

BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

AUG. 18 and 25, 1933.*

I.—GENERAL; PLANT; MACHINERY.

Effect of alkalis and salt solutions on materials used for boiler construction. E. BERL and H. HINKEL (Arch. Wärmewirt., 1932, 13, 298; Chem. Zentr., 1933, i, 1003).—NaOH (\approx 0.8 g. per litre) gives increased protection against corrosion; with < 10 g. per litre cast Fe is more resistant than are steels. Addition of $MgSO_4$ or Na_3PO_4 (16.4 g. per litre) to the NaOH retards corrosion; Na_3PO_4 in greater concn. produces considerable corrosion. A. A. E.

Combining drying and grinding operations. L. T. WORK (Chem. Met. Eng., 1933, 40, 306—309).—Combined drying and grinding is effected by closed-circuit operation, using warm air as carrier. Applications include the pulverisation of coal and the combined grinding and dehydration of crystals as in the production of $CaSO_4$. Filter-press cakes may be treated in this way. Any type of mill may be used, the crucial point being the temp. of the air. The ground material is classified in an air separator. As an equilibrium curve exists between the H_2O content of any solid and the humidity of the air, the latter must be controlled to give even results, but the characteristic merit of warm air grinding is that caking does not occur. C. I.

Design of grid-packed cooling towers. C. C. FURNAS and R. H. NEWTON (Chem. Met. Eng., 1933, 40, 301—304).—In a tower packed with hurdles and cooling producer gas it was found that the heat-transfer coeff. was a linear function of the H_2O flow and varied as the 0.4 power of the gas flow. Data were computed on the heat lost by the gas and the log. mean temp. difference between the gas and H_2O at the top and bottom. In the calculation of tower dimensions the min. H_2O flow is fixed by the condition that the exit- H_2O temp. should be low enough to prevent the formation of much steam (e.g., 65°). Then the H_2O and gas flows can be read from curves given. The cross-sectional area is given by the practical consideration that for towers of this type the max. H_2O flow allowable is 1 lb./sq. ft./sec. if flooding is to be avoided. Deduction of the height follows. In many cases a better-proportioned tower is obtained by using a greater cross-section than the min. allowable, and reducing the height. C. I.

Explosions of oil vapour in compressed-air plants. V. KAMMERER (Bull. Soc. Ind. Mulhouse, 1933, 99, 285—309).—Whilst explosions of compressed-air receivers are often the result of mechanical failure, four explosions are described which could not be due to this cause and are attributed to the explosion of lubricating oil vapour. In regard to temp. reached in air com-

pressors it is pointed out that, in practice, in spite of cooling, a compression to $\frac{1}{4}$ vol. results in a temp. rise of 110° and it is on this account that multistage compression is used. Temp. rise may be greatly increased by valve defects resulting in compressed air being drawn back into the cylinder. The max. temp. for good working is taken as ≈ 160 — 170° . The flash point of lubricating oil is 190 — 215° and the temp. of spontaneous ignition 420 — 440° . Oxidation and polymerisation, however, occur below 160° , crusts of asphalt or coke are formed, and these tend to raise the temp. The possibility of local concns. of inflammable vapour (2.5 vol.-% for lubricating oil) cannot be excluded. The only probable causes of ignition are the autoxidation of peroxides either directly or acting through a coke deposit. This can occur at 200 — 230° . Desirable precautions for restricting temp. rise and the production of oil vapour are described. They include regular temp. reading, the use of a suitable lubricant, avoiding over-oiling, and systematic cleaning at stated intervals. C. I.

[Clays for] contact filtration. R. D. PETTY (Rep. Lubr. Oil Comm., U.S.S.R., 1930, 1, 216—225).—Clays are classified as (a) bentonites, having high bleaching and neutralising properties after activation, (b) clays which have had subterranean treatment with H_2O containing CO_2 , and (c) natural clays having a low bleaching power, but efficient as neutralising agents. The prep., properties, and analysis of clays are discussed. CH. ABS.

Comparison of various bleaching clays. N. I. TSCHERNOSHUKOV (Rep. Lubr. Oil Comm., U.S.S.R., 1930, 1, 193—215).—The Russian clay "kruimsil" is the most efficient. CH. ABS.

Testing Russian bleaching clays. R. D. PETTY (Rep. Lubr. Oil Comm., U.S.S.R., 1930, 1, 226—229).—A procedure is described. Clays are classified as non-activated (e.g., fuller's earth) and activated. CH. ABS.

Characteristic bleaching properties of moulding sands and other earths. V. A. KHOKHRYAKOV (Rep. Lubr. Oil Comm., U.S.S.R., 1930, 1, 230—246).—Russian and other bleaching clays have been compared. Among the untreated earths, moulding sands were the most effective. CH. ABS.

Theory of film lubrication. A. M. ROBB (Proc. Roy. Soc., 1933, A, 140, 668—694).—Consideration of Goodman's experimental results (Proc. Inst. Civil Eng., 1928, 226, 242; 1932, 233, 244) leads to the discovery of a flaw in the statement of Reynolds' fundamental theory, $dp/dx = 6\lambda u(h - h')/h^3$. The val. h' is always

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

taken to be the height at the section of max. pressure, and so to be const. Actually it can be const. only in the unreal case of a bearing of infinite axial length. It thus becomes necessary to deal with the side outflow and side inflow of the lubricant. On these modified conceptions, complete agreement is obtained between calc. and experimental results as regards attitude, eccentricity, and load-carrying capacity. For any radial clearance the coeff. of friction depends on eccentricity alone.

L. L. B.

Uses of solid CO₂.—See VII.

PATENTS.

High-temperature furnace. G. B. REMMEY (U.S.P. 1,879,494, 27.9.32. Appl., 20.2.31).—A furnace for the determination of fusion points comprises a circular chamber surrounded by thick walls and having a cylindrical block resting on the centre of the floor; the fuel burners are tangential to the lower part of the annular space, and extra air inlets are disposed rather higher.

B. M. V.

Retort with revolving hearth. C. AB-DER-HALDEN, ASSR. to SOC. POUR L'EXPLOIT. DES PROC. AB-DER-HALDEN (U.S.P. 1,878,581, 20.9.32. Appl., 18.5.28. Fr., 17.4.28).—A muffle roaster with a revolving hearth is provided with means by which the angle of the rakes may be adjusted during operation.

B. M. V.

Deconcentrator. C. G. HAWLEY, ASSR. to CENTRIFIX CORP. (U.S.P. 1,878,848, 20.9.32. Appl., 29.1.29).—An apparatus for concentrating scale-forming material into a small quantity of H₂O in a boiler (A) and discharging it comprises a turbine in the steam space coupled to a centrifugal rotor in the H₂O space, the exhausts of the driving steam and conc. sludge being controlled by valves outside A.

B. M. V.

Carrying out [temperature control of] chemical reactions. BRIT. CELANESE, LTD., H. F. OXLEY, and W. H. GROOMBRIDGE (B.P. 390,504, 24.9.31).—Heat is removed from exothermically reacting substances by vaporisation of a liquid, the vapour formed being made to pass downward through the liquid, after contact with incoming reactants if desired. The liquid may be heated by the products of reaction. Thus EtOH, steam, and air are passed through a heat exchanger to a catalyst and thence out through the lower part of the same heat exchanger. H₂O is supplied to the heat exchanger, and the steam generated by the heat of reaction passes through tubes surrounded by the H₂O and may be used to heat the entering gas mixture.

C. H.

Pulverising mills. H. S. POCHIN and A. RUSSELL (B.P. 393,519, 24.12.32).—In a disintegrator, a grinding block may be adjusted to the hammer circle by means of shims.

B. M. V.

Ball mill. E. L. PUNNETT, ASSR. to NAT. ANILINE & CHEM. CO. (U.S.P. 1,879,479, 27.9.32. Appl., 12.9.30).—An outlet pipe and stuffing box for the trunnion of a ball mill, used for S fusions and other operations causing the evolution of gas, are described.

B. M. V.

Separation of materials of different specific gravities. SCHÜCHTERMANN & KREMER-BAUM, A.-G. F. AUFBEREITUNG (B.P. 393,004, 4.1.32. Ger., 3.1.31).—

In a jig, both strata are discharged over the end remote from the feed, the heavy material being controlled by swinging flaps the width of each one of which is about equal to the size of the smallest particle discharged. The wt. of the flaps may be altered to adjust the pressure holding back the heavy material, and a finer adjustment may be effected, while running, by altering the inclination of the flaps.

B. M. V.

Centrifugal separators. J. R. KNOWLES and B. C. CARTER (B.P. 392,995, 18.12.31).—In a bowl for the separation of two liquids: turbine-like devices are used to avoid loss of energy at entrance and exit; the initial flow of the mixed liquids is through small-bore, honeycomb-like passages permitting flow only in the axial direction, then through radial passages of small width permitting separation radially and progression of both liquids axially, both sets of passages being narrow enough to ensure laminar flow of the fluids; in a quiescent zone above the separating zone, balanced floats are provided which float at the dividing surface of the liquids and control the rate of outlet of one of them, preferably the lighter, by means of sleeve valves on an axial outlet pipe.

B. M. V.

Horizontal centrifugal. N. V. MACHINEFABRIEK "REINEVELD" (B.P. 393,446, 29.8.32. Fr., 27.8.31).—The bowl and the motor have a common shaft and one bearing is supported in an extended, tapering end-plate of the motor in such a position that it coincides with the centre of gravity of the bowl.

B. M. V.

Centrifuges. F. E. KRAUSS (B.P. 393,216, 23.12.32. Ger., 12.1. and 28.4.32).—A flexible mounting for the bearings is described; the end of the shaft is the only point definitely located, and the driving pulley is situated there.

B. M. V.

Clarification of liquids. J. E. POLLAK. FROM CHEM. WERKE MARIENFELDE A.-G. (B.P. 393,142, 5.9.32).—Fermentation liquids, fruit juices, etc. are clarified by the agency of wood chips impregnated with pitch, the *d* being such that settlement is slow.

B. M. V.

Continuous filter. R. P. AKINS (U.S.P. 1,878,998, 27.9.32. Appl., 1.5.31).—A rotary continuous vac. filter is provided with cells (or shallow buckets) outside the drum; the feed of prefilter is into the cell on the crown of the drum. Any excess of prefilter sludge drops off at about the axial horizontal plane and is returned by a pump to the feed; the stiff cake continues to the lowest point and is blown off by air pressure. The wt. of the material will tend to cause autorotation; this is controlled so as to be intermittent, 1 cell pitch at a time, by a detent operated by a tumbling trough in the feed stream.

B. M. V.

Filtering. THERMAL SYND., LTD., and B. MOORE (B.P. 394,042, 15.1.32).—Filtering elements of relatively long front and short path are formed by pressing sharp edges, e.g., of fused SiO₂ rings, upon yielding material, e.g., rubber, paper, or soft metal, with more or less pressure according to the degree of filtration desired.

B. M. V.

Filter-presses. BLOMFIELD ENG. CO., LTD., and H. T. DURANT (B.P. 393,174, 26.10.32).—The press is formed of a no. of frames which are all alike, but are

assembled as alternate inlet and outlet, the outlet frames being converted into plates by the insertion of a slab of sponge rubber or other porous deformable material; the pressure of the prefilter is relied on to expand the slab radially and make a tight joint with the surrounding frame. B. M. V.

Filter-presses. W. BOULTON, LTD., and E. M. BREEZE (B.P. 393,625, 30.11.31).—Both end-plates of the press are movable by power; the end that is opened first stays in the same place for the next closing, thus saving about half the labour of moving the filter-plates and frames. B. M. V.

Filters. H. TRENEAR-THOMAS, and MANLOVE, ALLIOTT & Co., LTD. (B.P. 394,064, 18.2.32).—In the casing of a pressure leaf-filter, false walls are provided to spread the prefilter in smoothly flowing streams over the whole width of the upper part of the leaves. B. M. V.

Filtering apparatus. C. THON (B.P. 394,103, 12.4.32. Norw., 12.5.31).—Pressure or vac. leaves are suspended from outlet pipes and distended by chains, gauze, or other flexible material, the outlet pipes having flexible connexions at one end and shaking means at the other. B. M. V.

Filter-cake treating devices. (A) A. WRIGHT and (A, B) F. W. YOUNG (U.S.P. 1,880,005—6, 27.9.32. Appl., [A] 12.6.26, [B] 4.11.26. Renewed [B] 14.7.31).—(A) In a rotary drum filter a cake-reinforcing and -stripping means comprises a continuous band of a no. of parallel wires which while on the filter lie outside the filter medium. The cake is removed from the wires by reverse bends, by combs, and/or causing the wires to cross their own path. (B) A rotary drum or other type of filter is adapted to produce tapered sheets of cake (e.g., roofing tiles) by varying the rate of passage of filtrate at different points, thicker deposits being formed in localities where the filter medium is more porous, the vac. filtrate outlets being also situated near those points. The cakes may be removed by cords embedded in the filter surface. B. M. V.

Removing one or more volatile constituents from a liquid or gas. M. SHOELD, Assr. to KOPPERS Co. of DELAWARE (U.S.P. 1,878,607, 20.9.32. Appl., 20.1.31).—A liquid, e.g., wash oil from the scrubbing of coal gas, is freed from the most volatile constituent only, e.g., CS₂, in a tower by means of a current of gas (air) which passes right through from bottom to top. The tower is divided into sections, each having irrigating sprays and trays; the feed liquid is supplied to an intermediate spray and the wash oil containing all the light oils, but no CS₂, is removed from the tray next below the feed. Pure wash oil is elevated from the bottom of the tower to the top and lifts of shorter length are provided for wash oil + naphtha and wash oil + naphtha + toluol, respectively, the benzol remaining in the neighbourhood of the inlet and outlet. B. M. V.

Concentrating one or more components in liquid systems containing three or more components. R. LEISER (B.P. 390,716, 2.9.32. Austr., 2.9.31).—The mixture is extracted with one of the components to be conc., this being mixed if necessary with a substance which makes it less miscible with the other components; the substance may also be

added to the mixture to be extracted. Thus, 95% EtOH in 49 pts. of kerosene is extracted with 11.5 pts. of abs. EtOH, whereby there are obtained 12.25 pts. of anhyd. EtOH in the kerosene and 0.24 pt. of 80% EtOH. Similarly, a solution of 20 pts. of 95% AcOH in 100 pts. of oleic acid is extracted with 36 pts. of anhyd. AcOH with the addition of high-boiling hydrocarbon to the solution, or of 4 pts. of glycerol to the anhyd. AcOH. C. H.

Continuous mutual reaction of liquids. K. SCHMID (B.P. 393,527, 13.1.33. Ger., 12.2.32).—An apparatus for the continuous countercurrent contact of lighter and heavier liquids, e.g., nitroglycerin and alkali-wash, comprises a no. of open-topped agitators connected by sloping pipes extending from the bottom of one agitator to the upper part of the next, the pipes serving as separators and the flow being adjusted so that lighter liquid and emulsion will both rise and only heavier liquid fall. B. M. V.

Mixing liquids or liquids and solids. SOUTH METROPOLITAN GAS Co., H. STANIER, and J. E. DAVIS (B.P. 393,934, 1.12.31).—The materials are caused to flow through a pipe without baffles under such conditions that turbulence is ensured. Enlargements may be provided for the separation of treated liquids and addition of fresh constituents. B. M. V.

Aëration of liquids or dispersion of gases or vapours therein. DISTILLERS Co., LTD., and J. LOCKEY (B.P. 393,551, 21.2.33. Addn. to B.P. 387,486; B., 1933, 336).—The support for the spiral wire is triangular, cruciform, or fluted. B. M. V.

Air or gas washer. D. H. COUCH (U.S.P. 1,879,107, 27.9.32. Appl., 7.11.30).—The gas is caused to pass through a no. of parallel curved passages having vertical irrigated walls. Means are provided to cut out passages in the event of decrease of load. B. M. V.

(A) **Air and gas filter.** (B) **Means for filtering gas.** G. E. LYNCH ([A] U.S.P. 1,766,221, 24.6.30. Appl., 15.2.27; [B] B.P. 393,037, 4.3.32).—In (A) granular material is allowed to take its natural angle of repose and the gas enters through one slope and leaves by the opposite one. Preferably a pair (or more) of elongated piles are contained in parallel troughs with provision for withdrawing granular material from the bottom and returning it after cleaning to the top. In (B) the granular material is contained between perforated vertical walls and, for removal, slides on an imperforate sloping bottom. B. M. V.

Apparatus for cleaning gases. A. J. BOYNTON, Assr. to H. A. BRASSERT & Co. (U.S.P. 1,878,668, 20.9.32. Appl., 14.4.30).—Forms of labyrinth passages in a centrifugal rotor for scrubbing gases are described. B. M. V.

(A) **Apparatus for removing suspended particles from gases and vapours.** (B) **Apparatus for cleaning gases.** R. R. HARMON, Assr. to PEABODY ENG. CORP. (U.S.P. 1,880,017—8, 27.9.32. Appl., 7.9.29).—In (A) the gas is passed upwards through a tower in which are a no. of irrigated screens composed of endless wires moving horizontally across the tower and conveying the collected dust to side pockets. Each screen is

preferably composed of two layers of wires at 90°. In (B) the previously saturated gas is passed through a no. of vertical tubes which are externally cooled to below the dew point. Several stages are provided at temp. controlled to give successive deposition of dew.

B. M. V.

Purifying gases by means of liquid-wetted filters. W. FRANCKE (B.P. 393,117, 2.8.32. Ger., 19.9.31).—The gas is passed through a filter, about 1 mm. thick and having capillary pores, which is wetted either intermittently, or continuously section by section by relative rotation of the spray and filter, by a liquid supplied in the same direction as the gas in such quantity that it flushes the filter, a balance being retained by the pores to be pushed out as spray by the gas. Means of settling the liquid and returning it to the sprays are described. Tar may thus be removed, in solution, by C_6H_6 . [Stat. ref.]

B. M. V.

Devices for determining the density of gases. BRANDL & Co. KOMM.-GES. (B.P. 393,507, 9.12.32. Austr., 11.12.31).—The sample is contained in a \cap -tube of considerable height and is preferably continuously renewed by having the ends of the \cap bent in opposite directions in a conduit of the flowing gas, a constriction being added to prevent any Pitot effect or friction loss of head. One leg of the \cap acts as a static column of the gas and the difference in pressure between the top and bottom is measured by a manometer, preferably of the ring-balance type, the pressure of the lower point being transmitted by the gas itself in an approx. level tube and that of the upper point by a column of lighter liquid (oil) balanced against a heavier liquid (Hg).

B. M. V.

Composition of matter. [Warning of leakage of refrigerants.] C. R. HARRIS and A. L. PITMAN, Assrs. to ROESSLER & HASSLACHER CHEM. Co. (U.S.P. 1,878,276, 20.9.32. Appl., 2.1.30. Renewed 15.9.31).—Allyl alcohol is added to inodorous refrigerants.

B. M. V.

Refrigerating composition. F. J. DOBROVOLNY, Assr. to ROESSLER & HASSLACHER CHEM. Co. (U.S.P. 1,879,893, 27.9.32. Appl., 10.2.30).—Chloropicrin [1—6 (2%) is added to $MeCl$ as a warning of leakage.

B. M. V.

Antifreeze solution. I. T. SMITH (U.S.P. 1,878,903, 20.9.32. Appl., 18.1.32).—The solution comprises $CaCl_2$ 260 lb., glycerin 1 gal., $EtOH$ $\frac{1}{2}$ gal., extract from 2 lb. of coffee, H_2O to make 100 gals.

B. M. V.

Fire-extinguisher charge. R. C. IDDINGS, Assr. to FYR-FYTER Co. (U.S.P. 1,878,705, 20.9.32. Appl., 17.6.29).—The charge comprises three separate constituents: (1) a gas-forming material with a metal to provide exothermic heat, e.g., powdered Na_2CO_3 and Mg ; (2) an acid liquid, e.g., dil. HCl ; (3) a non-freezing liquid, e.g., $CaCl_2$ aq. or CCl_4 .

B. M. V.

[Domestic] emulsifying apparatus. A. G. and M. G. IONIDES (B.P. 393,494, 23.11.32).

Construction of [textile] material suitable as a filter medium [for milk etc.]. ROBINSON & SONS, LTD., V. O. ROBINSON, and J. J. BLOW (B.P. 393,592, 4.12.31).

Gas purification.—See XI. Milk evaporator.—See XIX.

II.—FUEL; GAS; TAR; MINERAL OILS.

Dedusting of coal. H. F. HEBLEY (Amer. Inst. Min. Met. Eng., June, 1933, Contr. No. 43, 39 pp.).—The various types of equipment for removing dust both by screening and aspiration, together with dust-recovery plant, are described.

C. A. K.

Austrian brown coal. F. NEUWIRTH (Berg- u. Hüttenm. Jahrb. Leoben, 1932, 80, 86—93, 136—157; Chem. Zentr., 1933, i, 704).—The extraction of bitumen, wax, resin, and oil, the effect of various solvents on the solubility of humic acids in NH_3 , and the properties of the tar, aq. distillate, etc. are discussed. Analytical data are recorded.

A. A. E.

Dehydration of brown coal before distillation. G. AGDE and R. HUBERTUS (Braunkohle, 1932, 31, 877—881, 897—900; Chem. Zentr., 1933, i, 704).—The vol. contraction is independent of the method of dehydration. Three phases are distinguished: removal of surface, capillary, and adsorbed H_2O . The capillary structure of the coal is discussed.

A. A. E.

Heating of a battery of Becker compound ovens by means of blast-furnace gas. W. J. BROOKE and W. F. CARR (Gas World, 1933, 99, Coking Sect., 77—80).—The construction and preliminary regulation of the first battery of by-product coke ovens in this country to be heated by blast-furnace gas are described.

G. E. F.

Destructive distillation of cottonseed hulls. E. E. RANDOLPH, C. S. GROVE, and R. C. TUCKER (J. Elisha Mitchell Sci. Soc., 1932, 48, 26).—Recovery of $AcOH$ is economically attractive. The tar is hard drying, very resistant to reagents, and rich in phenols.

CH. ABS.

Specifications for powdered activated carbon. I, II. J. R. BAYLIS (Water Works and Sewerage, 1932, 79, 311—314, 341—344).—I. Specifications and testing directions are given.

II. Gibbs' method for the determination of phenols is modified.

CH. ABS.

Causes and prevention of corrosion in gas mains. E. E. RANDOLPH and J. M. MORROW (J. Elisha Mitchell Sci. Soc., 1932, 48, 130—132).— C_2N_2 , NH_3 , and S compounds should be completely removed. A hot spray of gas tar protects a wrought-Fe pipe. The solution pressure determined with a potentiometer is a quick and efficient measure of the resistance of a metal to corrosion in a given medium.

CH. ABS.

Cold tars. H. MALLISON (Gas J., 1933, 202, 862—864).—A cold tar is defined as a road tar diluted with a volatile solvent. Specifications for winter and summer are given and should include the following properties: viscosity in a consistometer (4-mm. nozzle) at 30°, wt.-% H_2O , min. wt.-% heavy and anthracene oils, min. % pitch, max. vol.-% phenols, max. wt.-% $C_{10}H_8$ and crude anthracene, wt.-% free C, flash point (Pensky—Martens), and max. wt.-% ash.

R. N. B.

Filled tars. P. LE GAVRIAN, D. BOUTET, and G. BEDAUX (Gas J., 1933, 202, 861—862).—The addition of powdered coal or limestone to tars for the production of

road tars and the practical use of these in France is discussed. R. N. B.

Tar concrete. W. E. CONE (Gas J., 1933, 202, 864—865).—The factors controlling stability, durability, and safety of tar concrete and the methods of application to roads are discussed. R. N. B.

Structure of pitch. G. HUGEL and G. FRANGOPOL (Ann. Office nat. Combust. liq., 1932, 7, 225—238, 417—467; Chem. Zentr., 1933, i, 1056—1057).—Oil from the destructive hydrogenation of Saar pitch was dehydrogenated in presence of catalysts prepared by reduction of Fe and Mo oxides, affording polycyclic hydrocarbons, the nuclei of which are considered to be present in the pitch. Distillation is unsatisfactory as a means of separation of the constituents of an oil; distillation in the cathode vac. is necessary. A. A. E.

Temperature-porosity relations in oil sands. A. P. HONEST and G. R. HEYL (Pa. State Coll. Min. Ind. Exp. Sta. Bull., 1922, 11, 93—105).

Oil recovery. K. B. BARNES (Pa. State Coll. Min. Ind. Exp. Sta. Bull., 1932, 11, 71—92).—Solutions of Na_2CO_3 , Na silicate, and NaOH are no more effective than is H_2O as recovery agents in a forced drive through tightly consolidated sandstones. Na soap solutions are slightly better. A mixture of Na soap and Na_2CO_3 is better than H_2O in more porous sands. CH. ABS.

Volkenroda petroleum deposit. H. ALBRECHT (Kali, 1932, 26, 25—33, 39—43).—The petroleum, *d* 0.836, viscosity 1.4/20°, contains 25% of benzene. The natural gas contains CH_4 54.5, C_2H_6 12.4, C_3H_8 9.0, C_4H_{10} 3.7, C_5H_{12} etc. 2.2, N_2 18.0, O_2 0.1, CO 0.1%; CO_2 and H_2S are absent. CH. ABS.

