1935, 78, 954—959; cf. B., 1934, 530).—The rates of absorption of H_2S ($Fe_2O_3 \cdot 3H_2O + H_2S = Fe_2S_3 + 6H_2O + 14.9$ kg.-cal.) and of regeneration by O_2 ($Fe_2S_3 + 1\frac{1}{2}O_2 + 3H_2O = Fe_2O_3 \cdot 3H_2O + 3S + 144.6$ kg.-cal.), as determined in the laboratory, were approx. the same for the same sample of purifying

material (Luxmasse or bog-Fe ore), but differed slightly from sample to sample. The rates of both reactions passed through maxima (at 20–30% of H₂O) as the moisture content of the material was increased. It is concluded that reaction is preceded by dissolution of the gases in the liquid phase. The total amount of H₂S absorbed decreased with decreasing moisture content of the material. The reaction rates passed through maxima, at 40–50°, with rising temp. Addition of alkali, e.g., Na₂CO₃, improved the absorptive power of the material for H₂S, which, however, reached a max. at p_H 8 and fell again at higher vals. A. B. M.

Development and future possibilities of gas as an industrial fuel. J. E. WHITE (J. Inst. Fuel, 1935, 9, 118–124).—The advantages of gas as an industrial fuel are illustrated by reference to data on the operation of furnaces for the melting, extrusion, rolling, and annealing of non-ferrous metals, the rolling of steel sheets and plate, heavy forging, drop stamping, and the punching and drawing of steel ingots. A. B. M.

Compressed gas as a fuel for motor transport. R. COOK (J. Inst. Fuel, 1935, 9, 125–131).—The system of compressed-gas propulsion in use in this country is described. From the economic viewpoint compressed gas cannot compete under present conditions with heavy oil as a fuel for road transport. The influence which possible future developments may have on the economic possibilities of compressed gas is discussed. A. B. M.

Apparatus for distillation and fractionation of tar. E. GUIGNARD (Oel u. Kohle, 1935, 11, 889–891).—The apparatus comprises a horizontal cylindrical still within which a second cylinder containing a series of helical surfaces can rotate. It is so designed that a continuous stream of the crude tar in the form of a thin layer of relatively large surface area is distilled, the heat necessary being transmitted to the crude tar through the distilled tar. A. B. M.

Asphalt-pitch compositions as anticorrosive coverings for pipes. V. M. SCHALFEEV and E. V. KANDIDOVA (Plast. Massui, 1934, No. 6, 31–37).—Asphalt containing 15% of kaolin adheres well to pipes coated with a solution of stearic tar. Clay soil attacks the covering > does sand. CH. ABS. (p)

Hydrogenations in a tetralin medium. I. Destructive hydrogenation of bitumen and pitch. II. Destructive hydrogenation of coal with tetralin and with a mixture of related compounds as media. E. H. BOOMER and J. EDWARDS. III. Destructive hydrogenation of cellulose and wood. E. H. BOOMER, G. H. ARGUE, and J. EDWARDS. IV. Destructive hydrogenation of grain screenings. E. H. BOOMER and J. EDWARDS (Canad. J. Res., 1935, 13, B, 323–330, 331–336, 337–342, 343–350).—I. The importance of a suspension medium in processes of destructive hydrogenation is discussed. The ideal medium would possess thermal stability, high solvent power for the raw material, the thermal-decomp. products, and H₂, and would be an efficient H carrier. Experiments to determine the val. of tetralin (I) as the medium in the hydrogenation of bitumen and pitches were made at 400–450°/1000 lb. per sq. in., using MoO₃

as catalyst. (I) did not cause any increase in the oil yield, although there was an improvement in quality. The rate of hydrogenation of bitumen, but not of pitches, was increased when using (I).

II. Tar obtained in the pyrolysis of natural gas yields on hydrogenation a product which, as a suspension medium for the hydrogenation of Alberta bituminous and domestic coals, is only slightly less effective than (I). The results are of some practical val. in connexion with the utilisation of waste natural gas.

III. Wood and cellulose can be successfully hydrogenated in presence of (I), without additional catalyst, (I) acting as a H carrier. For complete conversion of these materials it is essential that (I) should be present in relatively large excess, and that the temp. should be > 325° (350°).

IV. An attempt is made to provide a method for the disposal of grain screenings that accumulate annually at the Canadian wheat elevators. By hydrogenation at 400°, with a 3:1 ratio of (I) to screenings, > 50% of the latter was converted into oils. The addition of catalyst, ZnO–CuO–Al₂O₃ or MoO₃, greatly increased the rate of hydrogenation, and also increased the production of hydrocarbon gases at the expense of the CO₂.

H. C. M.

Isolation and identification of the volatile hydrocarbons in a Mid-Continent petroleum. R. T. LESLIE and J. D. WHITE (J. Res. Nat. Bur. Stand., 1935, 15, 211–225).—22 hydrocarbons have been isolated from the 55–145° fraction of a Mid-Continent petroleum of b.p. 55–180°, and their proportions estimated. 6 other hydrocarbons have been detected, and the presence of 19 others is suspected. If these components account for the whole of this fraction the ratio of paraffin : naphthene : aromatic hydrocarbons is 6:3:1.

J. W. S.

Hodonin petroleum. I. Relations of naphthenic petroleum to terpenes. F. WENZEL and H. WEISER (J. pr. Chem., 1936, [ii], 144, 145–175).—A distillation fraction, the yield of which is > or < that of either of its neighbours, is called a “max.” or “min.” fraction, respectively. Such fractions are obtainable only by suitable choice of cuts and with absolutely const. pressure. Special precautions are needed with petroleum. German naphthenic petroleum (von Braun, A., 1931, 1396) gives max. fractions corresponding to C₁₅ and C₂₀. Two Tertiary-age oils from Hodonin give max. fractions corresponding to (a) C₁₅ and C₂₀ and (b) C₁₃, C₁₅, C₂₀, C₂₅, and C₂₈. The terpene origin of the oils is apparent. The C₂₈ fraction (I), C₂₈H₄₆, with KMnO₄ in hot COMe₂ affords *o*-C₆H₄(CO₂H)₂ and is derived from squalene by condensation of the centre of the chain with aromatisation and loss of 2Me. (I) is thus *o*-C₆H₄(CH₂-C₁₀H₁₉)₂, C₁₀H₁₉ being naphthene residues. It is the first member of a “naphthen-aromatic” series. Petroleum is considered to be derived from marine plants; from the types of constituents of petroleum and the relationship of abietic acid to scheererite and fichtelite it is concluded that it is formed by cyclisation and disproportionation. Polymerisation is rare, degradation being the probable cause of heterogeneity. The relation between petroleum and marine life shows that the main constituents of the

latter were built up first by C_1 , later by C_5 , units and are now derived by C_2 units; squalene is now a residue of the earlier type. R. S. C.

Technology of the "Dubrovai" vapour-phase cracking. K. K. DUBROVAI and A. B. SCHEINMAN (Gosud. Nauch.-Tech. Gorno-Geol. Neft. Izdat., 1934, No. 3, 4—15).—Operating conditions are described. CH. ABS. (e)

Influence of catalysts in vapour-phase cracking. P. P. BORISOV and M. V. GAVERDOVSKAJA (Neft. Choz., 1934, 26, No. 10, 37—40).—Experiments at 500° with various fractions, and with and without the use of catalysts (ZnO , $Ni-Al_2O_3$, activated C , Ni_2O_3 , Al_2O_3 , fused borax, glass chips, MnO_2 , TiO_2 , UO_3 , and ThO_2), are described. Data are tabulated. CH. ABS. (e)

Application of calorised refinery pipe-still tubes. C. L. CLARK, R. S. BROWN, and A. E. WHITE (Oil and Gas J., 1935, 33, No. 45, 44—45, 129). CH. ABS. (e)

Performance of the "Sovetski Kreking" [cracking] plant. M. A. KAPELIUSCHNIKOV (Gosud. Nauch. Tech. Gorno-Geol. Neft. Izdat., 1934, No. 3, 54—96).—The operation of the plant is described. CH. ABS. (e)

Results of operation of the Baku cracking units. M. B. MARKORIJAN (Gosud. Nauch. Tech. Gorno-Geol. Neft. Izdat., 1934, No. 3, 97—118).—Operating conditions and results are described. CH. ABS. (e)

Light cracking of heavy oils. J. BLJACHER, S. N. OBRIADTSCHIKOV, E. SMIDOVITSCH, and S. CHAIMAN (Neft. Choz., 1934, 26, No. 9, 51—54).—A viscous crude oil, stripped of light fractions and subjected to a preliminary light cracking at ≈ 25 atm., yielded 100% more gasoline on cracking than would have been obtained without the preliminary cracking. The latter changes the heavy fractions without excessive formation of C . CH. ABS. (e)

Temperature factor in the velocity of the cracking reaction. S. CHAIMAN (Neft. Choz., 1934, 26, No. 10, 34—37).—A crit. review. CH. ABS. (e)

Treating methods for vapour-phase-cracked and "reformed" gasolines. I. ANDREEV (Gosud. Nauch. Tech. Gorno-Geol. Neft. Izdat., 1934, No. 3, 236—237).—The vapour-phase treatment of gasoline with $ZnCl_2$ pptd. on Raschig rings, pumice stone, or gumbrin, followed by treatment with 0.1% $NaOH$, is described. In refining with H_2SO_4 and gumbrin, 80% H_2SO_4 gave the best results. CH. ABS. (e)

Heats of vaporisation of eight gasolines. R. S. JESSUP (J. Res. Nat. Bur. Stand., 1935, 15, 227—236).—The heats of vaporisation (l) at 40° of a natural gasoline, 2 aviation gasolines, 1 straight-run naphtha, 3 cracked naphthas, and a "safety fuel" have been measured to $\pm 3\%$. The first seven yield vals. which are approx. linear functions of their d and average volatility, but the safety fuel has a higher l , owing to its higher aromatic hydrocarbon content. The large differences observed in the rates of ice formation on the carburettors of aviation engines are not due to differences in l , but are attributable to differences in completeness of vaporisation of the fuels, resulting from differences in volatility. J. W. S.

[Gasoline] plant residue test. R. N. DONALDSON (Petroleum World, 1935, 32, No. 3, 27).—A method is outlined for determining the total losses of C_5H_{12} and heavier hydrocarbons in gasoline-plant dry gas. The heavier constituents are absorbed in liquid C_4H_{10} , and a controlled weathering test of the combined condensates is carried out at 0° without fractionation. CH. ABS. (e)

Analysis of "soluble" carbolineums. I. Retention of ether by hydrocarbons, phenols, and bases. II. Fractionation of the oily constituents by distillation. L. A. DESHUSSES and J. CORBAZ (Arch. Sci. phys. nat., 1935, [v], 17, Suppl., 144—147, 147—150).—I. To remove the whole of the Et_2O phenols must be heated to 150° , bases to 90° , and hydrocarbons to 82.5° . Anthracene oils require a current of air blown through at 50° .

II. Fractionation of the oils by distillation, using 100 g. of oil, is described. H. G. R.

Bleaching effect of active earths on mineral oils. G. R. SCHULTZE (Angew. Chem., 1936, 49, 74—77).—The decolorising effect is generally increased by heating at 100 — 120° ; the optimum temp. differs with the nature of the earth. Heating does not completely regenerate the active earth, due to loss of H_2O of constitution; sintering plays no important part in regeneration. The relative decolorising effects of different earths are not const. E. S. H.

Chemical demulsification. N. RIAZANOVSKI (Neft, 1933, 4, No. 17, 17—20; cf. B., 1933, 949).—5% of a solution containing 0.25% of naphthenic acids, with 0.25% of $NaCl$ or 0.2% of $NaOH$, effects a 98.6% separation of oil from H_2O when added to the emulsion. CH. ABS. (e)

Laboratory measurement of the resistance of oil to sludge formation. M. FAIRLIE (Oil and Gas J., 1935, 33, No. 45, 58, 60).—An apparatus is described in which the oil to be tested is pumped continuously through an aëerator, heating coil, cooler, and sump. CH. ABS. (e)

Determination of viscosity of small samples of oil from oil-impregnated paper. Method and apparatus. H. F. SCHNEIDER, JUN., and T. A. MCCONNELL (Ind. Eng. Chem. [Anal.], 1936, 58, 28—29).—A ball-and-inclined tube type of viscosimeter, suitable for determinations with < 2 c.c. of liquid and covering the range 0.7—25 poises, is described. E. S. H.

Production of lubricating oils from coal products. F. C. HALL, W. R. WIGGINS, and A. W. NASH (J. Inst. Fuel, 1935, 9, 106—117).—Previous work on the production of lubricating oils by the polymerisation of olefines and condensation of chlorinated paraffins, alone or together with aromatic hydrocarbons, in presence of Al (cf. B., 1934, 744) is reviewed. By polymerising C_2H_4 under pressure at 100 — 300° in presence of $AlCl_3 + Al$, lubricating oil fractions having η indices as high as 60—70 have been produced; oils produced in a similar way using $AlCl_3$ alone had poor η indices (cf. B., 1931, 328). Oils produced by the condensation of C_2H_4 with $C_{10}H_8$ in presence of $AlCl_3$ were unsuitable as lubricants. Oils of high η and high stability to oxidation were produced by the condensation of a

chlorinated paraffin wax with C_6H_6 , PhMe, or $C_{10}H_8$, in presence of Al. A. B. M.

Preparation of lubricating oils from crude oils of the Sterlitamak district. N. I. TSCHERNOSHUKOV and B. B. KROLL (Nef. Choz., 1934, 26, No. 9, 44—46).—The crude oil yields 15—17% of lubricating oils of fair quality. The best refining method is fractionation by SO_2 , followed by treatment with clay. Dewaxing may be carried out with $C_2H_4Cl_2$ before the SO_2 treatment. CH. ABS. (e)

Evaluation of mineral waxes. K. S. NITSCHÉ (Petroleum, 1936, 32, No. 3, 19—22).—To mixtures of ozokerite and paraffin in varying proportions lac benzine is added, and after solidification the smoothed surface of the mixture is observed for signs of crystallisation, which may be accelerated by fine grinding or the use of lower-boiling solvents. The best mixture is that which most inhibits crystallisation. The use of standards is recommended. The method distinguishes between various types of ozokerite. J. W.

Treating dusts [in collieries]. Road materials.—See IX. **Cutting oils.**—See X.

PATENTS.

Low-temperature carbonisation of briquettes. POWER-GAS CORP., LTD., N. E. RAMBUSH, and C. INGMAN (B.P. 439,824, 16.6.34).—A mixture of coal or other carbonaceous material of low caking index with a bituminous binding material, e.g., pitch, and/or a coking coal, the materials being graded to pass an $\frac{1}{8}$ -in. sieve, is briquetted, and the briquettes are carbonised in a static retort by direct contact with a hot gaseous medium, e.g., producer gas heated in a regenerator system. A. B. M.

[Liquid] fuel-burning methods and apparatus. W. W. TRIGGS. FROM TIMKEN SILENT AUTOMATIC CO. (B.P. 440,750, 4.9.34).—Liquid fuel is squirted in comparatively large drops on to a circle of metallic elements which become heated sufficiently to volatilise the oil instantaneously. Primary air is supplied along a different path to the same zone. B. M. V.

Manufacture of water-gas. H. J. CARSON (B.P. 439,562 and 439,626, 4.4.34).—(A) The apparatus comprises a producer (*P*), the upper part of which contains a carbonising chamber (*C*), a carburettor (*D*), and superheaters (*S*). The fuel bed in the lower part of *P* is alternately blasted by air supplied at a no. of vertically spaced levels, and gasified by steam introduced above the lowermost air-blast level. The air-blast gases pass through the annular space between *P* and *C*, and thence to *D* and *S*, wherein they are burned with secondary air. Part of the water-gas passes through *C* and is withdrawn with the gases produced by the carbonisation of the fuel (e.g., coal) therein; the remainder passes into *D* and is carburetted. The steam supplied to *P* during the gasification period is superheated in one *S*. The ash and clinker are withdrawn from *P* as liquid slag. (B) Within *C* is an assembly so designed that a controllable amount of the gases may be withdrawn through a no. of annular openings communicating with a central offtake. A. B. M.

Obtaining illuminating gas, rich in hydrogen and practically free from carbon monoxide, from solid fuels. GES. F. LINDE'S EISMASCHINEN A.-G. (B.P. 439,832, 16.6.34. Ger., 24.6.33).—Solid fuel is gasified under pressure with O_2 , produced by air separation, and steam, and the gas produced is freed from the greater part of its CO by cooling under pressure. It is then washed with liquid N_2 , produced simultaneously with the O_2 used for gasification, whereby the remainder of the CO and the hydrocarbons are removed from the gas. A. B. M.

Simultaneous washing of light hydrocarbons and naphthalene out of gases. N. V. MACHINERIEËN-EN APPARATEN FABR. "MEAF" (B.P. 439,772, 8.3.35. Ger., 22.6.34).—The gas is washed with an oil cooled to $< 0^\circ$. The wash oil is heated in the usual manner to recover the light oil (benzol) and is then cooled to about -4° , freed from the solid $C_{10}H_8$ and H_2O which separate, and recirculated. A. B. M.

Conversion of organic sulphur compounds [in natural or cracker gases] with ferrous sulphide. R. ROSEN and E. LIEBER, ASSTS. TO STANDARD OIL DEVELOPMENT CO. (U.S.P. 1,976,806, 16.10.34. Appl., 18.9.31).—The gas is freed from H_2S by any suitable process, then passed over small pieces of FeS at $350-400^\circ$, and again through the H_2S scrubber. A. R. P.

Refining gasoline with zinc chloride. F. E. KIMBALL (U.S.P. 1,970,143, 14.8.34. Appl., 15.9.33).—The vapours make contact with a mixture of $CaCl_2$ 55—65, $MgCl_2$ 3—5%, and H_2O (rest) at $185-220^\circ$, then with a solution of 80—70 pts. of $ZnCl_2$ in 20—30 pts. of H_2O at $175-205^\circ$, and finally, after admixture with NH_3 to neutralise HCl taken up from the preceding treatments, with a solution of 50—60 pts. of $CaCl_2$ in 50—40 pts. of H_2O at $135-190^\circ$ to remove hydrocarbons of high b.p. A. R. P.

Drying loose material [coal].—See I. **Removing S oxides from gases.**—See VII. **Wood preservative.**—See IX. **Photometers.**—See XI. **Paint for oil tanks.**—See XIII.

III.—ORGANIC INTERMEDIATES.

Synthesis of carbamide from carbon dioxide and ammonia. II. M. TOKUOKA (J. Agric. Chem. Soc. Japan, 1935, 11, 107—117; cf. A., 1935, 966).—The conversion of $NH_2 \cdot CO_2 \cdot NH_4$ (I) into $CO(NH_2)_2$ (II) by heating in an autoclave is described. The optimum temp. is $155-160^\circ$, (I) being packed into the autoclave at 0.9 g. per c.c. The yield of (II) is 44.10% at 155° for 2 hr. and 43.33% at 160° for 1 hr. CH. ABS. (r)

Adsorption of butadiene from gases after passage through scrubbers charged with activated carbon. G. A. PANKOV and A. S. MALINKINA (Sintet. Kautschuk, 1935, 4, No. 1, 37—42).—Activated C adsorbs butadiene (I), alcohol, and aldehyde vapours from the gases. Recovery of $> 90\%$ of (I) is thus attained. CH. ABS. (p)

Polymerisation of butadiene recovered from gases passed through the polymerisers. A. F. OGNEVSKI, I. P. SCHASCHKIN, and A. P. KRIUTSCHKOV (Sintet. Kautschuk, 1935, 4, No. 2, 23).—A second

passage of the condensate through the polymeriser yielded a semi-liquid product. Its properties are examined. CH. ABS. (p)

Polymerisation of butadiene in presence of mixed catalysts. V. E. KRAVETZ (Sintet. Kautschuk, 1935, 4, No. 1, 36).—Polymerisation proceeded more rapidly with a catalyst containing 10% of Na and 10% of pptd. Fe_2O_3 than with one containing Na and 10% of MgO . CH. ABS. (p)

Polymerisation of butadiene with a suspension of sodium. N. A. TSCHAJANOV (Sintet. Kautschuk, 1935, 4, No. 1, 28—32).—Polymerisation was carried out in a steel bottle, using a catalyst containing MgCO_3 , a 1% kerosene solution of rubber, paraffin, Na dispersion, and oleic acid. A 99% yield was obtained after 63 hr. Properties of the product are recorded. CH. ABS. (p)

Fractionation of sodium-butadiene polymeride. I. I. SHUKOV, F. M. SIMCHOVITSCH, S. L. TALMUD, and V. P. NIKOLSKAJA (Sintet. Kautschuk, 1935, 4, No. 2, 6—16).—The polymerides were pptd. from solution in C_6H_6 , PhMe , PhCl , and CCl_4 by means of EtOH . η relations of the solutions are examined. CH. ABS. (p)

Crude cresol. I. Examination by determination of the b.p. II. Evaluation by means of the nitro-product. M. BEUKEMA-GOUDSMIT and T. POTJEWILD (Pharm. Weekblad, 1936, 73, 57—61, 97—103).—I. Distillation tests on representative commercial and synthetic samples of crude cresol are described. The test is inadequately described in the Dutch Pharmacopœia V and in D.A.B. VI. The method described in the Swiss Pharmacopœia should be adopted.

II. Nitration of such samples by the Raschig method (Dutch Pharm., Suppl. I) gave varying yields of nitro-products. The variations are partly, but not entirely, explained by solubility losses of trinitro-*m*-cresol in the diluted nitration mixture and washings from the filtered solid. The m.p. of the product ($> 105^\circ$) is important and is depressed to $< 100^\circ$ by the presence of picric acid, which is formed simultaneously when the crude cresol contains $> 5\%$ of PhOH . The nitration test is of use only when the distillation range of the crude cresol is satisfactory. No test will detect 5% of PhOH in crude cresol. S. C.

Analysis of phthalic acid and phthalates. A. RUFF and A. KRYNICKI (Farben-Ztg., 1936, 41, 111).—A modification of Kappelmeier's method (B., 1935, 1151) is described. $\text{C}_6\text{H}_4(\text{CO}_2\text{K})_2, \text{EtOH}$ is determined as K_2CO_3 . The best qual. test for phthalic acid is conversion into phenolphthalein. F. R. G.

Detection of phthalic acid by means of the fluorescein reaction. A. KRAUS (Farben-Ztg., 1936, 41, 111—112; cf. preceding abstract).—The procedure used is described. F. R. G.

Ph_2 as steam superheater.—See I. [Products from] wood treatment.—See IX.

PATENTS.

Manufacture of dodecahydrotriphenylene. COUTTS & Co., and F. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 440,285, 8.9.34).—*cyclo*Hexanone or its mixture with *cyclo*hexylidene*cyclo*hexanone is heated at

270—320° under pressure with a (dehydrating) catalyst containing one or more oxides of rare-earth metal (e.g., 95.5 Al_2O_3 : 4.5 ThO_2 , Al_2O_3 - CeO_2) and, if desired, a H_2O -binding substance, e.g., CaO . The yield is 30—32% of theory. H. A. P.

Manufacture of aryl[am]ides from 4-hydroxydiphenyl-3-carboxylic acid and of azo dyes therefrom [ice colours and pigments]. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 437,675, 7.5.34).—The acid or its chloride is condensed with arylamines free from CO_2H and SO_3H , e.g., NH_2Ph [product (I), m.p. 231°], dianisidine [(II), m.p. 287°], *o*- $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{OMe}$ (m.p. 155°), *o*-, *m*-, and *p*-toluidine (m.p. 208°, 222°, 244°, respectively), *m*-4-xylydine (m.p. 217°), *p*- $\text{C}_6\text{H}_4\text{Cl}\cdot\text{NH}_2$ (m.p. 268°), β - $\text{C}_{10}\text{H}_7\cdot\text{NH}_2$ (m.p. 240°), 3 : 6-diaminocarbazole [(III), m.p. 332—334°], *p*- $\text{C}_6\text{H}_4(\text{NH}_2)_2$ (m.p. 383—384°), 4 : 4'-diaminostilbene (m.p. 392—394°), 4 : 4'-diaminodiphenylmethane (m.p. 305—307°), 1 : 5- $\text{C}_{10}\text{H}_6(\text{NH}_2)_2$ (m.p. 357—358°), *p*- $\text{NH}_2\cdot\text{C}_6\text{H}_4\cdot\text{NO}_2$ (m.p. 253—255°). These arylamides are used as coupling components for ice colours and pigments. Examples are: 5-chloro-2-*p*-chlorophenoxyaniline \rightarrow (I) (greenish-olive); 2 : 5-dichloroaniline \rightarrow (II) (yellowish-brown); 4-benzamido-2 : 5-diethoxyaniline \rightarrow (III) (reddish-grey-brown). C. H.

Manufacture of a solid tetrazo salt. I. G. FARBENIND. A.-G. (B.P. 440,424, 25.6.34. Ger., 24.6.33).—*p*- $\text{C}_6\text{H}_4(\text{NH}_2)_2$ is diazotised by $\text{NO}\cdot\text{HSO}_4$ in 78% H_2SO_4 at 20—25°, and the solution is cooled to -15° and diluted with ice, or poured into an org. solvent (MeOH , EtOH , COMe_2). The cryst. salt *p*- $\text{C}_6\text{H}_4(\text{N}_2\cdot\text{SO}_4\text{H})_2$ is pptd. and may be stabilised by admixture with a metallic sulphate or arylsulphonate. H. A. P.

C_{10}H_8 from gases.—See II. $\text{Co}(\text{OAc})_2$.—See VII.

IV.—DYESTUFFS.

Production of natural indigo in Japan. H. LEOPOLD (Dyer, 1936, 57, 119—120).—Methods of cultivation and the separation of indigo (I) from the leaves (only a dark-brown dye is obtained from the stalks) of the plant *Polygonum tinctorium* are described. Natural (I) competes successfully against synthetic (I) in Japan. A. J. H.

Identifying dyes.—See VI.

PATENTS.

Manufacture of azo dyes. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 436,095, 4.4.34).—Azo dyes containing at least once the grouping $\text{X}\cdot\text{Ar}\cdot\text{N}_2\cdot\text{Ar}'\cdot\text{OH}$, in which X = reactive halogen, Ar and Ar' are C_6H_5 or C_{10}H_8 residues, and the X and OH are *ortho* or *peri* to the N_2 , are treated with NH_3 , amines, alkoxides, phenoxides, sulphites, or sulphinates in presence of Cu compounds, with or without an acid-binder and/or nitrogenous base. A Cu complex (if stable) is formed, and the halogen is replaced. Examples are: 2 : 4-dichloroaniline-6-sulphonic acid \rightarrow β - $\text{C}_{10}\text{H}_7\cdot\text{OH}$, with $\text{Cu}(\text{OAc})_2$, EtOH , and KOH (orange on wool); 4-chloro-*m*-toluidine \rightarrow β -naphthol-5 : 7-disulphonic acid, with CuSO_4 , Na_2CO_3 , and Na_2SO_3 ; 1-chloro- β -naphthylamine-6-sulphonic acid \rightarrow F-acid, with CuSO_4 , Na_2CO_3 , and Na_2SO_3 (red on wool). C. H.

Manufacture of azo dyes containing metals. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 440,415, 21.6.34).—The metal compounds of *o*-hydroxy-azo dyes are prepared by interaction of salts of halogeno-aliphatic acids of low mol. wt. with the corresponding *o*-alkoxyazo dye. Reaction is claimed to be faster and smoother than with other salts (*e.g.*, chlorides, sulphates, acetates) of the metal. *E.g.*, the dye 2:4:1:5-NH₂·C₆H₂Cl(OMe)·NO₂ → 1:4:8-OH·C₁₀H₅(SO₃H)₂ is heated with Cr₂O₃ (?) and CH₂Cl·CO₂H in H₂O at 130° for 3 hr.

H. A. P.

Azo dyes.—See III.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Silk soaking. A. JOHNSON (Text. World, 1936, 86, 85).—Increased regularity in knitting is obtained by first soaking raw silk yarn for 10–12 hr. in a liquor containing a sol. oil, a wetting agent, a plasticiser, a mildew-preventive, and K₂CO₃. A graph is given showing the rate of absorption of sol. oil from a typical soaking liquor.

A. J. H.

Cotton waste as a material for rayon manufacture. Y. UNO (Text. Manuf., 1934, 60, 369).—Pulp is made by boiling the waste with alkali liquor from mercerising mills. Residual NaOH is neutralised with H₂SO₄ for extracting wax to be utilised in spinning.

CH. ABS. (p)

Use of rayon flock mixed with cotton. C. LEVI (Boll. Staz. Sperim. Ind. Carta Fibre Tess., 1935, 30, 758–792).—Tests of wt., breaking strain, and behaviour on treating with various detergents, bleaching agents, and dyes with fabrics containing different proportions of cotton and rayon indicate that 5% of the latter may be incorporated in the warp and 10% in the weft without detriment to these properties.

D. R. D.

Mechanical properties of cotton yarns. H. F. SCHIEFER and D. H. TAFT (J. Res. Nat. Bur. Stand., 1935, 15, 237–253).—The breaking strength and elongation at rupture of various cotton yarns have been determined by single-strand, multiple-strand, and skein tests. The data are discussed statistically. The effects of various mechanical factors on the strength of a cotton yarn are also discussed.

J. W. S.

[Chemical] pulpwood. R. SIEBER (Papier-Fabr., 1936, 34, 33–37).—The change in volumetric wt. of wood, as well as in its sp. heat, with change in H₂O content is shown graphically, indicating the space occupied by H₂O, solid material, and air per solid m. of wood. Examples of its uses in calculating cooking requirements are given.

D. A. C.

Standard methods of determining swelling criteria [of pulps]. MEMO. No. 10, FASERSTOFFANALYSENKOMM. DES VEREINS DER ZELLSTOFF- U. PAPIER-CHEMIKER U. -INGENIEURE (Papier-Fabr., 1936, 34, 17–20).—(1) Absorbency is determined by the Klemm method, the standard conditions being to use strips 15 mm. wide, to immerse to a depth of 5 mm. in H₂O at 20°, and to measure the rise in height of the H₂O in the strip after 10- and 60-min. immersion. (2) Swelling in and absorption of 17.5% aq. NaOH are determined by measuring the increase in thickness and wt. of ten superimposed 30-mm. diam. discs of the pulp sheet

after 4- and 5-min. immersion, respectively, under a 10-g. wt. Apparatus is described. (3) The density of test-sheets is expressed as the bone-dry wt. (g. per sq. m.) per 1-mm. thickness of the air-dry sheet. 20 thickness determinations are made over an area of 1 sq. dm.

D. A. C.

Density of test sheets as index of the porosity of the pulp. A. NOLL (Papier-Fabr., 1936, 34, 25–27).—The vol.-% occupied by air (termed porosity) in a test sheet is deduced from thickness measurements of the air-dry sheet (cf. preceding abstract), and the *d* of the fibrous material.

D. A. C.

Industrial evolution of the chlorine process for cellulose. History and future prospects. U. POMILIO (Chim. e l'Ind., 1936, 18, 6–13; cf. B., 1934, 923).—The author's process (*loc. cit.*) is described. Plant and results obtained originally in S. America and recently in Italy (principally using straw) are described. Advantages are continuity of operation and elimination of incrustants and degradation of the cellulose.

J. G.

Cellulose produced from aspen wood by the chlorine process. A. KRÜGER (Finnish Paper and Timber J., 1935, 216–226).—Yields and consumption of chemicals by the Cl₂ and NaOH processes are compared.

CH. ABS. (p)

Acetylation of cellulose and behaviour of cellulose acetate with solvents. G. CENTOLA (Gazzetta, 1935, 65, 1021–1028).—Measurements of the rate of acetylation of both natural and mercerised ramie fibre show that there is a gradual transformation of cellulose into cellulose triacetate (I) without the intermediate formation of less esterified compounds. The swelling of fibres of (I) in AcOH and in CHCl₃ has been followed by means of X-ray measurements. The solvent penetrates into the micelles of the fibre through an elastic, semi-permeable surface film.

O. J. W.

Nitration of cellulose with nitrogen pentoxide. R. DALMON, J. CHÉDIN, and L. BRISSAUD (Compt. rend., 1935, 201, 664–665).—A solution of N₂O₅ in CCl₄ nitrates cellulose in the dark at 13°, the yield being good. The product contains approx. 14% N.

H. J. E.

Bagasse. VIII. Action of dilute nitric acid on bagasse. Y. HACHIHAMA, M. ÔNISHI, and W. TAKEMURA (J. Soc. Chem. Ind., Japan, 1935, 38, 690–691 B).—The max. quantity of lignin and pentosan is extracted from bagasse (without affecting the cellulose) when this is digested with 3–5% HNO₃ at 100° during 1 hr. and subsequently treated with 2% NaOH at 100° during 1 hr. The lignin dissolves as nitrolignin and the pentosan is hydrolysed to xylose.

H. G. M.

Manufacture of artificial wool. H. YORKE (Silk J., 1935, 11, No. 129, 20).—The coagulating bath consists of dil. H₂SO₄ and a higher [Na₂SO₄] than is used for rayon. Curling fibres are formed by rapid alternation of heating and cooling.

CH. ABS. (p)

Paper as a packing material for foodstuffs. J. GRANT (Food, 1935, 4, 329–332, 401–404, 484–486; 1936, 5, 122–124, 187–190).—The following aspects are discussed from the viewpoint of food packaging: manufacture of pulp and paper, physical tests, tests for chemical purity, determination of fibre contents by

staining methods, printability and effects of adhesives, speciality papers (*e.g.*, vegetable parchment, waxed and greaseproof papers, transparent wrappings), the packaging of fatty foods, the influence of the paper on transmission of moisture and light and on autoxidation, and the catalytic effect of impurities. J. G.

Effects of fumigants on paper. C. G. WEBER, M. B. SHAW, and E. A. BLACK (*J. Res. Nat. Bur. Stand.*, 1935, 15, 271—275).—HCN, $(\text{CH}_2\text{Cl})_2$ and CCl_4 , CS_2 , C_2H_4 and CO_2 , and AcOH and CO_2 have no serious deleterious effect on papers, and can safely be used as insecticides on records of permanent val. J. W. S.

Hydrogenation of cellulose. Determining η of oil from paper.—See II. **Retting of flax.**—See VI. **Sheet materials.**—See XV. **Crude fibre.**—See XIX.

PATENTS.

Manufacture of [paper] pulp. C. K. TEXTOR, Assr. to NORTHWEST PAPER Co. (U.S.P. 1,970,258, 14.8.34. Appl., 18.10.29).—The digestion liquor is obtained by treating aq. Na_2CO_3 with SO_2 until the pH falls to 7.5—9.5. The spent liquor is treated with NaOH and evaporated to dryness, the residue is incinerated and extracted with H_2O , and the solution divided into two parts, one being causticised with CaO and the other treated with SO_2 to the desired pH for re-use in the wood digester. A. R. P.

Paper bonding method and composition. G. E. CORSON, Assr. to CLINTON CORN SYRUP REFINING Co. (U.S.P. 1,977,514, 16.10.34. Appl., 4.11.31).—The bonding material consists of a mixture of starch gum (100), $\text{Fe-free Al}_2(\text{SO}_4)_3$ (9), and NaAlO_2 (3 pts.) ground through 100-mesh. A. R. P.

Production of artificial silk and the like. G. B. BARMEN and K. MEYER-GAUS, Assrs. to AMER. BEMBERG CORP. (U.S.P. 2,003,170, 28.5.35. Appl., 5.10.32. Ger., 5.10.31).—A stretch-spinning device is claimed.

Cylinder plant for drying paper or paper stuff. E. SCHMIDT (B.P. 440,619, 22.7.35. Ger., 23.7.34).

Disintegrating pulp. Drying cellulosic materials.—See I. **Rubber yarn or thread.**—See XIV.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

New acetate-rayon dyes. G. RUDOLPH (*Kunstseide*, 1936, 18, 63).—The application of new orange, green, brown, and navy-blue dyes is described. A. J. H.

Dyeing of three-fibre lace. L. A. JORDAN (*Text. World*, 1935, 85, 2460).—Degumming, H_2O_2 -bleaching, and dyeing (with direct and acid dyes in two separate baths) methods are described for silk-cotton-viscose-rayon lace. Equality of shade on the cotton and rayon is obtained by dyeing cold with the direct dyes, and satisfactory penetration of the cotton (the bleaching process does not allow complete removal of the H_2O -resistant natural fats and waxes) is obtained by adding a wetting agent to the dye liquor. A. J. H.

Neolan colours on wool. T. A. FORSTER (*Text. Manuf.*, 1934, 60, 423, 463).—These dyes (containing Cr in the dye mol.) may be differentiated from "chrome"

dyes by boiling the dyeings with 10% Neolan salt NSII. The former bleed freely, but the latter are unaffected.

CH. ABS. (p)

Dyeing of carbonised [wool] piece goods and pieces fast to carbonising. ANON. (*Dyer*, 1936, 57, 118—119).—Practical recipes are given. Level dyeing of carbonised fabric is secured by steeping it for 20 min., before dyeing, in boiling H_2O containing 20% (calc. on the wool) of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, whereby part of the carbonising acid in the fabric is removed and the remainder evenly distributed. A. J. H.

Chemical examination of furs in relation to dermatitis. VI. Identification of vegetable and other dyes. H. E. COX (*Analyst*, 1935, 60, 793—800; cf. B., 1935, 722).—The common dyes used on furs, and simple colour reactions, based on tests with hot 10% HCl and hot Na formaldehyde-sulphoxylate solution, for their detection are described. A. R. P.

Mercerisation of cellulose. G. CENTOLA (*Gazzetta*, 1935, 65, 1015—1021).—X-Ray investigations show that the mercerisation of cellulose consists in the formation of solvated compounds of cellulose with the mercerising agent. The reversible transformation, mercerised cellulose \rightleftharpoons natural cellulose, corresponds with the process $\text{Na-cellulose I} \rightleftharpoons \text{Na-cellulose II}$ (cf. A., 1934, 244). O. J. W.

Fluorescence tests for the mercerising of cotton and the retting of flax. O. MECHEELS and E. GRUENSTEDL (*Text. Manuf.*, 1934, 60, 434).—The tests are described. They are inapplicable to chemically-retted fibres. CH. ABS. (p)

Finishing of cotton-rayon necktie fabrics. P. LE BRUN (*Text. World*, 1936, 86, 97).—Methods are described for obtaining various types of finish on cotton fabric ornamented with small "jacquard" effects. Festoon-drying is adopted to give well-raised rayon effects against a flat dull cotton background, whereas drying with the "face" of the fabric against the drying cylinders is used to obtain an all-over lustrous appearance. A. J. H.

Deterioration of rayon by fireproofing treatments. H. J. HENK (*Kunstseide*, 1936, 18, 45—46).—Fireproofing with $\text{Al}_2(\text{SO}_4)_3$, $(\text{NH}_4)_2\text{SO}_4$, $(\text{NH}_4)_3\text{PO}_4$, and MgSO_4 is harmful since free H_2SO_4 is formed during subsequent prolonged storage or hot ironing. Satisfactory fireproofing is obtained with aq. Na_2WO_4 , Na_3VO_4 , Na_2SnO_3 , $\text{Ti}(\text{OH})_4$, and NH_4Br . A solution containing 20% of Na_2WO_4 and 4% of Na_2HPO_4 is recommended since this does not stiffen the rayon fabric unduly. A. J. H.

Rayon flock-cotton mixtures.—See V.

PATENTS.

Production of colour resists on textile materials. IMPERIAL CHEM. INDUSTRIES, LTD., S. HOWARD, and A. WORMALD (B.P. 441,330, 11.5.34. Addn. to B.P. 433,865; B., 1935, 946).—The process of the prior patent is extended to the application of quaternary phosphonium or sulphonium salts containing an aliphatic chain of $\leq \text{C}_8$. A. W. B.

Retarding the absorption or re-absorption of vat and sulphur dyes by the fibre. SOC. CHEM. IND. IN

BASLE (B.P. 441,296, 12.9.34. Switz., 19.9.33 and 21.7.34).—Sulphonated benz- or naphth-*iminazoles* substituted in the iminazole ring with an aliphatic or cycloaliphatic residue of $\leq C_8$ (cf. B.P. 403,977; B., 1934, 233) are claimed as retarding agents. A. W. B.

Treatment of filaments, yarns, or the like of organic derivatives of cellulose. H. DREYFUS (B.P. 441,276, 16.7.34).—Filaments etc. of ethers or esters of cellulose are treated to varying degrees along their length with solutions of cellulose (I) or derivatives thereof which readily regenerate (I), e.g., xanthates, nitrates, or cuprammonium solutions, so as to obtain "intermittent" effects, particularly in after-dyeing. A. W. B.

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

Determination of sodium chloride in salt. C. W. FOULK and J. R. CALDWELL (J. Amer. Water Works Assoc., 1935, 27, 1712—1716).—A method is described for the examination of NaCl used in regenerating zeolites. Approx. 94% of pure NaCl is pptd. by conc. HCl and the remaining Na is pptd. as triple acetate by means of Mg UO₂ acetate (cf. A., 1932, 588). C. J.

Factory tests on crystallisation of ammonium nitrate and its physical properties. G. I. GORSCHTEIN, A. N. VISCHNEVSKI, and J. F. DISHEVSKI (Chimstr., 1935, 7, 150—158).—Granulated NH₄NO₃ with $\geq 0.15\%$ of H₂O does not cake under any storage conditions. With 0.4—0.5% of H₂O caking is excessive at $> 31.5^\circ$. The rate of hardening decreases with increased grain size, and is much decreased by coating with paraffin. Tests on the production of mixed fertilisers are described. CH. ABS. (e)

Precipitation of nickel hydroxide in the hydro-metallurgical treatment of Chalilovsk nickel ore. M. I. GUTMAN and A. D. MAJANTZ (Tzvet. Metal., 1934, No. 7, 92—100).—Data for the pptn. of Ni(OH)₂ by MgO and MgCO₃ are recorded. CH. ABS. (e)

Freeing nickel sulphate solutions from iron and aluminium impurities. M. I. GUTMAN and A. D. MAJANTZ (Tzvet. Metal., 1934, No. 6, 63—71).—Fe^{II} is best oxidised to Fe^{III} by aëration. The optimum conditions for the pptn. of Fe and Al by MgCO₃ or CaCO₃ are studied. CH. ABS. (e)

Determination of alumina in manganese ore. M. SEKINO (Bull. Inst. Phys. Chem. Res. Japan, 1935, 14, 1241—1245).—Pptn. of the basic acetate is complete from solutions of p_H 5.2—5.6. R. S.

Production of alumina at the Volchov aluminium plant. M. M. LABODA (Legk. Metal, 1935, 4, No. 1, 27—31).—The charge used is bauxite 49, CaCO₃ 28, Na₂CO₃ 23%. After calcining, Al₂O₃ is extracted with aq. Na₂CO₃ at 70°. CH. ABS. (e)

Determination of available and total carbon dioxide in baking powders and self-raising flours. F. W. EDWARDS, E. B. PARKES, and H. R. NANJI (Analyst, 1935, 60, 814—816).—The apparatus comprises a tall, thick-walled glass vessel fitted with a tap funnel and glass tap, the funnel stem leading directly into a boiling tube from which a delivery tube

leads to the bottom of the outer vessel. The sample is placed in the tube, the vessel evacuated, and H₂O (for available CO₂) and N-HCl (for total CO₂) are gradually run in, the CO₂ being collected in 50 c.c. of 0.1N-Ba(OH)₂ and 50 c.c. of H₂O; after 4 hr. the vac. is broken and the excess of Ba(OH)₂ titrated with 0.1N-H₂C₂O₄ (phenol-thymolphthalein). A. R. P.

Determination of phosgene in gases from experimental fires extinguished with carbon tetrachloride fire-extinguisher liquid. W. P. YANT, J. C. OLSEN, H. H. STORCH, J. B. LITTLEFIELD, and L. SCHEFLAN (Ind. Eng. Chem. [Anal.], 1936, 8, 20—25).—An average of 23.6 p.p.m. of COCl₂ was found, confirming previous work of Fieldner *et al.* (B., 1920, 800 A). E. S. H.

Alkaline absorption of nitrogen oxides. A. G. SHIVOTOVSKI (Chimstr., 1935, 7, 158—162; cf. A., 1935, 452).—The rate of absorption of N oxides may be greater for dil. than for conc. alkali solutions. The rate is controlled by the η and d of the absorbing solution. CH. ABS. (e)

Removing sulphur dioxide from flue gases with moist limestone. N. G. ZALOGIN and E. N. TSCHERNOV (Izvest. Teplotech. Inst., 1934, No. 10, 46—51).—H₂O was passed through a tower containing limestone. Gases containing CO₂ and SO₂ were passed as a counter-current. Approx. 50% of the SO₂ was converted into CaSO₄ and CaSO₃. CH. ABS. (e)

Determination of iodine in iodised salt. R. L. ANDREW and J. L. MANDENO (Analyst, 1935, 60, 801—803).—The salt (40 g.) is dissolved in 200 ml. of H₂O, the solution is made just acid with HCl (Me-orange), treated with 1 ml. of saturated aq. Br, boiled until NaCl begins to separate, diluted, cooled, and treated with 2 ml. of HCl and 0.2 g. of KI, and the liberated I is titrated with 0.002N-Na₂S₂O₃. Low results are obtained if the solution is made too acid before oxidation of the KI to KIO₃. A. R. P.

Determination of iodine in kelp. J. B. MCKEAN (Analyst, 1936, 61, 11—13).—Iodides are extracted with hot H₂O, S in the extract is coagulated by boiling with HCl and keeping for 4 hr. at 100° or 24 hr. at room temp., the extract is filtered, and the I liberated from an aliquot part by HNO₂ is extracted with CS₂ and titrated with Na₂S₂O₃. E. C. S.

Determination of radium in carnotite and pitchblende. L. D. ROBERTS (Ind. Eng. Chem. [Anal.], 1936, 8, 5).—The ore is fused with Na₂CO₃ and K₂CO₃ in a Pt boat, dissolved in HNO₃, and Rn collected in a chamber, where it is determined electroscopically. E. S. H.

Pigments and paints.—See XIII.

PATENTS.

Production of sodium sesquicarbonate and sodium bicarbonate. G. L. CUNNINGHAM and H. L. ROBSON, Assrs. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,975,449, 2.10.34. Appl., 26.7.32).—Saturated aq. NaCl containing NH₃ $\leq 32\%$ of the NaCl is treated with CO₂ at $< 40^\circ$ to ppt. Na₂CO₃, NaHCO₃, and the mother-liquor is further carbonated to ppt. NaHCO₃. A. R. P.