Corrosion in non-pressure [petroleum] refining equipment. S. S. SHAFFER and J. E. POLLOCK (Refiner Nat. Gasoline Mfr., 1932, 11, 568).—Corrosion and its arrest with NH_3 are discussed. CH. ABS.

Isolation of ethylbenzene from an Oklahoma petroleum. J. D. WHITE and F. W. ROSE, JUN. (Bur. Stand. J. Res., 1933, 10, 639—645).—PhEt has been isolated (0.03%) from petroleum by fractional crystallisation and subsequent sulphonation of the xylene fraction. The physical properties have been compared with those of a synthetic specimen. The f.p. and composition of eutectic mixtures of PhEt and *m*- and *p*-xylenes have been determined. F. R. S.

Purification of hydrocarbons by crystallisation from liquid methane. Isolation of β -methylheptane from petroleum. R. T. LESLIE (Bur. Stand. J. Res., 1933, 10, 609—618).— β - $\text{C}_7\text{H}_{15}\text{Me}$ (I), f.p. -111.3° , has been separated from petroleum by mixing with C_2H_6 and adding dropwise to liquid CH_4 contained in a special apparatus. The solid phase is separated by centrifuging and volatile solvent recovered. Petroleum contains 0.15% of (I), the physical properties of which are described. The method could be applied to other difficultly crystallisable hydrocarbons by mixing with C_2H_6 , C_3H_8 , or C_2H_4 . F. R. S.

Determination of the chemical composition of cracked gasolines. I. M. D. TILITSCHÉEV and M. P. MASINA (Khim. Sost. Neft. Neftyan. Prod., 1931, 286—321). II. (Neft. Choz., 1932, 23, 161—169).—I. Methods

are reviewed. The total aromatic and unsaturated hydrocarbon content is determined by Kattwinkel's method; these compounds are removed from another portion by means of 98% H_2SO_4 followed by distillation, and the NH_2Ph points determined before and after treatment, whence the content of aromatic and unsaturated compounds is calc.

II. The total aromatic and unsaturated compounds are determined by sulphonation; aromatic compounds are then determined by the usual method after removal of unsaturated compounds by bromination followed by distillation. The method is accurate to 1%. The % of aromatic compounds in cracked gasoline does not change with the temp. provided that the yield is unchanged. The % of unsaturated compounds increases, and that of naphthenes decreases, with rise of temp. The heavier is the cracking, the higher is the content of aromatic compounds and naphthenes in the cracked gasoline, but the average composition of the total of cracked gasolines from primary cracking and recycling operations is more or less const. Cracking pure paraffin hydrocarbons affords much naphthenes, but practically no aromatic hydrocarbons. The high-boiling cracked gasoline fractions are the richer in aromatic hydrocarbons, particularly in repeatedly recycled gasolines. CH. ABS.

Photolysis of cracked oil. E. VELLINGER and G. RADULESCO (Compt. rend., 1933, 196, 1495—1498).—The rate of absorption of O_2 by cracked oil during irradiation (Hg-light) in pyrex glass vessels parallels the amount of gum produced; oils showing induction periods give least gum. The rate of oxidation is increased by photo-sensitisers and decreased by photo-inhibitors. Some samples absorbed > 30 vols. of O_2 ; the amount of gum formed is practically proportional to the O_2 uptake in the first stages. The absorption diminishes gradually to a limiting val. Coloured resinous liquids are produced. The above process can be used to determine the gumming tendency (and hence the quality) of the oil. H. B.

Critical solution temperatures of mixtures of gasoline, ethyl alcohol, and water. O. C. BRIDGEMAN and D. QUERFELD (Bur. Stand. J. Res., 1933, 10, 693—704).—The crit. solution temp. (C.S.T.) of these mixtures decreases with the $\text{H}_2\text{O}:\text{EtOH}$ ratio and with the % and type of gasoline used. Mixtures of 95% EtOH with equal pts. of gasoline separate into 2 phases at $14-41^\circ$. For the C.S.T. to be $< 20^\circ$ the % EtOH must be $\leq 90\%$ for 95% EtOH, but may be as low as 10% with 99% EtOH. J. W. S.

Physical analysis of mixtures of liquid fuel with alcohol or with alcohol and benzene. C. BONNIER and G. JUGE-BOIRARD (Ann. Office nat. Combust. liq., 1932, 7, 799—809; Chem. Zentr., 1933, i, 1057).—The mixture is titrated with H_2O and the point of separation at various temp. is determined. A. A. E.

Rôle of oxygen in conversion of hydrocarbons. I. N. BEALL (Refiner Nat. Gasoline Mfr., 1932, 11, 606).—A discussion. CH. ABS.

Rôle of sulphuric acid in the treatment of [hydrocarbon oil] pressure distillate. A. W. TRUSTY (Refiner Nat. Gasoline Mfr., 1932, 11, 604).— H_2SO_4

causes a rise in the b.p. of distillate proportional to the amount used, the time of agitation, and the temp. of treatment; the improvement in colour and S and gum content also depend on the quantity used. CH. ABS.

Relationship between end-point and true b.p. [of hydrocarbon oils]. A. J. GOOD and A. J. CONNELL (Refiner Nat. Gasoline Mfr., 1933, 12, 56).—Cut temp. near 232° gave fractions having an end-point < the true b.p. (Peters and Baker), cut temp. of 149° gave a product with an end-point < the true b.p., whilst at about 193° the temp. were approx. identical. The A.S.T.M. distillation method is discussed. CH. ABS.

Nitrobenzene [extraction] process for lubricating oils. S. W. FERRIS and W. F. HOUGHTON (Refiner Nat. Gasoline Mfr., 1932, 11, 560).—PhNO₂ is the most satisfactory solvent as regards selectivity and vol. required; normal amounts of wax present no difficulty. Viscosity-temp. relationships of oils are examined. Countercurrent continuous extraction is recommended. The naphthenic residual oil is also useful as a lubricant. The loss of solvent is about 0.2% per cycle. CH. ABS.

Combined drying and grinding. Cooling towers [for gases]. Bleaching clays. Film lubrication.—See I. OH-acids from oxidation of hydrocarbons.—See III. Reduction of CO.—See VII. Forrer magnetic separator [for coal].—See XI.

PATENTS.

Coking retort oven. J. VAN ACKEREN, Assr. to KOPPERS Co. OF DELAWARE (U.S.P. 1,872,612, 16.8.32. Appl., 26.1.28).—Each of the heating walls of a vertical coke-oven battery has an upper (*A*) and a lower (*B*) group of flame flues, which are structurally independent of each other. The *A* groups of two adjacent heating walls are connected in series in such a manner that heating gases pass upward in one of the walls and downward in the other; the *B* groups in the two walls are similarly connected. The regenerators (*C*), which are arranged on each side of the battery structure, are so connected to the several series of groups of flame flues that all *C* on one side of the battery supply air and gas simultaneously to the flues while those on the other side simultaneously transmit waste gases from the heating walls to a waste-gas main. The direction of flow is periodically reversed. When a rich heating gas is used this is supplied directly to the flues and only the air is preheated in *C*. A. B. M.

Treatment [carbonisation] of carbonaceous material. M. J. TRUMBLE, Assr. to COALS & CHEMICALS, LTD. (U.S.P. 1,873,910, 23.8.32. Appl., 13.10.26).—The material is carbonised in a series of intercommunicating chambers by direct contact with superheated steam. The steam is introduced into the first chamber at 600–650° and leaves the last at about 290°. The mixture of steam and volatile distillation products is then passed through a dephlegmator (*A*) wherein the heavy fractions are condensed. The uncondensed steam and vapours issuing from *A* are reheated to 600–650° in a second superheater and passed to a second series of carbonising chambers. By maintaining the steam in the vapour phase in this manner its latent heat is conserved. A. B. M.

Manufacture of finely-divided carbon. A. L. STROUT and E. E. LYDER, Assrs. to STANDARD OIL Co. OF CALIFORNIA (U.S.P. 1,872,519, 16.8.32. Appl., 7.7.28).—An area of petroleum oil is maintained in incomplete combustion in a burner pan to which a regulated quantity of air is supplied through a no. of pipes passing through the bottom of the pan. No additional source of heat is used. The products of combustion are passed through a separating apparatus to remove coarse particles and tarry matter, and are then cooled and passed to a second separating apparatus wherein the finely-divided C is collected. A. B. M.

Water-gas generator. W. BENNHOLD (U.S.P. 1,880,010, 27.9.32. Appl., 15.8.28. Ger., 19.8.27).—A generator for the production of water-gas from pulverised fuel comprises a vertical downflow generating passage (*A*) within a pair of regenerators in which the steam is heated by the alternate combustion of previously made gas and air. *A* is widened below the generator to allow ash to deposit. B. M. V.

Gas-purification process. F. W. SPERR, JUN., Assr. to KOPPERS Co. (U.S.P. 1,878,609, 20.9.32. Appl., 6.10.25).—Gas, e.g., from coke ovens, is treated while hot with H₂SO₄ to remove NH₃, the reaction effecting further heating, and then scrubbed with a liquid, e.g., aq. Na₂CO₃ + Fe₂O₃, to remove H₂S, without intermediate loss of heat. B. M. V.

Asphaltic cement. W. C. FERGUSON (U.S.P. 1,878,625, 20.9.32. Appl., 24.11.28).—Hard asphalt in the form of fairly large grains is mixed with asphalt plasticised by such a small quantity of solvent that the mixture will be self-setting without access of air. B. M. V.

Removal of phenols from waste and other liquors. S. P. MILLER, Assr. to BARRETT Co. (U.S.P. 1,873,900—1, 23.8.32. Appl., 30.6.27).—(A) The liquors are brought in intimate contact, e.g., by countercurrent flow, with a heavy neutral coal-tar oil having *d* > that of the liquor. The phenol-containing oils are then washed with aq. NaOH and recirculated. (B) The liquors are extracted with a neutral coal-tar oil, substantially free from C₆H₆ and PhMe, and having *d* < 1, e.g., a neutral oil of boiling range 130–200°. A. B. M.

Treatment of cracked hydrocarbons. T. T. GRAY, Assr. to GRAY PROCESSES CORP. (U.S.P. 1,878,580, 20.9.32. Appl., 10.1.27).—Cracked vapours without added gases, but containing H₂ produced during cracking, are subjected at 200° to the action of a mixture of fuller's earth and that material impregnated with a catalyst, e.g., Ni. B. M. V.

Clarification of hydrocarbons containing suspended or colloidal complexes. S. SWARTZ, Assr. to JENKINS PETROLEUM PROCESS Co. (U.S.P. 1,878,650, 20.9.32. Appl., 2.2.29).—Petroleum containing compounds of Ca and C due to cracking or other cause is clarified by treatment with fuller's earth or other absorbent which is impregnated with an acid containing a C₁₀H₈ ring, dissolved in a petroleum solvent; alternatively, the oily acid waste from a H₂SO₄ treatment may be used for impregnation. B. M. V.

Motor fuel. J. G. DAVIDSON, Assr. to CARBIDE & CARBON CHEMICALS CORP. (U.S.P. 1,879,118, 27.9.32. Appl., 27.12.28).—The fuel comprises a mixture of about 4 pts. of gasoline from natural gas, having a final b.p. of $\geq 165^\circ$, with about 1 pt. of PhEt or other side-chain benzene which will diminish evaporation without raising the detonation or the distillation end-point.

B. M. V.

Storing and utilising highly volatile liquids [gasoline]. G. G. OBERFELL (U.S.P. 1,878,174, 20.9.32. Appl., 7.10.27).—Gasoline for gas enrichment is transported under considerable pressure and on arrival is transported by that pressure to tanks at a lower pressure through a cooler if desired. The vapour formed normally passes to the gas main; when this is impossible the vapour is passed to a storage tank at some pressure between that of liquid storage and atm., and when this tank becomes full vapour is withdrawn, condensed by refrigeration, and passed to the liquid storage.

B. M. V.

Lubricating system and products. W. V. KIDDER (U.S.P. 1,879,874, 27.9.32. Appl., 16.10.31).—Colloidal graphite (0.005—0.05 or 0.01%) is incorporated in the crankcase oil of internal-combustion engines. B. M. V.

Textile oil [lubricant for fibres]. F. W. SULLIVAN, JUN., Assr. to STANDARD OIL CO. (U.S.P. 1,871,927, 16.8.32. Appl., 9.12.26).—The composition contains a purified, low-viscosity mineral oil, an alkali-metal soap of a sulphonated mineral oil (as emulsifier, 12—15%), oleic acid (12—15%), and an antioxidant, e.g., β -C₁₀H₇·OH (0.1—2%). Its use with artificial silk causes neither discoloration nor permanent weakening of the fibre.

D. J. N.

Removing volatile constituents from liquids etc. Purifying gases.—See I. **Recovery of C₂H₄.**—See III. **Bleaching clays.**—See VII. **Hydraulic binding medium. Asphalt paving materials.**—See IX. **Lubricating oils and greases.**—See XII.

III.—ORGANIC INTERMEDIATES.

Determination of furfuraldehyde in various vegetable products. V. V. TSHELINCEV and A. F. VOROBIEVA (J. Chem. Ind. Russ., 1933, No. 2, 27—35).—10 g. of material are boiled with 40 g. of 7% HCl, or of 20% H₂SO₄, the vol. being kept const. by addition of H₂O. The entire furfuraldehyde (I) content of the material is present in the first 90 g. of distillate; this is neutralised, saturated with NaCl, and (I) is separated by fractional distillation. The content of (I) in various dry products is: rice straw 6.8, bran 5.0; wheat straw 8.4, bran 6.7; sunflower stalks 5.2, seed husks 11.8; soya stalks 5.0, pod membranes 7.0; cedar-nut shells 5.3; bamboo 10.3; rushes 10.5; flax tow 7.8—10.1; hemp tow 8.6; cotton waste 7.2; ramie 4.6; oak wood, 10.5, bark 7.5, extracted tannery bark 7.9; oat straw 14.6, bran 6.0; maize cob waste 18.0, stalks 18.0, husks 4.4%.

R. T.

Fatty [hydroxy]-acids insoluble in light petroleum. A. DAVANKOV (Masloboino Zhir. Delo, 1932, No. 1, 54—60).—The OH-acids formed by oxidation of hydrocarbons can be separated by the use of 33—20% of the usual amount of benzene if the latter is saturated

with 0.3—0.8% gaseous HCl. On hydrogenation the unsaturated OH-acids become sol. in benzene.

CH. ABS.

Possibility of using the hydroxy-acids obtained by oxidation of paraffin in the textile industry. E. S. CHATROV (Rekonstr. Textil. Prom., 1932, 11, No. 4, 48—50).—The crude OH-acid was sulphonated in 4 different ways. The most highly sulphonated acid was a good wetting agent, but was not a satisfactory substitute for soap. It could be used instead of Na ricinoleate in C₁₀H₇·OH or lizanol baths for printing with alizarin-red or -rose.

CH. ABS.

[AcOH from] cottonseed hulls. C₂H₄ from cracking-still gases. PhEt and β -methylheptane from petroleum.—See II.

PATENTS.

Recovery of ethylene. G. F. HORSLEY, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 390,863, 13.10.31).—C₃H₈ and higher olefines are absorbed from mixtures rich in C₂H₄, e.g., cracking-still gases, by washing with mineral oil, b.p. $> 200^\circ$ (kerosene), preferably at > 10 atm.; substantially pure C₂H₄ remains, and the C₃H₈ etc. may be recovered from the solution by releasing the pressure.

C. H.

Production of water-free ethyl alcohol. A. GORHAN (U.S.P. 1,879,847, 27.9.32. Appl., 8.9.30. Ger., 9.9.29).—Aq. EtOH vapour is treated in a tower with a countercurrent of a solution in abs. EtOH of a dehydrating salt capable of passing directly from aq. solution to the molten state, e.g., CaCl₂, Na₂S, MgCl₂, or, preferably, KOAc.

L. A. C.

Manufacture of acetaldehyde [from alcohol]. H. DREYFUS (B.P. 390,506, 5.10.31).—The MeCHO is extracted from the gaseous product with a H₂O-insol. solvent, e.g., paraffin oil, PhCl, C₆H₄Cl₂, (CH₂Ph)₂O, C₂H₂Cl₄, triacetin, etc.

C. H.

Manufacture of condensation products of aldehydes and ketones. H. LANGWELL, J. E. YOUELL, and BRIT. INDUSTRIAL SOLVENTS, LTD. (B.P. 390,905, 19.1.32).—Aq. caustic alkali is stirred into the ketone (COMe₂) and H₂O, the aldehyde (MeCHO) is added to the cooled mixture, and the alkali is at once neutralised to prevent formation of resin.

C. H.

Concentration of aliphatic [acetic] acids. H. DREYFUS (B.P. 390,825, 10.10. and 8.12.31).—Dil. acid, e.g., AcOH from acetylation of cellulose, is converted into a heavy-metal (Cu, Al, Cr, Ni, Co, or Fe) salt, which is then decomposed, e.g., at 200—450°.

C. H.

Manufacture of aliphatic [acetic] anhydrides. H. DREYFUS (B.P. 390,845, 30.9.31).—The acid (AcOH) is preheated and/or anhydridised in the form of thin sheets, e.g., in annular spaces $\frac{3}{16}$ — $\frac{1}{2}$ in. thick.

C. H.

Production of the anhydrides of volatile fatty acids [acetic anhydride]. DEUTS. GOLD- U. SILBER-SCHNEIDANSTALT VORM. ROESSLER, H. WALTER, and H. SCHULZ (B.P. 390,987, 15.7.32).—An aliphatic acid chloride, prepared from the acid by passing it with CO and Cl₂ over a charcoal catalyst, is treated with the corresponding acid in a high-boiling org. solvent, e.g., 1-C₁₀H₇Cl. Suitable apparatus is figured.

C. H.

Manufacture of organic bases [from dichlorohydrins and ammonia]. L. LILIENTHAL (B.P. 390,516 and Addn. B.P. 390,523, 4.7.31).—(A) Sol. liquid products are obtained by interaction of NH_3 and a dihalohydrin of a polyhydric alcohol below 100° , preferably in presence of solvent or diluent (EtOH , H_2O). From alcoholic NH_3 and $\beta\beta$ -dichloroisopropyl alcohol at 16 – 18° there is obtained after 10 days a viscous yellow oil, sol. in H_2O or EtOH . (B) The temp. is allowed to exceed 100° , without external heating. The product is dark, but sol. in H_2O or EtOH . C. H.

Softening, plasticising, and like agents and processes. DEUTS. HYDRIERWERKE A.-G. (B.P. 390,534, 7.10.31. Ger., 7.10.30).—*cyclohexyl* (and homologous) esters of aliphatic or alicyclic monocarboxylic acids above C_6 , free from NH_2 and SO_3H groups, e.g., *cyclohexyl* palmitate (b.p. 185 – $190^\circ/3$ mm.), abietate, montanate, or naphthenate, methyl*cyclohexyl* oleate (b.p. 190 – $220^\circ/3$ mm.) or palmitate (b.p. 190 – $220^\circ/3$ mm.), are used as softening, smoothing, plasticising, or impregnating agents in the treatment of leather, textiles, silk, artificial silk, etc., as plasticisers for cellulose esters or ethers, and as ingredients of cleansing preps. C. H.

Manufacture of terpenes. SCHERING-KAHLBAUM A.-G. (B.P. 391,073, 13.12.32. Ger., 18.12.31).—As catalysts for the conversion of nopinene into pinene and camphene, or of pinene into camphene, there are used H_2O -sol. neutral metal sulphates which retain $1\text{H}_2\text{O}$ at 220° , preferably introduced on carriers in portions into the heated terpene. C. H.

Preparation of retene. G. O. HENKE and G. ETZEL, Assrs. to NEWPORT INDUSTRIES, INC. (U.S.P. 1,881,565, 11.10.32. Appl., 28.7.30).—The product obtained by heating rosin, abietic acid, etc. with S is steam-distilled under reduced pressure before being recrystallised from EtOH . S. M.

Manufacture of nitro-compounds of the diphenyl series. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 390,556, 3.11.31).—Diphenyls carrying an acidic group in position 4 are mononitrated with mixed acid, sulphonation being avoided either by cooling initially at 0 – 10° or by adding a diluent (AcOH , H_2O). Diphenyl-4-carboxylic acid gives a 2'- NO_2 -compound, m.p. 248 – 250° (amine, m.p. 182 – 185°), and as main product the 4'- NO_2 -isomeride, m.p. 344 – 346° (acid chloride, m.p. 194°), which may be reduced to amine, m.p. 239° [4'-OH- (m.p. 289 – 290°), 4'-Cl- (m.p. 290 – 293°), and 4'-Br- (m.p. 303 – 305°) compounds are described]. Other products prepared are: 4'-nitro-4-benzoyldiphenyl, m.p. 164° [amine, m.p. 148° ; B, HCl, m.p. 254 – 256° (decomp.)]; 4'-nitro-4-acetyldiphenyl, m.p. 152° (amine, m.p. 174°); nitro- and amino-diphenyl-4-sulphonic acids; 4:4'-dinitrodiphenyl, m.p. 233° . C. H.

Carrying out chemical reactions. Ball mill [for S fusions]. Concentrating liquid systems.—See I. Phenols from waste liquors.—See II. Camphor from pyroxylin.—See V. EtOH , BuOH , and acids produced by fermentation.—See XVIII. Removing NHPh_2 from smokeless powder.—See XXII.

IV.—DYESTUFFS.

Condensation of chlorodinitrobenzene with p-aminophenol-3:5-disulphonic acid. I. M. KOGAN, A. S. VORONOV, and A. Z. LUBITELEVA (Anilokras. Prom., 1933, 3, 153–154).— $\text{C}_6\text{H}_3\text{Cl}(\text{NO}_2)_2$ (I) condenses with the acid Na salt of p-aminophenol-3:5-disulphonic acid in alcoholic or, better, in aq. solution in presence of NaOAc to Na 2:4-dinitro-4'-hydroxydiphenylamine-3':5'-disulphonate, dyeing wool in yellow shades of poor fastness to boiling H_2O and alkali. G. A. R. K.

Chemical properties of substantive dyes. A. S. SCHPITALNI (Izvest. Textil. Prom. Torgov, 1930, No. 4–5, 77–81).—Combinations of benzidine with naphthionic acid are least stable. Introduction of OH and SO_3H groups, or increase in the no. of OH, OMe, or SO_3Na groups, increases the stability. The viscosity of a dye solution is decreased by OH and SO_3H groups. CH. ABS.

PATENTS.

[Manufacture of] tetrakisazo dyes. IMPERIAL CHEM. INDUSTRIES, LTD., and C. PAINE (B.P. 390,529, 4.9.31).—An amine, $\text{Y}\cdot\text{Ar}\cdot\text{CO}\cdot\text{NH}\cdot\text{Ar}'\cdot\text{NH}_2$ or $\text{Y}\cdot\text{Ar}\cdot\text{SO}_2\cdot\text{NH}\cdot\text{Ar}'\cdot\text{NH}_2$, in which Y is an aminogen group (i.e., NO_2 or acylamino) and Ar' carries a SO_3H group, is diazotised and coupled through a middle component (I) with an N-aminoaryl-J- or -H-acid, the aminogen group is converted into NH_2 , and the resulting diamine is tetrazotised, in substance or on the fibre, and coupled with 2 mols. of a "yellow" end-component (e.g., a pyrazolone, acylacetic arylamide, 2:4-dihydroxyquinoline, 3-methylindole, salicylic acid, resorcinol). In the examples, (I) is 2-ethoxy-Cleve acid, 2:5-dimethoxyaniline, or Cleve acid. The products give bluish- to yellowish-green shades. C. H.

Yellow varnishes.—See XIII.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Production of a good quality of cotton-like fibre. D. I. RUDAKOV (Rekonstr. Textil. Prom., 1932, 11, No. 4, 33–42).—Raw flax was cooked with aq. NaOH (10), Na silicate (2), and "Kontakt" (2). Cooking under pressure (3 atm.) yields a fibre having a strength approaching that of cotton; bleached fibre has 6% lower strength. Double cooking with H_2O and washing (1 hr.) yields a utilisable fibre. The cottonisation of flax by tannery spent liquor depends on the fat and NaOH contents. Cooking flax in 2% aq. $\text{Ca}(\text{OH})_2$ at 4 atm. yields a fibre which can be spun. CH. ABS.

Production of threads from the sinews of large cattle. M. P. SELIVANOV and I. G. KOROBNINA (Rekonstr. Textil. Prom., 1932, 11, No. 3, 42–45).—Chemical treatment renders the sinews gelatinous (NaOH) or rubber-like (Na_2CO_3), and separation into filaments is impossible without mechanical treatment. Mechanical carding gave a 32% yield of filaments of very poor quality. H_2O contributes to the sizing of the outer particles of the spun thread and increases the tensile strength; Na_2CO_3 or 0.5% NaOH causes swelling of the thread, which gelatinises rapidly. CH. ABS.

Natural pigments of raw silk of domestic cocoons. IV. M. OKU (J. Agric. Chem. Soc. Japan, 1933, 9, 76—79).—In the yellow cocoon silk xanthophyll is present as an ester. Carotene (I) (0.6—0.8 mg. per 100 g. of air-dried cocoon layers) is partly oxidised. (I) from golden-yellow and orange-yellow cocoons could not be distinguished. CH. ABS.