Production of sodium carbonate decahydrate. G. L. CUNNINGHAM, Assr. to MATHIESON ALKALI WORKS, INC. (U.S.P. 1,977,376, 16.10.34. Appl., 26.7.32. Renewed 12.1.34).—An aq. eutectic solution of NH_4Cl and Na_2CO_3 is treated at 0° with CO_2 and NH_3 while adding NaCl slowly so that the pptd. $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ crystals grow at a predetermined rate. The crystals are eventually separated from the NH_4Cl pptd. at the same time by screening on suitable sieves. A. R. P.

Recovery of potassium salts from minerals. E. P. PARTRIDGE and F. FRAAS, Assrs. to UNITED STATES OF AMERICA (U.S.P. 1,975,798, 9.10.34. Appl., 21.7.32).—Minerals containing K_2SO_4 , CaSO_4 , and MgSO_4 are reduced at $800\text{--}900^\circ$ with C or natural gas and steam, and the resulting K_2S is extracted with H_2O and converted into any suitable salt in the usual way. A. R. P.

[Alkali silicate-phosphate] detergent. H. K. IHRIG and A. S. BUTTERWORTH (U.S.P. 1,975,946, 9.10.34. Appl., 29.10.32).— $\text{Na}_2\text{SiO}_3 \cdot x\text{H}_2\text{O}$ 75 and $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$ 25% are intimately mixed in a slightly moist state and the mixture is formed into pellets under pressure. A. R. P.

Apparatus [saturator] for production of ammonium sulphate. A. SCHMALENBACH (U.S.P. 2,000,038, 7.5.35. Appl., 10.9.32. Ger., 30.7.31).—Conc. NH_3 gas is admitted to H_2SO_4 in a finely-divided state at different levels. Mechanical agitation is provided and the crystal sludge is discharged by gravity down a sloping pipe turning upwards into a steam or air lift. B. M. V.

Purification of ammonium thiocyanate. W. GLUUD, Assr. to GES. F. KOHLENTCHNIK M.B.H. (U.S.P. 1,970,303, 14.8.34. Appl., 2.5.33. Ger., 7.5.32).—Crude aq. NH_4CNS is boiled, filtered, and evaporated to crystallisation, the crystals are redissolved in cold H_2O , and, after settling for some time, the solution is filtered and again evaporated for pure crystals. A. R. P.

Preparation of magnesium sulphate. O. V. MARTIN, Assr. to TEXACO SALT PRODUCTS Co. (U.S.P. 1,977,560, 16.10.34. Appl., 19.3.32).—Oil-well brine containing MgCl_2 is treated with $\text{Ca}(\text{OH})_2$ to ppt. $\text{Mg}(\text{OH})_2$, and the washed ppt. is thickened and treated with dil. H_2SO_4 on the countercurrent principle to produce neutral aq. MgSO_4 , free from Fe^{+++} etc., which crystallises on cooling. A. R. P.

Manufacture of lead sulphocyanide [thiocyanate]. C. R. HARRIS, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,977,440, 16.10.34. Appl., 17.2.33).—Crude aq. NaCNS is purified from S^{--} , CO_3^{--} , and $\text{Fe}(\text{CN})_6^{--}$ by successive additions of Pb , Ca , and Zn salts and the filtered solution is neutralised and treated with $\text{Pb}(\text{NO}_3)_2$ to ppt. $\text{Pb}(\text{CNS})_2$. A. R. P.

Manufacture of light fluffy material [precipitated dolomite]. W. H. MACINTIRE, Assr. to AMER. ZINC, LEAD & SMELTING Co. (U.S.P. 1,975,213, 2.10.34. Appl., 2.8.32).—Calcined dolomite (1 pt.) is suspended in H_2O (12 pts.) containing NH_3 (0.05 pt.), and CO_2 is passed into the agitated suspension until the hydroxides are completely converted into carbonates. A. R. P.

Manufacture of cobaltic acetate. W. O. WALKER and U. KOPSCH, Assrs. to A. O. SMITH CORP. (U.S.P.

1,976,757, 16.10.34. Appl., 7.5.32).—A suspension of $\text{Co}(\text{OAc})_2 \cdot 4\text{H}_2\text{O}$ in glacial AcOH is treated at $50\text{--}85^\circ$ with air containing 15—20% of MeCHO , and the solvent is removed by evaporation in vac. A. R. P.

Adsorbent [silica]. G. E. TAYLOR, Assr. to GEN. CHEM. Co. (U.S.P. 1,970,255, 14.8.34. Appl., 12.7.32).—Clay is roasted at 650° and digested with 40% H_2SO_4 to remove Al_2O_3 and K_2O , the residue is washed, calcined at $600\text{--}625^\circ$, and digested with boiling 25% aq. Na_2CO_3 to extract the SiO_2 , and the solution is treated with CO_2 to ppt. SiO_2 gel. A. R. P.

Manufacture of silicious [kieselguhr] product. A. B. CUMMINS, Assr. to JOHNS MANVILLE CORP. (U.S.P. 1,970,280, 14.8.34. Appl., 11.4.32).—Levigated kieselguhr (particles $< 10 \mu$) is mixed with 6% Na_2CO_3 or borax, or the elutriated mineral is made into a slurry with an alkaline solution and then dried; the mixture obtained by either method is calcined at about 1000° for 30 min., ground, and levigated. A. R. P.

Treatment of diatomaceous earth with chemical agents. M. STOCKTON, Assr. to DICALITE Co. (U.S.P. 1,970,204, 14.8.34. Appl., 11.8.33).—The earth is heated in lumps at $> 820^\circ$ until dehydrated, then cooled by spraying with aq. Na_2SiO_3 , ground, and dried in a current of hot air at $150\text{--}200^\circ$. A. R. P.

Separation of zirconium and hafnium. W. PRANDTL (U.S.P. 1,976,293, 9.10.34. Appl., 20.5.32. Appl., 6.6.31).—Fractional pptn. with $\text{K}_4\text{Fe}(\text{CN})_6$ is claimed (cf. A., 1933, 78). A. R. P.

Preparation of dry carbon dioxide. R. T. HOWES, Assr. to H. MUMPER and L. CRICKSHANK (U.S.P. 1,977,063, 16.10.34. Appl., 18.11.30).—A slurry of finely-divided SiO_2 and MgCO_3 is autoclaved and the CO_2 evolved is separated from the steam by condensing the latter and then further cooling the residual gas with cold gases from the CO_2 liquefaction process. A. R. P.

Production of oxygen from liquid air. F. J. EICHELMAN, Assr. to CARBO-OXYGEN Co. (U.S.P. 1,976,336, 9.10.34. Appl., 20.6.32).—An apparatus for producing and delivering O_2 under pressure comprises a rectification column in which air is liquefied and separated into O_2 and N_2 , a vaporiser into which pure liquid O_2 is delivered, a valved passage connecting the upper end of the vaporiser to the low-pressure side of the rectification column, and controlled evaporating means for vaporising the O_2 at such a rate that it is delivered at a desired pressure. A. R. P.

Recovery of sulphur from sulphide ores. C. B. KUZELL (U.S.P. 1,976,736, 16.10.34. Appl., 28.12.32).—Pyrites is fed continuously into a barrel-type Cu converter in which it is rapidly melted and blown to form Fe_3O_4 , S, and SO_2 by a blast of preheated air. A. R. P.

Cyclic process for removal of oxides of sulphur from waste gases. W. C. ANDERSON (B.P. 438,582, 26.6.35).—The gases are scrubbed with an aq. suspension of MgO . The MgSO_4 formed is separated, dried, mixed with about 25% of C, and heated to a red heat in an atm. of H_2 , whereby it is reconverted into MgO . The H_2S formed in this stage may be converted into S by passing it into aq. $\text{Mg}(\text{HSO}_3)_2$. A. B. M.

Ti ores.—See X. **Electrochemical reactions.**—See XI. **ZnS pigments.**—See XIII.

VIII.—GLASS; CERAMICS.

Tests for "neutral" glass used for phials. M. CINI (Boll. chim. farm., 1935, 74, 805—808, 811—812, 837—840, 843).—Improved methods for determining the chemical behaviour of so-called "neutral" glasses, used in the making of phials for containing pharmaceutical preps., are described. The measurement of the acidity or alkalinity of such glasses is discussed.

O. J. W.

Evaluation and technological classification of quartzites. G. V. KUKOLEV (Ogneup., 1935, 3, No. 1, 7—16).—A discussion.

CH. ABS. (e)

Draining of ground-coat enamels for sheet steel. M. C. GAUTSCH (Bull. Amer. Ceram. Soc., 1936, 15, 14—15).—A coating which applied well at 21—24° had a quick "set" and a tendency to "break" below, and lost its set above, this temp. Under-smelting of the frit causes loss of set, which is usually regained by milling with 0.05% of Na₂O, Al₂O₃, or other electrolyte. Draining qualities must be controlled by standardising the smelting, grinding, and ageing processes and the temp.

J. A. S.

Sagger clays and sagger bodies. R. A. HEINDL (J. Res. Nat. Bur. Stand., 1935, 15, 255—270).—Properties of sagger bodies made from various clays and grogs have been studied as a function of composition and temp. of heating.

J. W. S.

Determination of calcium sulphate, as such, in clays. C. A. PETERS (Bull. Amer. Ceram. Soc., 1936, 15, 15—16).—The clay is extracted with H₂O, the solution filtered, conc. (and filtered again at just < saturation point, if necessary), and the CaSO₄ pptd. by diluting with EtOH.

J. A. S.

Determination of ability of clays to absorb water. F. F. LAPTEV and V. S. SCHAROV (Neft. Choz., 1934, 26, No. 11, 19—22).—The samples were kept in desiccators containing H₂SO₄ of a definite concn. until const. wt. was attained.

CH. ABS. (e)

Manufacture of magnesite brick. P. M. MUSIENKO (Ogneup., 1935, 3, No. 1, 47—53).—The process used at the Satka magnesite plant (Ural) is described.

CH. ABS. (e)

PATENTS.

Tunnel kiln. S. M. KIER and F. M. HARTFORD (U.S.P. 1,970,320, 14.8.34. Appl., 21.6.30. Renewed 18.1.34).—Claim is made for means of providing an even and controlled heating of the kiln from a longitudinal flue extending the entire length of the roof from which a series of regularly spaced gas burners are directed vertically downwards into the kiln.

A. R. P.

Coloured-glass transparencies. PILKINGTON BROS., LTD., and V. W. JENNINGS (B.P. 440,459, 25.1.35).—The glass base is patterned with hills and valleys and the latter only are charged with colouring matter.

B. M. V.

(A, B, D) **Safety glass.** (c) **Laminated safety glass.** (A—C) J. D. RYAN and (A) W. J. ARNER, (c) G. B. WATKINS, and (D) G. B. WATKINS and J. D.

RYAN, ASSTS. to LIBBEY—OWENS—FORD GLASS Co. (U.S.P. 1,976,748—50 and 1,976,758, 16.10.34. Appl., [A] 30.3.32, [B, D] 2.4.32, [C] 18.9.33).—The two sheets of glass are separated by a sheet of (A) cellulose ester plastic bonded with plasticised cellulose acetate (I) of which < 70% is sol. in a 42:58 mixture of H₂O and COMe₂, (B) (I) bonded with cellulose diacetate which has been partly hydrolysed to the hydrocellulose compound by heating with dil. HCl at 70° and then treated with a suitable plasticiser, (c) an ethylcellulose (II) plastic bonded with the product formed by oxidation of (II) with KMnO₄, or (D) (I) bonded with the plasticised oxy-compound formed by treating the diacetate with KMnO₄ at 50° and extracting the reaction product with COMe₂. A. R. P.

Colouring of sands. P. E. McELLIN (B.P. 440,481, 15.5.35).—Metallic oxides are fused without flux into the surface of the particles at < 900°.

B. M. V.

Manufacture of dental porcelain. F. P. HOFFMANN, ASSR. to AMER. PORCELAIN Co. (U.S.P. 2,000,285, 7.5.35. Appl., 19.3.32).—A mixture of felspar and SiO₂ is fused, then chilled, and ground with colouring matter, the mixture again fused, and the whole finally fused with kaolin and additional felspar.

B. M. V.

Manufacture of pressure-moulded refractory articles [e.g., zinc-distillation retorts]. A. L. J. QUENEAU (U.S.P. 1,975,800, 9.10.34. Appl., 15.3.32).—A mixture of FeCl₃ 12.5, NaCl 12.5, CaCl₂ 12.5, and 3ZnCl₂.NH₄Cl 62.5% is added to the clay, sand, and grog paste, which is then moulded under pressure, air-dried, and heated very slowly up to a temp. at which the above salt mixture forms a glaze on the surface.

A. R. P.

[Moulds for] casting of refractory metals. E. A. DE BATS (U.S.P. 1,976,009, 9.10.34. Appl., 15.10.32).—The refractory material is moulded under pressure around a pattern of fusible metal, which is then melted out.

A. R. P.

Manufacture of (A) corundum product, (B) bonded article. E. L. HAUMAN, ASSR. to EXOLON Co. (U.S.P. 1,966,407—8, 10.7.34. Appl., 17.3.32).—(A) A mixture of Al₂O₃ 60—86 and SiO₂ 40—14% with 5% of MgO is fused electrically to produce a suspension of α -corundum crystals in an unstable glassy matrix. (B) The product of (A) is ground, graded, pressed into shape with the aid of a temporary (e.g., volatile or combustible) binder, and then heated to a temp. at which the unstable matrix is converted into a stable, sintered mass consisting of mullite and a clear glass.

A. R. P.

Abrasive coated articles. CARBORUNDUM Co., LTD. (B.P. 440,569, 2.7.34. U.S., 12.10.33).—The abrasive grains are coated with a fusible resin and the backing material has a film of liquid resin, and the two elements are united and heated. The fusible resin is not necessarily applied by fusion; it may be applied in powdered form to the grains coated with the liquid resin.

B. M. V.

Apparatus for tempering glass. COMP. RÉUNIES DES GLACES ET VERRÉS SPÉCIAUX DU NORD DE LA FRANCE (B.P. 440,467 and 440,556, 9.4.35. Fr., 9.4.34).

Filtering product.—See I. **Joining ceramic materials to metals.**—See IX. **Electric furnace [for glass].**—See XI.

IX.—BUILDING MATERIALS.

Combined cements. A. TREGUBOV (Tzement, 1934, 2, No. 10, 44—47).—Hydraulic constituents (diatomite, trass, etc.) should be added in amounts of 20—30%, and inactive substances (sand, granite, etc.) in amounts of 30—40%. Data for mechanical properties are tabulated.

CH. ABS. (e)

Experiences with special cements. R. GRÜN (Angew. Chem., 1936, 49, 85—95).—The composition and physical properties and uses of Portland and allied cements are described in detail. Laboratory and practical observations on the heat of setting, strength, water-proofness, and resistance to CO_2 and salts (particularly chlorides and sulphates) of simple (Portland, slag, aluminous, etc.) and compounded cements (trass, lime-trass, puzzuolana, moler, blast-furnace slag, etc.) are recorded in graphical form.

J. A. S.

Utilisation of Novorossisk natural cement marl ("treskunui") for production of a binding material. K. KRASOVSKI (Tzement, 1934, 2, No. 10, 47—48).

CH. ABS. (e)

Use of slags from electric furnaces in the cement industry. P. BOSHEV (Stroit. Mat., 1935, No. 1, 43—45).—White and black slags (SiO_2 20.69, 10.10; Al_2O_3 3.22, 2.90; FeO 1.6, 21.67; Fe_2O_3 0, 7.83; CaO 60.99, 36.6; Mg 11.19, 8.6; MnO 2.06, 9.53; Cr_2O_3 0, 1.76%, respectively) can be used as addenda to Portland cement.

CH. ABS. (e)

Plant methods of determination of lime in slag mixtures of raw materials and cements. N. I. MEDVED (Tzement, 1935, 3, No. 1, 23—27).—A method of direct titration (Me-red) is described.

CH. ABS. (e)

Prevention of timber discoloration. Results of chemical dipping methods. M. LEVÓN (Finnish Paper and Timber J., 1935, Spec. Issue, 256—262).—To prevent fungal growth the moisture content of the wood should be < 24%. The optimum temp. is just > 0°. The best results were obtained with aq. HgEtCl or chlorinated phenols.

CH. ABS. (e)

Influence of hydrogen-ion concentration with pretreatment of wood on its subsequent delignification. A. J. COREY and O. MAASS (Canad. J. Res., 1935, 13, B, 289—295; cf. B., 1936, 103).—The effect of acids, alkalis, and salts in the solution used in pre-treating wood at 100—140° was studied. The yields of pulp and the lignin in the pulp were a min. for pre-treating solutions of p_{H} 4—5 (measured on the cold solution). When wood is heated with distilled H_2O , the latter becomes acidic owing to formation of HCO_2H and AcOH . Acid formation increases with temp.

H. J. E.

Distillation of wood and utilisation of wood waste in Japan. I. MIURA (Proc. 5th Pacific Sci. Congr., 1934, 5, 3913—3918).—Statistics are tabulated.

CH. ABS. (e)

Adhesion in relation to bituminous road materials. A. R. LEE (J.S.C.I., 1936, 55, 23—29 r).—A method for measuring the wetting properties of various road binders and oils in presence of H_2O is described. In the experimental conditions described tars have better wetting properties than has a residual bitumen of

similar η . There is little difference in the wetting properties of tar towards the different kinds of stone used in road construction when the stone surface is highly polished and previously wet with H_2O . Qual. tests support the finding that surface texture, roughness, and porosity of the stone are the most important properties of the stone affecting the adhesion of the binder. A description is given of a "jar" and a "plate" test for detecting the displacement of binders from stones as used in road construction. If weathering of the binder occurs before contact with H_2O the drying properties of the binder will have a big influence on its displacement. Reference is made to the undesirability of using wet stones for the surface-dressing of roads, and a method is described for oil-treating stones which will allow complete wetting of stones, such as porous gravels, by tar in the presence of H_2O . The factors affecting the ultimate strength of the joint between stone and stone and between stone and road are discussed in the light of the mechanism of adhesion.

Treatment of dust on travelling-roads [in collieries]. J. L. HAY and F. V. TIDESWELL (Trans. Inst. Min. Eng., 1936, 90, 213—218).—Dust-laying has been accomplished by spraying with 3% aq. Perminal W, followed at intervals of 2—3 weeks by spraying with H_2O or aq. CaCl_2 .

D. K. M.

Hydrogenation of wood.—See II.

PATENTS.

Cement plaster. F. BAUER (U.S.P. 2,000,371, 7.5.35. Appl., 20.5.33).—A composition comprising white limestone sand 58 lb., Ca(OH)_2 15 lb., Keene's or Portland cement 27 lb., and powdered dry cactus 6 oz. is claimed.

B. M. V.

[Kieselguhr] aggregate. W. R. MACDONALD, Assr. to W. M. SUTHERLAND and N. W. SNOW (U.S.P. 1,976,573, 9.10.34. Appl., 5.8.33).—Lumps of diatomite are saturated with a combustible oil and burned to produce a porous cement clinker.

A. R. P.

Curing of concrete. A. A. JOHNSON (U.S.P. 2,000,759, 7.5.35. Appl., 15.4.33).—After an initial cure under burlap, the surface is coated with a bitumen-rubber mixture (preferably as an aq. emulsion of asphalt and rubber latex) and, if desired, with S to effect vulcanisation.

B. M. V.

Waterproofed gypsum [product]. W. C. HANSEN, Assr. to AMER. CYANAMID CO. (U.S.P. 1,975,787, 9.10.34. Appl., 20.2.31).—Ordinary plaster of Paris is mixed with 1—10 (5)% of a resinate made by heating colophony with 5% of CaO .

A. R. P.

Production of insulating building slabs. H. STÖSSEL (B.P. 440,443, 19.7.34. Ger., 17.8.33).—Substantially undisintegrated seaweed and rubber or bituminous emulsion as binding medium are heated at 100—140° in closed moulds.

B. M. V.

Cements for joining constructional parts made from metallic and ceramic materials. R. BOSCH A.-G. (B.P. 440,703, 11.5.35. Ger., 20.6.34).—Finely-ground Al_2O_3 (95—99.8%) is mixed with Mg or other silicofluoride (5—0.2%), the mixture being bonded by water-glass solution of $d < 1.32$.

B. M. V.

Wood preservative. R. T. GOODWIN, J. S. REARICK, and H. P. FERGUSON, Assrs. to DORR Co., Inc. (U.S.P. 1,976,221, 9.10.34. Appl., 10.10.31).—A mixture of a toxic substance, *e.g.*, creosote, and an acid-treated cracked pressure residuum, *e.g.*, petroleum tar, is claimed.

A. R. P.

Manufacture of composite [laminated wood] article. H. R. FIFE, Assr. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 2,000,383, 7.5.35. Appl., 25.3.31).—Laminae of wood containing more H₂O than is present in seasoned wood (and, if desired, other thin materials) are coated with vinyl resin and then heated and cooled under pressure.

B. M. V.

Heat-dissipating laminated products. Drying [of wallboards].—See I.

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

Magnetic ageing of iron due to oxygen. T. D. YENSEN and N. A. ZIEGLER (Metals Tech., 1935, 2, Tech. Publ. 624).—A review of previous work indicates that dissolved O or pptd. FeO is not responsible for the magnetic ageing of Fe, but experiments on 3 samples of Fe containing $\gtrsim 0.0015\%$ C, $\gtrsim 0.0005\%$ H, and $\gtrsim 0.001\%$ S with 0.015, 0.029, and 0.019% O, respectively, indicate that the pptn. and coalescence of FeO particles at 200°, 400°, 600°, and 800° causes changes in the magnetic properties of Fe. A certain crit. particle size causes the greatest lattice distortion, and this size is probably of the order of 10⁻⁵ cm.

W. P. R.

Cast materials of the iron group for construction of chemical utensils. H. JUNGBLUTH and H. MÜLLER (Chem. Fabr., 1936, 9, 41—46).—The properties of types of Fe-alloy castings containing Si, Cr, Ni, Cu, Mn, and Al are discussed and examples given of their use in industry.

R. S.

Inhibitors of the corrosion of iron by acids. J. BANCELIN and Y. CRIMAIL (Compt. rend., 1935, 201, 1033—1034).—Rhodamine inhibits corrosion of steel by 0.1N-HCl in proportion to its concn. Inhibition by CS(NH₂)₂ (I) reaches a max. at about 50 mg. per litre. There is a corresponding min. in the potential taken up by a steel electrode in 0.1N-HCl in presence of (I).

T. G. P.

Resistance of galvanised iron to corrosion by domestic water supplies. S. C. BRITTON (J.S.C.I., 1936, 55, 19—22 r).—Differences in the manner of corrosion of Zn and of Fe by domestic H₂O supplies are due to the fact that in the case of Zn an insol. carbonate layer tends to form on the attacked areas, whereas with Fe the corresponding product becomes removed from the metal surface. Zn may suffer a pitting form of attack in some waters, although galvanised Fe may not be rapidly perforated by them, since Zn can give electrochemical protection to any part of the alloy layer of the galvanised coating which has been laid bare by corrosion. The process of electrochemical protection is complicated by the formation of obstructive layers both on the Zn and on the Zn-Fe alloy; its ultimate success appears to depend on the building up of the protective effect of a CaCO₃ layer on the alloy at a greater rate than that at which protection

is lost by dissolution of Zn from the area adjacent. The thickness of the Zn layer of the coating and the Ca(HCO₃)₂ content and *p*H of the H₂O seem to be the deciding factors.

Manufacture and properties of Bessemer steel. C. C. HENNING (Metals Tech., 1935, 2, Tech. Publ. 623, 21 pp.).—The properties of Bessemer steel which compare favourably with those of open-hearth steel are machinability, stiffness, weldability, sensitivity to cold-work, and grain-size control.

W. P. R.

Permeability to hydrogen of copper, iron, nickel, aluminium, and some alloys. W. BAUKLOH and H. KAYSER (Z. Metallk., 1935, 27, 281—285).—Drawn Cu or Al tubes are impermeable to H₂ at temp. below the m.p., but H₂ passes through Fe, Ni, Ni-Fe, and Cu-Ni tubes at $> 550^\circ$. The permeability increases with rise in temp. and decrease in wall thickness, and, in the case of alloys, with the Ni content. Ni is impermeable to the inert gases.

A. R. P.

Electrical resistance of copper and some copper alloy wires. C. BLAZEY (J. Inst. Metals, 1936, 58, Advance copy, 503—522).—The electrical resistance (*R*) of 7 samples of high-conductivity wire-bar Cu (I), 2 samples of Cd-Cu (0.6 and 1.3% Cd) (II), 1 sample of fire-refined Cu (III), and several samples of pure Cu to which small amounts of impurities were added was measured after annealing at 300—950° in CO₂ and either quenching or furnace-cooling. Practically all the samples showed min. *R* on annealing at 500° and a steady increase in *R* on quenching from $> 500^\circ$. In (I) quenching from 950° increases *R* by 0.5—1% above the min. irrespective of the nature of the previous cold-work or heat-treatment; this increase disappears on slow cooling or after reheating at 500°. High-temp. quenching has little effect on the *R* of (II), but produces an increase of 10% in that of (III). Remelting of (I) under charcoal results in a greater increase in *R* on quenching from 900°, but remelting under conditions permitting an increase in the O content results in insignificant variations in *R* on heat-treatment. Addition of S or Se to Cu with a low O content increases the resistance markedly on quenching, but has little effect on *R* after slow cooling; this difference appears to be due to variations in the solid solubility of Cu₂S and Cu₂Se in the metal.

A. R. P.

Tinning of copper wire. C. BERNHOEFT (Z. Metallk., 1935, 27, 264—266).—Faulty tinning of Cu wire is ascribed to (a) incomplete removal of pickling acid, too high a temp. in the Sn bath resulting in its contamination with Cu, too low a temp. resulting in a thin, poorly adherent coating, (b) too rapid passage through the bath, or (c) insufficient cleaning of the Cu.

A. R. P.

Possibility of substituting zinc for tin in coating copper wire. V. P. KIBANOV (Tzvet. Met., 1934, No. 4, 74—81).—The Zn coating is applied at 450°. The Zn-covered wire, on vulcanising, becomes coated with ZnS, which has no harmful effects on the wire or the rubber. Difficulties of the process are: oxidation of the liquid Zn, failure of excess Zn to run off the wire, and the high operating temp.

CH. ABS. (e)

Removal of zinc from high-tin bronze. N. N. MURATSCH (Tzvet. Met., 1934, No. 4, 69—74).—By blowing

air through molten bronze scrap the Zn in it was reduced to the permissible limit. CH. ABS. (e)

Magnesium-copper alloys. V. **Copper-rich alloys.** W. R. D. JONES (J. Inst. Metals, 1936, 58, Advance copy, 41—48; cf. A., 1931, 1224).—Alloys of Cu with $\geq 3\%$ Mg are difficult to cast free from inclusions of MgO films, which seriously affect their mechanical properties; the best results are obtained by addition of Mg to thoroughly deoxidised Cu followed by tilt-casting in a Durville machine in an atm. of N_2 . Addition of Mg to Cu increases the tenacity, yield point, and hardness, but seriously reduces the ductility; the 2.25% Mg alloy has the best properties, further addition of Mg resulting in rapid loss of ductility until at 4.25% Mg the alloys become very brittle. No age-hardening effects occur in alloys with $< 6\%$ Mg. A. R. P.

α -Aluminium-bronze and its mechanical properties. P. I. GRADUSOV (Tzvet. Met., 1934, No. 7, 126—137).— α -Al-bronze ($6.5 \pm 0.5\%$ Al; balance Cu) is a good substitute for bronzes containing Sn, Zn, and Cu or Sn, P, and Cu. Tests of its mechanical properties are described. CH. ABS. (e)

Standard manganin containing aluminium, and its properties. P. I. GRADUSOV (Tzvet. Met., 1934, No. 6, 101—105).—Manganin (Cu 85, Mn 12, Ni 3%) in which Al replaces Ni behaves during melting, pouring, and heat treatment like the ordinary alloy. The sp. resistance of the Al-manganin increases with the tempering temp. In practice it can be used up to 400°. CH. ABS. (e)

Physical properties and annealing characteristics of standard nickel-silver alloys. M. COOK (J. Inst. Metals, 1936, 58, Advance copy, 551—565).—The hardness and mechanical properties of 7 nickel-silver alloys containing Cu 62 and Ni 10—30% after varying degrees of cold-work and different annealing conditions are shown in tables and graphs. The elastic modulus and, in annealed alloys, the hardness increase regularly with the Ni content; after cold-working to 90% reduction, however, the hardness is the lower the higher is the Ni content, i.e., the work-hardening capacity of the alloys decreases with increase in Ni. The temp. at which softening commences is raised by increasing the Ni content, and lowered by an increase in cold-work. A. R. P.

Free energy and heat of formation of the inter-metallic compound CdSb. H. SELTZ and J. C. DE HAVEN (Metals Tech., 1935, 2, Tech. Publ. 622, 7 pp.).—The thermodynamic properties of CdSb have been determined by measuring the e.m.f. at 390—438° of the cell Cd (liq.)Cd (in KCl, LiCl)/CdSb (sol.)/Sb (sol.). The whole cell was evacuated in order to free the molten electrolyte from gas bubbles. The e.m.f. was reproducible to ± 0.2 mv. The free energy = $-3486 + 1.067T$ and the heat of formation = -3486 g.-cal. The entropy change of the reaction is small. W. P. R.

Influence of phosphorus and sulphur on the mechanical and technological properties of platinum and palladium. A. JEDELE (Z. Metallk., 1935, 27, 271—275).—The hardness, yield point, and tensile strength of Pt and Pd are increased, and the ductility and working properties decreased, by small quantities

of P or S. The metals become unworkable at 850° with 0.006% P, and Pd is also rendered hot-short by 0.02% S, but Pt can be hot-worked with up to 0.15% S since PtS has a limited solubility in Pt. The formation of brittle, fusible compounds along the grain boundaries of Pt and Pd vessels when heated in contact with substances which yield P or S is, in many cases, the cause of their breakdown. A. R. P.

Properties of evaporated films of aluminium over chromium. R. C. WILLIAMS (Physical Rev., 1934, [ii], 46, 146).—A Cr-Al film, prepared by evaporating first Cr and then Al on a specially cleaned glass surface, and hardened by washing with H_2O or EtOH, is superior to an Al film in hardness, and comparable with it in tenacity, tarnish-resistance, and reflectivity. The Al layer can be removed by KOH or by conc. salt solution without removing the Cr. Fumes of burning S, of H_2S , and of H_2O_2 have no apparent effect on the films, which can be repeatedly cleaned with EtOH and H_2O without deterioration. L. S. T.

Deep-drawing test for aluminium. A. G. C. GWYER and P. C. VARLEY (J. Inst. Metals, 1936, 58, Advance copy, 7—16).—The test consists essentially of two drawing operations, the first an ordinary cupping and the second a redrawing operation which serves to detect small differences in the drawing properties of various grades and tempers of Al. The necessary apparatus is described with reference to photographs, and numerous results obtained on commercial grades of Al are recorded. A. R. P.

Fatigue characteristics of three aluminium specimens, each containing from four to six large crystals. H. J. GOUGH and G. FORREST (J. Inst. Metals, 1936, 58, Advance copy, 17—40).—After subjection to alternating torsional fatigue tests at a const. range of applied torque, the slip-band distribution of all the specimens was found to be in accordance with the max. resolved shear-stress law calc. for each crystal as though it alone occupied the entire specimen, showing that the effect of grain boundaries on the distribution of slip-bands is slight. Cracking occurred only in regions of high resolved shear stress, usually in close proximity to a grain boundary, but the results clearly indicate that fatigue-cracking is not initiated at, nor does the crack tend to follow, such a boundary. The fatigue limit (10^8 cycles) of all the specimens was about ± 1 ton per sq. in., i.e., practically identical with that of a single crystal of Al. A. R. P.

Plastic working of metals. G. SACHS (Metal Ind., 1936, 48, 51—54).—A general review is given of the factors involved in the drawing, deep-pressing, and extrusion of metals. W. P. R.

Precautions necessary in changing the type of oil used in the cutting and plastic deformation of metals. K. KREKELER (Z. Metallk., 1935, 27, 262—263).—Mineral oils are now replacing vegetable and animal oils in lathe- and screw-cutting and in deep-drawing and other types of plastic deformation. Hints for using them are given. A. R. P.

Effect of molten solder on some stressed materials. G. W. AUSTIN (J. Inst. Metals, 1936, 58, Advance

copy, 473—487).—Tensile tests have been made on a no. of steels and non-ferrous alloys at 316° in oil and in molten solder. Ni, monel metal, and cupronickel are only very slightly affected by stressing in contact with the solder, whereas all the other metals and alloys tested suffered more or less weakening due principally to intercryst. penetration of the solder. Plain low-C steels and low-C pearlitic and austenitic heat- and corrosion-resistant steels are less subject to penetration than similar steels with a higher C content. In heat-treated alloy steels penetration is the greater the harder is the steel and the greater the secondary grain size. The embrittling effect of the solder seems to be of a similar nature to the notch effect and to the effect of intercryst. corrosion, in that the resistance to deformation of the metal persists while the cohesion is reduced.

A. R. P.

Frictional oxidation at metal-to-metal joints and its importance in fatigue fracture. A. THUM and F. WUNDERLICH (*Z. Metallk.*, 1935, 27, 277—280).—Frictional oxidation at these joints is caused by fatigue of the metal and the entry of O₂ into the surface layer. Evidence in support of this statement is afforded by the results of fatigue tests of steels in dry and oiled steel clamps.

A. R. P.

Sprayed metal coatings. ANON. (*Power*, 1935, 79, 143—144).—Sprayed Pb had the optimum resistance to corrosion by East River H₂O, provided the base metal was properly prepared. Phosphor-bronze has been applied up to 1.25 in. thick on salt-H₂O pumps, Zn being first applied to the cast-Fe surface. Recent advances in spraying combustion chambers of internal-combustion engines with Al are described.

CH. ABS. (e)

Spectrographic examination of alloys. H. TRICHÉ (*Compt. rend.*, 1935, 201, 1178—1181).—Suitably prepared alloys have been analysed qualitatively and certain constituents (Al and Cr) quantitatively.

T. G. P.

Non-poisonous plating baths. K. ASSMANN (*Chem.-Ztg.*, 1935, 59, 904—905).—Ag and Cu can be deposited as bright plates from solutions containing the iodides or thiocyanates dissolved in conc. solutions of the corresponding alkali salts, Cu from double alkali oxalates, Ag from CS(NH₂)₂ complexes, Cd and Zn from sulphate baths, Sn from cresolsulphonate baths, and Cr from solutions of violet CrCl₃, using sol. Cr anodes with superimposed a.c.

A. R. P.

Electrolytic test for zinc coatings on [iron] wire. S. C. BRITTON (*J. Inst. Metals*, 1936, 58, Advance copy, 49—60).—The test comprises anodic dissolution (at 1 amp. per sq. in.) of the coating in 10% aq. ZnSO₄ containing 2% of NaCl, and testing the stripped wire for exposure of Fe by immersion in 10% aq. CuSO₄ after a time just insufficient to remove the coating if it conforms to specification. The test can also be used for testing the brittleness of the coating; in the test the wire is coiled around a mandrel, then uncoiled, straightened, and tested for the specified time. Potential measurements made during stripping afford information on the structure of the coatings, and the method can be extended to determine the actual thickness of coatings. Field tests show that the method gives more reliable

indications than the Preece test as to the behaviour of galvanised Fe in outdoor exposure.

A. R. P.

Gas as industrial fuel.—See II. Ni(OH)₂ from ore.—See VII. Enamelled steel.—See VIII. Measuring stresses [in steel rods]. Detecting metallographic processes.—See XI. Steels for soya-bean sauce.—See XIX. Sewer linings.—See XXIII.

PATENTS.

Cupola operation. S. R. LEWIS, L. K. SPINK, and B. W. HAGERMAN, Assrs. to FOXBORO Co. (U.S.P. 1,977,559, 16.10.34. Appl., 3.5.33).—Claim is made for automatic means of controlling the blast supply so that a const. wt. of air is passed into the furnace in unit time.

A. R. P.

[Iron] ore conditioning process. E. BUTLER, A. K. KNICKERBOCKER, and R. O. HOCKING (U.S.P. 1,977,262, 16.10.34. Appl., 23.4.30).—The ore is conc. by a series of sizing, jigging, log-washer, and classification operations, followed by reducing-roasting and magnetic separation.

A. R. P.

[Collector for] flotation of ores. L. J. CHRISTMANN and D. W. JAYNE, JUN., Assrs. to AMER. CYANAMID Co. (U.S.P. 1,970,508, 14.8.34. Appl., 29.11.32).—Claim is made for the use of a xanthate containing an ether group but no free OH groups, e.g., the product of the reaction of aq. NaOH, CS₂, and a monoalkyl ether of O[C₂H₄·OH]₂.

A. R. P.

Ore concentration [by flotation]. W. TROTTER and E. W. WILKINSON, Assrs. to MINERALS SEPARATION N. AMER. CORP. (U.S.P. 1,976,203, 9.10.34. Appl., 11.4.32).—Claim is made for the use, as collector, of the reaction product of an org. chloride, e.g., BzCl, with an organo-metallic monothiocarbonate, e.g., KEtCO₂S.

A. R. P.

Manufacture of ornamental rustless iron product. A. L. FEILD, Assr. to ALLOY RESEARCH CORP. (U.S.P. 1,977,270, 16.10.34. Appl., 2.11.32).—The article is indented or reticulated and heated at 315° until the surface attains a straw or "old gold" colour; the prominent parts are then buffed bright, leaving the colour untouched in the recessed parts.

A. R. P.

Forming chromium-iron alloys. J. J. VETER, Assr. to NATURAL PRODUCTS REFINING Co. (U.S.P. 1,975,338, 2.10.34. Appl., 10.9.32).—Chromite is roasted with CaO, Na₂CO₃, and CaF₂ at < the m.p. of the CaF₂ to convert 65—80% of the Cr₂O₃ into sol. chromate, which is leached out, and the residue smelted with coke and/or ferrosilicon to produce a Cr-Fe alloy.

A. R. P.

Bimetallic spring. A. R. STARGARDTER, Assr. to GILLETTE SAFETY RAZOR Co. (U.S.P. 1,977,458, 16.10.34. Appl., 16.12.33).—Claim is made for a spring made by coiling a flat strip of steel (1.1% C) coated with Cu by immersion in molten Cu, and then hardening and tempering it as usual.

A. R. P.

Hardening of iron and steel. H. BARDT (U.S.P. 1,976,210, 9.10.34. Appl., 2.12.32. Ger., 9.12.31).—The metal is heated at 850—950° in an atm. of CO₂, quenched in linseed oil containing colophony 12, acid K resinates 3, and (HCO₂)₂Ni 3 and/or urea 7.5%, reheated to redness, and quenched in H₂O.

A. R. P.

Preparation and composition of rods of hard facing material [for surface-hardening cast iron]. C. TAYLOR, J. A. WEIGER, and G. N. SIEGER (U.S.P. 1,977,361, 16.10.34. Appl., 16.2.33).—A mixture of powdered Ni 2–5 (3), ferrocromium 14–39 (27.5), ferromolybdenum 7–23 (15), ferrotungsten 2–30 (2.67), C 1, WC 5–25, and Fe 30–65% is pressed to form a bar or rod, using a wax binder, and sintered in H_2 at 1200°. A. R. P.

Hardening iron, steel, and cast-iron alloys by nitriding. O. HENGSTENBERG, Assr. to NITRALLOY CORP. (U.S.P. 1,970,141, 14.8.34. Appl., 10.10.31. Ger., 1.11.30).—The surface of the articles is coated with a thin film of CoO or $CoSO_4$, which prevents catalytic decomp. of the NH_3 thereon and thus increases the depth of hardening. A. R. P.

Air-hardening steel. H. HARRIS, Assr. to A. O. SMITH CORP. (U.S.P. 1,976,341, 9.10.34. Appl., 27.6.32).—The steel contains Cu 3–4 (4), C 0.1–0.25 (0.16), Mn 1.5–2 (2) %, and is hardened by heating to 800–850° and cooling in air or quenching in oil to produce a tensile strength of \leq 85 tons per sq. in. with an elongation of \leq 13.5%. A. R. P.

Hard facing [of tool steels]. F. P. HAWKINS, Assr. to HAYNES STELLITE CO. (U.S.P. 1,977,128, 16.10.34. Appl., 22.9.32).—A welding rod of soft steel is sprinkled on one side with a flux of steel chips 20, Mn 60, borax 5, and CaO 5%, then with powdered WC or other hard material, and heated at 1320° in a reducing or neutral atm. to melt the flux. The rod is then used for applying a hard coating to drills etc. by arc- or C_2H_2 -welding. A. R. P.

Case-hardening [of steel]. A. B. KINZEL, Assr. to ELECTRO METALLURG. CO. (U.S.P. 1,977,280, 16.10.34. Appl., 21.8.31).—The steel contains Fe \leq 85, C \leq 0.1, and V \leq 0.6% and is case-hardened until the outer layer contains $>$ 0.9% C. The V stabilises the structure of the inner layers during the hardening treatment. A. R. P.

Copper alloy. W. B. PRICE, Assr. to SCOVILL MANUFG. CO. (U.S.P. 1,976,803, 16.10.34. Appl., 28.2.34).—Alloy of high strength and elastic limit for making shell and cartridge cases immune from season-cracking consists of Cu with Si 0.1–1 (0.5 or 1), Sn 0.01–0.5 (0.25), and Fe 0.01–0.75 (0.25)%. A. R. P.

Copper-base alloy. J. WECKER (U.S.P. 1,975,216, 2.10.34. Appl., 12.8.32. Ger., 18.8.31).—A bearing brass for railway-coach axle journals consists of Cu with Pb 20–30, Mn 1–7 (1), and Ni 1–5 (3)%; addition of 0.3% of Na deoxidises the metal and assists in maintaining the Pb regularly distributed throughout the casting. A. R. P.

Composition of matter and treatment of molten [non-ferrous] metals. A. H. DAVIES (U.S.P. 1,975,084, 2.10.34. Appl., 7.3.32).—Cu alloys are treated before casting with a mixture of $KClO_3$ 2–4, MnO_2 2–3, borax 2–4, CaF_2 1–2, Zn 1, Mn 1–2, Fe_2O_3 2, dolomite 2, coal 2, and charcoal 2 pts. A. R. P.

Protection of molten [galvanising] baths. J. S. GUMBERT and J. E. HUTCHINSON, Assrs. to PENNSYLVANIA SALT MANUFG. CO. (U.S.P. 1,970,136, 14.8.34. Appl.,

1.3.32).—The surface of the molten Zn is covered with a thick layer of pptd. Al_2O_3 . A. R. P.

[Tarnish-resisting] silver alloys. E. F. KERN, Assr. to AMER. METAL CO., LTD. (U.S.P. 1,970,318–9, 14.8.34. Appl., 8.5.31).—The alloy consists of (A) Ag 85–93, Sn 3–14, and Cd, Zn, Sb, Ni–Cr, Cu, Mn, Li, or Ca, or mixtures of \leq 2 of these, 1–4%, e.g., Ag 91, Sn 8.5, Li 0.5%, or (B) Ag 85–92, Sn 4–11, and Cd, Zn, Sb, Ni–Cr, Cu, or Mn 1–4%. The amount of alloying element present in each case is such as to produce a Brinell hardness of $>$ 36 and, in (A), the Li + Ca is \geq 1%. A. R. P.

Treatment of [lead] alloys. J. C. DITTMER, Assr. to NAT. LEAD CO. (U.S.P. 1,976,333, 9.10.34. Appl., 17.9.31).—Sn, As, Al, Si, Se, Te, and alkaline-earth metals are removed from molten Pb and Sb–Pb alloys by treatment with NaOH and steam at \geq 425° while the metal is stirred in such a way as to form a vortex into which the reagents are drawn. A. R. P.

Manufacture of [barium–nickel–cobalt] alloy and electron emitter. D. W. RANDOLPH, Assr. to GEN. MOTORS CORP. (U.S.P. 1,976,295, 9.10.34. Appl., 6.5.32).—The alloy consists of Ni and/or Co with Cr \geq 10, Mn \geq 2, and Ba 0.1–0.8%. A. R. P.

Sulphating titaniferous ores. B. D. SAKLATWALLA, H. E. DUNN, and A. E. MARSHALL, Assrs. to SOUTHERN MINERAL PRODUCTS CORP. (U.S.P. 1,977,208, 16.10.34. Appl., 8.8.32).—Ground ilmenite is treated with 80% H_2SO_4 at 65° in a rotary kneading machine heated by means of an oil-jacket until the vigorous reaction has subsided; the temp. is then gradually raised to 250° and kneading continued until the pasty mass becomes dry and crumbly, whereby a 90% sulphation is obtained. A. R. P.

Bright finishing of metals. A. E. BELLIS (U.S.P. 1,970,268, 14.8.34. Appl., 17.8.32).—Scale and oxide from annealing operations are removed by quenching or pickling in aq. 5% Na_2CO_3 containing 5–6% of HCO_2NH_4 . A. R. P.

Separate recovery of volatile metals, non-metals, or volatile or gaseous metallic or non-metallic compounds. C. P. DEBUCH, Assr. to AMER. LURGI CORP. (U.S.P. 1,977,117, 16.10.34. Appl., 14.3.33. Ger., 2.1.32).—The material is passed through a rotary furnace divided into two zones in the first of which the more volatile constituent is expelled and discharged from the charging end of the furnace by a counter-current air flow, and in the second of which the less volatile constituent is expelled and discharged at the discharge end of the furnace by a direct current of air. The process is applicable to the recovery of As and S (or SO_2) from arsenical pyrites. A. R. P.

[Magnesium] alloy. R. E. PAINE, Assr. to MAGNESIUM DEVELOPMENT CORP. (U.S.P. 1,975,120, 2.10.34. Appl., 4.1.34).—The alloy contains Sn 0.1–20 (5) and Co 0.1–4 (1)%; high strength and hardness are obtained by annealing at 525° for 20 hr., quenching, and ageing at 150° for 20 hr. A. R. P.

[Magnesium] alloys. G. SCHICHTEL, Assr. to AMER. MAGNESIUM METALS CORP. (U.S.P. 1,975,375–6, 2.10.34.

Appl., 22.8.33. Austr., 19.2.32).—(A) The alloy consists of Mg 80—98.9, with Zn 1—20 and Sb and/or Bi 0.05—2%. (B) Mn 0.12—2% replaces part of the Zn.

A. R. P.

Duplex [magnesium] metal article. R. H. BROWN, ASSR. to MAGNESIUM DEVELOPMENT CORP. (U.S.P. 1,975,778, 9.10.34. Appl., 20.10.33).—Claim is made for Mg sheet coated on both sides with a protective thin layer of welded and rolled-on Mg alloy containing Hg 0.02—5, Tl 0.01—2, or Pb 0.5—15%, or any combination of these metals in amounts sufficient to increase the potential of the Mg.