Behaviour of aqueous solution of domestic [silk] cocoons. VIII. Coagulation. H. KANEKO (J. Agric. Chem. Soc. Japan, 1932, 8, 1052—1060).—Two sericins are present: sericin-A is, whilst -B is not, coagulated by $(\text{NH}_4)_2\text{SO}_4$; the isoelectric points are, respectively, p_{H} 3.8 and 4.5. Sericin is coagulated by various electrolytes, particularly by nitrates of heavy metals, and by various non-electrolytes. Good reliability of the cocoons is associated with coagulability of the aq. solution by H_2PtCl_6 or Fe salts. Sericin-A appears to have a micelle structure, whilst -B is amorphous. CH. ABS.

Use of an acid in the boiling of silk fabrics. P. P. VIKTOROV and Z. S. BLOCH (Rekonstr. Textil. Prom., 1932, 11, No. 4, 44—47).—Acid removes sericin more slowly than does soap, and certain concns. of H_2SO_4 weaken the fibre. With 2 g. of H_2SO_4 per litre, followed by 5 g. of soap per litre, approx. the same results are obtained as with soap alone; the action of other acids depends on their p_{H} . CH. ABS.

[Production of] unshrinkable woollen goods. T. CALLAN (Chem. & Ind., 1933, 544).—Priority is claimed for the use in 1914 on a large scale of liquid Cl_2 and Br for obtaining an excellent degree of unshrinkability with considerable improvement in handle in woollen goods (cf. Trotman, B., 1933, 587). A. J. H.

Erratum.—On p. 584, col. 2, line 13 from bottom, for wood read wool.

Rapid cooking of sulphite cellulose. I. KAGAN (Bumazhn. Prom., 1932, 11, No. 12, 34—43).—Using 5.5% SO_2 (80% free SO_2) in units of 300 cu. m. capacity, 80% cellulose was obtained by cooking for 6.5 hr. CH. ABS.

New method for determination of cellulose, based on observations on the removal of lignin and other encrusting materials. A. G. NORMAN and S. H. JENKINS (Biochem. J., 1933, 27, 818—831).—For determination of cellulose (including cellulosan) straw or wood is treated twice with neutral NaOCl and then \leq 3 times with acid NaOCl, each NaOCl treatment being followed by boiling with Na_2SO_3 . The results by this method (A) are almost identical with those obtained by the Cross and Bevan method (B) without pretreatment. The products from cereal straws obtained by methods A and B contain some lignin, but lignin-like material may be produced from pentose-cellulosan during the determination involving treatment with 72% H_2SO_4 . Lignin determinations as ordinarily made are therefore likely to be too high. W. O. K.

Viscosity of cellulose acetate solutions. T. E. ELLISON (Chem. & Ind., 1933, 134—136).—It is shown that the viscosity of a primary cellulose acetate solution is directly related to that of the cellulose from which it is prepared. Fifteen samples of cotton linters of const.

H_2O content were acetylated at 20° with a mixture of Ac_2O , AcOH, and H_2SO_4 for 24 hr. The viscosities in poises of the resulting solutions were compared with those of the cellulose samples dispersed by the xanthate process. The relation between the viscose and acetate viscosities is not a straight line, but rough proportionality exists. V. E. Y.

Influence of sulphidity on the physical and chemical characteristics of kraft pulp. O. KRESS and G. H. MCGREGOR (Paper Trade J., 1933, 96; T.A.P.P.I. Sect., 302—304).—The effect of varying the ratio $\text{Na}_2\text{S}:\text{NaOH}$ in the alkaline cooking of spruce wood has been determined by investigating the bleachability (KMnO_4 method) and physical and chemical characteristics of the resulting pulp, both before and after bleaching with NaOCl or Cl_2 and NaOCl. In general, a 1:2 ratio is most satisfactory. A 2:3 ratio yields pulp of good quality, but the colour and power consumption for adequate hydration are not satisfactory. Substitution of total alkali by Na_2S is restricted to fairly narrow limits. Chemical tests (α -cellulose, Cu no., lignin, and cuprammonium viscosity) afford little indication of physical quality. H. A. H.

Properties of paper pigmented with zinc sulphide. H. M. CYR (Paper Trade J., 1933, 96; T.A.P.P.I. Sect., 293—295).—Considerations affecting the use of ZnS, alone or in admixture with BaSO_4 , as a loading material for paper (cf. B., 1933, 382) are discussed. Opacity, whiteness, and printing properties are much improved, the optimum particle size being about 0.25 μ . Reduction in mechanical strength is remarkably small, and resistance to degradation by rapid ageing tests is markedly increased for most types of papers. Retention may vary from 30 to 95% under widely different mill conditions. Pulp so loaded is much more sterile than untreated pulp, and the growth of slime in pipe-lines is inhibited. H. A. H.

Furfuraldehyde in vegetable products.—See III. **Wool finish.**—See VI.

PATENTS.

Degumming of silk. L. WALLERSTEIN, Assr. to WALLERSTEIN Co., Inc. (U.S.P. 1,877,097, 13.9.32. Appl., 2.2.27).—After cleaning with dil. soap solution if desired, the silk is treated with a bacterial liquor containing a sericin-dissolving enzyme (cf. U.S.P. 1,227,525; B., 1917, 732) either for 1—2 hr., or for a short time followed by exposure to moist air; the material is afterwards washed. F. R. E.

Reducing the contents of resins and fatty acids in cellulose produced by sulphite digestion. G. HAGLUND, Assr. to PATENTAKTIEB. GRÖNDAL-RAMÉN (U.S.P. 1,870,452, 9.8.32. Appl., 10.4.31. Ger., 18.11.30).—The pulp is separated from the waste liquor before the temp. of the liquor has fallen sufficiently to cause repptn. of resins etc. on the pulp. D. J. N.

(A) **Manufacture of shredded cellulose pulp adapted for nitration.** (B) **Nitrocellulose manufacture and cellulose therefor.** (C) **Preparation of nitrocelluloses.** M. O. SCHUR and B. G. HOOS, Assrs. to BROWN Co. (U.S.P. 1,880,052 and 1,880,054—5,

27.9.32. Appl., [A] 21.9.29, [B] 20.4.31, [C] 3.9.31).—(A) After coating the fibres with a reaction-retarding material (aq. dispersion of waxes or oils), the wet pulp containing 40–70% of dry cellulose is finely shredded and dried before nitration. (B) A cellulose pulp of thickness 0.02–0.07 in. and compactness [wt. in lb. of 415 sq. in./ $(100 \times \text{thickness in in.})$] 40–70 is used for nitration. (C) After draining from the strong nitrating acids, the freshly nitrated cellulose sheets are drowned in a large vol. of warm H_2O at $\gtrsim 45^\circ$.

F. R. E.

Conditioning of cellulose fibre [for nitration]. M. O. SCHUR, R. H. RASCH, and B. G. HOOS, Assrs. to BROWN Co. (U.S.P. 1,880,051, 27.9.32. Appl., 14.12.28).—Dry waterleaf paper composed of wood pulp of high α -cellulose content is treated with an org. solvent, which is evaporated from the surface to concentrate the natural resinous and waxy substances thereon.

F. R. E.

Stabilisation of cellulose xanthate. G. A. RICHTER and P. C. SCHERER, JUN., Assrs. to BROWN Co. (U.S.P. 1,880,041, 27.9.32. Appl., 15.10.28).—Cellulose xanthate in the form of purified crumbs or of continuous ribbon or filament obtained by pptn. from solution is dehydrated *in vacuo*, pulverised, and treated with a solution of a H_2O -repellent material in an org. solvent (stearic or oleic acid or their glycerides in Et_2O or EtOH), the latter being subsequently removed by evaporation.

F. R. E.

Manufacture of cellulose derivatives. I. G. FARBENIND. A.-G. (B.P. 368,271, 28.8.30. Ger., 28.8.29).—Hydroxyalkylcellulose esters, particularly acetates, which are sol. in COMe_2 without previous hydrolysis, and while resembling ordinary cellulose acetates in their general properties are distinguished therefrom by lower sensitivity towards H_2O , are prepared by esterifying a cellulose hydroxyalkyl ether obtained by the action of a gaseous alkylene oxide on alkali-cellulose at $< 30^\circ$ and preferably containing 1 hydroxyalkyl group per 2–4 mols. of $\text{C}_6\text{H}_{10}\text{O}_5$.

D. J. N.

Manufacture of cellulose derivatives. SOC. CHEM. IND. IN BASLE (B.P. 393,914, 6.3.33. Switz., 4.3.32. Addn. to B.P. 342,167; B., 1931, 343).—Partly esterified or etherified cellulose is treated with a heterocyclic compound containing one or more N:C-halogen groups (cyanuric halide, tetrachloropyrimidine) in presence of NMe_2Ph and an org. solvent (C_6H_6 , CHCl_3). The products show enhanced stability and are sol. in org. solvents.

F. R. E.

Manufacture of artificial threads or other products from cellulose compounds. L. LILIENFELD (B.P. [A] 367,920 and [B] 368,288, [A] 25.8.30, [B] 25.8. and 22.9.30. [A] Addn. to B.P. 335,993, [B] Addn. to B.P. 335,994; B., 1931, 153).—New cellulose derivatives are prepared by xanthating either alone or in admixture with cellulose the products obtained by the action on cellulose in the presence or absence of alkali of (A) a halogenated alkyl- or aralkyl-amine, e.g., $\text{CHMeCl}\cdot\text{CH}_2\cdot\text{NH}_2\cdot\text{HCl}$ or $\text{CH}_2\text{Cl}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{NMe}_2\cdot\text{HCl}$, or of (B) a reagent (except certain specified types previously claimed) which reacts with compounds containing a OH group whereby ≤ 1 of the OH groups of the original is blocked by an org. group, and ≤ 1 OH group

remains free to be xanthated. 75 examples are given, using $\text{C}_2\text{H}_4\text{Cl}_2$, $\text{C}_2\text{H}_2\text{Cl}_2$, $\text{CH}_2\text{Cl}\cdot\text{OMe}$, $\text{COMe}\cdot\text{CH}_2\text{Cl}$, bromostearic acid, chloropicrin, COCl_2 , trithiocarbonic ester of glycerin, CNBr , $p\text{-C}_6\text{H}_4\text{Me}\cdot\text{SO}_2\text{Cl}$, BzCl , etc.

D. J. N.

Treating [reducing the viscosity of] carbohydrate esters. W. O. SNELLING and R. N. BOYD, Assrs. to TROJAN POWDER Co. (U.S.P. 1,873,061, 23.8.32. Appl., 15.12.30).—The material, e.g., nitrocellulose, is dispersed in a large excess of a chemically inactive liquor of b.p. $< 110^\circ$, e.g., conc. aq. NH_4NO_3 , and heated at $< 110^\circ$ until the viscosity of the product is reduced to the desired degree. Thus the viscosity of 120-sec. nitrocellulose is reduced to < 1 sec. by treatment for 4–6 hr. at 130° in 81 wt.-% aq. NH_4NO_3 .

D. J. N.

(A) **Fabrication, (B) preparation, of viscose.** W. F. RICHTER, Assi. to CHEM. HOLDING CORP. (U.S.P. 1,876,754–5, 13.9.32. Appl., [A] 7.10.30, [B] 1.5.31).—(A) Viscose is coagulated in a bath containing 5–7% H_2SO_4 , 1–3% $\text{Bi}_2(\text{SO}_4)_3$, and 0.5–2% ZnSO_4 . (B) Unaged alkali-cellulose is xanthated, dissolved in dil. aq. NaOH at 8° , and at once spun through ≤ 14 in. of an 18% solution of H_2SO_4 at the same temp. F. R. E.

Production of artificial filaments and threads in the form of hanks. BRIT. CELANESE, LTD., and W. I. TAYLOR (B.P. 393,302, 27.11.31).—A method of winding the spun filaments after leaving the extrusion orifices is described.

F. R. E.

Manufacture of crêpes with threads of cellulose acetate artificial silk. C. and V. C. CLEMENCON and P. SCHMIT (B.P. 393,712, 11.3.32. Fr., 16.3.31).—The threads are treated with a swelling agent (I) (EtOH , CHCl_3) containing a colloid (gelatin) so as to cause an increase in vol. of 40–50% and a permanent shrinkage after drying of 10–15%; after removal of (I) they are subjected to a hard twisting of 2800–3000 turns per m.

F. R. E.

Manufacture of [matt] artificial structures from cuprammonium cellulose solutions. W. W. TRIGGS. From J. P. BEMBERG A.-G. (B.P. 393,890, 13.1.33).—Finely-divided SnO_2 made by direct combustion of Sn in O_2 is added to the solution before spinning. F. R. E.

Recovery of camphor [from pyroxylin plastic compositions]. G. J. ESSELEN, JUN., Assi. to FIBERLOID CORP. (U.S.P. 1,875,731, 6.9.32. Appl., 12.7.29).—The material is extracted at $15\text{--}40^\circ$ with a mixture of 5–35% of COMe_2 or EtOAc with 60–95% of textile spirits (petroleum fraction between gasoline and kerosene), and the camphor recovered by distillation of the liquid extract.

F. R. E.

Defibrating wood and the like. A. J. A. ASPLUND (B.P. 393, 159, 10.10.32).—Wood chips, preferably containing $\gtrsim 60\%$ of H_2O , are heated by direct steam at $> 100^\circ$ ($121\text{--}182^\circ$) for, e.g., about 1 min. and are then defibrated at this temp. in the presence of $\gtrsim 7$ times their wt. of H_2O in a special mill (described). The product may be used for wallboard, or may be further milled and used for the manufacture of paper. D. J. N.

Production of chemical pulp. L. BRADLEY and E. P. MCKEEFE (U.S.P. 1,877,219, 13.9.32. Appl., 2.9.26. Renewed 26.10.29).—The residual liquor from

cooking wood in an acid sulphite liquor (*A*) containing NaHSO_3 , and more Na_2SO_3 than $\text{Na}_2\text{S}_2\text{O}_3$, is rendered alkaline by addition of a liquor (*B*) containing Na_2CO_3 and Na_2S , conc., furnaceed under reducing conditions, and the resulting Na_2CO_3 and Na_2S is leached with H_2O to produce *B*. A portion of *B* is causticised with $\text{Ca}(\text{OH})_2$, yielding a liquor containing NaOH with a small proportion of Na_2S which is used for cooking another batch of wood. The residual liquor from the second cooking operation is conc., furnaceed under reducing conditions, and the resulting Na_2CO_3 and Na_2S is dissolved, causticised, and sulphited hot to yield *A*.

F. R. E.

Chemical modification of [removal of pentosans and non- α -cellulose constituents from] cellulose fibre. G. A. RICHTER, Assr. to BROWN CO. (U.S.P. 1,870,650, 9.8.32. Appl., 6.9.30).—The material is treated first with hydrolysing agents to hydrolyse impurities, particularly pentosans, and then with alkali to remove the products of hydrolysis and other impurities. Suitable hydrolysing agents include H_2O , Na_2SO_3 , and dil. alkalis at 150–205°; dil. acids and aq. solutions of acid-reacting salts may also be used at lower temp., e.g., 0.02% HCl at 100°, but these tend to impair the papermaking qualities of the fibre. Thus, kraft pulp, after a preliminary treatment with 3–6% of Cl_2 , is washed, digested for 2–6 hr. in 1% aq. Na_2SO_3 at 182–190°, and treated with 8% aq. NaOH at 15–20° for 2–4 hr. The resulting product contains 96% of α -cellulose and \approx about 2% of pentosans.

D. J. N.

Impregnation of fibrous articles and material therefor. M. O. SCHUR, Assr. to BROWN CO. (U.S.P. 1,880,050, 27.9.32. Appl., 25.9.28).—Thermoplastic material (pitch) is melted and passed through a colloid mill to reduce the solid and gummy components to particles of impalpable fineness; fibrous articles are impregnated with the molten material under pressure.

F. R. E.

Bleaching of pulp. C. B. THORNE (B.P. 393,106, 8.7.32. Can., 3.5.32).—Apparatus is described for bleaching pulp by a multi-stage process, at least one stage, e.g., the first, being conducted on low-density pulp. The apparatus is suitable when Cl_2 gas or $\text{Cl}_2\text{-H}_2\text{O}$ is used as the bleaching agent in one or more of the stages.

D. J. N.

[Paper-pulp] bleaching process. H. JOHN, Assr. to PAPER PATENTS CO. (U.S.P. 1,872,743, 23.8.32. Appl., 21.11.27).—The pulp is treated with $\frac{1}{4}$ – $\frac{1}{2}$ of its total requirements of bleach, and when this is exhausted the spent liquor is removed and the partly bleached stock thickened to about 25%. It is then diluted to a consistency of \approx 3% with sufficient aq. CaOCl_2 (0.6% of available Cl) to give a large excess (about 10 times) of CaOCl_2 over that actually required. Bleaching is conducted with gentle agitation at 20–35° under alkaline conditions. When complete, the excess liquor is recovered and fortified for use in a further second-stage operation. The liquor left in the pulp (about 10% of the whole) is displaced with about 2 vols. of H_2O and used in a first-stage bleaching operation. The process gives high yields of bleached pulp of high α -cellulose content, low KOH solubility, and low Cu no. D. J. N.

Laminated moulded products formed from paper pulp. BRIT. THOMSON-HOUSTON CO., LTD., Asses. of R. H. KIENLE and W. J. SCHEIBER (B.P. 393,412, 30.5.32. U.S., 29.5.31).—Wet fibrous pulp mixed with a binder, e.g., a phenolic resin, is laminated wet to the desired thickness with interlocking of the fibres of the several plies, dried, and moulded under heat and pressure.

F. R. E.

Continuous treatment of paper refuse, old paper, wood pulp, cellulose, and the like in the preparation of paper pulp. F. GREWIN (B.P. 393,824, 3.10.32. Ger., 15.10.31).—The material is thoroughly moistened and mechanically disintegrated; suitable apparatus is described.

F. R. E.

Production of alkaline filler [for paper]. H. R. RAFTON, Assr. to RAFFOLD PROCESS CORP. (U.S.P. 1,879,483, 27.9.32. Appl., 13.2.30. Cf. B.P. 378,024; B., 1932, 931).—Before addition to the paper mix, the alkaline filler [CaCO_3 and $\text{Mg}(\text{OH})_2$] is treated with a H_2O -sol. acidic material (alum), whereby its p_{H} is reduced to approx. 8.

F. R. E.

Rendering paper moisture-, grease-, and acid-proof and solution therefor. L. A. DILS, Assr. to KELLOGG-DILS, INC. (U.S.P. 1,871,842, 16.8.32. Appl., 2.12.30).—The paper is impregnated at 60–65° with an aq. solution containing (wt.-%) pure gelatin 13, Irish moss 6.5, hide glue 3.25, glycerin 8.25, COMe_2 0.375, NaOBz 0.125, K alum 2, Na alum 1, 37% CH_2O 0.5. The dried paper is then treated with a solution of 1 lb. of 37% CH_2O and 1 oz. of glycerin in 1 gal. of EtOH .

D. J. N.

Manufacture of [pervious] paper. R. H. MCKEE (U.S.P. 1,870,259, 9.8.32. Appl., 14.3.29).—Strong, absorbent paper, suitable for blottings or filter paper, is obtained by incorporating with the pulp, e.g., in the beater, a non-waterproof binding agent, e.g., viscose solution, in quantity sufficient to give a paper containing \approx 3% of regenerated cellulose. The viscose should be made with a min. of NaOH and CS_2 , and should be ripened to a salt point \approx 8. Coagulants are not usually required, the viscose being pptd. on the fibre during the drying of the sheet. Pptn. of S may be obviated by adding a small quantity of SO_2 or Na_2SO_3 to the pulp as it runs on the machine.

D. J. N.

Manufacture of carbon or like paper. A. DEPLANCHE (B.P. 393,084, 27.5.32. Fr., 28.5.31).—Apparatus is described embodying a scraper (*A*) acting on the coated paper as it passes over a heated cylinder, the pressure of *A* being such that the *C* is forced into the paper and excess waxy material removed.

D. J. N.

Chemical printing [on paper sheets etc.]. E. GASKINS, Assr. to UNITED STATES GYPSUM CO. (U.S.P. 1,871,683, 16.8.32. Appl., 26.5.30).—The material, e.g., plaster board, is printed with 5–10% aq. KMnO_4 and heated to form MnO_2 . Such printing is readily eradicated when desired.

D. J. N.

[Yarn-winding machine for] treatment of [waxed] yarns or threads. J. W. WILLIAMS, LTD., and A. STOPPARD (B.P. 394,126, 14.5.32).

Textile oil.—See II. **Treatment of vegetable fibres etc.** **Sizing of paper.**—See VI. **Safety**

(etc.) glass.—See VIII. Coating composition [for fibre articles].—See XIII. Cigarette [paper].—See XX.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Theory of the dyeing process. A. PORAI-KOSCHITZ [with A. EFIMOV, J. SCHAPIRO, J. RISKIN, N. GORELIK, M. PESKIN, E. WELLER, N. SOKOLOVA, and E. VASILIEVA] (*J. pr. Chem.*, 1933, [ii], 137, 179—215).—The mechanism of dyeing with substantive acid (cotton) dyes is investigated by using a neutral dye bath of the NH_4 salt of the dye and determining the NH_3 set free. Wool has a weak affinity for NH_3 which is removed by boiling in H_2O . When wool is dyed in such a dye bath at the b.p. NH_3 is evolved proportionally to the dye absorbed (allowance being made for the affinity of the wool for NH_3). With cotton, however, the dye is absorbed as a whole and no NH_3 is evolved. No appreciable dyeing occurs when wool is boiled in a neutral solution of the Na salt of the dye, but in presence of NH_4 salts dyeing takes place with evolution of NH_3 . The effect is not one of "salting out" as in the case of cotton, for whereas Na_2SO_4 and NH_4Cl have an equal effect in dyeing cotton, only the latter is really effective in the case of wool. As NH_4 salts do not ppt. the dye acids, this new technique makes it possible to use substantive dyes on wool that previously were considered unsuitable. The saturation val. of wool for acid dyes is a stoichiometric relationship independent of the nature of the dye (cf. Meyer, B., 1926, 740), and is equal to the val. for mineral acids (HCl , H_2SO_4). Wool saturated with H_2SO_4 from a 0.25*N* solution takes up dye (Chicago Blue 6B) equiv. to the H_2SO_4 present. Mutual replacement of dyes can occur when dyed wool is immersed in a solution of a different dye (NH_4 salt); if the wool is saturated no NH_3 is evolved. The general conclusion is drawn that whereas cotton dyeing is a purely physical process of adsorption, the dyeing of wool is a chemical process arising from combination of the dye acid with the basic wool fibre. An explanation is offered of the anomalous behaviour of Alkali Blue, which is taken up by wool from weakly alkaline baths, but then gives dull, weak shades which develop into blue on addition of acids. It is shown that the behaviour of wool free from volatile bases with the NH_4 salt of the dye is normal, and that the anion alone enters the fibre. It is suggested that in presence of alkali it does so in the carbinol form, which is dehydrated to the coloured quinonoid form by acids. H. A. P.

Optimum conditions for utilisation of substantive dyes. E. A. RAKHLIN and N. F. IVANOV (*Rekonstr. Textil. Prom.*, 1932, 11, No. 3, 40—42).—The utilisation of common substantive dyes used normally was 50—98%. The optimum concn. of NaCl varies within wide limits. At the optimum NaCl concn. efficient utilisation was generally obtained at 80—100%.

CH. ABS.

Use of seaweeds in alkaline dyeing. V. A. ANDRÉEV (*Izvest. Textil. Prom. Torgov*, 1930, No. 8—9, 98—99).—The use of alginic acid as thickening agent was studied. Treatment of 2 kg. of dry weed with 200 g. of Na_2CO_3 in 40 litres of H_2O gave satisfactory results. CH. ABS.

Effect of mercerisation on fastness of dyeing. P. P. VIKTOROV and G. I. ZITLER (*Izvest. Textil. Prom. Torgov*, 1930, No. 4—5, 82—85).—Experiments with bleached satin show that mercerisation increases the fastness of substantive dyes. The dye penetrates deeper into the fibre when the cellulose is loosened. CH. ABS.

Use of indigo dyes in printing. I. M. PROROKOV (*Izvest. Textil. Prom. Torgov*, 1930, No. 4—5, 95—98).—British gum (300 g. per litre) is preferably used as thickener. The favourable effect of prolonged keeping before use is due to the dispersing action of NaOH, which facilitates the action of reducing agents and promotes absorption of leuco-compounds by the fibre. Oxidation with NaOCl renders subsequent treatment with EtOH unnecessary. CH. ABS.

Periodic variations in hank-processed yarn, and the patterns produced by them in stocking fabrics. D. A. CLIBBENS and A. GEAKE (*J. Text. Inst.*, 1933, 24, τ 221—232).—After wet-processing, Grant-reeled hanks may contain periodic variations in properties, the periods being about 54, 96, or 864 in. If these variations affect the dyeing properties, pronounced stripes are formed in dyed knitted fabrics when the length of yarn per course is nearly equal to the period or to half of it. An apparatus for detecting and measuring such periods is described. A. G.