A. R. P.

Refining of white-metal scrap. G. O. HIERS, ASSR. to NAT. LEAD CO. (U.S.P. 1,976,225, 9.10.34. Appl., 19.7.30).—The mush of Al compounds with Sb, As, Cu, and Fe obtained by treating white metal with Al is heated with the oxide or sulphide of one of the metals in the mush, e.g., with PbO or PbS, Cu₂S, or SnS to remove the Al, Sb, and As.

A. R. P.

Coating for [light-alloy] pistons. H. K. WORK, ASSR. to ALUMINUM CO. OF AMERICA (U.S.P. 1,975,818, 9.10.34. Appl., 24.8.32).—The piston is degreased, etched in a 1:3 vol. mixture of conc. HF and conc. HNO₃ at 20°, plated with Ni in a sulphate bath containing MgSO₄, NH₄Cl, and H₃BO₃, and then plated with Sn from a double oxalate bath. An intermediate layer of Co or Cr may be used instead of Sn.

A. R. P.

Electrolytic production of powdered metals. W. M. COSTA (U.S.P. 1,977,173, 16.10.34. Appl., 11.4.32).—The metal is deposited on a rotating spherical or ellipsoidal cathode partly immersed in the electrolyte and operating against a scraper outside the solution.

A. R. P.

Zn-distillation retorts. Casting refractory metals.—See VIII. **Joining metals to ceramic materials.**—See IX. **Welding electrode.**—See XI. **Degreasing metals.**—See XII. **Paint for steel oil tanks.**—See XIII. **Rubber-metal joints.**—See XIV.

XI.—ELECTROTECHNICS.

X-Ray measurement of elastic stresses. R. GLOCKER (Z. Metallk., 1935, 27, 196—198).—The mathematical principles of the method are explained and their application is illustrated with reference to the determination of elastic stress of steel rods under torsion.

A. R. P.

Detection of metallographic processes by radioactive methods. O. WERNER (Z. Metallk., 1935, 27, 215—219).—Since the rate of diffusion of radioactive emanations through a metal lattice is controlled by the lattice vibrations, the course of the temp.-radioactivity curves of a metal containing a radioactive substance, e.g., Th-X, is governed by the frequency and amplitude of the at. movements in the metal. The temp. coeff. of radioactivity of different metals is inversely \propto the characteristic temp., Θ , where $\Theta = h\nu_0/K$ (h = Planck's const., K = Boltzmann's const., and ν_0 = the limiting frequency of the metal). Determination of this coeff. affords a method of calculating the energy absorbed in rolling and the amount of dissolved H₂ in, e.g., electrolytic Cu, for determining transformation and magnetic

points of metals, and for studying the progress of sintering of compressed metal powders (Ni and Mo).

A. R. P.

Theory of the heat-treatment of magnetic materials. R. M. BOZORTH (Physical Rev., 1934, [ii], 46, 232—233).

L. S. T.

Use of furnace slag.—See IX. **Resistance of Cu and Cu-alloy wires. Test for Zn coatings on Fe wire. Plating baths.**—See X. **Colour testing.**—See XIII.

PATENTS.

Electric furnace. J. FERGUSON, ASSR. to FAIRMOUNT GLASS WORKS, INC. (U.S.P. 2,000,278, 7.5.35. Appl., 18.5.34).—In a furnace of the charge-resistance type for melting glass, cooling means are provided at paths of likely leakage to render any leaking glass non-conducting, a notable place being the junction between the refractory material of the electrode boxes and the furnace walls.

B. M. V.

Electrical resistance [silver-wire] thermometer. O. FEUSSNER, ASSR. to W. C. HERAEUS G.M.B.H. (U.S.P. 1,970,084, 14.8.34. Appl., 26.8.31. Ger., 26.8.30).—Ag wire containing 0.46—10 (0.46)% Au has a similar resistance to Pt up to 300—400° and is therefore suitable for resistance thermometers within this range.

A. R. P.

Carrying out electrochemical reactions. E. BERL, ASSR. to MATHIESON ALKALI WORKS, INC. (U.S.P. 2,000,815, 7.5.35. Appl., 30.9.31. Ger., 3.2.28).—In an apparatus for the production of peroxides and per-salts, the cathode comprises active C (with, if desired, insertions of graphite) which is protected from H₂O by a very thin coating of paraffin wax or the like. The oxidising gas may be applied to the exterior, or to the interior of a hollow electrode.

B. M. V.

Electrolyte for use with filmed [aluminium] electrodes [in condensers]. J. E. LILIENTFELD, ASSR. to ERGON RES. LABS., INC. (U.S.P. 1,976,700, 9.10.34. Appl., 31.10.31).—Aq. H₃BO₃ is claimed.

A. R. P.

Electric gaseous-discharge devices [neon tubes]. T. E. FOULKE, ASSR. to GEN. ELECTRIC VAPOR LAMP CO. (U.S.P. 1,965,585—9, 10.7.34. Appl., [A] 7.10.29, [B] 6.1.31, [C] 21.11.31, [D] 13.5.32, [E] 11.10.32).—(A) The electrodes are coated with a suspension of BaCO₃ and SrCO₃ in cellulose acetate solution and a small quantity of Mg or Ca is attached to one electrode, the tube is evacuated and heated to expel all volatile matter, a mixture of Ne with about 0.7% of A is admitted to 40—50 mm., and a high-potential high-frequency discharge of steep wave-front is created between the electrodes to reduce the oxides to metal. (B) The tube contains horizontal flat electrodes coated on the front with a mixture of Ba and BaO and on the back with Al powder to prevent creep of the cathode glow. (C) The BaO—SrO film on the electrodes is reduced by a steep wave-front discharge in an atm. of A containing 10% of N₂ at 10—12 mm. (D) The surface of the electrodes is etched and coated with a mixture of BaN₂ and CsN₃, the bulb is heated at 250°, but the electrodes are kept at < 150° during evacuation and, after admittance of the inert gas, heated at 180° to produce a surface of metallic Cs on the electrodes. (E) The tube contains

centrally disposed Ni electrodes coated below with Al and above with BaO, and subjected to conditions by which part of the BaO is reduced to Ba. A. R. P.

Electric glow-discharge tube. G. HOLST, M. J. DRUYVESTYEN, J. H. DE BOER, and M. C. TEVES, Assrs. to RADIO CORP. OF AMERICA (U.S.P. 1,976,397, 9.10.34. Appl., 18.2.31. Holl., 25.2.30).—The tube contains Ne and A at low pressure, two electrodes, one of which is coated with a mixture of Cs and Cs₂O, and a Cu starting plate from which a potential is applied to the alkali-covered electrode to reduce the striking potential of the tube. A. R. P.

Coating for thermionic cathodes. J. McCULLOUGH, Assr. to HEINTZ & KAUFMAN, LTD. (U.S.P. 1,977,318, 16.10.34. Appl., 31.5.32).—A Ni ribbon is coated with a mixture of BaCO₃ and/or SrCO₃ with sugar and heated by passing a current through it until the sugar is burned away and the carbonates are converted into oxides. A. R. P.

Coated electrodes for electric welding. (A, B) P. R. JUDY and (A) H. R. PENNINGTON, Assrs. to INDIANA STEEL & WIRE CO. (U.S.P. 1,977,277, 16.10.34. Appl., 1.7.33).—(A) A steel welding rod is coated with a paste of gum arabic and TiO₂ (< 30%) which stabilises the arc. (B) The rod is coated with the usual fluxes to which has been added > 10% of BaO, SrO, or CeO₂ to reduce the arc voltage. A. R. P.

Paste for [lead] storage-battery plates. H. R. HARNER and T. W. CARNEY, Assrs. to EAGLE-PICHER LEAD CO. (U.S.P. 1,975,544, 2.10.34. Appl., 30.7.31).—A compost of straw, sawdust, leaves, and tan bark undergoing aerobic decomp. is extracted twice with boiling dil. aq. NaOH, the extract is neutralised and treated with an aq. solution of a Pb salt, and the resulting ppt. of Pb tannate etc. is incorporated with the usual Pb oxide paste used for coating the plates of accumulators. A. R. P.

Manufacture of a permanent magnet. Y. KATO and T. TAKEI, Assrs. to MITSUBISHI DENKI KABUSHIKI-KAISHA (U.S.P. 1,976,230, 9.10.34. Appl., 8.8.33. Jap., 25.12.30).—Claim is made for moulded and sintered mixtures of Fe₃O₄ with CoO and NiO, CuO, ZnO, Cr₂O₃, or WO₃; e.g., Fe₃O₄ and CoO.Fe₂O₃ (1:1 mol.) are heated at > 600° and moulded into shape, or first moulded into shape and heated at 600° in a slightly reducing atm. A. R. P.

Copper oxide rectifier. P. H. DOWLING, Assr. to UNION SWITCH & SIGNAL CO. (U.S.P. 1,975,356, 2.10.34. Appl., 19.9.33).—Dished discs of Cu are mounted in pairs with the convex surfaces of each pair in contact and heated until the surfaces are converted into CuO above a layer of Cu₂O. The CuO is removed from the concave surface and the CuO-Cu₂O mixture from those parts of the convex surface which were in contact during oxidation. A. R. P.

Photometers. OLDHAM & SON, LTD., and H. HOLT, JUN. (B.P. 440,579, 12.10.34).—An apparatus for testing miners' safety lamps embodying a photo-electric cell is described. B. M. V.

Storage-battery plates. CHLORIDE ELECTRICAL STORAGE CO., LTD. (B.P. 440,939, 10.8.35).

Electric-discharge tubes. GEN. ELECTRIC CO., LTD., R. L. BREADNER, and A. G. PEARCE (B.P. 441,134, 9.7.34 and 20.2.35).

Gas-analysis apparatus.—See I. **Electron emitter.**
Powdered metals.—See X. **Rubber-metal joints.**—See XIV.

XII.—FATS; OILS; WAXES.

Spontaneous ignition of linseed oil. H. LEVECKE (Farbe u. Lack, 1936, 41—43).—The self-ignition of chrome-green (I) paint was investigated by conducting air or O₂ for > 20 hr. through chrome-yellow (II) and Prussian-blue (III) dispersions in linseed oil. Rapid temp. rises were observed with (III) and ignited residues of (I) containing Fe₂O₃, but no such rise was obtained with (II) or the oil alone. It is inferred that the pigment acts not as an O₂ carrier, but as an absorbent for the oil; heat evolution ensues at the interface until the ignition points of (III) and the oil are attained. Addition of large proportions of kieselguhr reduced the heat evolution considerably. Caution must be exercised in grinding (III) with drying oils and in exposing dry (I), (II), and (III). S. M.

Composition of olive oil from the islands of Rodi and of Coo. V. BRANDONISIO (Chim. e. l'Ind., 1936, 18, 14—16).—Respective data are: *d*¹⁵ 0.9172, 0.9171; *n*²⁵ 62.6, 62.8; Engler η (at 25°) 11.30, 11.30; solidifying point 10°, 9°; acidity 1.54, 2.93; sap. val. 190.70, 192.04; I val. 84.18, 88.89; unsaponifiable matter 1.451, 1.258%; fluorescence both yellow-orange. The vals. for the glycerides (olein 68.58, 67.96; linolein 10.30, 13.52; palmitin 19.40, 16.87; stearin 0.26, —; myristin —, 0.39) are similar to those obtained by other workers for oils from warm regions. J. G.

Optical activity of the unsaponifiable matter of olive oil. I. W. CRUSA (Chim. e. l'Ind., 1936, 18, 13—14).—Treatment of pure expressed olive oil with 5% of carboraffin for 5 min. reduced the $[\alpha]$ from 0.37—0.40° to 0—0.10°, whilst with secondary refined oils the max. fall was only 0.12°. A crude filtered S oil was refined by treatment in succession with H₂O, 1.5% H₂SO₄, 20—25% NaOH, "klarit," and deodorisation, and the unsaponifiable matter and $[\alpha]$ were determined at each stage. $[\alpha]$ decreased from 9.7° (after H₂SO₄ treatment) to 0.45°, the biggest drop (8.7° to 0.75°) being after treatment with klarit; unsaponifiable matter also decreased (2.25 to 1.55%) at this stage of the treatment. J. G.

Fractional distillation of the fatty acids of highly hydrogenated [fish] oils. II. S. UENO and S. MATSUDA (J. Soc. Chem. Ind., Japan, 1935, 38, 691—692 B; cf. B., 1935, 1053).—Repeated fractionation of the product obtained by saponification of refined fish oils after hydrogenation under high pressure in presence of Ni affords a no. of saturated fatty acids in the % proportions given in parenthesis. Thus extremely hardened Alaska pollack liver oil, m.p. 59.8—60.7°, gave mixed fatty acids, m.p. 54.4—55.6°, which contained C₁₄ (0.9—1.0), C₁₆ (13—14), C₁₈ (37—38), C₂₀ (18—19), C₂₂ (25—26), and C₂₄-acids (1.0—1.1), whilst highly hardened Hiragashira liver oil, m.p.

57.2—58.4°, gave mixed fatty acids, m.p. 54.6—55.7°, which contained C_{14} - (1.8—1.9), C_{16} - (19—20), C_{18} - (32—33), C_{20} - (19—20), C_{22} - (19—20), and C_{24} -acids (5—6).
H. G. M.

Characteristics of halibut-liver oils. R. T. M. HAINES and J. C. DRUMMOND (Analyst, 1936, 61, 2—7; cf. B., 1934, 412).—The direct relation previously observed between the vitamin-A content and the I val. of such oils extends to the *n* and the % of unsaponifiable matter. The proportion of sterols precipitable by digitonin in the unsaponifiable matter varies inversely as the -A content of the oil. Relevant data are tabulated for 18 samples of West Greenland, 9 of Labrador, and 3 of Iceland oils and for 5 oils of unknown origin. The cellular structure of halibut liver is denser and more compact than that of cod liver, which probably accounts for the comparative difficulty of extraction of oil by treatment with steam.
E. C. S.

Characteristics of halibut-liver oils of the 1935 season. N. EVERS, A. G. JONES, and W. SMITH (Analyst, 1936, 61, 7—11; cf. B., 1934, 26; 1935, 194, 560).—The ranges of vals. for 41 oils from Iceland, Faroës, and West Greenland, and 5 Norwegian oils were: blue val. 495—6300, vitamin-A 18,700—211,300 units per g., -D (on 3 bulked samples) 2300—2800 units per g., d_{20}^{25} 0.924—0.929, n_D^{20} 1.4709—1.4836, acid val. 0—3.6, sap. val. 160—176, I val. 115—131, unsaponifiable matter 7.2—17.55%, I val. of unsaponifiable matter 95—197, of glycerides 111—133, of non-A unsaponifiable matter 50—83.
E. C. S.

Spectroscopic determination of the vitamin-A content of pilchard oil. G. M. SHRUM and T. G. HOW (Canad. J. Res., 1935, 13, A, 93—98).—Results obtained by calculation from the extinction coeff. of the oil (328 μ), using the conversion factor for cod-liver oil, were much > those of biological tests. The discrepancy is not entirely explained by the presence of colouring matter or of saponifiable substances in the oil.
A. G. P.

Quality of Japanese fish oils from the viewpoint of the hardened oil industry. V. Quality of sardine and herring oils. S. UENO and G. INAGAKI (J. Soc. Chem. Ind., Japan, 1935, 38, 693—698 B; cf. B., 1933, 797).—The sap., I, and acid vals. of a large no. of Japanese sardine and herring oils produced at various places since 1932 are tabulated. The quality of the oils has improved in recent years. Ordinary sardine oils have an I val. > 170; that of small-herring oils is much less, whilst "Baka herring oils" have an intermediate val.
H. G. M.

Practical value of technical stearin for candle-making. S. UENO and H. TSUCHIKAWA (J. Soc. Chem. Ind., Japan, 1935, 38, 693 B).—Autoclaved fatty acids of hardened fish oils (autoclaved stearin) is suitable as a substitute for paraffin for candle-making.
H. G. M.

Fish oils in paint.—See XIII. **Glucosides in food-stuffs.**—See XIX. **[Fatty oils in] maté leaves etc.**—See XX.

PATENTS.

Manufacture of [mono]glycerides of fatty acids. IMPERIAL CHEM. INDUSTRIES, LTD., T. P. HILDITCH, and

J. G. RIGG (B.P. 440,888, 2.7.34).—Mixed glycerides containing a high proportion (< 80%) of monoglyceride are prepared by esterifying 1 mol. of fatty acid(s) with > 1 (< 3) mol. of glycerol at 120—180° in a medium which dissolves both ingredients, viz., a phenol or mixture of phenols (cresols, xylenols); an aromatic or (preferably) a hydroaromatic sulphonic acid (e.g., camphor- β -sulphonic acid) is used as esterification catalyst.
E. L.

Apparatus for degreasing metal and like non-absorbent articles. W. F. JESSON, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 440,732, 5.7.34).—An accessory to the usual heavy-vapour degreasing plant comprises a portable tank for small articles placed within the fixed degreasing tank and supplied, preferably from the bottom, with liquid solvent condensed on the coil of the apparatus.
B. M. V.

Manufacture of emulsifying media. R. KERN, ASSR. TO CHEM. FABR. R. BAUMHEIER A.-G. (U.S.P. 1,977,558, 16.10.34. Appl., 4.8.31. Ger., 6.8.30).—Casein (200) is soaked in dil. aq. NH_3 (800) until it ceases to swell and the mixture is kneaded hot with oleic soap (500 pts.) and set aside to ripen. The product is used for emulsifying resin with H_2O .
A. R. P.

Manufacture of waxes. H. T. BÖHME A.-G. (B.P. 441,096, 3.10.34. Ger., 18.11.33).—Unsaturated wax esters (whence unsaturated wax alcohols can be obtained by saponification) are manufactured by reduction of higher fatty acids (> C_8) with H_2 in presence of catalysts (Cu-Cr, Pt, etc.) the activity of which is controlled by the addition of "regulators" so that the reduction of the ester grouping or of the unsaturated linkings is retarded and only the CO_2H group becomes reduced. The regulators consist of non-metallic compounds containing non-metals or metalloids of group IV, V, or VI which are capable of exercising a higher valency, e.g., a compound of S'' with quinoline diluted with xylene in amount \equiv 0.03—0.6% of the S, on the wt. of catalyst employed.
E. L.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Fish oils in paint media. F. OHL (Farbe u. Lack, 1936, 39—40, 53—54).—Substitution of linseed oil in a phenol-resin varnish by increasing proportions of a fish oil (const. given) gradually increased the drying time and H_2O -penetrability (data tabulated) of the films and reduced their resistance to weather and chemicals. Products cooked at 250° and 300° behaved much the same. Exposure of a fish oil to light during summer months improved its drying time and other properties.
S. M.

Preparation of paints and pigments. E. S. GREIGOV (Peint., Pig., Ver., 1936, 13, 7—8).—Laboratory preps. of (especially) white ZnS from Zn solution and S, and of clean violet and yellow shades of Fe_2O_3 pigments from Fe_2O_3 and borax are described.
S. S. W.

Properties of zinc oxide influencing the weathering of paints. A. C. EIDE (Off. Digest, 1935, No. 145, 164—177).—Relatively coarse acicular types of ZnO impart better durability to paints. Blends of basic Pb sulphate and acicular ZnO are as good as, or superior to, co-fumed leaded ZnO.
CH. ABS. (p)

Colour permanency of synthetic and natural iron oxides [in paint]. H. R. HARLAN (Amer. Paint J., 1935, 19, 18).—Colour changes in natural and synthetic sienna, yellow oxide, French ochre, etc. are compared in linseed oil paints under severe weather conditions. CH. ABS. (p)

Viscosity of oil paints as an indication of their structure. H. WOLFF and G. ZEIDLER (Kolloid-Z., 1936, 74, 97—103).—The expression $\log \eta_{sp} = ap + b$, where η_{sp} is sp. viscosity, p the pigment content in vol.-%, and a and b are consts., is derived for oil-paint systems. The dispersity of the pigment is related to a . E. S. H.

Oil requirements of pigments as a function of size and form of the particles. H. WOLFF and G. ZEIDLER (Kolloid-Z., 1936, 74, 103—106; cf. preceding abstract).—The max. density of packing of pigment particles of different size and form is discussed. E. S. H.

Ball mills for wet grinding [of pigments]. O. PROMNITZ, SEN. (Farben-Ztg., 1936, 41, 136—137).—The control of quality and time of grinding by varying the quantity of balls and material to be ground in relation to total vol. of mill is discussed mathematically. S. S. W.

Zinc sulphide pigments for internal paints. H. A. NELSON (Off. Digest, 1935, No. 145, 177—185).—Effects of modification of the base to suit the vehicle on properties of the finished paint are examined. CH. ABS. (p)

Rapid determination of titanium [in pigments]. H. B. HOPE, R. F. MORAN, and A. O. PLOETZ (Ind. Eng. Chem. [Anal.], 1936, 8, 48—49).— TiO_2 is reduced to Ti^{2+} by liquid Zn amalgam and titrated with $FeNH_4(SO_4)_2$, using KCNS as indicator. $CaSO_4$ does not interfere, but $BaSO_4$ should be removed before the reduction. E. S. H.

Colour testing and recording. N. BLAND (J. Oil Col. Chem. Assoc., 1936, 19, 9—23).—Lovibond, Guild-trichromatic, and photo-electric cell methods are described. The undertone of pigments and the determination of their staining power in oil and H_2O are discussed. S. M.

Recovery of glycerin from used printing blocks. J. ALTENBURG (Chem.-Ztg., 1935, 59, 901—902).—Glycerin may be recovered from residues containing gelatin, glue, and sugars by steam-distillation at 165—200° or by mixing the material with an equal wt. of hot H_2O , adding CH_2O , heating for 3—4 hr. at 100—105°, and extracting the comminuted mass countercurrently with hot H_2O . The residue from the latter process may be ground with peat for use as fertiliser. A. R. P.

Varnish making in the light of recent developments. P. J. GAY (Paint Manuf., 1935, 5, 106—107).—A discussion. CH. ABS. (p)

New forms of phenol resins. J. TSCHULKOV, M. SPERANSKAJA, and V. BIBISCHEV (Plast. Massui, 1934, No. 6, 17—26).—The optimum ratio for prep. of resin by chlorination is 1 PhOH : 10 NaOH : 5.4 Cl_2 . Steam-distillation of the resin yields 2 : 4 : 6- $C_6H_2Cl_3$ -OH and two ketonic substances one of which is probably tetrachloroketodihydrobenzene. The non-volatile portion is a resin. CH. ABS. (p)

Recovery of technical resins. M. SOBOLEVSKI (Plast. Massui, 1934, No. 6, 40—42).—A mixture of 83.3% of ground resin waste, 8.3% of furfuraldehyde, and 8.3% of novolac containing 15% of $(CH_2)_6N_4$ is pressed at 155—165°/300—400 kg. per sq. cm. CH. ABS. (p)

Measurement of the mechanical properties of plastic films. A. VILA and F. TESSON (Compt. rend., 1935, 201, 1031—1033).—An arrangement for the rapid study of the elasticity and viscous flow of extensible films is described. Results for three paints and a varnish are recorded. T. G. P.

Spontaneous ignition of linseed oil.—See XII.

PATENTS.

Manufacture and application of protecting composition for materials. [Paint for steel oil tanks.] E. R. SCHAEFFER, ASSR. to PHILIP CAREY MANUF. CO. (U.S.P. 1,976,807, 16.10.34. Appl., 7.8.30).—Tung, soybean, or, preferably, maize oil is heated with S at 65—92° or treated with S_2Cl_2 at room temp. until partial reaction occurs; the mixture is then sprayed or painted on steel or Fe tanks and the reaction allowed to complete itself by exposure to air to produce a strong, plastic, adherent coating resistant to corrosion by acid vapours. A. R. P.