Deconvolution of cotton hairs as a test of the mercerisation process. The "deconvolution count." M. A. CALVERT and D. A. CLIBBENS (*J. Text. Inst.*, 1933, 24, τ 233—254).—Fragments of hairs, produced by cutting mercerised cotton with two razor edges set 0.2 mm. apart, are examined microscopically and the percentage of fragments free from natural convolutions is described as the "deconvolution count." The val. obtained depends on the variety of the cotton, and on the thoroughness of the penetration of the mercerising NaOH into the material, and is less for hard-twisted yarns and for cloth than for soft-twisted yarn or loose cotton. It is only slightly affected by variations in the concn. of NaOH within the normal range, by the mercerising tension, and by mild chemical modification. It is not closely related, in a general way, to those qualities of appearance and handle which constitute a successful mercerised finish, but is valuable for detecting differences in mercerising treatment when disturbing factors are absent. A. G.

Examination of mercerised hosiery yarns. D. A. CLIBBENS and A. GEAKE (*J. Text. Inst.*, 1933, 24, τ 255—272).—Periodic shade variations in hosiery yarns are often due to irregular mercerising, and such irregularities are detected by the deconvolution count (see preceding abstract), by redyeing with and without remercerising, and by a "shrinkage diagram." This diagram reveals variations in the mercerising tension by providing an automatic record of the shrinkages of 2-in. lengths of the yarn when it is remercerised loose. Chemical modification as a cause of shade variation is best detected by dyeing with methylene-blue and by staining with an alkaline AgNO_3 solution. Singeing differences are an improbable cause of shade variations in dyed mercerised hosiery, because mercerising

diminishes the effect of such differences on the dyed shade. A. G.

Unshrinkable finish on wool. Application in commercial practice. C. H. EDWARDS (J.S.C.I., 1933, 52, 192—195 T).—An account is given of some large-scale experiments in the chlorination of knitted-wool underwear fabrics together with the results of subsequent examination of these fabrics for damage and unshrinkability. Investigation of the effect of milling on the subsequent action of the fabric with Cl_2 showed no difference to result. Some details of the treatment of very coarse types of wool fabric are also given, together with suggestions for modifying the general process to suit different classes of goods. The cause of small holes in fine botany fabrics after this treatment has been investigated and methods for prevention are recommended.

Wetting agents [for textiles]. P. M. POGOZHEV (Izvest. Textil. Prom. Torgov, 1930, No. 6—7, 83—86). A discussion. CH. ABS.

Chemical fireproofing agents. H. STADLINGER (Synth. and Appl. Finishes, 1933, 3, 91—94, 102).—A review.

Using OH-acids from paraffin oxidation.—See III.

PATENTS.

Fabric dyeing machines. T. T. SYKES (B.P. 393,742, 5.5.32).—The winch in the usual type of dyeing machine is replaced by an endless travelling brattice, whereby chafing and permanent creasing of the fabric are avoided. A. J. H.

Dyeing [animal fibres etc.] with vat dyes. J. MORTON, J. E. G. HARRIS, and MORTON SUNDOUR FABRICS, LTD. (B.P. 390,513, 5.10.31).—An (alkali) borate is added to the caustic alkaline vat to produce pH 8—13. C. H.

Dyeing of textiles [with direct dyes]. A. G. BLOXAM. From SOC. CHEM. IND. IN BASLE (B.P. 390,553, 24.10.31. Addn. to B.P. 366,918; B., 1932, 544).—The dyed material is treated with a H_2O -sol. salt of an amine (other than those of the prior patent) carrying an alkyl above C_9 , e.g., $\text{C}_{18}\text{H}_{37}\cdot\text{NEt}_2\cdot\text{HCl}$, $\text{C}_5\text{H}_5\text{N}(\text{CH}_2\cdot\text{OH})\text{Cl}$, $\text{C}_5\text{H}_5\text{N}(\text{C}_2\text{H}_4\cdot\text{OH})\text{Cl}$. C. H.

Production of pattern effects with vat dyes. BLEACHERS' ASSOC., LTD., C. S. PARKER, C. L. WALL, and F. FARRINGTON (B.P. 393,381, 3.3.32).—Clearer resist effects are obtained in printing with the leuco-esters of anthraquinone (Soledon) vat dyes by having present in the resist paste a reducible mineral acid salt of a heavy metal, e.g., Cu and Fe, which not only oxidises and hydrolyses the dye ester before absorption occurs, but also interacts with a suitable substance added to the colour printing paste, e.g., $\text{Na}_4\text{Fe}(\text{CN})_6$, to form a semi-impermeable film on the textile material so that penetration by the dye is retarded. A. J. H.

Manufacture of printing colours. DR. A. WACKER GES. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 390,641, 7.4.32. Ger., 9.5.31).—In place of hydrocarbons of the C_6H_6 series there is used as solvent a mixture of paraffin hydrocarbons with a little neutral, org., O-containing

lacquer solvent of b.p. between 90° and 170° , e.g., 10% of PrOH, glycol monoethyl ether. C. H.

[Delustring] treatment of acyl, alkyl, or aralkyl cellulose derivatives. IMPERIAL CHEM. INDUSTRIES, LTD., and L. G. LAWRIE (B.P. 393,985, 17.11.31).—Cellulose acetate (etc.) silk is delustrated by steeping in a liquor at 80 — 100° containing $< 5\%$ of pine oil emulsified by means of Turkey-red oil or the like. A. J. H.

Treatment of textiles and paper and sizes therefor. L. NEUMAN (B.P. 393,774, 14.7.32).—The materials are sized with ordinary sizes to which is added 8—20% (calc. on the wt. of dry size) of dry pectins. A. J. H.

(A) Treatment of vegetable fibres and artificial threads. (B) Coating, dressing, and other treatment of textile materials. (C, D) Manufacture of cellulose compounds and of artificial materials therefrom. L. LILLENFELD (B.P. 390,515, 390,517—9, 4.7.31. [D] Addn. to B.P. 335,994 and 368,288; B., 1931, 153; 1933, 664).—(A) Textile materials are treated, in presence or absence of a base (NaOH) or catalyst, with an aliphatic compound which contains halogen, N, and O attached to at least 2 different C atoms, and which may contain further halogen, N, and/or O. The essential N and O are preferably present as substituted or unsubstituted NH_2 and OH, respectively. The products have affinity for acid dyes and in some cases for acetate silk dyes. Suitable reagents are the aliphatic compounds specified in B.P. 390,516 (B., 1933, 662) and in (c). Cellulose, viscose silk, and cellulose ethers or esters may be so treated. (B) In the process of B.P. 302,115 and 357,190 (B., 1929, 169; 1932, 144) the cellulose or cellulose derivative is deposited from its solution which has been made into a stiff lather, e.g., with Marseilles soap. (c) Cellulose xanthate is treated with an oxygenated halogenated amine which may be aliphatic or aromatic but is otherwise as defined in (A), compounds referred to in B.P. 357,526 and 357,551 (B., 1932, 60) being excluded. Examples of such amines are the products of B.P. 390,516 (*loc. cit.*) or 390,523 (B., 1933, 662), $\text{CH}_2\text{Cl}\cdot\text{CH}(\text{NH}_2)\cdot\text{CH}_2\cdot\text{OH}$, or $\text{CH}_2\text{Cl}\cdot\text{C}(\text{OH})(\text{NH}_2)\text{Me}$, the corresponding *tert.* amines, or NH_3 and $\text{CH}_2\text{Cl}\cdot\text{CH}(\text{OH})\cdot\text{CH}_2\text{Cl}$ in succession, etc. (D) In the process of the parent patents the reagents are replaced by those of B.P. 385,979 (B., 1933, 224) or of (c). C. H.

Treatment of dry-cleaning fluids. H. MILLER (U.S.P. 1,878,287, 20.9.32. Appl., 1.2.28).—Dry-cleaners' solvent is treated in turn with Cl_2 gas, an alkaline solution, and H_2O ; it is then settled to remove solids and filtered to remove H_2O . B. M. V.

Softening etc. agents.—See III. **Bleaching pulp.**—See V. **Treating tanned leather.**—See XV.

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

Making phosphoric acid in the blast furnace. H. W. EASTERWOOD (Chem. Met. Eng., 1933, 40, 283—287).—Work extending over 6 years with 2 experimental furnaces (the earlier 25 ft. high, the second 75 ft. high) is described. The reaction is $\text{Ca}_3\text{P}_2\text{O}_8 + 3\text{SiO}_2 + 5\text{C} = 3\text{CaSiO}_3 + \text{P}_2 + 5\text{CO}$. Although excess SiO_2 gives quicker volatilisation of P,

trials showed that better yields and less trouble with SiO_2 dust are obtained by using a SiO_2 : CaO ratio of 0.90. The accessories used included hot blast stoves, cooling and hydrating tubes, and a Cottrell precipitator. Difficulties encountered related mainly to dust and to the handling of the slag. Best results were obtained by the use of briquettes containing < the above proportion of SiO_2 , the balance being added separately, and the use of only 50% of the theoretically required C, added as powdered coal or coke. Trials with a 95-ft. furnace afford a slag containing < 2% P_2O_5 , ferrophosphorus containing 24% P (which is converted into Na_3PO_4), and the fume products, these being divided to yield (1) P and P_2O_5 , (2) 85–90% H_3PO_4 . The P_2O_5 yield is > 90%. C. I.

Catalysts for ammonia synthesis. D. A. EPSTEIN and I. S. UPOLOVNIKOV (J. Chem. Ind. Russ., 1933, No. 2, 41–44).—Shaitan titanomagnetite (TiO_2 5.53, SiO_2 4.12, Fe_2O_3 52.06, FeO 24.34, Al_2O_3 5.13, MgO 3.69, CaO 1.3, V_2O_5 0.7, other oxides 0.3%), heated in air at 800–1000° and then in a stream of H_2 and N_2 , affords a very active catalyst for synthesis of NH_3 . R. T.

Influence of various factors on the synthesis of ammonia. C. TONIOLO and G. GIAMMARCO (Giorn. Chim. Ind. Appl., 1933, 15, 219–222).—Nomographic treatment (cf. B., 1921, 386A) is used to determine the influence of inert gases and of the ratio H_2 : N_2 on the synthesis of NH_3 . Moderate alteration of the ratio does not sensibly affect the equilibrium, a mixture with 15% N_2 and 85% H_2 at 1000 atm. behaving as a stoichiometric mixture at 932 atm. The influence of inert gases is greater, and with a mixture containing 10% of inert gas at 1000 atm. the equilibrium is that corresponding with 810 atm. ($0.9 \times 0.9 \times 1000$). When (1) the H_2 : N_2 ratio differs from 3, and (2) inert gases are also present, the product of the separate correction factors for (1) and (2), determined from the nomogram, must be used. The influence of pressure on the equilibrium const. is due to divergence of the gas mixture from the perfect gas laws on which the thermodynamic calculations of the equilibrium are based. T. H. P.

Calcium carbide and calcium cyanamide. J. GELHAAR (Tekn. Tidskr., 1932, 62, No. 46; Kemi, No. 11, 81–86; Chem. Zentr., 1933, i, 583).—The decomp. of CaC_2 at red heat cannot be caused by $\text{Ca}(\text{OH})_2$ formed on grinding, since grinding causes a loss of only 1.11% CaC_2 . If the CaC_2 content of crude carbide is calc. as equiv. to the C_2H_2 evolved the free CaO after azotation is 11–13% < that calc. from the increase in wt. The difference vanishes when it is assumed that part of the C_2H_2 is combined as $\text{CaC}_2\cdot\text{C}_2\text{H}_2$; this C_2H_2 is formed on fusion of the carbide from the H of the coal. The reaction $\text{CaC}_2 + \text{ZnCl}_2 \rightarrow \text{CaCl}_2 + \text{Zn} + 2\text{C}$ at 400° affords evidence that the active carbide is < is determined from the C_2H_2 evolved. Thermal decomp. of the carbide at 800° consists in the liberation of the bound C_2H_2 ; at > 1150° Ca distils off (from $\text{CaO} + \text{C}$), and the CO formed reacts thus: $\text{CaC}_2 + \text{CO} = \text{CaO} + 3\text{C}$. A. A. E.

Composition of magnesium oxychloride. W. DAWIHL (Tonind.-Ztg., 1932, 56, 781–782; Chem. Zentr., 1932, ii, 2614).—Polemic (cf. Lukens, A., 1932, 822). A. A. E.

Thermal decomposition of limestone, dolomites, and magnesites. S. V. POTAPENKO (J. Appl. Chem., Russia, 1932, 5, 693–704).—Temp. of incipient and complete decomp. in dry air (1 hr.) are, respectively, limestone 600°, 800°; dolomite 500°, 800°; magnesite 400°, 600°; and in dry CO_2 (1 hr.) 850°, 900–925°; MgCO_3 of dolomite 725°. CH. ABS.

Analysis of aluminium acetate solution. C. ROHMANN (Pharm. Zentr., 1933, 74, 393–396).—Al is determined by a modified 8-hydroxyquinoline-Br method; Ca by pptn. with $(\text{NH}_4)_2\text{C}_2\text{O}_4$ in presence of tartaric acid, NH_4Cl , and aq. NH_3 and titration of the solution of the ppt. in H_2SO_4 with KMnO_4 ; AcOH by steam-distillation after acidification with H_3PO_4 ; and H_2SO_4 by pptn. with BaCl_2 after addition of NaOH and removal of Al with CO_2 and AcOH by boiling with HCl. E. H. S.

Influence of cyanogen on reduction of carbon monoxide in contact with refractory materials. H. W. HIBBOTT and W. J. REES (Trans. Ceram. Soc., 1933, 32, 253–269).—A modified apparatus is described (cf. B., 1929, 680), in which the effect of C_2N_2 on the reduction of CO by hot firebrick has been investigated. CO and $\text{CO}-\text{C}_2\text{N}_2$ mixtures were circulated for 24 hr. over a given wt. of firebrick maintained at 300°, and for 12 hr. at various temp. between 300° and 550°, the extent of the decomp. of the CO being measured by the change in pressure at const. vol. of the gas in the apparatus. In mixtures containing 0.2, 0.5, and 1.5% C_2N_2 , the temp. range of appreciable reaction (370–500°) was the same as, and the reduction of CO >, for CO alone. The reduction of CO in a mixture containing 4.5% of C_2N_2 , inappreciable below 540°, was < for CO alone, and in mixtures containing 10.2 and 23% of C_2N_2 the reaction was almost inhibited. In all cases some oxidation of the C_2N_2 , apparently by Fe_2O_3 in the firebrick, was observed, and it is suggested that, for mixtures containing > 1.5% of C_2N_2 , the reduction of CO, appreciable at 370–430°, is accelerated at 430–520° by the reaction of C_2N_2 and Fe_2O_3 . In mixtures containing larger proportions of C_2N_2 , reaction of this gas with Fe_2O_3 spots still occurs, but excess C_2N_2 adsorbed on the surface of the brick may prevent catalytic reduction of the CO by the reduced Fe. A. L. R.

Production and uses of solid carbon dioxide. H. G. LITTLER (Chem. and Ind., 1933, 533–537).—A lecture. CO_2 for solidification must be freed from (1) odorous impurities, (2) oil derived from compressors, (3) H_2O vapour. The last-named produces $\text{CO}_2\cdot 6\text{H}_2\text{O}$ at 10° and causes blockages. When blocks are passed from a CO_2 atm. to air, cooling and contraction occur, with the result that rigid blocks fly to pieces. The sp. gr. should not much exceed 1.4. The loss of CO_2 in transit from a railway container is 1½% per 24 hr. At high temp. it is a relatively inefficient refrigerant owing to its high production cost. Its advantages are in low-temp. refrigeration and its convenience in use. C. I.

Combined drying and grinding.—See I. Pb alloys resistant to H_2SO_4 .—See X. Forrer magnetic separator [for sylvinites].—See XI. Ti white. Zn and alkaline-earth chromates.—See XIII. Determining K.—See XVI.

PATENTS.

Manufacture of phosphates and phosphoric acid. L. ADELANTADO (U.S.P. 1,878,997, 27.9.32. Appl., 5.6.29. Spain, 19.2.29).—Good commercial crystals of sol. phosphate are formed from material of any grade, however low, by treatment (a) with rather $>$ the theoretical H_2SO_4 , the excess being used in order to obtain a large proportion of sol. salt; (b) neutralisation with NH_3 , which process also renders the material sufficiently open for percolation; and (c) leaching with H_2O followed by evaporation and crystallisation.

B. M. V.

Oxidation of phosphorus. S. D. GOOCH and W. H. WAGGAMAN, Assrs. to CORONET PHOSPHATE Co. (U.S.P. 1,879,189, 27.9.32. Appl., 15.4.30).—Impure, wet P sludge, e.g., the product of a blast furnace, is burned in a rotary burner, and the P_2O_5 volatilised and subsequently condensed in an absorption system with the H_2O already present to form comparatively pure H_3PO_4 .

B. M. V.

Manufacture of monopotassium phosphate. R. D. PIKE (U.S.P. 1,878,426, 20.9.32. Appl., 5.7.28).—Crude KH_2PO_4 is produced by simple admixture of K_2CO_3 -brine with crude H_3PO_4 , the Fe and Al impurities being valuable as plant food. The acid should be more acid than p_H 3.4, the alkali more basic than p_H 6.4, and the mixture between those concns. The solution should be evaporated to dryness below 250° .

B. M. V.

Preparation of magnesium chloride from a basic chloride thereof. A. K. SMITH, Assr. to DOW CHEM. Co. (U.S.P. 1,880,505, 4.10.32. Appl., 6.5.29).—Basic $MgCl_2$, prepared, e.g., by air-drying cryst. $MgCl_2$, is treated in granular form at \approx about 290° with HCl in an atm. such that $HCl:H_2O$ is $> 2.34:1$ mol.

L. A. C.

Manufacture of aluminium and barium or strontium compounds. COFRAMET SOC. ANON. (B.P. 393,896, 23.1.33. Fr., 22.1.32).—Mixtures of bauxite, clay, etc. with $BaSO_4$ or $BaSO_3$ (or $SrSO_4$ or $SrSO_3$) in proportions such that BaO (or SrO): $Al_2O_3 = 1.75:1$ mol., with the addition, if desired, of CaO and C, are calcined at about 1100° , and the products are lixiviated to yield $BaAl_2O_4$ solution, which is then treated with CO_2 to ppt. $BaCO_3$ and Al_2O_3 ; the mixed ppt. is (a) washed with aq. NaOH to remove the Al_2O_3 , or (b) calcined to render the Al_2O_3 insol., when the $BaCO_3$ is extracted with HCl or HNO_3 , or (c) treated with H_2SO_4 to yield $Al_2(SO_4)_3$ solution and $BaSO_4$.

L. A. C.

Production of bleaching clays. BAYERISCHE A.-G. F. CHEM. U. LANDWIRTSCHAFTLICH-CHEM. FABRIKATE (B.P. 393,807, 3.9.32. Ger., 3.9.31).—Raw clays are treated with boiling dil. HCl or H_2SO_4 in quantity $<$ that hitherto employed, but in the presence of H_2O -sol. salts of the acids and/or waste liquor from a previous operation.

L. A. C.

Manufacture of metal carbonyls. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 393,684, 11.1.32).—The metal, partly or wholly in granular form, is charged continuously into the top of, and the residue is withdrawn continuously from the bottom of, a vertical cylindrical chamber (A) which is kept full of the material; CO is introduced into the lower end of A and the carbonyl is drawn off at the top. L. A. C.

Crystallisation of salts [silver nitrate etc.] from solutions containing them. D. F. OTHMER, Assr. to EASTMAN KODAK Co. (U.S.P. 1,879,445, 27.9.32. Appl., 19.1.31).—An apparatus particularly suitable for the crystallisation of $AgNO_3$ comprises a heated rising column of liquid terminating in a spray within a chamber subjected to vac. produced by a barometric column of the same liquid, which is cooled by evaporation and in which the crystals settle; air is permitted to enter this column and pass upwards, eventually through the spray.

B. M. V.

Protection of phosphorus. W. H. WAGGAMAN, S. D. GOOCH, and F. P. KERSCHBAUM, Assrs. to CORONET PHOSPHATE Co. (U.S.P. 1,880,538, 4.10.32. Appl., 27.2.31).—P is immersed in a solution of a Cu or Sn salt to ppt. on the surface a protective layer of the metal and/or its phosphide.

L. A. C.

Gas purification.—See II. By-product Fe oxides.—See X. Treating Mn ore.—See XI. Cleaning composition.—See XII. Pigments. Lithopone.—See XIII. Fertilisers.—See XVI.

VIII.—GLASS; CERAMICS.

Volynites. S. NAZAREVICH, L. KRYANOVSKI, G. BYVEL, and Y. GUROVICH (Trans. Kiev Div. Ukrain. Sci. Res. Inst. Silicate Ind., Russia, 1931, 9, 36 pp.).—Attempts have been made to use Volynite basalts for making black and coloured glasses, and the optimum conditions of crystallisation for making high- and low-voltage insulators have been found. The presence of much alkali lowers the m.p. of basalt. The pots are attacked.

CH. ABS.

Volatilisation of boric acid during glass melting. I. I. KITAIGORODSKI and M. S. FEDOROVA (Trans. State Exp. Inst. Glass, Russia, 1932, No. 1).—The effects of viscosity, composition, and quantity of glass were studied. Loss is greatest in Zn, and least in Ba, glasses; it is least in glasses of average viscosity.

CH. ABS.

Influence of aluminium oxide on physico-chemical properties of glass in dependence on raw materials. I. I. KITAIGORODSKI and M. G. CHERNYAK (Trans. State Exp. Inst. Glass, Russia, 1932, No. 1).—Glasses prepared with felspar (I) were softer than those containing kaolin, but much more difficult to purify. $Al_2(SO_4)_3$ could not be used. Resistance to attack by NaOH was better in felspar than in kaolin glasses; that of glasses prepared with fired kaolin (II) was $>$ those prepared with raw kaolin (III). Tendency to devitrification is in the order: (II) $>$ (III) $>$ (I).

CH. ABS.

Producing glass from [blast]-furnace slag. C. A. BASORE (Chem. Met. Eng., 1933, 40, 309).—Blast-furnace slag offers a cheap source of CaO, Al_2O_3 , and

SiO₂ for glass-making and its sensible heat is available. Additional SiO₂ may be added in the form of cheap building sand. Such glass will be green, brown, or black owing to the presence of Fe. It has good thermal resistance and excellent resistance to corrosive agents. C. I.

[Effects of] introduction of volcanic ash into glass. N. A. PENTKA and A. S. RAZUMOV (Keram. i Steklo, 1932, 8, No. 10, 17—21).—For photographic plate glass: the alkali required is less, the cost is slightly greater, the rate of melting and final temp. are higher, the corrosion of tank refractories is much less, the d of glass and transparency are greater, and the coeff. of expansion is smaller. CH. ABS.

Increase of the iron content of glass when cullet from the blow-pipe is used in the batch. V. I. MOZHEIKO (Keram. i Steklo, 1932, 8, No. 10, 32—33).—A formula is given for calculating the increase in Fe content when glass adhering to the blow-pipe is added to the batch. CH. ABS.

Properties of high-tension porcelain dependent on its composition. A. N. EGOROV and I. M. TIKHOMIROV (Keram. i Steklo, 1932, 8, No. 12, 7—10).—A high felspar content is associated with highest electrical and mechanical strength and the best physical properties. CH. ABS.

Magnesite refractories. I. Microstructure of South Manchurian magnesites fired at different temperatures. S. KONDO, T. SUENO, and H. YOSHIDA (J. Japan. Ceram. Assoc., 1932, 40, 422—436).—After heating for 1 hr. at 1200—1800°, the specimens contained chiefly periclase (I), amorphous MgO, forsterite (II), and clinoenstatite. Considerable changes took place at 1200—1300° and 1600—1700°. Addition of SiO₂ to a Seizanhai magnesite fired to cones 26, 28, and 30 favoured the development of (II) and (I). Addition of Fe₂O₃ favoured the formation of (I) and caused that of magnioferrite. Cr₂O₃ dissolves in (II). Al₂O₃ favoured the formation of (I) and produced a poikilitic structure, probably owing to the formation of cordierite. CH. ABS.

Florescences. VI. The fluorescence test and the chemical examination of florescences. B. BUTTERWORTH (Trans. Ceram. Soc., 1933, 32, 270—283; cf. B., 1932, 679).—The problem of fluorescence, and the requirements of a test to show the liability of bricks to this defect, are discussed. Two methods of testing in use at the Building Research Station are described, and the results obtained in a no. of selected cases are considered. Methods for the chemical examination of, and the reactions used for the detection of Ca, Mg, Na, K, and Fe in, florescences are summarised. The interpretation of the results of fluorescence tests is briefly discussed. A. L. R.

Setting of plaster of Paris.—See IX.

PATENTS.

Manufacture of glass. E. HEINZ (B.P. 393,907, 10.2.33. Ger., 11.2.32).—A frit of Ba borosilicate (prep. described) is used as a batch constituent. J. A. S.

Safety glass. G. H. PETERS, Assr. to HERCULES POWDER CO. (U.S.P. 1,882,298, 11.10.32. Appl., 25.9.31).—Terpinene-maleic anhydride medium, prepared by heating equiv. wts. of α -terpinene and maleic anhydride or acid, is used alone or in combination with other non-volatile solvents, e.g., fenchone, for uniting glass to celluloid etc. L. A. C.