(A) Heat-treatment of pigments. (B) Handling pigments for heat-treatment. (C) Production of zinc sulphide pigments. (A) C. C. FEAGLEY, (B, C) M. L. HANAHAN, ASSRS. to KREBS PIGMENT & COLOR CORP. (U.S.P. 1,977,577 and 1,977,582—3, 16.10.34. Appl., 22.4.31).—(A) Pptd. pigments are heated with steam under pressure at $> 200^\circ$ (310—360°) for 5—50 min. to develop the colour and texture, instead of the usual calcining operation. (B) A 1 : 1 slurry of the pigment and H_2O is autoclaved, with stirring, at 200—700° but preferably below the crit. point of H_2O . (C) ZnS containing $\geq 0.05\%$ Zn as ZnO or $\geq 0.075\%$ excess S as Na_2S , or lithopone, is pigmented by heating in the form of a thick slurry at $> 200^\circ / > 215$ lb. per sq. in. A. R. P.

Improvement of pigments containing titanium. F. VON BICHOWSKY (U.S.P. 1,975,339, 2.10.34. Appl., 3.2.32).— TiO_2 pigment containing sufficient Fe to tint it brown is heated at 1100° in a slightly reducing atm. to reduce the Fe_2O_3 to FeO, which combines with the TiO_2 and produces a black compound the colour of which is obscured by the excess of white pigment. A. R. P.

Method of printing [from marble blocks]. O. A. BERIAU, ASSR. to U.S.B. PROCESS, LTD. (U.S.P. 1,977,372, 16.10.34. Appl., 3.3.30).—The design on coloured marble may be reproduced on other surfaces by using the marble as a printing block, the surface being progressively more deeply etched by treatment with a dil. mineral acid, the rate of etching of the variously coloured portions being different, so that the design of each coloured portion is consecutively brought into prominence for printing. A. R. P.

(A) Inorganic thermoplastic composition. (B) Mica products with inorganic binders. (C) General process of bonding. (D) Manufacture of moulded laminated mica products with inorganic binders. (E) Fibrous products with inorganic binders. (A—E) W. A. BOUGHTON and (D) W. R. MANSFIELD, ASSRS. to NEW

ENGLAND MICA CO. (U.S.P. 1,975,077—81, 2.10.34. Appl., [A] 10.1.31, [B] 9.3.31, [C] 22.6.31, [D] 18.3.32, [E] 12.9.32).—(A) An inorg. plastic binder consisting of HPO_3 with 3—6% of H_2O to prevent crystallisation on cooling and an inert filler is claimed. (B) Mica flakes are bonded under heat and pressure with the binder claimed in (A), or with similar binders containing NaBO_2 , NaVO_3 , or Na_2BeO_2 . (C) The process of (B) is carried out at 100—500°/ > 200 lb. per sq. in. (D) The composite mica sheet is bent or pressed into suitable shape, e.g., cylinders, and then baked at > 260° (800—900°). (E) The mica laminations are separated from one another by a layer of asbestos fibre impregnated with 15—40% of the binder claimed in (A), and the composite shape is heated under pressure at 105—300°. A. R. P.

Paint-mixing machine. O. L. NELSON (B.P. 440,706, 30.5.35).

Azo pigments.—See III. **Laminated wood.**—See IX. **Emulsifying media.**—See XII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Natural and synthetic rubber. XV. **Oxygen in rubber.** T. MIDDLEY, JUN., A. L. HENNE, A. F. SHEPARD, and (MISS) M. W. RENOLL (J. Amer. Chem. Soc., 1935, 57, 2318—2321; cf. B., 1934, 592).—Synthetic rubber is free from O. Natural rubber contains 1 OH for each 1000 isoprene units and is probably a mol. of geraniol type extended by isoprene units; however, it contains an excess of H over the theory for C_5H_8 , equiv. to 1 H for each 70 isoprene units, and also 0.007% of N, present as NH_2 -acid. Oxidation of natural rubber involves formation of a peroxide, rearrangement thereof to an alcohol with liberation of O_2 , elimination of some OH as H_2O , and rupture of the mol. R. S. C.

Sprayed rubber. III. **Accelerated ageing tests.** T. R. DAWSON (J. Res. Assoc. Brit. Rubber Manuf., 1935, 4, 131—153; cf. B., 1935, 737).—The results of a no. of oven-ageing tests on several samples of sprayed rubber and also on Wickham, Parà, crêpe, and smoked sheet rubbers are discussed; the test-pieces represented vulcanised mixings of rubber and S with, and without, an accelerator (diphenylguanidine) and other compounding ingredients. The sprayed rubber generally was superior to the others in resistance to ageing. The results contradict earlier assumptions as to the poor ageing of slow-vulcanising rubbers and the adverse influence of C black on the ageing of rubber in which it is incorporated. The presence of C black or diphenylguanidine leads to a rise in resilience with ageing, whilst ZnO, PbO, or glue tends to give the reverse effect. D. F. T.

Shock-absorbing quality of rubber. L. FRUMKIN and V. MARGARITOV (J. Rubber Ind. U.S.S.R., 1934, 11, No. 3, 213—222; No. 5, 424—429; No. 7, 113—115).—Standard methods of examination are criticised on the basis of the fatigue developing under various conditions. The influence of C, ZnO, and kaolin on vals. obtained is recorded. CH. ABS. (p)

Impact cutting test for tyre-tread stocks. J. H. DILLON (Ind. Eng. Chem. [Anal.], 1936, 8, 68—71).—Apparatus and procedure for testing the cutting-resistance of tread stocks are described. E. S. H.

C black.—See II. **Polymerised butadiene.**—See III.

PATENTS.

Manufacture of rubber goods from latex. (A) J. EDUARDES, (B) G. W. WINCHESTER, (C) J. B. CROCKETT, ASSRS. TO HEVEATEX CORP. (U.S.P. 1,993,212, 1,993,233, and 1,993,596, 5.3.35. Appl., 24.8.33).—(A) A form of the desired shape (possibly of pulp or paper) is coated with a substantially non-coagulant mixture of a desiccating material (colloidal clay) and a viscous (gelatinous) binding material, which sets to a smooth, H_2O -absorbent condition. On bringing the treated form in contact with latex a layer of rubber is deposited on it, which is then dried and stripped. (B) A form, coated with a colloidal dehydrant (karaya gum, gum arabic, starch, casein, NH_4 alginate, methylcellulose, etc.), is used for the dipping operation. After removal from the latex and partial dehydration of the deposit, the form is again dipped in the latex, these operations being repeated until the desired thickness of deposit is obtained. (C) A dipping form is used with a substantially non-coagulant coating of colloidal desiccating material consisting, e.g., of colloidal clay such as bentonite. D. F. T.

Manufacture of rubber yarn or thread. HARBEN'S (VISCOSE SILK MANUFERS.), LTD., M. LEON, and L. C. GOODWIN (B.P. 440,909, 27.10.34).—Latex is extruded through an annular orifice co-axially around a stream of coagulant, the dimensions being such that after the coagulant has dispersed and the tube coagulum has collapsed it will produce a homogeneous thread > 0.38 mm. in diam. The extruded latex is passed over heated drums to evaporate the solvent, collapse the tube, and vulcanise the thread. Apparatus is described. D. F. T.

Procuring direct adhesion of soft rubber to metal. AVON INDIA RUBBER CO., LTD., and J. G. MACKAY (B.P. 440,882, 25.5.34).—The metal surface after first being plated with Cu or brass is made the anode in a (compounded) aq. dispersion of rubber so that a thin layer of rubber is deposited thereon into which Cu ions penetrate. A firm bond is thereby obtained between the metal and the thin rubber layer, and sheeted rubber may be built up on the latter. D. F. T.

XV.—LEATHER; GLUE.

High-grade tanning material. G. ARBUZOV (Kosh.-Obuvn. Prom., U.S.S.R., 1933, 12, 574).—Conditions for use of sulphite-cellulose extract are given. CH. ABS. (p)

Lastometer for testing sheet materials [leather, fabric, etc.]. A. T. MCKAY (J. Soc. Leather Trades Chem., 1936, 20, 9—16; cf. B., 1933, 400).—An instrument for simulating the lasting process in boot and shoe manufacture and for determining the plasto-elastic modulus (E) of resistance to distortion of any shoe-upper material from $z = a + (\alpha^2 p / \beta h E)^{\frac{1}{2}}$, where z is the polar displacement, h the average thickness, and a a const.; p is the load and α and β are consts. of the instrument. a and Eh have been determined for different leathers and fabrics. a is negative for patent leathers and positive for fabrics; a becomes positive on "mulling" the patent leather. D. W.

[Tannins in] maté leaves etc.—See XX.

XVI.—AGRICULTURE.

Mineral composition of the soils of south Ayrshire. S. ELDER and R. J. S. McCALL (J. Agric. Sci., 1936, 26, 1—21).—Mineralogical analyses are recorded. Minerals identified could be referred to local origin, but no close relationships was apparent with subadjacent rock. A. G. P.

Soil survey of the eastern portion of the Vale of the White Horse. F. F. KAY (Univ. Reading Fac. Agric. Hort. Bull., 1934, No. 48, 187 pp.).—A detailed record of chemical characteristics is given. Comparison is made of soils of varied types and formations. Suitability of analytical methods is considered.

CH. ABS. (p)

Soil structure. A. L. S. BÄR (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 17—18).—Various suggested indices of soil structure are examined. The desirability of a new basis of consideration is indicated. A. G. P.

Binding forces between clay particles in a soil crumb. E. W. RUSSELL (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 27—29).—The hypothesis is advanced that crumb formation in soils results from the binding together of clay particles by oriented mols. of a polar liquid, linked by cations dissociated from the clay surface. A. G. P.

Interpenetration of the diffuse double layers surrounding the soil particles. R. K. SCHOFIELD (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 30—33).—The simple Donnan membrane equilibrium [$x^2 = y(y+z)$] is not applicable to soils since the diffuse double layers surrounding neighbouring particles interpenetrate only to a limited extent. Interpenetration probably decreases with rising H_2O content of the soil. Additional depression of f.p. due to ionic dissociation measures the repulsive force caused by interpenetration of layers. The latter is liable to destroy structure in alkali soils.

A. G. P.

Comparative action of lime and magnesia on clay and humus colloids [in soils]. C. BRIOUX and E. JOUIS (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 19—20).—Clay colloids are flocculated with the same relative intensity by $Ca(HCO_3)_2$ (I) and $Mg(HCO_3)_2$ (II). The effect on humus colloids is much greater in the case of (I). In some cases (II) probably favours dissolution of humus. A. G. P.

Iodine question in Westphalia. R. BALKS (Landw. Jahrb., 1935, 81, 939—1002).—The I content of rocks is related to their geological formation and tends to increase with weathering. In soil the I content increases with heaviness, and is greater in grassland than in cultivated areas. The amounts of I in turnips, potatoes, cabbage, and carrots were unrelated to that of the soil in which they were grown. Spinach accumulates much I, the amount of which is roughly paralleled by that present in the soil. Manuring with I increases the proportion of the element in plants. With rye seedlings the I intake increased with the proportion of $Ca(HCO_3)_2$ -sol. I in the soil. The action of I manures varies with soil type, and is least apparent in calcareous soils.

A. G. P.

Influence of dicyanodiamide, guanidine, and guanylurea on bacteria [in soils]. S. TESHIMA

(J. Sci. Soil Manure, Japan, 1935, 9, No. 1, 31—46).—Dicyanodiamide (I), guanidine (II), and guanylurea (III) do not affect the ammonification of urea, but inhibit the nitrification of $(NH_4)_2SO_4$. The injurious effect of (III) is < that of (I) and (II). (I) and salts of (II) are toxic to *Azotobacter chroococcum*. *Aspergillus niger* can utilise (I) and (II) as a source of N (but not of C) and the phosphates of (II) and (III) as sources of P. An aq. extract of *A. niger* decomposes (II) phosphate (to NH_3 and urea) more rapidly than the chloride. (I) and (III) phosphate are not decomposed under similar conditions. Urease produces no NH_3 from (III) phosphate.

CH. ABS. (p)

Transport of water through heavy clay soils. I. E. C. CHILDS. II. H. H. NICHOLSON and E. C. CHILDS (J. Agric. Res., 1936, 26, 114—127, 128—141).—I. Expressions are deduced for H_2O profiles in soils under characteristic conditions on the assumption that H_2O movement is governed by diffusion laws in a uniform heavy soil.

II. Results of field examination are recorded in respect of theoretical vals. obtained. The effect of the surface tilth layer is considered.

A. G. P.

Minimum water of saturation [in soils]. L. B. OLMSTEAD (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 4—5).—A method of determination is described. Vals. are paralleled by those for sticky-point H_2O . As a single-val. soil const. the method has the advantage of applicability to all soil types.

A. G. P.

Effect of irrigation and of dry fallow on a heavy, base-saturated soil. H. GREENE and O. W. SNOW (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 21—24).—Effects on the amount of H_2O -sol. matter, base-exchange equilibria, and the physical condition of the soil are considered.

A. G. P.

Determination of moisture in soils by the carbide method. W. SIBIRSKY (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 10—13).—Apparatus is described. Vals. obtained agree closely with those of the customary drying method.

A. G. P.

Is the alcohol method for determining the water content of soils reliable? L. C. SMOLIK (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 13—14).—In an appreciable no. of cases the method gives results diverging considerably from those of oven-drying methods. The divergences are not related either to the nature of the soil horizons or to their org. matter content.

A. G. P.

Determination of the water-holding power of soil. M. TRÉNEL (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 15—17).—A form of capillarity meter is described. Relations between capillary power and size distribution of soil particles are examined.

A. G. P.

Non-protein nature of a fraction of soil organic matter. A. W. J. DYCK and R. R. MCKIBBIN (Canad. J. Res., 1935, 13, B, 264—268).—Determinations of N in soils by Dumas' method are generally > those by the Kjeldahl method. The "non-protein N" (i.e., that recorded only by Dumas' method) is unlikely to consist of ligno-protein complex (Waksman). In soils

containing $> 0.8\%$ of org. C all $\text{NO}_3\text{-N}$ is probably recorded by the direct Kjeldahl process A. G. P.

Effect of temperature on the mechanical analysis of soils. M. GRAČANIN (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 34—38).—Data recorded show considerable variations in the crude clay fraction as a result of difference in temp. A. G. P.

Citrate method for mechanical analysis of soils. A. DEMOLON and E. BASTISSE (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 33—34).—The method (A., 1934, 1171) is compared with the International method in soils of various types. Dissolution of CaCO_3 from calcareous soils leads to liberation of colloidal matter which did not previously exist as such. The citrate method gives the lower results in these cases. The $\text{SiO}_2 : \text{R}_2\text{O}_3$ ratio of soil colloids is discussed. A. G. P.

Mechanised procedure for determining the sticky point of soils. L. B. OLMSTEAD (Trans. 3rd Internat. Congr. Soil Sci., 1935, 1, 5—6).—Apparatus is described. A. G. P.

Effects of fertilisers on soil reaction. II. C. ICHIKAWA (J. Agric. Chem. Soc. Japan, 1935, 11, 118—123).—Titratable acidity of soil was neutralised by added NaNO_3 (I), $\text{Ca}(\text{NO}_3)_2$ (II), KNO_3 (III), and CaCO_3 (IV). $\text{Na}_2[\text{K}_2]\text{HPO}_4$ rendered soil slightly acid. NH_4NO_3 (V) and $(\text{NH}_4)_2\text{HPO}_4$ (VI) markedly increased acidity. The amounts of Fe and Al exchanged were increased by (III), (IV), and (VI), and decreased by (I), (II), (V), and K_2HPO_4 . CH. ABS. (p)

Fixation of atmospheric nitrogen in the soil and utilisation of molasses as fertiliser. N. R. DHAR and S. K. MUKERJEE (Proc. Acad. Sci. Agra and Oudh, 1934—5, 5, 61—70; cf. B., 1935, 740).—Exposure to sunlight in quartz vessels of sterile soil to which sucrose has been added increases the total and $\text{NH}_3\text{-N}$; also, solutions of glucose containing freshly-pptd. $\text{Fe}(\text{OH})_2$ give NH_3 when air is passed through them, thereby showing that N can be "fixed" provided energy is available from the photochemically or "induced" oxidation of sugar. Soil containing bacteria and molasses when exposed to sunlight accumulates $\text{NH}_3\text{-N}$ up to a limiting val. which then decreases as a result of secondary reactions. The improved yield of rice and sugar-cane crops demonstrate a more readily available N source when molasses is used as a fertiliser before the crop is sown. J. L. D.

Manurial value of nitrogen, phosphate, and potassium. E. NAKAMURA (J. Sci. Soil Manure, Japan, 1935, 9, No. 1, 45—53).—In pot cultures with wheat, P and K were more effective in a glasshouse than in the open air. CH. ABS. (p)

Distribution of phosphoric acid in soils. C. W. G. HETTERSCHIJ (Phosphorsäure, 1935, 5, 215—230).—The horizontal distribution of PO_4''' in grassland was very irregular. In cultivated soils the sol. P occurred chiefly in the uppermost 10-cm. layer. The greater part of added P remained in the top 5-cm. layer. CH. ABS. (p)

Phosphate fertilisation and production. L. SCHMITT (Phosphorsäure, 1935, 5, 174—197).—Effects

of various P fertilisers and CaO on soil reaction are examined. CH. ABS. (p)

Action of various phosphate fertilisers. A. WILHELMJ and S. GERICKE (Phosphorsäure, 1935, 5, 198—214).—Basic slag produced a strong basic reaction in both acid and basic soils. Acid P fertilisers corr. soil acidity through reaction of acid soil constituents with sol. PO_4''' . CH. ABS. (p)

Influence of potash manuring on the value and effect of farm fodders. F. KÖNIG (Landw. Jahrb., 1935, 81, 829—889).—K manuring increased not only the yield but also the palatability of herbage, resulting in increased consumption by animals. The increased protein content of K-treated herbage is largely due to stimulated growth of clover, but this alone does not account completely for the improved growth of cattle following manuring. Mineral constituents and botanical composition are also important factors. Applications of K increase the ash content of herbage, its energy val., and the efficiency of its utilisation by the animal. A. G. P.

Unfavourable effects of iron salts on availability of potash fertilisers. K. SHIBUYA and T. TORII (J. Sci. Soil Manure, Japan, 1935, 9, No. 1, 1—14).—The available K in soil decreased by mutual action with sol. Fe in the soil H_2O . CH. ABS. (p)

Report of Department of Agriculture. V. R. S. VICKERS, V. C. FISHWICK, H. B. BESCOBY, and N. L. TINLEY (J. South-East Agric. Coll., Wye, 1936, No. 37, 44—52).—Manurial trials with barley, wheat, potato, and mangel crops are recorded.

Spraying with NaClO_3 for thistle control caused temporary burning off, but appeared to encourage new shoots from underground stocks.

Grass dried in hop oasts contained 14.56% of crude protein and 47% of carbohydrates. It was sweet and green and, on a wt. for wt. basis, produced better live-wt. increases in sheep than did a 1:7 mixture of decorticated cotton cake and oats. A. G. P.

Vernalisation. G. D. H. BELL (J. Agric. Sci., 1936, 26, 155—171).—Effects of low-temp. treatment of seed on the development of wheat, barley, and oats are examined. The time of sowing has a considerable influence on results obtained. A. G. P.

Root excretions of plants grown with and without nutrient additions. P. SOLBERG (Landw. Jahrb., 1935, 81, 891—917).—Acid excretions of roots of lupins were $>$ those of maize or beans. Differences in reaction of soil immediately in contact with plant roots and that in surrounding zones may reach 0.5—1.0 p_H unit. This may be slightly increased by fertilisers containing $(\text{NH}_4)_2\text{SO}_4$ and, in some cases, decreased by those containing NaNO_3 . Acid substances are excreted by very young seedling roots, the process continuing throughout growth without wide or regular variations in intensity. CO_2 and other acid compounds are formed. A. G. P.

Course of photosynthesis [in plants] on the mountains of Pamir. V. A. BLAGOVESTSCHENSKI (Planta, 1935, 24, 276—287).—The mountain plants are adapted to low CO_2 contents in the atm. (0.25—0.3 mg.

of CO_2 per litre). Assimilation rates and $[\text{CO}_2]$ are closely related. Org. matter production per 100 sq. cm. of leaf surface corresponds to 25.2 mg. of glucose daily.

A. G. P.

Effect of inoculation on the lupin (*Lupinus luteus*, L.) as green manure with reference to changes in its composition towards maturity. S. ARAKAWA (J. Sci. Soil Manure, Japan, 1935, 9, No. 1, 63—74).—Seed inoculation was superior to soil inoculation in producing suitable growth for green manure. In the younger plants the N content was high and the ash low.

CH. ABS. (p)

Influence of nematodes on yield and composition of sugar beet in relation to manuring. W. KRÜGER, G. WIMMER, and H. LÜDECKE [with H. ROEMER, O. RINGLEBEN, O. VOIGT, G. UNVERDORBEN, and J. GRIMM] (Z. Wirts. Zuckerind., 1935, 85, 623—679, 717—761; cf. B., 1935, 1158).—Nematode attack does not impair the ability of plants to absorb nutrients, but causes a withdrawal of portions of nutrient from the plant system. In well-nourished soils nematode injury is more extensive in normal than in dry seasons. The reverse applies to plants grown with nutrient deficiency. Injury is lessened by appropriate manuring. A. G. P.

Hop research [manuring]. A. H. BURGESS (J. South-East. Agric. Coll., Wye, 1936, No. 37, 31—35).—No differences in yield or quality of hops can be traced to different periods of application of quick-acting N fertilisers, or to the use of org. or inorg. forms of N, or combinations of these.

A. G. P.

Planting of rice (*Oryza sativa*). III. Effect of acidity and concentration of nutritive medium and type of nitrogenous salts on planting in aqueous media. S. FUKAKI (Bul. Sci. Fak. Terkult. Kjusu Univ., 1933, 5, 337—349).—The optimum p_{H} and nutrient concn. (0.0026—0.0013M solutions) for improving the grade of plants coincide with that for max. dry-matter production. $(\text{NH}_4)_2\text{SO}_4$ gives better development than $\text{Ca}(\text{NO}_3)_2$.

CH. ABS. (p)

Toxicity of sodium arsenite and sodium chlorate in California soils. A. S. CRAFTS (Hilgardia, 1935, 9, No. 9, 461—498).—The toxicity to plants of Na_3AsO_3 (I) and NaClO_3 (II) in soil varied considerably with soil type. (II) is the more easily leached. (I) is "fixed" by soils and gradually transformed into insol. compounds unavailable to plants.

A. G. P.

Factors influencing the effectiveness of sodium chlorate as a herbicide. A. S. CRAFTS (Hilgardia, 1935, 9, No. 9, 437—457).—Chlorates penetrate the roots of deep-rooting plants either by translocation within the plant or by absorption through the soil. If applied directly to soil a suitable vertical distribution of NaClO_3 (I) must be ensured, e.g., by watering. Best results are obtained by simultaneous treatment of foliage and soil. Pretreatments aimed at injuring the plant tended to decrease the efficiency of (I). Hoeing after (I) injury by soil application was beneficial. Winter applications should be made early. Excessive (I) in soil is best removed by irrigation.

A. G. P.

Soils in relation to marsh spot of pea seed. B. S. FURNEAUX and H. H. GLASSCOCK (J. Agric. Sci., 1936, 26, 59—84).—The occurrence of marsh spot is associated

with a high H_2O -table in the soil (within 52 in.) and heavy texture.

A. G. P.

***Fusarium* bulb-rot of narcissus.** L. E. HAWKER (Ann. Appl. Biol., 1935, 22, 684—708).—Addition of CH_2O to the customary hot- H_2O bath for treatment of bulbs materially increased its efficiency without ill effects on growth, flowering, or on the increase in bulb size during the season. Steeping bulbs in 0.1% aq. HgCl_2 retards flowering. Fungicidal treatment should precede the hot- H_2O treatment.

A. G. P.

Life history and control of gladiolus thrips in California. H. L. MCKENZIE (Calif. Agric. Exp. Sta. Circ., 1935, No. 337, 16 pp.).—Satisfactory results are obtained by treatment of corms with C_{10}H_8 , $\text{Ca}(\text{CN})_2$, HgCl_2 , or hot H_2O . Additional field control is obtained by spraying with Mn arsenate (or Paris-green)-sugar mixtures.

A. G. P.

Fungicides in relation to scab control and spray russet [of apples]. A. B. GROVES (Virginia State Hort. Soc. Proc. 39th Ann. Meet., 1934; Virginia Fruit, 1935, 23, No. 1, 100—103).—Promising results are obtained with Cu phosphate.

CH. ABS. (p)

Removal of spray residue from pears and apples. F. W. PETTEY (Farming in S. Africa, 1935, 10, 115—118).—Methods are considered, and the effects of acid and of sol. As on the keeping quality of fruit are discussed.

CH. ABS. (p)

Response of sweet cherry trees to zinc sulphate treatment for little leaf. O. T. McWHORTER (Oregon State Hort. Soc. 26th Ann. Rept., 1934, 56—58).—Affected trees improved after treatment with ZnSO_4 placed in bore holes in trunks. The disease practically disappeared in 2 years.

CH. ABS. (p)

Codling-moth sprays and problems connected with removal of residues. W. S. HOUGH (Virginia State Hort. Soc. Proc. 39th Ann. Meet., 1934; Virginia Fruit, 1935, 23, No. 1, 165—169).—Sprays containing free nicotine (I) were effective if applied at frequent intervals during the period of activity of the moth. (I) salts were not satisfactory. Ca and Mn arsenates were less active than was Pb arsenate (II). Natural cryolite-fish oil preps. used in late cover sprays following (II) as calyx and early cover sprays gave as good control as (II) used throughout. HCl was more effective than Na silicate in removing cryolite spray residues.

CH. ABS. (p)

Substitutes for lead arsenate in codling-moth control in the Hood River Valley. L. CHILDS (Oregon State Hort. Soc., 26th Ann. Rept., 1934, 85—89).—Various nicotine preps., pyrethrum, derris, silico-fluorides, Ca and Zn arsenates, and Zn arsenite were all less effective than was Pb arsenate. ZnSO_4 and $\text{Al}_2(\text{SO}_4)_3$ prevent foliage injury by Ca and Zn arsenicals.

CH. ABS. (p)

Control of walnut blight in Oregon. P. W. MILLER (20th Ann. Meet. Western Nut-Growers Assoc., Oregon State Hort. Soc. 20th Ann. Rept., 1934, 105—118).—On mature trees, spraying with Bordeaux mixture (I) (2:2:50) before and after blooming gave good control. Leaf injury was entirely prevented by addition of salmon or petroleum oil to (I).

CH. ABS. (p)

Toxic action of certain chemical compounds on *Tilletia tritici* as a measure of permeability. S. HERMANN and R. NEIGER (Zentr. Bakt. Par., 1935, II, 93, 137—141).—Toxic substances producing insol. compounds with the protein of fungus spores (or, in the special case of *Tilletia*, with NMe_3) form a protective layer around the organism, thus preventing penetration of the poison. Washing removes the toxic material and the spore subsequently germinates. Such compounds include sulphosalicylic acid and salts of Cu, Cd, and Zn. The associated anions have no influence on the action. Other substances, e.g., salicylic acid, form no insol. compounds, penetrate the cell, and kill the organisms. Small concns. of Fe^{III} salts act as those of Cu; larger proportions penetrate and kill the spore. In this case the action is influenced by the anion and by the p_{H} of the solution. The bearing of these results on mechanism of toxicity of fungicides and on its measurement is discussed. A. G. P.

Volatility of spray oils in relation to [tree] injury. R. H. ROBINSON and M. B. HATCH (Oregon State Hort. Soc. 26th Ann. Rept., 1934, 81—84).—Light oils of high volatility should be used for susceptible varieties. Medium to light-medium oils are suitable to more resistant kinds provided ≥ 3 applications are made per season. The drip from trees sprayed with Creosap and a commercial emulsion contained the same amount of oil as the original spray; that from tank-mixed and casein- NH_3 emulsions contained much $<$ the originals. CH. ABS. (p)

Rotenone content of some derris roots from different parts of the Philippine Islands. F. T. ADRIANO, S. B. OLIVEROS, D. TABIJE, and F. CRISOSTOMO (Philippine J. Agric., 1934, 5, 245—254).—Crude rotenone contents varied from 0.09 to 2.42% (H_2O -free basis). Roots < 1 cm. in diam. showed higher vals. than larger roots. CH. ABS. (p)

Control of *Dothiorella* rot on avocado fruits. W. T. HORNE and D. F. PALMER (Calif. Agric. Exp. Sta. Bull., 1935, No. 594, 16 pp.).—Wet sprays are more effective than dusts. Cu preps. are more efficient than Zn preps. Addition of CuSO_4 to ZnSO_4 -CaO sprays increases their toxicity, and the Cu thus applied is not a source of danger in subsequent HCN fumigation. Bordeaux mixture has increased efficiency when mixed with S. A. G. P.

Indigo.—See IV. Cryst. NH_4NO_3 .—See VII. [Fertiliser from] printing-block [residues].—See XIII.

PATENT.

Treatment of seeds. E. BRANDUS, AssT. to N. V. NOORD-WEST ORION HANDEL MAATS. (U.S.P. 1,970,163 14.8.34. Appl., 30.1.31. Ger., 4.2.30).—The seeds are treated with a foam containing an insecticidal substance, e.g., Cu or As salts, or Hg peptonate. A. R. P.

XVII.—SUGARS; STARCHES; GUMS.

Decolorisation [of sugar liquors] with norite. A. M. PSHENICHNUI and B. P. SHUMKOV (Nauch. Zap. Sach. Prom., 1934, 10, No. 37/38, 99—105).—Optimum conditions for the decolorisation of thick and thin juices are determined. CH. ABS. (p)

Revivication of activated carbons [in sugar clarification]. I. F. ZELIKMAN and K. K. LYUBITZKI (Nauch. Zap. Sach. Prom., 1934, 10, No. 37/38, 106—113).—For beet-sugar C a temp. of 700° in the lower retort is necessary; 550 — 600° is suitable for refinery C. The length of treatments depends on the nature of the C and the use to which it has been put. CH. ABS. (p)

Amount of moisture absorbed by centrifugal sugar in storage. M. M. ALICANTE (Rept. Res. Bur. Philippine Sugar Assoc. [1932—3], 1934, 89).—The H_2O absorbed increased with time to a max. (1.645%). Vals. were higher at the bottom than at the top of stacks, and were lower when stored on Fe roofing than when on paper. CH. ABS. (p)

Action of dil. HNO_3 on bagasse.—See V. Sugar beet. Molasses as fertiliser.—See XVI. Sugars in fermenting apple juice.—See XVIII. Sugar-beet pulp for pigs. Fodder yeast.—See XIX.

XVIII.—FERMENTATION INDUSTRIES.

Hop pectin. III. Significance in brewing. H. FINX and F. JUST (Woch. Brau., 1936, 53, 33—37; cf. B., 1935, 779).—Some 50—60% of the pectin of hops passes into wort during boiling, a "model wort" (10—14% glucose solution, acetate-buffered to p_{H} 5.6) dissolving rather more than H_2O similarly buffered, thus showing the influence of wort constituents on the degree of dissolution. Further, reduction of the hop rate causes a small increase in the proportion of pectin dissolved. Much of the pectin is reprecipitated with the copper sediment, but an appreciable amount remains in the cast wort. The presence of small amounts of pectin can be demonstrated in cooler deposits, fermentation deposits and heads, cask deposits, unwashed filter pulp (from pectin-containing beer sedimentary materials), and, in very small amounts, in the finished filtered beer. I. A. P.

Foam [on beer]. II. J. BLOM [with P. PRIP, A. BAK, and J. JACOBSEN] (Woch. Brau., 1936, 53, 25—29; cf. B., 1936, 214).—Filtration and pasteurisation have an unfavourable influence on the stability of beer foam, but on storage the foam stability of pasteurised beers shows little change, whilst it deteriorates in unpasteurised beers. H_2O , EtOH, $\text{C}_5\text{H}_{11}\text{OH}$, fats, and soaps, or an increase in p_{H} , cause a decrease in foam stability, but this is increased by glycerin, cane sugar, the ions of Zn, Cu, or Fe, or weak acidification with lactic acid. During the primary and secondary fermentation, foam stability increases, reaches a max. after approx. 4 weeks, and then falls. Foam stability is variously influenced by different hop samples. Measurements of the surface tension of the beer, made simultaneously in all the above cases, indicate that there is no simple relation between this and foam stability. I. A. P.

Defecation by lime and determination of total acidity of wine. P. JAULMES (Ann. Falsif., 1935, 28, 540—545).—Unless treatment with CaO is limited to 30 min. in the cold, sugars are decomposed with formation of volatile acids. Determination of the latter by the official method (cf. B., 1932, 204) consequently gives too high vals. with wines containing appreciable amounts of sugars. E. C. S.

Fluorides in wine. F. F. JOHNSON and L. FISCHER (Amer. J. Pharm., 1935, 107, 512—514).—37 samples of wine from two sources contained 0.02—0.20 grain of F per lb. A modification of Wichmann and Dahle's method (A., 1934, 45) was employed for the determination. E. H. S.

Variations in relative proportions of sucrose, glucose, and fructose in apple juice during alcoholic fermentation. G. WARCOLLIER and A. LE MOAL (Ann. Falsif., 1935, 28, 517—534).—Apple and pear musts contain, on the average, 62.5 and 75.4%, respectively, of the total sugar as fructose (I), 20.0 and 10.0% as sucrose (II), and 17.5 and 15.6% as glucose (III). During fermentation the rate of disappearance diminishes in the order (II), (III), (I). From the magnitude of the ratio (II):total sugars it is possible to detect addition of (II) in both unfermented and partly fermented musts, and in the former to determine the approx. amount of added (II), or in the latter the amount of added (II) remaining unfermented. E. C. S.

Glycerol fraction in saké. M. YAMADA (Bull. Agric. Chem. Soc. Japan, 1935, 11, 28).—The glycerol (I) fraction of saké and the mash contained β -butylene glycol and (I) in the proportion 1:20. CH. ABS. (p)

Micro-organisms in saké brewing at Formosa.
I. **Saccharomyces.** R. NAKAZAWA, Y. TAKEDA, and M. SHIMO (J. Agric. Chem. Soc. Japan, 1935, 11, 85—97).—Varieties are isolated, classified, and examined. CH. ABS. (p)

Hop manuring.—See XVI.

PATENT.

Manufacture of spirituous liquors. SEMET-SOLVAY ENG. CORP., Assees. of F. G. RING (B.P. 440,610, 18.5.35. U.S., 26.5.34).—In a described plant, fermented mash is continuously distilled, and means are provided for removing the aliphatic acids present. These (C₄—C₁₁) are conc., fusel oil and much of the H₂O being removed, and the concentrate is brought into intimate contact in a refluxing treatment vessel with alcoholic distillate of high (e.g., < 40%) [EtOH] at a high temp. Thus esters are formed, and spirituous liquors may be produced with body, aroma, and flavour superior to those from pot-stills, whilst the time necessary for ageing is reduced. I. A. P.

XIX.—FOODS.

Examination of wheat and flour by the Chopin extensimeter. P. NOTTIN and A. DARON (Compt. rend., 1935, 201, 1217—1219).—Influence of the H₂O content of the dough on results is examined. A. G. P.

Microbial content of soft wheat flour. D. F. HOLTMAN (J. Bact., 1935, 30, 359—361).—The bacterial content of flour, normally low in marketed samples, may increase considerably under certain storage conditions. In over-bleached flour oxidation of fat may occur more readily. A. G. P.

Vitamin content of Norwegian foodstuffs. O. RYGH (Tids. Kjemi, 1936, 16, 10—12).—Vitamin-A, -B complex, -C, -D, and antivitamin-D have been determined in various meats, and in oat products. Antivitamin-D activity is due to a substance similar

to vitamin-D, as well as to inositolhexaphosphoric acid. M. H. M. A.

Increasing flow-speed in filtering [milk] by chemically treating the cotton. G. J. ESSELEN and W. F. TALBOT (Milk Plant Month., 1935, 24, No. 3, 42—43).—Treatment of cotton with very dil. acid improves rate of filtration. CH. ABS. (p)

Examination of pasteurised milk. STAFF OF THE PREVENTIVE MEDICINE DEPT., BRISTOL UNIVERSITY (Analyst, 1936, 61, 35—38).—The methods of examination of raw, pasteurised, and mixed milk depending on fat content, stability of suspended particles, enzymic activity, and nos. and types of bacteria are summarised and critically discussed. E. C. S.

Causes and methods for control of sedimentation in homogenised milk. D. A. CHARLES and H. H. SOMMER (Milk Plant Month., 1935, 24, No. 4, 26—27, 32).—The sediment consists of a white fraction present in normal milk and dark-coloured dirt. No relation is apparent between the heat-stability of the milk and the amount of sediment formed on homogenising. Addition of large amounts of citrate or phosphate decreases the white sediment. Clarification of hot milk immediately after homogenisation is suggested. CH. ABS. (p)

What is bottled concentrated milk? R. B. STOLTZ (Milk Plant Month., 1935, 24, No. 3, 52—58).—Such milk has been evaporated until the total solid content is doubled. It is not sterilised and has no "cooked" flavour. The physical and chemical properties of the milk are only slightly modified. CH. ABS. (p)

Soft-curd milk. F. J. DOAN and R. C. WELCH (Milk Plant Month., 1935, 24, No. 5, 29—32).—Hard- and soft-curd milks were similar in all respects, except that the former had the higher casein (I) content. Differences in digestibility are almost entirely attributable to differences in (I) content. Dilution of hard-curd milk with H₂O to produce the same (I) content as a soft-curd milk eliminated differences in digestibility and curd tension. If curd tension is lowered by artificial means, rates of digestion are influenced by denaturation or pre-coagulation of protein or factors causing abnormal coagulation. CH. ABS. (p)

Soft-curd milk. M. H. BERRY (Milk Plant Month.-1934, 23, No. 10, 30—33; No. 11, 50—55).—Curd hardness was not affected by storage at 5° when no appreciable change occurred in the acidity. Colostrum formed a very hard curd. Viscolisation at 3000—5000 lb. pressure reduced curd hardness to extents which increased with the initial hardness. Ordinary pasteurisation or heating at 71.1° for 30 min. did not produce a soft-curd milk. Heating at 82.2° had a marked softening effect. Milks of varying natural or modified curd hardness produced the same wt. increases in rats. CH. ABS. (p)

Influence of homogenisation on the soft-curd character of milk. W. J. CAULFIELD and W. H. MARTIN (Milk Plant Month., 1934, 23, No. 12, 24—28). The reduction in curd tension caused by homogenisation is dependent on the initial curd character of the milk. Soft-curd milk may be produced from whole milk having

initial curd tension of 62, irrespective of temp. or pressure used. Reduction of tension by a temp. of 74° is > that by 49° or 62·8°. Rehomogenisation produces no additional change. Pasteurisation at 62·8° for 30 min. or momentary heating at 74° prevents the development of rancid flavour. The latter occurred in milk homogenised at 37·8°/2500 lb. within 2 hr. of processing. CH. ABS. (p)

Apparatus for determining curd character of milk. A. P. COLE (Milk Plant Month., 1935, 24, No. 1, 24—25). CH. ABS. (p)

Vitamin-D milk. Comparison of methods of production. V. W. SPICKARD (Northwest Med., 1934, 33, 204).—A review. CH. ABS. (p)

Flavours of milk and their control. C. L. ROADHOUSE and J. L. HENDERSON (Calif. Agric. Exp. Sta. Bull., 1935, No. 595, 30 pp.).—The effect of various feeding-stuffs on milk flavour is considered and means of obviating ill-effects are recorded. A. G. P.

Aroma of fermented milk. O. K. PALLADINA, V. A. MAZJUKEVITSCH, E. L. MILOVA, and N. S. GRIGORIEVA (Milch. Forsch., 1935, 17, 222—243).—Effects of various ferments on the aroma of milk, fermented for margarine manufacture, were studied. The introduction of "Aroma" bacteria (N.Y. Agric. Exp. Sta. Tech. Bull., 1930, No. 167) reduces the tendency to acidity in margarine. The use of Ac₂-forming ferments does not necessarily result in good aroma. Such bacteria which also produce acidity are unsuitable. It is advisable to add synthetic Ac₂ and a culture containing a large proportion of "Aroma" and cremoris. *Strep. lactis* speedily decomposes Ac₂. E. B. H.

Intestinal bacteria in milk products. O. K. PALLADINA and T. A. KROTOVA (Milch. Forsch., 1935, 17, 212—221).—Crit. min. *p*_H for growth of intestinal bacilli in milk is 4·2. They are destroyed in 24 hr. at *p*_H 4·6 in presence of 5% NaCl solution. Development in butter and margarine manufacture is inhibited by rapid souring and the addition of NaCl. E. B. H.

Variations in titratable acidity of milk. P. F. SHARP (8th Ann. Rept. N.Y. State Assoc. Dairy and Milk Inspectors, 1934, 157—164).—To obtain comparable vals., the speed of titration, amount of indicator, temp., and dilution of the milk must be kept const. A positive correlation between fat content and acidity, and a negative one between titratable Cl' and acidity, are recorded. CH. ABS. (p)

Substitution of methylene-blue thiocyanate for methylene-blue chloride in the reduction test of milk. H. R. THORNTON, R. B. SANDIN, and C. S. MILLER (Canad. J. Res., 1935, 13, B, 257—263).—The thiocyanate is the more satisfactory since a high degree of purity is more easily attained. A. G. P.

Maintaining the desired alkalinity in [milk-] bottle- and can-washer solutions. H. W. LEHMKUHL (8th Ann. Rept. N.Y. State Assoc. Dairy and Milk Inspectors, 1934, 127—144).—H₂O flowing to the washer passes over briquettes of detergent material. CH. ABS. (p)

Detection and control of mastitis. D. H. UDALL (8th Ann. Rept. N.Y. State Assoc. Dairy and Milk Inspectors, 1934, 235—246).—Milk from cows subject

to mastitis is usually slightly more alkaline than normal milk. Bromothymol-blue is recommended to detect such abnormalities. Mastitis may be detected by the keeping quality and the bacterial and physical condition of the milk. CH. ABS. (p)

Intensifying flavour and aroma in butter. H. A. RUEHE and R. J. RAMSEY (Milk Plant Month., 1935, 24, No. 2, 40).—Flavouring constituents in butter cultures, including Ac₂ and acetoin, are removed by steam-distillation and added to butter or to cream prior to churning. CH. ABS. (p)

Behaviour of various lactic acid bacteria in Emmenthal cheese. K. J. DEMETER and H. SCHMID (Milch. Forsch., 1935, 17, 244—282).—Quant. changes in the content of lactic acid bacteria in the cheese, during manufacture and ripening, are described. Bacteria are classified according to the Orla-Jensen system. The importance of *Strep. thermophilus* is established and a new streptococcus resembling *Strep. faecium* (Orla-Jensen) is described. A betacoccus and small amounts of two tetracocci were found. *Thermobacterium helveticum* and *lactis*, *Streptobacterium casei* and *plantarum*, and only negligible amounts of acid-forming proteolytic bacteria were present. E. B. H.

Effect of degree of ripening of cheese on percentage of fat. C. BRIOUX and E. JOUIS (Ann. Falsif., 1935, 28, 535—537).—Owing to the decomp. of nitrogenous substances the ratio fat:total solids increases during ripening. In Camembert cheese the fat, % of total solid, increased in 3 weeks from 47·19 to 47·30, and in a further 6 weeks to 50·61. E. C. S.

Chemical changes exhibited in sterile and in contaminated haddock muscle stored at different temperatures. J. T. R. NICKERSON and B. E. PROCTOR (J. Bact., 1935, 30, 383—394).—During cool storage the *p*_H of haddock muscle tended slightly to decrease; that of contaminated samples increased somewhat. NH₂-N increased during the later stages of storage of contaminated fish. In sterile samples vals. increased early and declined at a later stage. Changes in NH₄-N indicate that bacterial activity is low for the first 24 hr. of storage at temp. up to 17°, but increases later. At temp. > 5° bacteria are the principal agents effecting decomp. of haddock tissue. A. G. P.

Oxygen uptake of pork and bacon. J. BROOKS (J.S.C.I., 1936, 55, 12—14T).—The residual O uptake of the muscle tissue of pork and bacon was measured manometrically. The relative rates of diffusion and of uptake of O were such as to reduce the [O] in the tissue to zero except in a thin surface layer when exposed to air. The relation of O uptake to the fixation and stability of the colour of bacon is discussed.

Determination of nitrates and nitrites in meat. O. JONES (Food, 1936, 5, 185—186).—McVey's modification (B., 1935, 1020) of Blom and Treschow's method for NO₃' + NO₂' (B., 1929, 370) gives excellent results. For NO₂' alone the Griess-Ilosvay method is recommended. E. C. S.

Chemical composition of canned peas of two varieties of different sizes and grades. W. S. THOMPSON and W. H. PETERSON (J. Agric. Res., 1935, 51,

365—370).—In general, the % of dry matter, protein, Ca, P, Cu, Fe, Mn, and crude fibre increased with the size of the pea (wet-wt. basis). In Alaska peas, vials tended to approach greater constancy when calc. on a dry-wt. basis. A. G. P.

Digestibility of ensiled Jerusalem artichoke stalks. M. F. GULUI and U. S. LISTOVNITSCHA (Ukrain. Biochem. J., 7, No. 1, 145—151).—Analyses are given. The product has starch equiv. 9.93 (corr.) and digestible protein 0.62%. Crude ash was not digested.

CH. ABS. (p)

Non-corrodible steels for soya-bean sauce. H. SEKIGUCHI (Kinz.-no-Kenk., 1935, 12, 67—78).—Corrosion is small in steels containing $> 7\%$ Cr. Steel having 25% Ni is not corroded.

CH. ABS. (p)

Analysis for fluoride. Application to determination of spray residue on food products. W. M. HOSKINS and C. A. FERRIS (Ind. Eng. Chem. [Anal.], 1936, 8, 6—9).—Modifications of the Willard-Winter method (A., 1933, 242) are described. The concn. at which certain ions interfere has been determined.

E. S. H.

Prevention of foaming in crude-fibre determinations. H. W. GERRITZ (Ind. Eng. Chem. [Anal.], 1936, 58, 75).—In the apparatus described, foaming is prevented by projecting a fine jet of air on the centre of the boiling liquid surface.

E. S. H.

Moulds and food spoilage. S. LANCEFIELD (Food, 1936, 5, 196—198).—A no. of common moulds are described. The means available for protecting foodstuffs from infection are discussed.

E. C. S.

Moulds growing on soya-bean cake. S. OTOMO (J. Agric. Chem. Soc. Japan, 1935, 11, 124—146).—A no. of varieties of *Penicillium*, *Aspergillus*, and *Monilia* occur in mouldy cake. There was loss of fat and sol. carbohydrates, but not of total N. No toxic effects were observed when fed to rats.