Manufacture of non-splintering glass. I. S. VIDAL (B.P. 393,760, 27.6.32. Spain, 7.7.31).—Two glass sheets, one or both of them cemented to celluloid or acetylcellulose sheets, are united by a permanently soft composition comprising a solution of gelatin or isinglass in glycerin to which is added chrome alum, potash alum, or CH₂O. L. A. C.

Vitreous materials. BRIT. THOMSON-HOUSTON CO., LTD., Asses. of P. K. DEVERS (B.P. 393,899, 26.1.33. U.S., 27.1.32).—A material, as elastic as fused SiO₂, more workable and stable in the flame, and less liable to surface-cracking, is prepared by fusing (at > 1700°) a mixture of 90—99 pts. of SiO₂ and 10—1 pts. of beryl. J. A. S.

Manufacture of porous refractory articles. I. SETTERBERG (U.S.P. 1,880,157, 27.9.32. Appl., 3.12.31. Swed., 15.10.31).—A heat-insulating brick etc. is formed of a non-setting refractory material, a gas-developing material (e.g., Al powder), and H₂O, the mixture being made into a plastic mass. The gas is allowed to develop in the cold, the mass moulded and partly dried, the surface layer impregnated with a binding agent (e.g., waste sulphite liquor or molasses), and the whole completely dried and fired to the sintering point. B. M. V.

[Cast] refractory article. G. S. FULCHER, Assr. to CORNING GLASS WORKS (U.S.P. 1,879,676, 27.9.32. Appl., 15.12.27).—A refractory article for use in contact with molten glass is composed of, e.g., Al₂O₃, ZrO₂, and SiO₂, and is cast around an annealed core of the same material, the whole being afterwards annealed. B. M. V.

Production of abrasive flours. S. F. WALTON, Assr. to EXOLON CO. (U.S.P. 1,875,531, 6.9.32. Appl., 1.3.30).—Grains of abrasive material, e.g., S.C., are blown against a block of the same material and crushed by impact. After air-separation the coarser grains are re-blown. B. M. V.

Glass-melting tank.—See XI. Ceramic pigments.—See XIII.

IX.—BUILDING MATERIALS.

Aluminous cements. III. R. SALMONI (Giorn. Chim. Ind. Appl., 1933, 15, 223—230; cf. B., 1933, 388).—The fact that the setting of aluminous cements is retarded or accelerated by salts in low concns. suggests that the velocity of hydration of these cements is a direct function of the p_H and that the absorption of H₂O is, at least initially, a purely colloidal phenomenon. T. H. P.

Average moisture equilibrium for wood. M. B. WELCH (Proc. Roy. Soc. New South Wales, 1933, 66, 383—386).—An average moisture content is 13—14%. C. W. G.

Cold and filled tars and tar concrete.—See II.

Setting of plaster of Paris and properties of the hardened product. R. N. JOHNSON (Trans. Ceram. Soc., 1933, 32, 284—294).—Properties of plaster of Paris of practical significance in connexion with pottery mould-making are described. The apparent expansion of a plaster-H₂O mix (I), which begins after the mass first sets hard, increases rapidly for 1 hr., then more slowly, attaining its max. after several days. The rate of setting, expansion, strength, and surface hardness of (I) all depend on the plaster-H₂O ratio and time of mixing. On drying the expansion of (I) ceases, but max. strength and surface hardness are not attained until after complete drying. Sol. compounds added to (I) may greatly modify the expansion and setting time; thus all common sulphates (except Fe), Na and K salts and hydroxides accelerate the setting and reduce the expansion of (I). The accelerating power of any salt increases with concn. of its solution, but, in general, there is an optimum concn. at which max. rate of setting is attained. Na₂B₄O₇ retards the setting process at all concns. and also reduces the expansion on setting. Solutions, used to control the properties of dental plasters, of possible application to pottery mould-making are described. The possible use of added salt solutions in extending the time during which (I) is of the "correct" consistency for pouring, and factors determining the permeability of plaster moulds, are discussed. Vessels in which (I) is blended must be free from set plaster, small quantities of which cause marked acceleration of, and increased expansion after, setting of the new mix. The drying and hardening of plaster moulds by heat is discussed. A. L. R.

PATENTS

Manufacture of light concrete. PHILIPP HOLZMANN A.-G. ZWEIGNIEDERLASSUNG BERLIN (B.P. 393,429, 12.7.32. Ger., 13.6.32).—Aggregate for concrete consists of burned clay balls which have a porous interior obtained by burning a mixture of clay and a gas-forming material, e.g., wood meal. C. A. K.

Producing a [hydraulic] cement composition. H. K. MOORE, Assr. to BROWN Co. (U.S.P. 1,880,038, 27.9.32. Appl., 12.1.28).—A suitable cement has a dominant mol. proportion of basic (BaO, CaO) elements though lower than in Portland cement. The mol. formula may be represented by 9CaO(BaO), Al₂O₃, 5SiO₂, xFe₂O₃. C. A. K.

Producing a pulverulent hydraulic binding medium. "STRABA" STRASSENBAUBEDARFS-A.-G. (B.P. 394,122, 5.5.32. Ger., 24.2.32).—Finely-powdered hydraulic material, e.g., cement, CaO, blast-furnace slag, and > 6% of its wt. of atomised bituminous material, e.g., asphalt at 120°, are injected through separate nozzles into a closed chamber. L. A. C.

Production of dampproof, non-rotting, and non-swelling protective materials [for buildings]. C. ALFEIS (B.P. 393,270, 30.10.31).—Glass wool or other fibrous glass fabric is treated with a cementing material (e.g., ethylcellulose or a synthetic resin) and then saturated with a bituminous or cellulosic product which is non-synthetic and waterproof. C. A. K.

Lime mixture. J. E. UNDERWOOD and C. A. CABELL, Assrs. to NAT. LIME ASSOC. (U.S.P. 1,878,206, 20.9.32.

Appl., 29.10.26).—A plaster having quick initial set and high strength is composed of Ca(OH)₂, a carbonate (e.g., whiting), a sulphate [e.g., Al₂(SO₄)₃], sugar, and an oil-treated Al compound. B. M. V.

Colouring slabs of mineral substances. H. C. FISHER, Assr. to RICHARDSON Co. (U.S.P. 1,879,155, 27.9.32. Appl., 17.1.29).—Asbestos cement shingles are coated with pigmented dehydrated silicate having the ratio Na₂O (or K₂O) : SiO₂ < 1 : 3.25, and heat is applied until the superficial temp. is 482—537°, producing a dull surface; alternatively, with some pigments glazing of the coating may be effected at 750—805°. B. M. V.

Reconditioning asphalt paving materials. N. H. TAYLOR (B.P. 393,454, 27.9.32).—The paving is pulverised and the voids are increased further by adding sand or crushed stone. The mixture is heated in a revolving drum to 170° and bituminous fluxes are added to give a product with 1.5—5% of voids when compressed. A similar cold-process product may be obtained by treating the pulverised paving with petroleum-bitumen mixtures. C. A. K.

[Resilient] floor tile. J. E. GRAHAM, Assr. to BIRD & SON, INC. (U.S.P. 1,876,289, 6.9.32. Appl., 3.9.31).—Graded cork (125 pts.), mineral fillers, and pigments are added to a paste made from nitrocellulose having high η (100 pts.), tolyl phosphate (90 pts.), and ester gum (20 pts.), and the whole is then calendared. No supporting material is required. S. M.

Method of impregnation for preserving wood. H. E. HABEGGER, Assr. of H. HABEGGER (B.P. 394,162, 17.8.32. Switz., 18.8.31).—An aq. solution of, e.g., NaF or C₆H₅Cl(NO₂)·ONa, of such concn. and in such quantity that, if desired, the tree dies, is introduced into a single, downwardly inclined borehole extending through the bark and sapwood into the heart of the tree. L. A. C.

Filter-cake [roofing tiles].—See I.

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

Gravity concentration tests on Michigan iron formations. F. J. TOLONEN (Amer. Inst. Min. Met. Eng., May, 1933, Contr. No. 46, 23 pp.).—The difference in sp. gr. between the gangue and Fe oxide minerals was not sufficiently great for good separation. Better results were obtained by using an Fe ore suspension of *d* 1.5, and this would result in the reduced cost of H₂O. The effect of viscosity should be considered whenever small sizes are being separated, but the properties of suspensions may be governed by suitable chemical treatment. C. A. K.

Calculating charge in typical blast furnaces. A. D. GOTLIB and N. V. RULLA (Domez, 1932, No. 10, 1—12; No. 11, 24—33).

Viscosity of acid and basic open-hearth furnace slags in the molten state. T. MATSUKAWA (Suiyokai-shi, 1932, 7, 57—68).—The viscosity of the slag (SiO₂ 60% and 20%, respectively) at 1650—1700° does not differ from that of molten steel, but a slight fall in temp. increases the viscosity. Acid is more viscous than basic slag. Increase in FeO or MnO decreases the viscosity; the former lowers, whilst the latter raises, the

m.p. Fayalite, $2\text{FeO}\cdot\text{SiO}_2$, has m.p. 1360° ; rhodonite, $\text{MnO}\cdot\text{SiO}_2$, 1255° ; tephroite, $2\text{MnO}\cdot\text{SiO}_2$, 1270° .

CH. ABS.

Manufacture of cast iron in the electric furnace.

M. SANO (Suiyokai-shi, 1932, 7, 132—141).—Fe of the required Si content was obtained on a hearth composed of sand and fireclay (5%) by employing a high- SiO_2 slag. The S content was decreased to 0.04% when the slag contained 20—30% CaO.

CH. ABS.

Fibrous structure of cold-rolled iron. B. GARRE and A. WALSDORFF (Z. anorg. Chem., 1933, 212, 329—330).—The tensile strength of cold-rolled Fe containing 0.35—1.35% C is greater in the direction of the fibres than perpendicular to them. The converse is true when the C content is < or > the above. F. L. U.

Flow lines in forged steel. E. W. NELSON (Heat Treat. Forg., 1932, 18, 465—467, 529—530, 534).—Etchings showing flow lines were obtained using a mixture of HCl and H_2SO_4 . The theory of flow lines is discussed.

CH. ABS.

Nitrogenisation of steel by ammonia, and ageing phenomena. I. FESZCZENKO-CZOPIEWSKI and WOJCIK (Prace Badaw. P.W.U., 1931, No. 1, 51—122).—The solubility of N in Fe is probably > is indicated in Fry's diagram. Practically only Al and Cr steels are suitable for nitrogenisation, although hard C steels containing Si and Mn can sometimes be nitrified. Al and Cr steels are preferably nitrified at 540° for 30 hr., at 20% dissociation of NH_3 . The results of ageing of nitrified steels are tabulated; hardening by ageing is more efficient in low-C steels.

CH. ABS.

Metallurgical aspects of stainless-steel welding.

E. C. ROLLASON (Metallurgia, 1933, 8, 37—40, 60).—Since much of the welding of stainless steel is carried out on the austenitic alloy, the great contraction on cooling may fracture the joint during a second welding on the back of the plates. Cutlery steel (Cr 12—14%) is rarely welded, but requires immediate after-annealing. In rustless irons the structure around the weld varies with the heat gradient, and the inherent brittleness in Fe (12—16% Cr) caused by overheating may be removed by adding 2% of Ni. Plain Ni-Cr steels typified by Anka, Staybrite, Krupp's V2A, would appear ideal for welding purposes but are subject to "weld decay"—a rapid attack by corrosive media around the grain boundaries—which has necessitated a special test (described) in the specifications of the Air Ministry.

C. A. K.

Precipitation-hardening of copper steels. C. S. SMITH and E. W. PALMER (Amer. Inst. Min. Met. Eng., May, 1933, Contr. No. 47, 32 pp.).—Steels containing > 0.7% Cu are capable of being hardened by pptn. and possess the optimum properties after normalising from approx. 800° and reheating to ppt. the Cu retained in metastable solution. Rapid cooling is not necessary, and hence the danger of over-stressing is eliminated. No advantage is gained with > 1.5% Cu except in the quenched condition, and the hardening is additive to the basic hardness of C steels. Pptn.-hardness was not influenced greatly by other alloying elements.

C. A. K.

Zirconium additions to steel and cast iron.

R. TULL (Heat Treat. Forg., 1932, 18, 471—473).—The properties of pearlitic Mn steels are improved by addition of Zr (0.10—0.30%); Zr affects cast Fe similarly. The advantages of Zr as a deoxidising, denitrogenising, and desulphurising agent are indicated.

CH. ABS.

Eutectoid transformation of bronze. G. SHINODA (Suiyokai-shi, 1932, 7, 367—372).—The β -phases of bronzes containing, respectively, 22.38 and 25.70% Sn have body-centred cubic lattices, a 2.973, 2.981 Å. These β -phases are transformed by tempering into β' -phases, which are then decomposed into α - and δ -like phases. The former specimen quenched from 730° had a body-centred tetragonal lattice, a 2.889 Å., c/a 1.059.

CH. ABS.

"Tin-free" leaded bearing bronze. H. K. HERSCHMAN and J. L. BASIL (Bur. Stand. J. Res., 1933, 10, 591—608).—The effect of small proportions of Sn, Mn, Ca, Ba, Mg, Al, Ni, Si, Zr, Li, Ti, S, and Si-Zr alloy on the distribution of Pb in bronzes containing > 30% Pb and on their mechanical properties at different temp. has been investigated. The best alloy produced contained 0.4% S and 1.5% Si-Zr alloy in which Pb up to 45% is highly dispersed and uniformly distributed. The wear-resistance and compression strength are good and the resistance to deformation is not materially affected by temp.

J. W. S.

Properties of monel metal and similar copper-nickel alloys. O. BAUER and J. WEERTS [with O. VOLLENBRUCK] (Metallwirt., 1932, 11, 629—633, 643—649; Chem. Zentr., 1933, i, 666—667).—Mechanical properties and resistance to corrosion are discussed.

A. A. E.

Causes of formation of zinc dust. R. BROSIUS (Rev. univ. Mines, 1932, 8, 317—324; Chem. Zentr., 1933, i, 1001).—Formation of Zn dust is favoured by increasing the speed of passage of the Zn vapour through the condenser. Addition of small amounts of salt (> 2%) diminishes it, but the dust then contains Cl. Zn can be condensed without formation of dust when a gas stream rich in Zn is passed sufficiently slowly through a condenser kept slightly above the f.p. of Zn, and when the Zn vapour contains no gas which reacts with it. Massive Zn can be obtained by melting the dust with NH_4Cl .

A. A. E.

Lead alloys resistant to sulphuric acid. B. GARRE and H. J. MIKULLA (Z. anorg. Chem., 1933, 212, 326—328).—Addition of AgCd_4 (0—2%) to Pb increases the resistance of the latter to attack by cold 10% H_2SO_4 and by conc. H_2SO_4 at 15° , 100° , and 200° .

F. L. U.

New method of welding the extra-hard alloy "pobedit." I. G. E. VARSHAVSKI (Azerbaid. Neft. Choz., 1932, No. 12, 24—32).—The manufacture of "pobedit," a solid solution of WC in Co, is described. The metal is welded to the drill with yellow Cu and $\text{Na}_2\text{B}_4\text{O}_7$.

CH. ABS.

Hard alloys used for drilling by the Azneft. G. E. VARSHAVSKI and N. L. VARTAMETOV (Groz. Neft., 1932, 2, No. 7—8, 47—54).

Preparation of white gold. ANON. (*Metallurgia*, 1933, 8, 56).—An alloy which possesses many of the physical properties of Pt including some degree of resistance to acids is prepared by alloying a primary alloy with a large proportion of Au. For a soft (hard, in parentheses) 18-carat white Au the primary alloy contains Au 37 (37.4), Ni 38.1 (44.5), Cu 16.4 (5.0), Zn 7.1 (11.1), and Mn 1.4 (2)%. This alloy is best prepared from granulated metals, and approx. 25% of the alloy is melted with 75% of Au in the second stage.

C. A. K.

Platinum-cadmium alloys. K. W. RAY (*Proc. Iowa Acad. Sci.*, 1931, 38, 166).—Pt dissolves in molten Cd, forming white alloys having relatively low m.p. Pt_2Cd_3 and $PtCd_2$ are formed. Pt_2Cd_3 decomposes at 615° into Cd and $PtCd_2$, which has m.p. 725°. The eutectic Pt_2Cd_3 -Cd (2%) has m.p. 315°. All the alloys containing > 6% Pt are very brittle and much harder than Pt or Cd. Cd is dissolved by HCl or H_2SO_4 , Pt being left in a spongy condition. Cd volatilises rapidly when the prep. of alloys containing > 50% Pt is attempted, and the pasty mass can be melted only under pressure.

CH. ABS.

Characteristics of aluminium alloys in relation to chemical and structural composition. C. PANSEBÉ (*Alluminio*, 1932, 1, 279—307; *Chem. Zentr.*, 1933, i, 667).—Duralit containing Cu 3, Ti 0.20% was most suitable for the construction of Diesel engines.

A. A. E.

Age-hardening of alloys. C. H. DESCH (*Sibley J. Eng.*, 1932, 46, 65, 66, 83).—A discussion. CH. ABS.

Nature of metals. R. SELIGMAN (*J. Inst. Brew.*, 1933, 39, 445—448).—A lecture.

Physical properties of metals used in brewing. T. S. PRITCHARD (*J. Inst. Brew.*, 1933, 39, 449—453).—A lecture.

Recent developments in electroplating. M. DE K. THOMPSON (*Metal Clean. Finish.*, 1933, 5, 9—18).—A review. CH. ABS.

Carbonate in cyanide copper plating. L. C. PAN (*Metal Clean. Finish.*, 1933, 5, 19—22, 81—84).—The resistivity of a cyanide Cu solution decreases rapidly with increasing amounts of Na_2CO_3 up to 100 g. per litre. Max. reduction of anode polarisation is attained at 42 g. per litre, at which concn. the cathode polarisation is slightly decreased. The throwing power is max. at 42 and 221.5 g. per litre. The anode efficiency is greatly reduced in presence of Na_2CO_3 , with the exception of a small rise to a max. at 12.5 g. per litre. The anode and cathode efficiencies intersect at 5 and 30 g. per litre; the cathode efficiency decreases slightly with increasing Na_2CO_3 content. The anode film formed in presence of Na_2CO_3 is immediately sol. in the solution, whilst that formed in absence of Na_2CO_3 is insol. while plating takes place. The cathode deposit exhibits max. brightness at 20 g. of Na_2CO_3 per litre. The optimum Na_2CO_3 content is about 42 g. per litre. CH. ABS.

Nickel anodes. E. BECKER (*Metallbörse*, 1932, 22, 1293—1294, 1325—1326; *Chem. Zentr.*, 1933, i, 1094).—The effect of the presence of Cu, Fe, As, S, and C is discussed. In general, all impurities are undesirable,

but small quantities of C and NiO have a depolarising action. Cast anodes are most readily sol., but for rapid Ni-plating baths rolled or hammered anodes are preferred. A. A. E.

Baths for removing nickel. H. KRAUSE (*Metallwar.-Ind. Galv.-Tech.*, 1932, 30, 515—516; *Chem. Zentr.*, 1933, i, 1003).—Anodic treatment at 4—8 volts in H_2SO_4 containing various addenda is usually employed. As_2O_3 is undesirable owing to the liberation of AsH_3 . The dissolution velocity of Ni and of the metallic base diminishes with increasing H_2SO_4 concn. Addition of a small quantity of Na_2SO_4 increases the conductivity. KCN baths remove Ni but damage the metallic base. In HNO_3 the Ni flakes off. A. A. E.

Gold-plating baths. A. WOGRINZ (*Metallwar.-Ind. Galv.-Tech.*, 1932, 30, 495—496; *Chem. Zentr.*, 1933, i, 1003).—A discussion. A. A. E.

Use of bimetallic anodes in the electrolytic synthesis of alloys. C. BÉCHARD (*Compt. rend.*, 1933, 196, 1480—1482; cf. B., 1932, 430).—When electrolysis is effected in a bath of cyanides with brass (66 Zn : 34 Cu) anode and under conditions giving a deposit rich in Cu the Zn : Cu ratio in the deposit and the relative rates of their dissolution from the anode oscillated, the Cu content in the deposit after successive 24-hr. intervals being, e.g., 57.5, 64.2, 62.8, 66.6%. Corresponding figures with an anode consisting of sheets of Zn and Cu (separate) in (area) ratio 5 : 1 were 36.6, 22.5, 53.6, 50.6; other ratios gave similar results. In general, the oscillations were greater as the composition of the alloy capable of being deposited (due to composition of bath, c.d., etc.) differed more from that of the anode. Such oscillations equally occurred if the bath contained only KCN. C. A. S.

Materials for boiler construction.—See I. Preventing corrosion in gas mains.—See II. Glass from blast-furnace slag. Vitreous enamel.—See VIII.

PATENTS.

Tiltable reverberatory furnace. K. SCHMIDT GES.M.B.H. (B.P. 393,433, 3.8.32. Ger., 4.8.31).—The apparatus comprises two shafts connected at the bottom to form a U-shaped unit which is tiltable 90° each way from the vertical about an axis passing between the shafts. Air and fuel are supplied to the top of an empty shaft and serve to melt the charge in the bend of the U mainly by radiation, the gases passing on up the other arm of the U and preheating the charge. The air-supply pipe may be swung to the other shaft for reversal when desired, and preheating of the air may be effected in a passage surrounding the tilting axis, through the refractory material forming the wall between the shafts. B. M. V.

Melting furnace. H. A. BRASSERT, Assr. to H. A. BRASSERT & Co. (U.S.P. 1,880,012, 27.9.32. Appl., 27.7.31).—The metal bath is annular and the shaft is above the island in the bath. A method of supporting the annular dome roof is described. B. M. V.

[Case-hardening] retort. W. C. WHYTE, Assr. to ELECTRO-ALLOYS Co. (U.S.P. 1,878,307, 20.9.32. Appl., 9.1.30).—A retort suitable for case-hardening small

articles by gas is bottle-shaped, the means for rotation and supply of gas being at the neck and a door for the goods at the wide end. Longitudinal ribs are provided to tumble the articles. B. M. V.

Composition for smelting hearths. C. TAMA, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,879,589, 27.9.32. Appl., 16.1.31. Ger., 17.1.30).—A heat-insulating lining for induction furnaces is formed of BeO (20–98%), other refractory oxides, and a fritting substance. B. M. V.

Manufacture of ferrous articles. G. A. REINHARDT and R. H. EURICH (U.S.P. 1,878,539, 20.9.32. Appl., 9.2.29).—Sponge Fe (with addition of C if steel is desired) is pressed cold into the form of a desired article, with allowance for shrinkage, and then heated to the crit. range. B. M. V.

Utilising certain by-products of iron and steel plants [to produce iron oxides]. H. McCOMB (U.S.P. 1,879,373, 27.9.32. Appl., 23.9.31).—Spent pickle liquor is mixed with dry flue dust containing Fe, with addition of alkali if desired, and the plastic mass is sintered to Fe oxides. B. M. V.

[Moulding-]sand preparation. E. A. INKLEY, Assr. to FOUNDRY MATERIALS, INC. (U.S.P. 1,879,272, 27.9.32. Appl., 21.2.31).—A binder having self-hardening properties for moulding sand comprises Na_2SiO_3 solution and colloidal clay. B. M. V.

Flotation [of zinc ores]. A. M. GAUDIN (U.S.P. 1,879,871, 27.9.32. Appl., 1.8.29).—A dithiocarbamate is used as the collector, the pulp being maintained at pH 7–10. B. M. V.

Electrolytic method of continuous [metal] sheet manufacture and apparatus therefor. G. A. REINHARDT and R. T. EURICH (U.S.P. 1,878,540, 20.9.32. Appl., 22.3.29).—An apparatus especially suitable for the manufacture of Fe sheets is described. B. M. V.

Preparing metals for electroplating. A. F. FRANCIS (U.S.P. 1,878,837, 20.9.32. Appl., 3.9.30).—After removing grease and scale by, e.g., alkaline and acid treatments the surface is scoured with an abrasive containing a non-acid oxidising agent, e.g., CaCO_3 and KMnO_4 , aq. B. M. V.

Induction furnace. Treating Mn ore.—See XI.

XI.—ELECTROTECHNICS.

The Forrer magnetic separator and its applications. P. VAISSIER (Bull. Soc. Ind. Mulhouse, 1933, 99, 310–323).—The Forrer separator has been designed for the magnetic purification of sylvinitic and has also been tested for coal-cleaning. The extremely low magnetic coeff. of the materials dealt with is compensated for by the use of an intense field having a high magnetic gradient. The material treated falls as dust between the poles of an electromagnet of special design, and the paths of the particles are bent by the magnetic forces. Coal-cleaning trials produced results comparable with those of washing or dry-cleaning. C. I.

Volynites [for insulators]. High-tension porcelain.—See VIII. **W-steel.** **Electroplating.** Cu-

plate. **Electrolytic Zn. Ni anodes. Ni-removing and Au-plating baths.** **Synthesis of alloys.**—See X.

PATENTS.

Electric induction furnace. F. LINNHOF, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,879,360–1, 27.9.32. Appl., 22.7.29. Ger., 24.7.28).—In an induction furnace comprising a crucible with a coil around it, magnetic yokes are provided to collect the external return flux and improve the power factor. In (A) the yokes are C-shaped and made of laminated steel, a no. being arranged radially; in (B) a complete annular cylinder is formed of powdered Fe embedded in ZnO. B. M. V.

Induction electric furnace. E. F. NORTHRUP, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,879,431, 27.9.32. Appl., 17.7.29).—Magnetisable metal scrap is melted in a crucible having an upward extension producing a head of the material; the exciting coil is in two sections, one being around that part where the metal is cool enough to retain its magnetism. A single upward extension may be used over two or more furnaces in turn. B. M. V.

Electrical induction furnaces without closed ferromagnetic circuits. ALLMÄNNA SVENSKA ELEKTRISKA AKTIEB. (B.P. 393,958, 10.11.31. Swed., 9.2.31).—Arrangements and no. of turns of the furnace windings and of the series transformer are claimed. J. S. G. T.

Electric glass-melting tank. H. W. McINTOSH, Assr. to HARTFORD-EMPIRE Co. (U.S.P. 1,878,591, 20.9.32. Appl., 25.7.29).—In a tank of the type in which the glass is used as a conductor, the joints in the bricks forming the bottom are staggered in the direction of flow of the current. B. M. V.

Manufacture of storage-battery separators. E. W. SMITH (U.S.P. 1,879,562, 27.9.32. Appl., 21.4.30).—Inert fibrous material mixed with Na_2SiO_3 and SiO_2 is formed into a sheet and allowed to harden. Na_2O is removed by H_2SO_4 , leaving porous SiO_2 ; the original SiO_2 may also be porous, e.g., infusorial earth may be employed. B. M. V.

Composition of matter [for storage batteries]. W. H. ROWLEY, Assr. to EVANS LEAD Co. (U.S.P. 1,879,638–9, 27.9.32. Appl., [A] 7.11.30, [B] 10.12.31).—Cellulose fibre, e.g., hemp, is heated with H_2SO_4 until partly carbonised, and the mass is mixed (in A) with Pb oxide and reduced to powder, or (in B) with PbSO_4 and Pb esters, the compositions being suitable for addition to the paste for negative plates of storage batteries. B. M. V.

[Electrode for] luminous tube. J. E. GROSS, Assr. to AURORA SIGN Co. (U.S.P. 1,879,740, 27.9.32. Appl., 2.11.28).—A lead is embedded in a sintered mass of Ni 50, BaO 25, and SrO 25%, which may be surrounded by a refractory sleeve. B. M. V.

Glow-discharge lamp. T. E. FOULKE, Assr. to GEN. ELECTRIC VAPOR LAMP Co. (U.S.P. 1,879,158, 27.9.32. Appl., 19.12.28).—A lamp of the negative-glow type having Ni electrodes, one, at least, of which is coated with Mg and Al, arranged in an envelope containing He, Ne, and A, is claimed. J. S. G. T.

Coating of substances [thermionic cathodes].

H. S. COOPER and M. MERLUB-SOBEL, Assrs. to KEMET LABORATORIES, INC. (U.S.P. 1,878,112, 20.9.32. Appl., 20.9.27).—A thermionic cathode is coated with an alkaline-earth oxide by dissolving a compound of the metal in an org. solvent [e.g., Ba(OEt)₂ in EtOH], applying the solution to the support, and decomposing by heat. B. M. V.

Electrical treatment of liquids having great dielectric strengths. L. MELLERSH-JACKSON. From L'AIR LIQUIDE, SOC. ANON. POUR L'ETUDE ET EXPLOIT. DES PROC. G. CLAUDE (B.P. 393,623, 26.11.31).—Liquids, e.g., hydrocarbons, are subjected to the action of a fixed or rotary arc or disruptive discharge, using a tubular electrode and a cavity counter-electrode. J. S. G. T.

Electrolytic treatment of manganese-bearing material. N. A. LAURY, Assr. to J. C. WIARDA & Co. (U.S.P. 1,878,244, 20.9.32. Appl., 8.12.27).—The ore is treated in the cathode compartment of a cell containing H₂SO₄, with production of MnSO₄ solution, and MnO₂ at the anode. B. M. V.

Electrostatic purification of gases. J. J. V. ARMSTRONG. From RESEARCH CORP. (B.P. 393,906, 10.2.33).—The surface of the collecting electrodes in an electrical precipitator of the film-electrode type are completely wetted with H₂O containing a colloidal wetting agent, e.g., Na silicate. J. S. G. T.

Making collecting electrodes for electrical precipitators [for gases]. C. B. CLYNE, Assr. to INTERNAT. PRECIPITATION Co. (U.S.P. 1,880,811, 4.10.32. Appl., 8.5.30).—Plate sections of electrically semi-conducting, cementitious materials are formed with unbonded abutting edges, and common reinforcing metallic members are embedded or cast therein. J. S. G. T.

Electroplating. Electrolytic metal sheet.—See X.

XII.—FATS; OILS; WAXES.

Spontaneous heating of soap. W. H. SIMMONS (Perf. Ess. Oil Rec., 1933, 24, 219—220).—A sample of powdered olive oil soap (0.0025% Fe), packed in paper bags, after one month's storage had a temp. of > 100° in the middle of the package; analysis showed: free fatty acids (as oleic) 13.7%, normal fatty acids 69.1%, oxidised fatty acids 16.0%, and I val. of total fatty acids 61.6. E. H. S.

Chemical processes in stand-oil formation. C. P. A. KAPPELMEIER (Farben-Ztg., 1933, 38, 1018—1020, 1077—1079).—The main change is considered to be a conversion of the conjugated systems present in tung oil (and formed in linseed oil at high temp.) by "diene synthesis" to relatively high-mol. glycerides of dicarboxylic acids, probably derivatives of cyclohexene. Other structural and colloid-chemical changes are, however, superimposed (particularly in the case of linseed oil) and the nature of these is discussed. S. S. W.

Proteins and oil of the soya bean. K. NAKAJIMA (J. Fac. Agric. Hokkaido, 1932, 31, iii, 165—356).—Glycinin is denatured almost completely into a glutelin-like protein, sol. in 0.2% NaOH, by the oil-extraction process. The rates of digestion of natural and denatured glycinin by enzymes, and the action of papain and

castor-seed powder on the oil, were studied. Viscosities of mixtures of the oil with org. solvents were measured.

CH. ABS.

Characteristics of millet oil. W. E. SMITH and E. K. WALLER (Analyst, 1933, 58, 319—324; cf. B., 1920, 346 A).—Physical and chemical characteristics are given of 3 specimens of millet oil, and of the fatty acids and unsaponifiable matter extracted from the oil. The unsaponifiable matter consists largely of a substance (m.p. 285°) composed of C 84.5%, H 11.8%, and O 3.7%. A CHCl₃ solution gives no coloration with H₂SO₄. The Liebermann-Burchard test results in the slow development of a violet tint. The oil contains no vitamin-A. E. C. S.

Fatty acids of fusel oil. T. TAIRA (J. Agric. Chem. Soc. Japan, 1933, 9, 7—18).—The principal acids contain C₆—C₁₈ (all even); the acids may be produced from hexose by the action of yeast. CH. ABS.

Oils of Manchurian Phaseolus mungo, L., var. radiatus, Bak. S. MIKI and S. SERA (J. Agric. Chem. Soc. Japan, 1932, 8, 1313—1319).—The oil (61% liquid, 39% solid, fatty acids) extracted with Et₂O has acid val. 42.50, sap. val. 173.3, I val. 81.65, unsaponifiable matter 16.55, Hehner val. 84.50. Acids present were identified. The unsaponifiable matter consists largely of sitosterol with a small quantity of stigmasterol and a trace of higher aliphatic alcohols. CH. ABS.

Petrol-sol. OH-acids.—See III. **Oil seeds.**—See XVI.

PATENTS.

Extraction of cocoa butter. I. S. HOCKER, Assr. to HOCKER CORP. (U.S.P. 1,882,013, 11.10.32. Appl., 3.12.28. Cf. U.S.P. 1,803,615; B., 1931, 1146).—Cacao bean is macerated with H₂O, a protein-coagulating agent (NaCl) and sugar (to increase the sp.gr.) are added, and the mixture is warmed in order to melt fatty matter and to gelatinise starchy materials, while stirring first about a horizontal and then about a vertical axis; freed fat is removed and the mixture then treated with a saccharifying agent and Na₂CO₃ as in the prior patent. E. L.

Making a soap compound. G. G. FRELINGHUYSEN, Assr. to P. BALLANTINE & SONS (U.S.P. 1,882,279, 11.10.32. Appl., 24.3.28).—Diastasic material is incorporated with soap (after saponification) at sufficiently low temp. (i.e., at > 60°). E. L.

Cleansing composition. W. A. SCOTT, Assr. to DE LAVAL SEPARATOR Co. (U.S.P. 1,879,953, 27.9.32. Appl., 26.5.28).—A soap powder especially for dairy utensils is composed of Na₃PO₄ 30—50 (42), Na₂SiO₃·9H₂O 40—60 (50), soap 2—10 (5), and preferably Na₂CO₃ > 10%. B. M. V.

Bases for use in the manufacture of [lubricating] greases. A. HORWITZ (U.S.P. 1,881,591, 11.10.32. Appl., 30.10.28).—Japan wax and castor oil (1—1.2 pts. each) are melted and compounded with Al stearate (3 pts.) and the cooled base is pulverised and compounded with a mineral oil. E. L.

Production of lubricating oils from fats or fatty oils. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 394,073, 26.2.32).—Fatty oils are converted into

unsaturated hydrocarbons by heat treatment (preferably in the presence of catalysts such as Cu chromite, Al_2O_3) at (i) 300–500° (preferably 420–480°) and 0–50 atm., or (ii) at 200–250° and 50–300 atm., in the presence of H_2 ; the unsaturated products are then polymerised at 40–100° in the presence of condensing agents ($AlCl_3$, $SnCl_4$, etc.) to yield lubricating oils characterised by a flat η -temp. curve. E. L.

Bleaching clays.—See I. Vitamin preps.—See XIX. Vanishing cream.—See XX.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Effect of storage on plasticity of paints. S. A. DE LACY (J. Oil Col. Chem. Assoc., 1933, 16, 181–220).—Tables and curves are given to show the alteration in the plastometric characteristics of several paints in common use (compositions not stated) when artificially aged by storing at various temp. for 14, 28, and 90 days. In hermetically-sealed containers, which included some air, red oxide and white-lead paints thickened slightly at 50°; a white enamel thinned slightly at 50° after 28 days, but after 90 days returned to its original condition. With a pinhole in the container lid these paints showed progressive thickening after 42 days at 50°. Data are also given for similar tests with 5 brown undercoat, 4 quick-drying, and 3 ZnO paints. Marked thickening was not observed in any case (unless with the pinhole) even at higher temp., at which, indeed, the paints frequently became thinner. A pressure plastometer, its standardisation with mineral oil, and comparison with a vac. plastometer are described and experiments recorded to show the effects of variation of the capillary radius, the temp. (for a white-lead paint), and the pigment concn. (for a ZnO paint). S. M.

Structure of ready-mixed paint. E. KLUMPP and H. MEIER (Farben-Ztg., 1933, 38, 1133–1135).—A general discussion is given of the behaviour of pigments and extenders (when ground and thinned to brushable consistency) from the aspects of agglomeration, wetting, and "oil sheath" formation, with special reference to the influence of adsorbed H_2O and air. S. S. W.

Manufacture of titanium white. H. MEIER (Farben-Ztg., 1933, 38, 1135).—A brief summary is given of the 3 main methods of obtaining TiO_2 from Ti ores (chlorination, alkali or sulphide fusion, and conc. H_2SO_4 treatment), the improvement of colour by elimination of traces of Fe, and the nature of the mixed TiO_2 -alkaline-earth sulphates etc. used as paint pigments. S. S. W.

Structure of zinc- and alkaline-earth chromates. H. WAGNER and R. HAUG (Farben-Ztg., 1933, 38, 988–989).—The composition, colour, permanence in normal and artificial weathering, etc. of "Zn yellows" (mixed chromates of Zn and K), "yellow ultramarines" (sulphochromates of Ba and Sr), and mixed crystals of alkaline-earth with Zn and Pb chromates, respectively, are tabulated and discussed. Pb-alkaline-earth and Zn-Sr chromate mixed crystals are promising in this field. S. S. W.

Raw or thickened tung oil [in varnishes]? W. RÜCKERT (Farben-Ztg., 1933, 38, 995).—The use of raw oil rather than preformed stand oil in tung oil

varnishes is recommended, particularly with the newer PhOH- CH_2O type of synthetic resin, on the grounds of complete dissolution of the resin, development to the full of its anti-gelling functions, and economy in fuel (avoidance of extra process). For mixed linseed-tung varnishes, the introduction of the former as stand oil is feasible. Typical processes are detailed. S. S. W.

Resoftening of linoxyn. P. SLANSKY (Farben-Ztg., 1933, 38, 1105–1106).—Mixtures of linoxyn with acidic and basic materials (linseed oil fatty acids and CaO) were stored in moist and dry atm. for 23 months, and the condition of the films at various stages is tabulated. The re-softening of linoxyn is due mainly to H_2O and to a lesser extent to free fatty acids, and is regarded as a manifestation of peptisation rather than of syneresis. With the exception of acid val. (which rises), the consts. of linoxyn do not change appreciably in the resoftening. S. S. W.

Nitrocellulose lacquers. H. WOLFF and B. ROSEN (Farben-Ztg., 1933, 38, 989–992, 1020–1021).—Clear and pigmented nitrocellulose lacquers containing "alkydals" were compared with corresponding lacquers based on ester gum (and a series of "combination lacquers," i.e., stand oil-nitrocellulose blends). In tensile strength, elasticity, hardness, resistance to accelerated and normal weathering, non-yellowing, etc. clear lacquers containing alkydals are superior to the others. The durability of such lacquers pigmented with ZnO and ZnO-lithopone, respectively, is considered in detail, and alkydals again show to general advantage. S. S. W.

Types of stoving finishes. A. W. C. HARRISON (Synth. and Appl. Finishes, 1933, 3, 96–98).—A general discussion. V. E. Y.

Cracking-still C_2H_4 [for resins].—See II.

PATENTS.

Manufacture and use of liquid binding medium for paints and varnishes. H. PLAUSON (B.P. 393,575, 23.11.31. Ger., 22.11.30).—A dispersion of vulcanised or unvulcanised rubber in a liquid hydrocarbon is heated with a drying oil and S until a homogeneous mass is formed; the oil may be preheated with S and worked up with the rubber dispersion. The product gives very resistant films. [Stat. ref.] S. M.

Manufacture of lithopone. E. J. FLYNN, Assr. to NEW JERSEY ZINC Co. (U.S.P. 1,882,072, 11.10.32. Appl., 7.8.28).—Lithopone consisting of uniformly sized aggregates is obtained by (a) continuously withdrawing crude lithopone pulp from the pptn. tank so that the liquid level remains const., (b) varying the rates and points at which the solutions of $ZnSO_4$ and BaS enter the tank so that, after agitation, the reaction takes place at a const. concn. The crude pulp is passed to similar finishing tanks to complete the reaction. S. M.

[Ceramic] pigments. HARSHAW CHEM. CO., Asses. of C. J. HARBERT (B.P. 393,474, 26.10.32. U.S., 23.5.32).—O-containing compounds of Ti, Sb, and Cr are heated together in the presence of an electropositive element, e.g., Na, K, incorporated as hydroxide etc. or as a ceramic raw material, e.g., china clay. The colour ranges from light yellow to olive according to composition, and the

pigments are insol. in H_2O , acids, and alkalis, and are inert even at high temp. S. S. W.

Manufacture of yellow varnishes. J. R. GEIGY A.-G. (B.P. 390,649, 21.4.32. Ger., 23.4.31).—Cellulose nitrate or acetate varnishes are coloured with the azo dyes: *o*-nitroarylamine of the C_6H_6 series, free from CO_2H or SO_3H groups (e.g., 3-nitro-*p*-toluidine or 4-chloro-2-nitroaniline) \rightarrow an acetoacetic ester. C. H.

Making a [waterproof coating] composition. E. W. LOVERING, Assr. to BROWN CO. (U.S.P. 1,880,036, 27.9.32. Appl., 12.12.28).—Cellulose fibre articles are impregnated at 150–232° with a mixture of blown petroleum asphalt (80–90%), rubber (5–15%), and wax (about 5%). S. M.

Antifouling compositions. COOPER, McDUGALL & ROBERTSON, LTD., and G. A. FREAK (B.P. 393,375, 23.2.32).—The active principle of plants of the genera *Tephrosia*, *Lonchocarpus*, *Derris*, and *Deguelia* (known under such native names as Tuba, Barbasco, Cube, Haiari, Timbo, etc.) is introduced into oil paints in the form of ground leaves or solvent extracts. S. S. W.

(A) **Purification of resins.** (B) **Preparation of high-m.p. rosin.** A. F. OLIVER and R. C. PALMER, Assrs. to NEWPORT INDUSTRIES, INC. (U.S.P. 1,881,893 and 1,881,907, 11.10.32. Appl., [A] 16.12.29, [B] 27.8.30).

—(A) Rosin, natural and artificial resins which contain Fe are rendered colourless by heating the molten resin, or its solution, with $H_2C_2O_4$ or citric acid; extraction of the product with petroleum naphtha gives an Fe-free resin. (B) The m.p. is raised from about 52° to about 66° by heating the rosin at 260–300° for 1–8 hr. and then distilling *in vacuo* or with superheated steam until the original wt. of the rosin has been reduced by 10–16%. S. M.

Manufacture of sodium resinate [rosinate]. R. C. MURRAY, Assr. to ECONOMICS LABORATORY, INC. (U.S.P. 1,881,858, 11.10.32. Appl., 3.8.29).—Non-caking products are obtained by heating molten rosin with less caustic alkali than is required for neutralisation and then adding excess of dry Na phosphate crystals. S. M.

Production of phthalic anhydride resins. M. M. AMIEVA, JUN., Assr. to W. P. FULLER & Co. (U.S.P. 1,875,408, 6.9.32. Appl., 7.3.31).—A mixture of glycerin and linseed oil acids is heated above 163° with a substantial portion of the phthalic anhydride for several hr., after which the remainder is added and the heating continued. S. M.

Manufacture of sheets or films from artificial polymerisation products. I. G. FARBENIND. A.-G. (B.P. 394,244, 7.12.32. Ger., 8.12.31).—The mechanical properties of sheets made from polymerised polyvinyl chloride, or from other highly polymerised compounds, are improved when the retained solvents and softeners are removed by treatment with an org. liquid, e.g., C_6H_6 , Et_2O , $MeOH$, which does not affect the material. S. M.

Manufacture of shaped articles from polyvinyl alcohols. CONSORT. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 393,488 and 393,505, [A] 16.11.32, [B] 9.3.32. Ger., [A] 16.11.31. Addns. to B.P. 386,161; B., 1933, 238).—

(A) A volatile org. liquid (not itself a solvent for polyvinyl alcohol) which promotes evaporation of H_2O , e.g., $EtOH$, is added to the polyvinyl alcohol solutions described in the prior patent, improving the uniformity of threads, tubes, etc. made therefrom. Dyestuffs and therapeutically active materials may also be incorporated. (B) In place of aq. solutions of polyvinyl alcohol, solutions thereof in org. liquids or mixtures of such with H_2O are used. Substances improving the visibility under Röntgen rays of threads made from the solution, e.g., $BaSO_4$, Bi salts, and substances increasing their capacity for being resorbed, e.g., gelatin, borax, sugars, etc. may also be added. S. S. W.

Prep. of retene. Plasticising agents.—See III. **Al and Ba or Sr compounds.**—See VII. **Floor tile.**—See IX. **Finishing coat for patent leather.**—See XV. **Nitrocellulose for lacquers.**—See XXII.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

PATENTS.

Treatment of [rubber] latex. A. A. NIKITIN, Assr. to NAUGATUCK CHEM. CO. (U.S.P. 1,880,975, 4.10.32. Appl., 16.4.29).—The after-creaming of latex which has been conc. by creaming is prevented by the subsequent addition of an anti-creaming agent, e.g., saponin. D. F. T.

Concentration of rubber latex. METALGIES. A.-G., A. PETERSEN, and W. GENSECKE (B.P. 393,732, 10.5.32. Addn. to B.P. 382,235; B., 1933, 32).—The circulation of the latex necessary in the repetition of the concn. process is now effected with the aid of a pump. The modified apparatus is described. D. F. T.

Concentration of dispersions or emulsions [of rubber latex]. E. M. RICHARDSON (B.P. 393,644, 10.12.31 and 21.9.32).—A process and apparatus are described in which the dispersion is subjected to centrifugal action inside a filtering medium (I) and the lighter disperse phase moves inwardly away from (I), the serum forced through (I) being substantially free from the disperse phase. During the operation a stabilising agent such as NH_3 may be introduced into the central zones to prevent coagulation of the conc. latex. D. F. T.

Compositions with a base of indiarubber latex for jointing purposes. E. A. L. DUBOIS (B.P. 393,614, 4.12.31).—Fillers, e.g., TiO_2 , certain oxides of Fe, and certain clays, in a state of subdivision and of hydration sufficient to yield a colloidal dispersion with H_2O , are introduced into latex without milling. In all cases a protective colloid is also added and the fillers are previously humidified with 500–100% of H_2O . [Stat. ref.] D. F. T.

Purification of bodies [e.g., rubber] insoluble in water. J. K. MITCHELL, Assr. to DISPERSIONS PROCESS, INC. (U.S.P. 1,880,968, 4.10.32. Appl., 30.11.28).—Wild rubbers etc. are freed from impurities by dispersing in H_2O containing a hydrophilic colloid (I), such as a H_2O -sol. soap, screening, and then spraying the dispersion into hot H_2O with agitation so as to coagulate the rubber and remove (I). D. F. T.

Production of aqueous dispersions of rubber or the like materials. DUNLOP RUBBER CO., LTD., ANODE RUBBER CO., LTD., D. F. TWISS, and W. McCOWAN (B.P. 394,077, 3.3.32).—Rubber, preferably premasticated, is reduced to a viscous and adhesive condition by heat, *e.g.*, at 140°, and is then dispersed in a H₂O-sol. soap, the latter being preferably in a pasty condition and being produced *in situ*, if desired. D. F. T.

Rubber product and its preparation. D. H. POWERS, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,882,035, 11.10.32. Appl., 31.8.26. Cf. U.S.P. 1,732,532; B., 1930, 205).—In the production of an accelerator of vulcanisation from an aldehyde, a primary arylamine, and CS₂, superior products are obtained by using aliphatic aldehydes containing C₂—C₇, *e.g.*, PrCHO, and a ratio of 2—4 mols. of aldehyde to 1 mol. of amine. D. F. T.

Manufacture of rubber compositions. DUNLOP RUBBER CO., LTD., D. F. TWISS, and F. A. JONES (B.P. 394,007, 19.12.31).—In order to prevent prevulcanisation, at least one of the ingredients consists of a basic substance in conjunction with an aliphatic acidic substance, *e.g.*, malonic acid or its substitution products, or acids containing the group ·CO·CH₂·CO₂H or ·CO·CO₂H, which undergoes decomp. with partial or complete loss of acidity at or near the vulcanisation temp. [Stat. ref.] D. F. T.

[Vulcanisation] mould-cleaning solution. R. C. BATEMAN, Assr. to GOODYEAR TIRE & RUBBER CO. (U.S.P. 1,875,552, 6.9.32. Appl., 28.10.29).—Moulds used for the vulcanisation of rubber are cleaned by applying a mixture of cresol and a penetrant, *e.g.*, pine oil or turpentine, and heating, followed by mechanical treatment for removal of the loosened incrustation. D. F. T.

Rubber vulcanisation accelerator. W. SCOTT, Assr. to RUBBER SERVICE LABS. CO. (U.S.P. 1,875,943, 6.9.32. Appl., 14.1.28).—Vulcanisation is accelerated by a secondary aliphatic amine salt of ethylxanthic acid, *e.g.*, piperidine ethylxanthate. D. F. T.

Improvement of ageing qualities of rubber. I. WILLIAMS and A. M. NEAL, Assrs. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,875,903, 6.9.32. Appl., 24.7.30).—The objection to primary aromatic diamines, *e.g.*, *m*-tolylenediamine, on account of staining and their poisonous character, is obviated by combining such compounds with a carboxylic acid (AcOH, H₂C₂O₄, BzOH) preferably so that only one NH₂ group is satisfied. D. F. T.

Binding medium for paints etc.—See XIII.

XV.—LEATHER; GLUE.

Diffusion of different vegetable tannins into animal hide. F. STATHER (Collegium, 1933, 316—327; cf. B., 1933, 240).—The diffusion consts. of different vegetable tanning materials have been calc. from the formula $E = K\sqrt{t}$, where t is the time and E the penetration, and then expressed as a % of the highest val., *viz.*, that for gambier. The materials have been divided into four groups of increasing diffusion const.: (I) pine bark; (II) mangrove, myrobalans, sumac; (III)

quebracho (untreated), chestnut, oakwood, algarobilla; (IV) mimosa, quebracho (sulphited), valonia, gambier. K was the same for 0.75% solutions at their natural pH after 6-hr. and 24-hr. periods, but was slightly greater for calculations after 48 hr. and 72 hr., respectively. The diffusion of the above tanning liquors was unaffected by adjusting their pH to 4.0, except for sulphited quebracho, but was increased by increasing their concns. to 4.5%, although the different materials retained the same order of increasing diffusibility. The diffusion from the grain side of the pelt can be expressed by $E = K\sqrt{t} \times \text{concn. of tan liquor}$. D. W.