CH. ABS. (p)

Cyanogenetic glucosides in foodstuffs. U. HORDH (Anal. Asoc. Quím. Argentina, 1935, 23, 67—86).—Plants, foodstuffs, and feeds which contain such glucosides (I) are reviewed, data being given as to the amounts of (I) and of HCN present; bitter-almond oil is also examined. Methods for the detection and determination of HCN in foodstuffs are discussed.

F. R. G.

Dried sugar-beet pulp for bacon pigs. E. T. SYKES (J. Min. Agric., 1936, 42, 992—998).—Partial replacement of weatings by the dried pulp (up to 20—25% of the ration) effects economy in cost without significant difference in results.

A. G. P.

Preparation of fodder yeast from wood-sugar solutions. II. H. FINK, R. LECHNER, and E. HEINISCH (Biochem. Z., 1935, 283, 71—82).—The experimental technique, course of growth, and methods of analysis used in the earlier-described work (B., 1935, 747) are given, and tables show the yields obtained under various conditions.

P. W. C.

Composition, digestibility, and nutritive value of samples of grassland products. S. J. WATSON and E. A. HORTON (J. Agric. Sci., 1936, 26, 142—154).—Vals. for fresh grass, hay, silage, artificially dried grass and lucerne, and a variety of fodder crops are recorded.

The calculation of starch equiv. of dried grass from digestibility data and composition is discussed. The correction factor for fibre should be the same as that for the fresh grass prior to drying.

A. G. P.

Effect of stage of maturity and method of curing on the vitamin-B₁ and -B₂ contents of lucerne, clover, and timothy hays. C. H. HUNT, P. R. RECORD, and R. M. BETHKE (J. Agric. Res., 1935, 51, 251—258).—The three hays contained more vitamin-B₂ than -B₁. The contents of both vitamins declined with advancing maturity and were correlated with leafiness, greenness, and protein content in the plants. The -B₂ content of lucerne did not decline after 96 hr. exposure to weather, unless rain occurred, when losses up to 50% resulted.

A. G. P.

Hydrogenation of grain screenings.—See II. **Packing of foodstuffs.**—See V. **Determining CO₂ in self-raising flours.**—See VII. **Vitamin-A in pilchard oil.** **Halibut-liver oil.**—See XII. **Farm fodders.**—See XVI. **Maté and Paraguay tea.**—See XX.

PATENTS.

Production of a chemical compound [for preserving meat]. C. E. BREIZY (U.S.P. 1,976,831, 16.10.34. Appl., 1.5.34).—A molten mixture of NaNO₂ (3) and NaNO₃ (2 pts.) is sprinkled at 270° with NaCl (1 pt.) and when this has dissolved the liquid is cooled in a thin layer on rollers.

A. R. P.

Obtaining albumin from animal matter. P. P. HILTNER and H. METZNER (B.P. 440,684, 28.12.34).—Minced flesh (2 pts.) is mixed with H₂O (1 pt.), which contains sufficient weak acid to reduce the *p*_H to 3.5. The mixture is heated to 65° during 1 hr., centrifuged, pressed, and dried at about 40°.

E. B. H.

Preservation of marine-animal products. W. J. TENNANT. From H. C. WINS (B.P. 440,553, 20.7.35).—Fresh livers from marine animals, finely comminuted, are dried to a H₂O content of 35—45% by passage over heated rollers, cooled rapidly to 25°, and packed tightly in practically airtight containers.

E. B. H.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Determination of elemental sulphur in sulphur ointment. H. R. FLECK and A. M. WARD (Analyst, 1936, 61, 28—30).—McLachlan and Mathews' criticism (B., 1935, 1117) that the authors' method gives low results is contradicted. On the contrary, Evers and Elsdon's method ("Analysis of Drugs and Chemicals," p. 260) gives high results, probably owing to co-pptn. of Ba(NO₃)₂ with BaSO₄.

E. C. S.

Combined iodine in iodine ointment. D. HENVILLE (Analyst, 1936, 61, 27).—A modification of Cocking and Middleton's method for total I (B., 1931, 1018) is described. A sample labelled "B.P.C. Iodine Ointment" contained free I 1.73, KI 5.89, total I (after deduction of KI-I) 2.63%. Several I ointments contain little $>$ traces of I.

E. C. S.

Modifications of W. and E. Jensen's method for determination of the phenol coefficient of an antiseptic. V. GRYZEZ and P. MARTIN (Compt. rend. Soc. Biol., 1936, 121, 35—36).

R. N. C.

Basis of efficiency of extraction method with different materials. H. BREDDIN (Pharm. Ztg., 1936, 81, 112—114).—A criticism of Koch's results (B., 1936, 44). R. S. B.

Horse-radish juice. A. KUHN and G. SCHÄFER (Pharm. Zentr., 1935, 76, 629—630).—The validity of Noetzel's reaction (B., 1935, 524) is criticised. E. H. S.

Galenic preparations. III. Fowler's solution. L. ROSENTHALER (Scient. Pharm., 1935, 6, 41—42).—For all practical purposes the prep. can be obtained by dissolving 1.476 g. of $KAsO_2$ in 50 c.c. of H_2O and neutralising with HCl. CH. ABS. (p)

Detection of lead in pharmaceutical preparations. F. FEIGL and A. SINGER (Scient. Pharm., 1935, 6, 37—38).—Pb salts are quantitatively oxidised to PbO_2 by alkali persulphates or hypohalites. Excess of the latter is removed by NH_3 . The benzidine acetate test may then be applied. CH. ABS. (p)

"Acid hydrolysis" method for opium analysis. G. E. MALLORY and P. VALAER, JUN. (Amer. J. Pharm., 1935, 107, 515—525).—The following steps are standardised: acid digestion, extraction of impurities and some non-morphine alkaloids with $CHCl_3$, acid pptn. of impurities, hot extraction of morphine (I) and non-morphine alkaloids, removal of codeine and non-morphine alkaloids, and pptn. of impurities from alkaline solution, hot extraction of (I). E. H. S.

Microchemical reactions of novocaine. M. WAGENAAR (Pharm. Weekblad, 1936, 73, 122—128).—Characteristic cryst. ppts. are obtained (sensitivity given in parentheses) when solutions of novocaine (I) are treated with NH_4Cl (1:50), Au^{+++} in presence of $NaOAc$, Pt^{+++} , picric acid (1:200), picrolonic acid (1:1000), $K_2Cr_2O_7$ (1:100), and $Br-H_2O$. Crystals of (I) are coloured bright red when treated with a 15% solution of furfuraldehyde in oleic acid. This test may be used to detect adulteration of (I) with cocaine, which remains uncoloured. S. C.

Paraguay tea and maté leaves. F. W. FRIESE (Pharm. Zentr., 1936, 77, 53—55).—The average vals. for the alkaloid, essential oil, resin, tannin, and fatty oil contents of the dried leaves and twigs of 14 South American species of the *Ilex* genus are given. The fresh leaves contain 0.45—2.28% of caffeine, 0.08—0.12% of unknown alkaloid, traces—0.35% of essential oil (d_{20}^{20} 0.885, n_D^{20} 1.447), 2—2.28% of fatty oil, 7.5—10.85% of tannin, 4.5—6.5% of ash, and 3—3.55% of a bitter substance yielding, on hydrolysis, glucose and a resin to which are due the diuretic and appetite-reducing properties of the drug. E. H. S.

Detection of hashish, pure or mixed with various drugs, by means of filtered ultra-violet light. J. KHOURI (Ann. Falsif., 1935, 28, 582—584).—Fragments of hashish (I) illuminated with ultra-violet light show a brown fluorescence becoming mahogany-coloured, but the powdered drug does not show this effect. A light-petroleum extract of (I) gives a greenish fluorescence which disappears on keeping in presence of air, but is not destroyed by heating the extract for $\frac{1}{2}$ hr. at 100°. (I) is distinguished from the few adult-

erants which yield fluorescent extracts, by the colour of the fluorescence in various org. solvents. E. C. S.

Nicotine content of cigarette smoke. C. O. JENSEN and D. E. HALEY (J. Agric. Res., 1935, 51, 267—276).— C_5H_5N does not interfere with the pptn. of nicotine (I) by silicotungstic acid in cigarette-smoke solutions. The (I) content of cigarette smoke is inversely \propto the H_2O content and increases with the strength of the puff. Condensation of (I) in the unburned butt of a cigarette is considerable. A. G. P.

Utilisation of essential oils from forest trees in Japan. I. MIURA (Proc. 5th Pacific Sci. Congr., 1934, 5, 3919—3922).—Data are tabulated. CH. ABS. (e)

Bulgarian rose oil. R. GARNIER and (MME.) S. SABETAY (Ann. Falsif., 1935, 28, 585—589; cf. B., 1934, 219, 908).—Characteristics, including congealing points, rhodinal, geraniol, stearoptene, and EtOH contents, of samples of "essence des eaux" and "essence directe" prepared on a semi-industrial scale in 1934 are given. Previous conclusions are confirmed and a rapid method for the stearoptene determination is described. Sesquiterpenes of the azulene type are present in all the samples (cf. A., 1934, 1106). E. H. S.

Cinnamon-bark oil of the Seychelles. W. HOLDSWORTH-HAINES (Perf. Ess. Oil Rec., 1936, 27, 6—9).—Seven commercial oils (yield 0.35—0.71%) obtained from the dry bark (162—172 kg./ton of leaves) of the small stems and twigs of *Cinnamomum zeylandicum* had d 1.004—1.050 and contained 67—76% of aldehydes, whereas 3 similar oils from the thick trunk bark had d 0.9826 and contained only 48—55% of aldehydes. E. H. S.

Essential oil from rhizomes of *Rheum emodi*. Wall. M. G. MOHIUDDIN (J. Indian Inst. Sci., 1935, 18A, 134—135).—Steam-distillation of the dry, powdered rhizomes of *R. emodi* gave 0.05% of oil having d_{20}^{20} 0.864, n_D^{20} 1.4378, α_D^{30} -1.7° , and containing eugenol. E. H. S.

Indian essential oils. VII. Essential oil from the flower heads and stalks of *Cymbopogon polyneuros*. Stapf. M. S. KOTNIS and B. S. RAO (J. Indian Inst. Sci., 1935, 18A, 129—133).—The dry grass gave 0.38% of oil having d_{20}^{20} 0.9329, n_D^{20} 1.4922, $[\alpha]_D^{20}$ $+49.3^\circ$, acid val. 4.8, ester val. 48.5, Ac val. 124.9, alcohols (as $C_{10}H_{18}O$) 37.9 and containing *d*-limonene, *d*-perilla alcohol, and a sesquiterpene alcohol. E. H. S.

Iodised NaCl.—See VII. **Glass for phials.**—See VIII. **Vitamin-A in pilchard oil.** **Halibut-liver oil.**—See XII.

PATENTS.

Manufacture of viscous solutions of salts of anaesthetic substances with hydroxycarboxylic acids. W. W. GROVES. From I. G. FARBENIND. A. G. (B.P. 440,355, 27.6.34).—The η of aq. solutions of OH-acid salts of bases of the novocaine type, e.g., the quinic acid salts of β -diethylaminoethyl *p*-aminobenzoate or β -dimethylaminoethyl *p*-butylaminobenzoate, is increased by addition of H_2O -sol. cellulose derivatives, e.g., methylcellulose and its $\cdot C_2H_4\cdot OH$ derivative. The preps. are used in lumbar anaesthesia. H. A. P.

Preparation, packaging, and use of colloidal metallic bismuth. W. G. CHRISTIANSEN, A. E. JURIST, and E. MONESS, Assrs. to E. R. SQUIBB & SONS (U.S.P. 1,976,920, 16.10.34. Appl., 10.10.31).—Aq. 14% $\text{Bi}(\text{NO}_3)_3 \cdot 5\text{H}_2\text{O}$ containing 13% of mannitol (440 c.c.) is mixed with 0.9% acacia solution (7500 c.c.), the mixture is covered with a layer of C_6H_6 , treated with 2% aq. $\text{Na}_2\text{S}_2\text{O}_4$ (1500 c.c.) containing conc. aq. NH_3 (10 c.c.) as a stabiliser, and, when the Bi salt is reduced to colloidal metal, dialysed to remove sol. salts. The Bi solution is withdrawn from below the C_6H_6 into a vac. evaporator in which it is conc. to 10% Bi; this liquid is then vac.-packed for therapeutic use. A. R. P.

Centrifuging of bacilli.—See I.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Action of photographic baths through the paper felt. C. EMMERMANN (Phot. Ind., 1936, 34, 101—102).—Penetration of developer through the paper of ordinary printing papers is exceedingly slow, and therefore plays no part in ordinary development. J. L.

The argentometer—an apparatus for testing for silver in a fixing bath. W. J. WEYERTS and K. C. D. HICKMAN (Brit. J. Phot., 1935, 82, 739—740).—The opacities of the solutions are recorded on a meter reading in microamp. one way, and g. per litre of Ag the other. The Ag is pptd. by Na_2S and Na_2SO_3 solution, stabilised (buffered) with citric acid, Na citrate, and gelatin. The Ag content is read off directly, by difference of readings before and after pptn. The apparatus and solutions to be used are described in detail. The max. safe Ag concns. of fixing baths are (per litre) 1.5 g. for prints and 4 g. for films. J. L.

PATENTS.

Sensitisation of photographic silver halide layers incorporating colouring matter. B. GASPAR (B.P. 441,411, 10.8.34. Ger., 10.8.33).—To produce a desired gradation in a light-sensitive silver halide emulsion layer containing a dye for formation of a coloured image, the layer is treated with a suitable sensitiser; as the sensitising max. of the latter approaches the absorption max. of the dye which forms the coloured image the gradation is flattened, and *vice versa*. The method may be applied to controlling the gradations in different superposed layers used for colour photography. F. M. H.

Preservation of colloid films. G. S. ROWELL, Assr. to MULTIGRAPH Co. (U.S.P. 1,992,965, 5.3.35. Appl., 19.9.32).—Chromated colloid films on lithographic plates are protected from over-drying, cracking, and loss of sensitivity on storage by coating the freshly dried film with a layer of a H_2O -insol. but H_2O -permeable waxy layer. This coating may comprise, e.g., beeswax $1\frac{1}{2}$, tallow 3, and turpentine 20 oz., or may be an aq. emulsion of wax and tallow. J. L.

[Photographic] monopack process. L. T. TROLAND, Assr. to TECHNICOLOR MOTION PICTURE CORP. (U.S.P. 1,993,576, 5.3.35. Appl., 10.8.33).—The shielding effect of the outer record on the inner record during

development is corr. by subsequent bleaching of the top record and partial bleaching of the inner record. Ferricyanide or persulphate reducers are most suitable. Separation of the photographic records is simultaneously achieved. J. L.

Copying of opaque originals by contact printing. N. V. CHEM. FABR. L. VAN DER GRINTEN (B.P. 440,826, 10.8.34. Holl., 11.8.33).

XXII.—EXPLOSIVES; MATCHES.

Recent changes concerning explosives and their use. W. CULLEN and J. E. LAMBERT (Bull. Inst. Min. Met., 1936, No. 376, 20 pp.).—Explosives that have recently come into use in mining are described. D. K. M.

Determination of camphor in smokeless powders by the interfacial tension of its solutions. A. K. SIBGATULLIN (Trans. Kirov Inst. Chem. Tech. Kazan, 1935, No. 3, 165—174).—The powder is distilled with 10% aq. NaOH and the ice-cooled distillate diluted till all camphor is dissolved. The surface tension of the solution is determined. The method is applicable in presence of NHPh_2 or nitroglycerin. CH. ABS. (p)

Explosibility of agricultural and other dusts as indicated by maximum pressure and rate of pressure rise. P. W. EDWARDS and L. R. LEINBACH (U.S. Dept. Agric. Tech. Bull., 1935, No. 490, 24 pp.).—The max. pressure and the max. and average rates of pressure rise have been observed with 133 dusts of various kinds (including food products and by-products, spices, drugs, insecticides, wood, paper, tanning materials, fertilisers, resins, waxes, soaps, C, coal, metals, etc.), containing 100 and 500 mg. per litre, on explosion. These factors determine the structural damage to buildings, and enable dusts to be classified with respect to explosibility. Conc. sometimes increases and sometimes decreases the max. pressure etc. R. S. B.

Nitrating cellulose.—See V.

PATENTS.

Pyrotechnic compositions for producing (A) brown, (B) orange, smoke. G. U. GRAFF (U.S.P. 1,975,099 and 1,975,785, [A] 2.10.34, [B] 9.10.34. Appl., [A, B] 18.1.33).—A mixture of (A) CuO 50, PbO_2 35, and Mg 15%, (B) PbO_2 50, $\text{K}_2\text{Cr}_2\text{O}_7$ 35, and Mg 15%, is claimed. A. R. P.

Cu alloy.—See X.

XXIII.—SANITATION; WATER PURIFICATION.

Quantitative analysis of mine dusts. X-Ray diffraction method. Q. L. CLARK and D. H. REYNOLDS (Ind. Eng. Chem. [Anal.], 1936, 8, 36—40).—A cryst. substance, not present in the dust, is added to it in a definite ratio. The intensities of the lines due to the added and constituent substances are then compared. The method has been applied to SiO_2 -silicate ore mixtures; the reproducibility is about 5%. E. S. H.

[Sewage] sludge elutriation tests. C. E. KEEFER and H. KRATZ (Eng. News-Rec., 1935, 114, 289—291).—The sludge is mixed with H_2O or effluent and allowed

to settle (22 hr.). Increased ratio of H_2O : sludge to 8 : 1 (by vol.) caused greater removal of ammoniacal decomp. products, and a saving in coagulant ($FeCl_3$) \propto the additional amount of these products removed.

CH. ABS. (p)

Sewer-lining materials tested for corrosion-resistance. H. G. SMITH (Eng. News-Rec., 1935, 114, 444—445).—Satisfactory use of S-silicate preps. is recorded.

CH. ABS. (p)

Cleaning of filter sand. C. V. SWEARINGEN (Proc. 6th Ann. Meet. Kentucky-Tennessee Sect. Amer. Water Works Assoc., 1931, 25—30).—HCl and H_2SO_4 (5%) removed org. matter and Mn. HNO_3 (25%) cleaned fairly well. $CuSO_4$ (5—15%), chlorinated CaO, and NaOH (5—15%) did not clean.

CH. ABS. (p)

Determination of oxygen dissolved in 1 c.c. of water. L. VAN DAM (J. Exp. Biol., 1935, 12, 80—85).—The sample is drawn in a syringe pipette and Winkler reagents are added without exposure to air.

CH. ABS. (p)

Determination of iron and manganese in water. S. STENE (Tids. Kjemi, 1936, 16, 12—14; cf. A., 1928, 1108; B., 1933, 334).—Org. matter in the H_2O is destroyed by evaporating with H_2SO_4 and $(NH_4)_2S_2O_8$ in specially-designed flasks. Fe is determined colorimetrically as $Fe(CNS)_6$. Mn is oxidised with KIO_4 , and the MnO_4' determined colorimetrically.

M. H. M. A.

Catalytic removal of iron from water. M. J. SHOEMAKER (Paper Trade J., 1936, 102, TAPPI Sect., 17—19).—The various methods are discussed. The use of an artificial zeolite, with or without auxiliary treatment, is advocated.

H. A. H.

Colorimetric determination of nitrates in water : influence of chlorides. R. DANET (J. Pharm. Chim., 1936, [viii], 23, 34—36).—The colour formed in the phenolsulphonic acid method is influenced by the presence of Cl'. The standard should contain the same quantity of Cl'.

E. H. S.

Testing for sea-water damage. W. M. SEABER (Analyst, 1936, 61, 14—22).—A sensitive test, based on the liberation of Br and its detection as eosin, is described. The limit of sensitivity is 1.7×10^{-6} g. of Br. In samples of sea- H_2O taken from the Thames estuary, the English Channel, the Mediterranean, and the Indian Ocean the ratio of Br : Cl = 1 : 280 (approx. const.). Examples of the procedure with various types of commodities are given.

E. C. S.

Interference of algæ with tests for residual chlorine [in water]. E. W. JOHNSTONE and W. R. EDMONDS (J. Amer. Water Works Assoc., 1935, 27, 1717—1724).—Under certain conditions the presence of algæ interferes with the o-tolidine and starch iodide tests for free Cl_2 in H_2O . The reason is still doubtful, but there appears to be a straight reaction between the colouring matter of the algæ and the chemicals used in the tests, and also an oxidation of the testing solution brought about by nascent O.

C. J.

Comparative studies of media for determination of the coli-ærogenes group in water analysis. C. C.

RUCHHOFT (J. Amer. Water Works Assoc., 1935, 27, 1732—1745).—The results of a comparison with standard lactose broth, in 15 widely distributed laboratories, of the following broths, viz., (I) buffered lactose, (II) fuchsin-lactose, (III) methylene-blue-bromocresol-purple, (IV) brilliant-green bile, (V) crystal-violet, and (VI) formate-ricinoleate, indicate that no broth is equal to the standard one as a primary enrichment medium, their productivity being in the order given. No. (VI) proved most inhibitive to spore-bearing lactose fermenters and with (IV) and MacConkey's broth has been compared with the standard eosin-methylene-blue agar in the confirmation procedure on finished chlorinated H_2O . In respect of total recovery, use of (VI) proved to be the best procedure, but further work is necessary to get completely confirmed results. A no. of presumptives were confirmed by other tests, but not by the standard procedure.

C. J.

Phenol coefficient as a measure of the practical value of disinfectants. J. C. VARLEY (Soap, 1936, 12, 101, 103, 121).—Tests show that coal tar and cresol compound types of disinfectants when diluted to 20 times their respective phenol coeffs. are equally efficient in killing representative pathogenic micro-organisms under practical conditions of use.

C. J.

Effect of metals on fly sprays. D. G. HOYER (Soap, 1936, 12, 105, 107).—A study of the effect of metals and other container materials on pyrethrum liquid insecticides shows that the presence of an excess of confectioner's glaze is the most serious cause of a loss of toxicity.

C. J.

Constitution and use of an atomised white oil-pyrethrum fluid to control *Plodia interpunctella* and *Ephestia elutella* in warehouses. C. POTTER (Ann. Appl. Biol., 1935, 22, 769—805).—Satisfactory use of pyrethrum dissolved in white oil (0.81% of pyrethrins I and II) is described.

A. G. P.

Furs and dermatitis.—See VI.

PATENTS.

Air filters particularly for use in connexion with gas masks and poison-gas shelters. A. POELMAN, and ÉTABL. R. SCHNEIDER (B.P. 440,584 and Addn. B.P. 440,585, 1.12.34. [A] Fr., 2.12.33, [B] Belg., 9.8.34).—(A) A strip of paper is pleated and sealed at its edges to the container by means of asphaltic material. The filter may have the size of pores reduced before use either by volatilising a sublimable substance (or [B] several substances mixed), or by atomising a solution of a solid in a volatile solvent. (B) A method of attachment of the filter paper to the container of the adsorption or other purifying agent is described.

B. M. V.

Injector means for dosing water with hypochlorite solution. D. J. EVANS (B.P. 440,509, 20.9.34).—A measuring vessel and non-return valve are inserted in the hypochlorite conduit between the regulating valve and the injector which draws the solution into the main flow of H_2O . To empty this vessel an air-cock at the top is opened and the solution allowed to run back to a zero mark; to take a measurement, the air-cock is closed and the time taken by the solution to reach an upper mark noted.

B. M. V.