Precipitation figure of chrome[tanning] liquors and effect of neutral salts thereon. E. STIASNY and M. ZIEGLER (Collegium, 1933, 327—345).—The pptn. figure (A) of Cr₂(SO₄)₃ solutions is increased by additions of NaCl owing to the hydration of the neutral salt ions, and by additions of Na₂SO₄ owing to the consequent increase in the SO₄ residues in the Cr complex. The increase in A is greater as theolation of the basic Cr complexes is greater. Greater increase of A is obtained by titration with Na₂CO₃ instead of NaOH, owing to the formation of carbonato-Cr complexes. A is lowered by adding NaCl to CrCl₃ liquors owing to the flocculating effect of NaCl on the highly basic, highly colloidal Cr complexes. A is lowered by adding Na₂SO₄ to CrCl₃ liquors owing to the formation of basic Cr₂(SO₄)₃. The decrease in A is greater as the basicity figure of the CrCl₃ solution is greater. In the absence of non-olated and carbonato-free Cr complexes, A is increased by an addition of an excess of NaSO₄, owing to an increase in the SO₄ residues in the Cr complex. D. W.

Loss due to material washed out of vegetable-tanned leather [by water]. L. JABLONSKI (Collegium, 1933, 309—310).—“Loss due to material washed out” (L) is more accurate as a measure of leather quality than is “H₂O-sol. matter.” L is important to leather dressers and shoe manufacturers who have occasion to soak leathers in H₂O, but this val. is quite different from the loss when the leather is finely divided and soaked for 12 hr. at 38—40°. A method of soaking is required in which a min. of tannin and a max. of other materials, particularly acids, are extracted. D. W.

Apparatus for determining the water-absorbing capacity of leather. V. KUBELKA and V. NĚMEC (Collegium, 1933, 311—316).—The leather is immersed in 75 c.c. of distilled H₂O in a brass flask (A) with a funnel-shaped neck, which is attached by means of a rubber connexion to the neck of an inverted, graduated, 75-c.c. hide-powder flask. After a specified time the whole apparatus is inverted and the vol. of unabsorbed H₂O measured, the leather being retained by a projection on the inside of the neck of A . Higher results have been obtained by this than by the old method. Max. absorption (I) was attained in a few min. by leathers which were incompletely or lightly tanned. The time of soaking required to attain (I) increased as the degree of tannage increased. D. W.

Furfuraldehyde in vegetable products.—See III.
Cotton-like fibre.—See V.

PATENTS.

Treating [wet chrome-tanned] leather. P. A. BLATZ (U.S.P. 1,877,119, 13.9.32. Appl., 29.3.30).—The freshly-tanned leather is stored in an insulated tank containing H_2O at 2–10° until required for dyeing.

D. W.

Manufacture of [finishing coat for] patent leather. E. I. DU PONT DE NEMOURS & Co. (B.P. 394,000, 18.12.31. U.S., 18.12.30).—The use is claimed of a varnish containing 40–60% of a glyptal resin, which has been modified with large proportions of linseed, tung, and/or other drying oil.

S. M.

Softening etc. agents.—See III. Nitrocellulose for artificial leather.—See XXII.

XVI.—AGRICULTURE.

Soil colloids. L. SMOLÍK (Věstn. českoslov. Akad. Zeměd., 1932, 8, 750–753; Chem. Zentr., 1933, i, 1191).—A review.

A. A. E.

Colloidal loam isolated from podsol. L. SMOLÍK (Věstn. českoslov. Akad. Zeměd., 1932, 8, 744–747; Chem. Zentr., 1933, i, 1191).—The colloids from various podsol strata have different chemical properties, those from the illuvium being richest in Fe, Al, and frequently PO_4 . The chief distinction lies in the mol. ratio $SiO_2 : Fe_2O_3$.

A. A. E.

Microbiological investigations of organic soils. I. Decomposition of rape cake. A. ITANO and S. ARAKAWA (Ber. Ohara Inst. landw. Forsch., 1932, 5, 427–446).—During the decomp. of rape cake in soils, the rate of production of inorg. N was paralleled by bacterial nos. up to the max. point, but not thereafter. Treatment of soils with rape cake increased the proportion of actinomyces to bacteria in both dry farm and paddy soils. Actinomyces became dominant in treated dry farm soils. Ammonification of rape cake is effected largely by actinomyces, and among bacteria sporing organisms were more active than non-sporers in this respect. The production of sol. non-protein-N is an important intermediate stage in the ammonification process and is favoured by a slightly acid reaction.

A. G. P.

Soil reaction and growth of *Astragalus sinicus*. A. ITANO and A. MATSUURA (Ber. Ohara Inst. landw. Forsch., 1932, 5, 421–426).—The buffer capacity of dry farm soils on the alkaline side was greater, and on the acid side smaller, than those of paddy-field soils. Differences were not, however, great. Germination of seed occurred within the range pH 4.21–7.90 with an optimum at pH 5.6. The growth optimum was pH 6.0. Improved growth of *A. sinicus* is associated with increased nodulation and higher N content of the plants. Growth of the plants tended to maintain an acid reaction in the soil. No relationship exists between the pH of the soil and that of plant saps.

A. G. P.

Nitrification studies on an alkali soil in Iowa. S. M. SMITH and F. B. SMITH (Proc. Iowa Acad. Sci., 1931, 38, 327–331).—On the alkali soils org. are superior to inorg. fertilisers in reducing the production of NO_3' . Alkali soils are favourable for NO_3' production.

CH. ABS.

Effect of phosphorus on nitrogen fixation by *Azotobacter*. L. G. THOMPSON, JUN., and F. B. SMITH (Proc. Iowa Acad. Sci., 1931, 38, 299–302).—Large amounts of P are not assimilated by *Azotobacter*, and hence are not necessary for its growth. Their beneficial effects are attributed to their buffer action.

CH. ABS.

Nitrate assimilation by soil bacteria. F. B. SMITH and D. SCHLOTS (Proc. Iowa Acad. Sci., 1931, 38, 289–291).—Certain soil bacteria may assimilate large quantities of $NO_3'-N$ under favourable conditions of moisture, temp., and food supply.

CH. ABS.

***Aspergillus niger* as an indicator of available phosphorus in the soil.** F. E. SCHLOTS, F. B. SMITH, and P. E. BROWN (Proc. Iowa Acad. Sci., 1931, 38, 303–307).—Results are compared with those obtained by the Truog method. *A. niger* indicates changes in the availability of soil P.

CH. ABS.

Soils and fertiliser experiments, Experiment Station Farm, Lexington. G. ROBERTS and E. J. KINNEY (Kentucky Agric. Exp. Sta. Bull., 1932, No. 331, 219–265).—Continuations of existing experiments and new trials of manuring and liming of a no. of crops are reported.

A. G. P.

Determination of ammoniacal nitrogen in fertilisers without distillation. Z. I. KERTESZ, F. J. KOKOSKI, and A. W. CLARK (J. Assoc. Off. Agric. Chem., 1933, 16, 233–240).—25 c.c. of aq. extract of sample ($\equiv 0.1$ g.) are neutralised, if necessary, with 0.1N-acid or alkali, and boiled with 5 c.c. of 0.5N-KOH to about 10 c.c. The NH_3 driven off is determined by titration with 0.1N-acid, care being taken to obtain the same end-point each time on account of the presence of P_2O_5 .

T. McL.

Application [to soils] of difficultly soluble with easily soluble phosphates. I. G. ROZHDESTVENSKI (Chemis. Social. Agric., 1932, 1, No. 6, 39–46).—Mixtures of raw phosphates and superphosphate (25% of total P_2O_5) give yield increases as good as does the latter alone. In the Hellriegel nutrient solution 75% of the total P_2O_5 can be in the insol. form.

CH. ABS.

Manurial action of "Nettolin," a new humus manure prepared from high-moor peat. L. MEYER (Z. Pflanz. Düng., 1933, 12, B, 262–281).—"Nettolin" (I) contains a proportion of easily assimilable nutrient (especially N), partly humified org. matter absorptively saturated with Ca, and a soil disinfectant and partial sterilising agent (wood tar). Crop yields produced by (I) were as great as, or >, those from other org. fertilisers. The NO_3' content of the expressed soil solution 2 months after the removal of the crop was much greater from soil treated with (I) than from that receiving $(NH_4)NO_3$ or stall manure.

A. G. P.

Effect of gypsum on calcareous soils. S. DAS (Agric. Live-Stock India, 1933, 3, 166–172).—Gypsum depressed crop yields on the soils examined. Poor results obtained with superphosphate are thus explained. The effect is ascribed to the reduction of $[PO_4''']$ in the soil by pptn. of insol. Ca phosphates, to an excessive $[SO_4''']$ produced, and to retardation of nitrification and N fixation by soil organisms.

A. G. P.

Determination of potassium by the cobaltinitrite method and its application in agricultural analysis. A. H. LEWIS and F. B. MARMOY (J.S.C.I., 1933, 52, 177—182 T).—A rapid and simple method for determining K in soil and plant extracts is described. Pptn. of K from solutions containing 0.1—0.8 mg. K per c.c. was complete. The ppt. (I) was washed with 70% EtOH, in which it is less sol. than in H₂O, 2½% aq. Na₂SO₄, etc. A centrifuge was used to separate (I) from excess reagent and wash liquid. The Co in (I) was determined colorimetrically by the thiocyanate and choline-ferrocyanide methods and the nitrite by the Griess method. The (I), although const. in composition, did not correspond exactly to K₂NaCo(NO₂)₆ but was lower in K and higher in the other constituents. Indirect standardisation against the Co and nitrite in the cobaltinitrite ppt. from standard K₂SO₄ solutions gave apparently theoretical recoveries of K. The nitrite in (I) was also determined volumetrically by titration with KMnO₄; the apparent recovery of K (the ppt. having been washed with H₂O) was theoretical.

Disintegration of bones by the alkali method, and their use as fertilisers. M. A. HOSSAIN (Agric. Live-Stock India, 1933, 3, 152—165).—Bones are treated for about 2 months in airtight containers with approx. 4 times their wt. of a solution containing 1.5% NaOH and 1% NaCl. The liquor is poured off and may be used several times. The bones are washed by decantation and powdered. Thus prepared, the bone fertiliser gave as good results as superphosphate in pot cultures.

A. G. P.

Effect of applications of sodium nitrate to peach trees during dormancy. C. F. WILLIAMS (J. Elisha Mitchell Sci. Soc., 1932, 48, 21).—Dormant seedling peach trees absorbed N at < 2° but not at -5°; N was not translocated to the tops at < 8°.

CH. ABS.

Effects of nitrogenous fertilisers on the nitrifying power of Carrington loam. M. H. BROWN (Proc. Iowa Acad. Sci., 1931, 38, 309—311).—CaCN₂, Ammophos-A, NaNO₃, (NH₄)₂SO₄, and superphosphate have little effect.

CH. ABS.

Course of the nutrient intake of oats during its growth period. E. BLANCK, F. GIESECKE, and W. HEUKESHOVEN (J. Landw., 1933, 81, 91—103).—Analyses of sand-cultured oats in various growth stages and receiving varied manurial treatment are recorded. Max. production of roots coincides with the commencement of formation of the panicles, but the production of green matter continues until the period of "full" ripeness. The intake of mineral matter is not proportional to dry-matter production and practically ceases as the panicles form. The N, P, and K contents of the roots decline from this period. In the aerial parts the N, P, and K contents also fall at this time, but reach a second max. at the "full-ripe" stage. With increasing N supplies the period of max. dry-matter production in the aerial parts is shortened and that of the roots prolonged. The max. intake of K and N by aerial parts is influenced somewhat by the level of N supplied.

A. G. P.

Ecology of oats. III. Rôle of potassium in the water retention of plants. O. TORNAU and K. MEYER

(J. Landw., 1933, 81, 175—194; cf. B., 1933, 84).—The effects of KCl and K₂SO₄ on the growth of oats during periods of drought are compared. The plants generously treated with KCl had the greater resistance to wilting, especially those receiving high proportions of the basal fertiliser (N, P, Ca, Fe, Na). Yield depressions resulting from drought were greatest on soils receiving heavy dressings of basal fertiliser. KCl tended to counteract this more effectively than did K₂SO₄. Differences in the effects of the two salts were not shown by morphological characteristics nor by H₂O consumption. KCl is more effective than K₂SO₄ in minimising the evaporation of H₂O from soil and in increasing its crit. H₂O content.

A. G. P.

Assimilation of phosphorus and of potassium by sprouts and by young seedlings of rye. S. HOLYŃSKI (Pam. Państw. Inst. Nauk. Gosp. Wiejsk. Pulawach, 1929, 10, No. 1, 163—174).—The assimilation curves of rye for P₂O₅ and K₂O are analogous, although the assimilation rate of the former is the lower. The min. is at 5.3 and 4.5 days after sowing, respectively.

CH. ABS.

Potassium status of soils and fruit plants in some cases of potassium deficiency. T. WALLACE and E. L. PROEBSTING (J. Pomology, 1933, 11, 120—148).—The H₂O-sol., citric acid-sol., and exchangeable K of orchard soils were low where pronounced K deficiency was shown by the trees. All vals. increased after manuring with K. Corresponding differences occurred in the K content of the terminal shoots and fruit pulp from the trees. In soils heavily dressed with farmyard manure and K₂SO₄ for a no. of years a large proportion of the added K was present in the surface layers in an exchangeable form.

A. G. P.

Comparative effect of chloride and sulphate of potash on composition and quality of white Burley tobacco. P. E. KARRAKER (Kentucky Agric. Exp. Sta. Bull., 1932, No. 334, 343—356).—Applications of KCl increased the Cl⁻ content of the crop, and did not cause injury in amounts > 100 lb. KCl per acre. The S content of the tobacco was increased slightly by application of K₂SO₄ without appreciable effect on the quality of the crop. The burning quality was detrimentally affected by KCl in amounts > 100 lb. per acre and by K₂SO₄ with > 400 lb. per acre.

A. G. P.

Influence of increased concentrations of soil solution on the oil content in seeds of oil-bearing plants. S. E. SEREDA (Chemis. Social. Agric., 1932, 1, No. 5, 53—63).—Pot experiments on a grey forest soil are recorded. An increase in concn. of the soil solution by adding nutrients (5, 10, 20, 40%) increased the yield only up to 10 or 20% concn. The amount of oil decreased with increase in concn. of nutrients except for soya bean and hemp (5% increase caused increase in oil content). The decrease is attributed to increase in protein content.

CH. ABS.

Relationships between water temperature and growth of rice plants. III. Injurious effect of water temperature on submerged plants. M. KONDŌ and T. OKAMURA (Ber. Ohara Inst. landw. Forsch., 1933, 5, 347—374).—Effects of irrigation at

various stages of growth, with H_2O of different temp., applied for varying periods, on the growth of rice are recorded. A. G. P.

Detection of lead in spray residues. M. HARRIS (J. Assoc. Off. Agric. Chem., 1933, 16, 245—246).—The alkaline solution containing about 0.15 mg. PbO is made slightly acid with aq. HNO_3 and evaporated just to dryness. The clear, filtered, aq. extract is neutralised with aq. NH_3 and treated with 0.1—0.2 g. of Na_2SO_3 . A turbidity indicates the presence of Pb . Pb is confirmed by dissolving the ppt. in a drop of 6% HNO_3 and pptg. PbI by KI - KBr solution on a microscope slide. PbI forms well-defined hexagonal plates, which are brown-yellow by transmitted light, glisten in reflected light, and display iridescent colours. T. McL.

Rice grain.—See XIX.

PATENTS.

Manufacture of phosphatic fertilisers. B. OBER and E. H. WIGHT, AssTs. to OBERPHOS CO. (U.S.P. 1,879,435, 27.9.32. Appl., 23.9.29).—A slurry of finely-ground phosphate rock with aq. NH_3 is treated with, e.g., H_2SO_4 or H_3PO_4 in quantity and of concn. such as to yield a mixture of desired concn., and the mixture is digested under raised temp. and pressure in an autoclave. L. A. C.

Treatment of soils. H. P. VANNAH, Assr. to BROWN Co. (U.S.P. 1,880,058, 27.9.32. Appl., 15.8.29).—Land unproductive in edible crops, e.g., the sawgrass soil of the Everglades regions of Florida, is treated with a mixture comprising anhyd. $AlCl_3$, cryst. $ZnSO_4$, cryst. $CuSO_4$, and loose, free-flowing soil. L. A. C.

Treatment of seeds. OESTERR. CHEM. WERKE G.M.B.H. (B.P. 393,808, 5.9.32. Austr., 21.9.31).—The seeds are pickled for several hr. in aq. solutions or suspensions of true peroxides or per-compounds, e.g., H_2O_2 , CaO_2 , or are stored, e.g., for 2—3 months, in contact with the solid compounds. L. A. C.

Composition for treating trees and other vegetation. A. J. VALLE (U.S.P. 1,879,777, 27.9.32. Appl., 13.7.27).—A banding for trees comprises whitening and fish or other slow-drying oil, castor oil, and a salt containing S, e.g., a solution of Na_2SO_4 and Na_2S . B. M. V.

KH_2PO_4 .—See VII.

XVII.—SUGARS; STARCHES; GUMS.

Extraction of sugar from dry cosettes by cold water. V. E. MALINOVSKI, N. K. PETROV, and V. I. KUZNETZOV (Nauk. Zapiski Tzuk. Prom., 1932, 24, 19—33).—Advantages of cold diffusion and low-temp. purification are described. CH. ABS.

Carbonatation. I. A. KUKHARENKO and E. P. KOSHEVEROVA (Nauk. Zapiski Tzuk. Prom., 1932, 24, 57—64).—In the first stage of carbonatation there is formed a colloidal solution of $CaCO_3$ which, on decrease of p_H , becomes unstable and gelatinises. On further carbonatation the amorphous salt becomes cryst. and gradually loses its adsorbing capacity. Hence the first fraction of the filtrate shows a decreasing, and the

last an increasing, concn. of dry substance. Decrease in the vol. of the ppt. is due to the increasing solubility of $CaCO_3$ in acidified solutions, and causes the growth of larger crystals in the supersaturated solution. At a higher temp. the vol. of ppt. also decreases. Carbonatation should, therefore, be conducted at a rather high temp. CH. ABS.

Determining sucrose in milk. Starch val. of barley chaff.—See XIX.

PATENT.

Fermentation of cellulosic material.—See XVIII.

XVIII.—FERMENTATION INDUSTRIES.

Modern chips. III. H. FINK (Woch. Brau., 1933, 50, 193—194).—Hallermann's objections (B., 1933, 568) to the use of chips in fermentation are contested. Experiments show that chips accelerate fermentation and produce a mild-tasting beer and a vigorous yeast. The slime surrounding the yeast cell is more deleterious than the "indifferent" matter which Hallermann finds in yeast by use of chips. The latter's statement that only 0.55% of active hop principles are lost in headless fermentation is opposed to Niggemeyer's results (B., 1933, 563). R. H. H.

Pitched plate-chips. HELL (Woch. Brau., 1933, 50, 206—207).—The action of pitched wooden chips ("Mammut bio-chips") (I) and pitched Al foil (II) in the storage tank are compared. In clarification (I) is superior to (II) since the adsorbate on (II) may be re-adsorbed by the beer. The formation of cracks in the pitch coating on (II) exposes the Al to the action of resinic acids in the beer which may become contaminated. R. H. H.

Influence of calcium and magnesium sulphate and chloride of brewery water on composition of the wort. P. KOLBACH and G. HAUSSMANN (Woch. Brau., 1933, 50, 201—205).—Addition of $CaSO_4$ to mash- H_2O causes deposition of the tri- and liberation of the mono-phosphate. The consequent fall in p_H approaches the optimum for the proteolytic enzymes. With increase in $CaSO_4$ dose, the extract, total N, permanently sol. N, and formol N increase, while apparent attenuation and coagulable N fall. Maltose production varies according as the p_H induced by the $CaSO_4$ is inside the optimum zone of amylolytic action at the temp. of mashing. $CaSO_4$ and $CaCl_2$ in boiled and unboiled worts give a lower p_H , higher attenuation, less buffering power, and more total N, formol N, and permanently sol. N than $MgSO_4$ and $MgCl_2$. Ca lactate lowers the p_H as much as $CaSO_4$. The fall in p_H on boiling the wort is greater for mash- H_2O untreated with $CaSO_4$. R. H. H.

Treatment of lactic cultures. SCHIRMANN (Z. Spiritusind., 1933, 56, 134).—*B. Delbruckii* in the soured mash is killed by heating at 65° for 15 min. Further souring is due to bacterial cells which have penetrated the wooden sides of the vat and escaped the heating. R. H. H.

[Treatment of lactic cultures.] LÜHDER (Z. Spiritusind., 1933, 56, 134).—The optimum temp. of *B. Delbruckii* lies between 41° and 47°, but the souring of

the mash should be carried out at 58–60° to inhibit the growth of AcOH and PrCO₂H bacteria. R. H. H.

[Beer-filtration technique. K. KRETSCHMER (Woch. Brau., 1933, 50, 194–196).—The so-called EK-filter effects degermination and filtration of the beer at the same time, but many factors, *e.g.*, nature of the pulp, adsorbing surface area of the filter-cake, pressure of filtration, and the type, composition, and biological condition of the unfiltered beer, necessitate careful biological control. Two examples of the type of control necessary are given. R. H. H.

Metals used in brewing.—See X.

PATENTS.

Production of acids by fermentation of cellulosic material. L. M. CHRISTENSEN and W. N. McCUTCHAN, AssTs. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,875,368, 6.9.32. Appl., 14.6.30).—Corn-cob residue, from which xylose has been prepared, is fermented by thermophilic bacteria, and the *pH* regulated by alternate additions of NH₃ and soda ash, whereby higher yields of volatile acids (AcOH, BuOH) are obtained. R. H. H.

[Producing EtOH and] propionic acid [by] fermentation. J. C. WOODRUFF and P. W. WILSON, AssTs. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,875,401, 6.9.32. Appl., 2.8.28).—The acid produced in a carbohydrate mash containing propionic acid bacteria is neutralised, and after the peak of fermentation is passed partial sterilisation is effected and yeast introduced. The EtOH thus produced from residual carbohydrate can be separated from the EtCO₂H salts by distillation. The process reduces the time of fermentation. R. H. H.

Continuous butyl alcohol fermentation process. M. C. WHEELER and C. D. GOODALE, AssTs. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,875,536, 6.9.32. Appl., 9.4.32. Can., 22.1.29).—Continuous fermentation processes for BuOH have failed since the organism used passes into an inactive spore state. To prevent this, portions of a sterile mash are pumped through a series of fermenters at such a rate that the fermenting mash in the first fermenter is displaced within a period included in the normal logarithmic growth period of the bacteria. R. H. H.

Distillation of fermentation glycerin. J. W. LAWRIE, AssT. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,881,718, 11.10.32. Appl., 11.11.27).—Atomisation of glycerin slop by hot gas or steam at 190–270°/760 mm. effects the separation of the fermentation solids and the glycerin, which latter is finally condensed. Improved yields are obtained by vaporising in absence of glycerin-decomposing catalysts, *e.g.*, O₂, CO₂, and silicates, and by use of a non-ferrous still. R. H. H.

[Fermentation] process of converting substantially uncracked petroleum, shale oil, or the like into an oily menstruum for making rubbery products. J. T. GIRON (B.P. 393,600, 5.12.31).—See U.S.P. 1,835,998; B., 1932, 911.

Clarification of liquids.—See I. Abs. EtOH.—See III.

XIX.—FOODS.

Storage of rice. VI. Physical and biochemical studies of hulled rice stored in straw bags. VII. Influence of varying moisture content and germinating power on preservation of vitamin-B in hulled rice. VIII. Hulled rice stored airtight for 26 and 28 years. M. KONDŌ and T. OKAMURA (Ber. Ohara Inst. landw. Forsch., 1932, 5, 395–406, 407–412, 413–420).—VI. The germinative power, vol.-wt., wt. per 1000 grains, H₂O-absorbing power, and swelling capacity of stored grain decrease with time. Provided insect attack is avoided, changes in chemical composition were small in a period of 2.5 years. The relative vitamin-B contents during the first 4 years of storage were 100, 92, 82, 56, 23, respectively. The safe limit of storage of hulled rice in straw bags is 2 years.

VII. Conditions causing loss of germinating power in stored rice (*e.g.*, high temp. and moisture) also favour loss of vitamin-B. Airtight storage minimises losses.

VIII. Prolonged storage of sun-dried rice (11–13% H₂O) did not greatly affect its physical condition or chemical composition. Little or no peroxidase activity was retained, but the catalase activity and vitamin-B contents were relatively high. A. G. P.

Relationships between the temperature and moisture content of rice grain and the humidity of the surrounding air. M. KONDŌ and T. OKAMURA (Ber. Ohara Inst. landw. Forsch., 1932, 5, 375–394; cf. B., 1930, 345).—Increased humidity is associated with the increased H₂O content of grain, whether hulled or not, and whether stored in Zn containers or in straw bags. With grain of a definite H₂O content rising temp. (from 0°) results in decreased humidity in the surrounding air to a min. point, followed by a steady increase. The temp. corresponding to the min. val. increases with humidity. Differences in the moisture conditions of Zn containers and straw bags are established. A. G. P.

Starch value of barley chaff. G. FINGERLING (Landw. Versuchs-Stat., 1933, 116, 1–63).—The utilisable energy of barley chaff for pigs was 32.6% higher than for oxen. Little difference was observed in the starch vals. for the two animals. A. G. P.

Determination of milk solids by drying *in vacuo* on asbestos. H. HAWLEY (Analyst, 1933, 58, 333–335).—The milk is weighed into stoppered tubes half-filled with purified commercial asbestos fibre, and dehydrated over conc. H₂SO₄ at 2 mm. pressure for approx. 18 hr. Sweetened condensed milk requires approx. 42 hr. E. C. S.

Detection and determination of sucrose in milk by means of phloroglucinol. M. SHIMIZU and Y. IWASA (J. Agric. Chem. Soc. Japan, 1932, 8, 1280–1285).—Proteins are removed with sulphosalicylic acid (A) (20% solution); the filtrate is heated with HCl at 100° for 10 min., and after cooling EtOH-phloroglucinol (10%) solution is added. In presence of sucrose (I) a red colour and red ppt. are produced. The red ppt. is not produced by fructose and/or by glucose. 0.02% of (I) in milk or 0.001% in solution can be detected. For the determination 1 c.c. of milk-serum free from protein is diluted to contain 0.01–0.002 g.

of (I); 5 c.c. are treated with *A* and 0.75 c.c. of HCl. After hydrolysis 2 drops of phloroglucinol solution are added, the solution is diluted with 5 c.c. of EtOH, and the colour is compared with that of a standard. CH. ABS.

Iodised eggs. A. D'AMBROSIO (Giorn. Chim. Ind. Appl., 1933, 15, 231—233).—By giving hens special food containing I compounds etc., the I content of the egg has been raised in Germany and Hungary to 2500 and in Italy (hyper-iodised eggs) to $260,000 \times 10^{-6}$ g. Fellenberg's method for determining I results in loss of I, especially from egg-white (cf. A., 1930, 1314), and peptisation either with HCl under pressure or with pepsin, followed by treatment with nitrite to displace the I from the peptone, gives much higher results. T. H. P.

Composition of whites, yolks, and whole eggs broken out by commercial egg-breaking establishments. L. C. MITCHELL, S. ALFEND, and F. J. MCNALL (J. Assoc. Off. Agric. Chem., 1933, 16, 247—255).—The composition of 74 samples of whole eggs, whites, and yolks are tabulated, the vals. given being for total solids, fat, P_2O_5 , total N, and H_2O -sol. N. T. McL.

Gas storage of fruit. III. Lanes Prince Albert apples. F. KIDD and C. WEST (J. Pomology, 1933, 11, 149—170; cf. B., 1930, 300).—Optimum storage conditions include a temp. of 4° and an atm. containing 2.5% of O_2 and 5% of CO_2 . Experimental data indicate that increasing concns. of CO_2 retard the loss of carbohydrate (I) and EtOH-sol. material (II), and accelerate loss of acid (III) and the hydrolysis of sucrose (IV). Reduction of O_2 concn. does not appreciably affect (I), (III), or (IV), but retards (II). A. G. P.

Determination of inactive malic acid in fruits and fruit products. B. G. HARTMANN and F. HILLIG (J. Assoc. Off. Agric. Chem., 1933, 16, 277—284; cf. B., 1933, 41).—*r*-Malic acid is not present as a normal constituent of fruit. The process for its determination involves isolation of total malic acid (*l*- and *r*-modifications), determination of total malic acid by oxidation with alkaline $KMnO_4$, and determination of the *r*-acid by subtracting the *l*-acid figure obtained polarimetrically from the total malic acid. The process is largely empirical and the exact conditions prescribed must be observed. T. McL.

Food preserving and natural colour. M. LAW (Food, 1933, 2, 277—280).—The pigment of sterilised raspberry juice is changed to golden-brown by prolonged heating and by exposure to sunlight. Reduction by Zn or Al causes loss of colour; by Sn or $SnCl_2$, loss of colour and blueing; by Fe, formation of a black ppt. Salts of these metals (other than $SnCl_2$), zinnatine laquer, Cu, $CuSO_4$, Co acetate, and $MgSO_4$ have little effect in 21 days. Fermentation at room temp. has no effect in 2—3 days; after 21 days 30% of the pigment is destroyed; after 63 days, 75%. The pigment becomes yellower when the juice is acidified, bluish-red when neutralised, and black when made strongly alkaline. E. C. S.

Preservative action of benzoic acid. G. BIERMANN (Z. Fleisch-Milch-hyg., 1932, 43, 21—29, 41—45; Chem. Zentr., 1933, i, 689).— $NaOBz$ (I) ($>0.1\%$) does not affect the colour of blood; 0.25% lightens it. The original colour of old blood could not be reproduced.

The effect of temp. and of (I) on bacterial growth is discussed. A. A. E.

Analysis of lettuce ash. L. WENDT and J. A. WILKINSON (Proc. Iowa Acad. Sci., 1931, 38, 159—161).—Analytical data are recorded. I is <10 p.p.m.

CH. ABS.

Bromatological analysis. Vegetable condiments. A. CERIOTTI (Edic. soc. nac. farm., Buenos Aires, 1932, 23 pp.).—Vegetable condiments and spices are classified and described, and analytical data are given. CH. ABS.

Determination of calcium in mineral [feed] mixtures. V. W. MELOCHE, L. E. CLIFCORN, and W. B. GRIEM (J. Assoc. Off. Agric. Chem., 1933, 16, 240—245).—The determination of Ca in the presence of P, Mg, Fe, and Al by the usual methods gives inaccurate results. Increased accuracy may be obtained by pptg. the Ca in the cold with $H_2C_2O_4$ at p_H 2.5, gradually increasing the p_H to 3.35 by adding $(NH_4)_2C_2O_4$, and adjusting the p_H at the b.p. to 4.50 by $NaOAc$. The CaC_2O_4 is collected on a sintered glass crucible and titrated with $KMnO_4$. T. McL.

Furfuraldehyde in vegetable products.—See III. **Threads from cattle sinews.**—See V. **Rice plants.**—See XVI.

PATENTS.

Milk evaporator. W. H. TEETSOW (U.S.P. 1,878,651, 20.9.32. Appl., 26.10.31. Estonia, 7.11.30).—A vapour-compression evaporator having an inclined calandria is described. The compressor is an injector operated by live steam, although operation is effected under vac.

B. M. V.

Manufacture of soft cheese. F. M. FREDERIKSEN, Assr. to PABST CORP. (U.S.P. 1,879,162, 27.9.32. Appl., 17.6.31).—A cheese product is made by mixing fresh cheese, H_2O , a source of butter fat, an emulsifying agent, NaCl, and lactose. It is then pasteurised, a starter added, and the mixture homogenised and held at a suitable temp. until the required acidity has developed.

E. B. H.

Manufacture of beverages and beverage materials. CALIFORNIA FRUIT GROWERS' EXCHANGE, Asses. of J. W. STEVENS (B.P. 393,739, 27.4.32. U.S., 4.5.31).—To fruit juice of high natural acidity buffering material (natural or an alkali salt of a fruit acid) is added to give p_H 2.9—3.15. Colour and flavour of the beverage are improved and more of the acid fruit juice may be used without giving excessive acidity.

E. B. H.

Pectin preparation. H. G. LOESCH, Assr. to GEN. FOODS CORP. (U.S.P. 1,879,697, 27.9.32. Appl., 10.12.25).—A jellifying food product is described consisting of a pectin-acid mixture in sugar solution, in which the pectin is held in suspension by reason of the acid present. On dilution with H_2O and addition of a suitable amount of sugar and synthetic or natural fruit flavours, a palatable jelly is formed.

E. B. H.

Improving South American maté. E. ORNO-ORNFELDT and M. LOEW (U.S.P. 1,881,227, 4.10.32. Appl., 16.6.30. Ger., 19.12.28).—The leaves are treated with an aldehyde or ketone; e.g., they are heated at 100° with 1.5 pts. by wt. of 1% aq. MeCHO.

L. A. C.

Treatment of fruit to remove spray residues. J. N. SHARMA, Assr. to FOOD MACHINERY CORP. (U.S.P.

1,875,944, 6.9.32. Appl., 9.6.31).— PbHAsO_4 , especially if it had been applied in the presence of an oily base, is effectively removed by immersing the fruit for 30 sec. in 2% Na_2SiO_3 solution. E. B. H.

Obtainment of vitamin concentrates from fats. W. G. CHRISTIANSEN and E. MONESS, Assrs. to E. R. SQUIBB & SONS (U.S.P. 1,879,734, 27.9.32. Appl., 18.9.28).—The fat is dissolved in COMe_2 (I) and saponified with non-alcoholic NaOH, the soap formed being filtered off from the vitamin-containing solvent and re-extracted with fresh (I) if required; excess of O_2 is avoided throughout. E. L.

Purification of vitamin-A preparations. F. HOFFMANN-LA ROCHE & Co. A.-G. (B.P. 393,883, 5.1.33. Ger., 13.1.32).—The crude concentrate (e.g., unsaponifiable matter of fish-liver oils) is dissolved in a solvent miscible with H_2O (MeOH , COMe_2) and chilled to, e.g., -50° to -60° ; pptd. impurities are then filtered off and the filtrate is diluted with H_2O and chilled. The active ppt. is collected and further crops are obtained by re-diluting and re-chilling the successive filtrates. The final mother-liquors may be extracted with light petroleum. Access of O_2 is avoided, and a layer of solid CO_2 is conveniently used as a filtering medium. E. L.

Clarification of liquids.—See I. Cacao butter.—See XII. Autoxidisable materials.—See XX.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Sterilisation of sodium bicarbonate solution [for injections]. H. ESCHENBRENNER (Pharm. Zentr., 1933, 74, 396—397; cf. B., 1933, 604).—An 8% solution of NaHCO_3 is made in distilled H_2O through which CO_2 has been passed for 30 min. and it is then filtered through a Seitz E.K. apparatus having a glass funnel and a membrane filter. E. H. S.

Spiritus aetheris nitrosi. A. NEUMANN (Pharm. Ztg., 1933, 78, 682—684).—Methods for its prep. and analysis, and its characteristics, are reviewed.

E. H. S.

Determination of potassium iodide in unguentum kalii iodati, D.A.B. VI. K. SCHULZE (Apoth.-Ztg., 1932, 47, 1062; Chem., Zentr., 1933, i, 980).—1 g. is dissolved in CHCl_3 , 10 c.c. of H_2O are added, and the mixture is vigorously shaken with 10 c.c. of CHCl_3 and (twice) with 10 c.c. of H_2O . The aq. liquid is treated with dil. H_2SO_4 (20 c.c.), H_2O_2 solution (5 c.c.), and CHCl_3 (10 c.c.). After 30 min. the mixture is shaken, the CHCl_3 layer is run into an I flask, the aq. liquid is shaken twice with 10 c.c. of CHCl_3 , and the united CHCl_3 extracts, after addition of 20 c.c. of H_2O , are titrated with 0.1N- $\text{Na}_2\text{S}_2\text{O}_3$. In the absence of impurities or adulterations, the united liquids in the I flask are thoroughly shaken and titrated with AgNO_3 in presence of K_2CrO_4 . A. A. E.

Determination of morphine in opium and official preparations. Z. REKTOŘIK (Časopis českoslov. Lék., 1932, 12, 285—292; Chem. Zentr., 1933, i, 1175).—The opium or opium extract (3.3 g.) must be triturated with H_2O (15 c.c.) and CaO (0.35 g.) before agitation to ppt. the Ca compound. Complete separation of this after addition of NH_4Cl requires 3 hr. (extract and tincture) or 8 hr. (opium). A. A. E.

Analysis of cumin essence. S. SABETAY, L. PALFRAY, and (MLLE.) D. SONTAG (Ann. Chim. Analyt., 1933, [ii], 15, 251—253).—Cuminaldehyde (I) is responsible for the odour of cumin essence and is determined by heating 2 g. of sample with 25 c.c. of 0.5N-KOH in benzyl alcohol for 2 hr., and back-titrating with 0.5N- H_2SO_4 (to phenolphthalein). After deduction of any blank, 1 c.c. of KOH is equiv. to 1 mol. of (I) (Cannizzaro reaction, cf. A., 1932, 867). The error is 1—2% for aromatic aldehydes, but the method is not quant. for others. J. G.

Some Brazilian essential oils. F. W. FREISE (Perf. & Essent. Oil Rec., 1933, 24, 202—204).—Wood from *Agonandra brasiliensis*, Miers, gave 3—3.8% of oil (85—88% boiling at 255°) with a sandalwood odour; it had d^{25} 0.958—0.972, n^{25} 1.485—1.555, and was sol. in 7 pts. of 70% EtOH. The stems of *Aniba canelilla*, Mez., gave 1.8—2.4% of oil ("Sandal Brasileiro") having d^{25} 0.966—0.982, n^{25} 1.572, and sol. in 3 pts. of 90% EtOH. From the roots, stems, and bark of *Aptandra spruceana*, Miers, 0.80—1.5% of oil was obtained. It is stated to have superior medicinal properties to sandalwood oil and has d^{25} 0.988—0.995, n^{25} 1.485—1.558, α^{20} $-4^\circ 30'$ to $-1^\circ 0'$, solubility in 70% EtOH 1 in 4 pts. The exterior parts of the trunk of *Calophyllum brasiliense*, Camb. ("Guanandy"), gave 1.5—2.25% of oil having b.p. 285° , d^{25} 0.925—0.955, n^{25} 1.485—1.510, which was completely sol. in 4 pts. of 70% EtOH. It is used as a sandalwood oil substitute. From the dry wood chips of *Caryocar glabrum*, Pers., 1.5—1.8% of oil was obtained, having d^{25} 1.015—1.112, n^{25} 1.585—1.622, and a strong odour of sandalwood oil. The flowers of *Guara spiciflora*, Juss., gave 0.03—0.035% of oil having d^{25} 0.968—0.975, n^{25} 1.498—1.507, α^{25} $-12^\circ 45'$ to -20° , solubility in 70% EtOH 4.5 pts. Steam-distillation of the white latex of *Guara trichiloides*, L., gave 2.00—2.85% of oil ("Oleo de Sandalo") having d^{25} 0.945—0.965, n^{25} 1.485, solubility in 70% EtOH 11 pts. The bark of *Hippocratea volubilis*, L., yielded 0.45—1.25% of oil having d^{25} 0.910—0.945, n^{25} 1.385—1.525, and sol. in 6 pts. of 70% EtOH. It has quicker, stronger, and more drastic effects than the genuine sandalwood oil. *Lecointea amazonica*, Ducke, yields in its younger roots 1.80—2.50% of oil having d^{25} 0.962—0.978, n^{25} 1.486—1.522, α^{20} -4° to $-11^\circ 30'$, solubility in 70% EtOH 1 in 3—5 pts. These properties are very similar to those of sandalwood oil. The bark of the young branches of *Minquartia guyanensis*, Aubl., gave 0.60—0.85% of oil having d^{25} 0.965—0.980, n^{25} 1.448—1.528, α^{25} $-5^\circ 30'$ to -1° , solubility in 70% EtOH 6—8 pts. *Ocotea Costulata*, Nees, yields 2.16—3.88% of oil having d^{25} 0.9388—0.9994, n^{25} 1.505—1.509, α $-4^\circ 30'$ to $-0^\circ 45'$, solubility in 80% EtOH 0.8—2.2 pts. E. H. S.

Tobacco.—See XVI.

PATENTS.

Vanishing cream. F. A. VAUPOTIC, Assr. to COMMERCIAL SOLVENTS CORP. (U.S.P. 1,875,530, 6.9.32. Appl., 4.12.29).—Alkyl (particularly Bu) esters of higher fatty acids are incorporated with stearic acid, soap, perfume, and H_2O . E. H. S.

Synthesising and transmuting antirachitic substances and the like. A. J. PACINI, Assr. to SUN-ASURED, INC. (U.S.P. 1,880,978, 4.10.32. Appl., 17.2.28).—Lipoid substances such as yeasts, moulds, etc. mixed with org. solvent and a photocatalyst, *e.g.*, U salts, pyrolusite, AcOH, are refluxed for 1—3 hr. Removal of the solvent from the extract leaves a material having high vitamin-*D* activity. E. H. S.

Obtaining a substance which reduces hyperglycaemia. M. MIZUTANI (B.P. 393,635, 31.8.31).—Yeast is treated with picric acid and the mixture is extracted with $\geq 60\%$ EtOH. The extract, on addition of EtOH of concn. $> 70\%$, yields a ppt. from which the active material is recovered in the usual manner. E. H. S.

Protection of autoxidisable materials. F. W. NITARDY, Assr. to E. R. SQUIBB & SONS (U.S.P. 1,879,762, 27.9.32. Appl., 12.2.31).—Tablets containing easily oxidisable materials, *e.g.*, vitamins, are coated with a concentrate containing an antioxidant, *e.g.*, quinol, and the whole is surrounded with an impervious envelope of gelatin or the like. E. H. S.

Cigarette. E. W. DESPER (U.S.P. 1,879,128, 27.9.32. Appl., 16.10.29).—The cigarette paper is treated with a solution of a tungstate, sulphate, borate, and phosphate with the object of forming a non-inflammable porous tube from the ash during smoking. B. M. V.

Shaped articles from polyvinyl alcohols.—See XIII. Vitamin preps.—See XIX.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Decomposition products of X-ray films. G. BALLARD (Radiology, 1933, 20, 18—31).—When the film is burned in a deficiency of air, $> 0.3\%$ HCN is generally formed; it arises both from the gelatin and from the base. Gelatin depresses film combustion. CH. ABS.

PATENTS.

Sensitising silver halide emulsions. I. G. FARBENIND. A.-G. (B.P. 388,898, 11.1.32. Ger., 10.1.31).—*iso*Cyanines containing a naphthothiazole or naphthoxazole nucleus, *e.g.*, the *iso*cyanines from 2-methyl- α -naphthothiazole ethiodide and quinoline ethiodide, or from 2-methyl- α -naphthoxazole methiodide and 6-methylquinoline ethiodide, sensitise emulsions to the blue-green, green, and yellow-green. C. H.

Ultra-violet sensitive layer. S. E. SHEPPARD and H. J. DIETZ, Assrs. to EASTMAN KODAK Co. (U.S.P. 1,880,503, 4.10.32. Appl., 12.5.31).—For actinometric paper sensitive primarily to ultra-violet light, an emulsion of $Tl_2(C_2O_4)_3$ in a colloid (gelatin, gum arabic, etc.) is used. J. L.

Ultra-violet-sensitive photographic element. R. E. BURROUGHS, Assr. to EASTMAN KODAK Co. (U.S.P. 1,880,411, 4.10.32. Appl., 6.5.31).—For sensitising plates to the extreme ultra-violet, up to and beyond 60μ ($60 \text{ m}\mu$?), a thin layer of Et dihydrocollidine-dicarboxylate is applied in solution in EtOAc. J. L.

[Manufacture of] light-sensitive films [for multi-colour pictures]. KALLE & Co. A.-G. (B.P. 390,616,

26.2.32. Ger., 28.2.31).—A transparent film of regenerated cellulose, cellulose ester, or the like is sensitised in the mass, *e.g.*, with a sensitive diazo compound and a coupling component, and then coated on one or both sides with a Ag halide emulsion. The external coatings are in turn printed under the corresponding part negatives, developed, bleached, and dyed. The third part picture is then printed on the internal film through the blue picture and developed with NH_3 . Preferably a nonactinic layer is arranged between the internal film and the external emulsions. C. H.

Projection screen. A. C. PAYNE and D. F. NEWMAN, Assrs. to TRANS-LUX DAYLIGHT PICTURE SCREEN CORP. (U.S.P. 1,881,128, 4.10.32. Appl., 28.11.25. Renewed 24.5.30).—A translucent screen comprises a fabric contained in a composition of glue, NaF, glycerin, casein, borax, $CuSO_4$, Co-blue, and H_2O . Adaptability to climate, non-stickiness, and permanence are claimed. J. L.

Colour photography. A. WECKFORT (B.P. 393,797, 13.8.32. Ger., 14.8.31).—In colour processes employing multicolour screens, the emulsion is selectively sensitised under the individual colour elements, which are printed on in a greasy ink after each corresponding sensitisation, in the order blue, green, red. If yellow elements are used, the emulsion beneath is sensitised to green. J. L.

Erratum.—On p. 572, col. 2, line 14 from bottom, for $\geq 50\%$ read $> 50\%$.

XXII.—EXPLOSIVES; MATCHES.

PATENTS.

Explosive composition. R. H. STRATTON, Assr. to ATLAS POWDER Co. (U.S.P. 1,880,116, 27.9.32. Appl., 27.2.31).—Almond-hull pulp is used as combustible ingredient as well as absorbent in explosives of the dynamite type. B. M. V.

Explosive primer compositions. G. H. CHAMBERS (B.P. 393,449, 9.9.32. U.S., 23.9.31).—Finely-powdered Zr improves ignition. A suitable composition contains Zr 10, Hg fulminate 35, $Ba(NO_3)_2$ 40, and Sb_2S_3 15%. W. J. W.

Delay powder. G. C. HALE (U.S.P. 1,877,127, 13.9.32. Appl., 11.1.32).—The composition comprises a metallic chromate ($PbCrO_4$), a metallic (Pb) oxide, a metal (Si, Al) that reacts with O_2 to form a solid, and linseed oil as a binding agent. W. J. W.

[Paper-like] fuse composition. J. PARSONS and J. H. STOVER, Assrs. to PAN-ROSS LABORATORIES, INC. (U.S.P. 1,875,932, 6.9.32. Appl., 6.5.30).—A carbonaceous material (woodmeal), an oxidising agent (KNO_3), and a solution of nitrocellulose are incorporated together, the mixture being formed into sheet. W. J. W.

Gelatinous [low-freezing] explosive composition. L. O. BRYAN, Assr. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. 1,879,064, 27.9.32. Appl., 28.3.30).—A mixture of tetranitrodiglycerin (I) and ethylene glycol dinitrate (II) is dissolved in nitroglycerin (III), the final mixture containing, by wt., 15—40% of (I), 5—40% of (II), and 20—75% of (III). W. J. W.

Removing diphenylamine from nitrocellulose [smokeless] powder [for lacquers and artificial

leather]. R. B. MITCHELL, ASST. to ATHOL MANUFG. Co. (U.S.P. 1,876,726, 13.9.32. Appl., 19.9.30).—The powder is extracted with (a) an org. solvent for both nitrocellulose powder (I) and NHPh_2 (II), e.g., certain alcohols or ketones, diluted with a non-solvent for (I), e.g., a hydrocarbon, so that (I) merely swells and facilitates dissolution of (II); (b) a mixture of two org. liquids, one of which is a solvent for (I) and the other for (II), the solvent power of the former being controlled by adjusting the amount of the second solvent, if this does not dissolve (I), or by adding a diluent; or (c) a common solvent for both (I) and (II) in admixture with a solvent for (II) only in sufficient amount to control the solvent power of the common solvent for (I).

W. J. W.

Continuous mutual reaction of liquids.—See I. Nitrocellulose. Carbohydrate esters.—See V.

XXIII.—SANITATION; WATER PURIFICATION.

Prevention of industrial diseases of the skin. H. HALDIN-DAVIS (Chem. & Ind., 1933, 575—578).—A lecture.

Health hazards in the lacquer and finishing industries. V. E. YARSLEY (Synth. and Appl. Finishes, 1933, 3, 80—82, 127—128, 141, 172, 175; 4, 21—24).

Detection of poisonous gases. E. SMOLCZYK (Gasmaske, 1933, 5, 36—39).—A review. CH. ABS.

Hypochlorites as disinfectants. J. GIBSON (Chem. & Ind., 1933, 145—146; cf. B., 1933, 253).—The superiority of coal-tar disinfectants in the presence of org. matter is emphasised by the fact that under these conditions the germicidal vals. of hypochlorites, permanganates, and HgCl_2 actually show a reduction.

V. E. Y.

Chlorine absorption by sewage sludge. W. RUDOLFS (Water Works and Sewerage, 1933, 80, 69).—Rates of absorption of Cl_2 were measured. CH. ABS.

New chemical sewage-purification process. E. A. CAPPELEN-SMITH (Water Works and Sewerage, 1932, 79, 420—422).—Coagulation with $\text{Fe}_2(\text{SO}_4)_3$ and CaO forms a sludge which is filtered and incinerated; basic N compounds are removed by an exchange reaction using zeolite, which is regenerated with subsequent recovery of the NH_3 . The sludge ash is treated with H_2SO_4 to recover $\text{Fe}_2(\text{SO}_4)_3$.

CH. ABS.

Ferric coagulation of soft water. E. C. CRAIG and E. H. BEAN (Water Works and Sewerage, 1932, 79, 301—304).—The use of $\text{Fe}_2(\text{SO}_4)_3$ as coagulant is discussed.

CH. ABS.

Activated carbon in industrial water purification. A. S. BEHRMAN (Water Works and Sewerage, 1933, 80, 55—59).—The use of pressure filters for H_2O treated with coagulant is described.

CH. ABS.

Bleaching clay in water purification. G. D. NORCOM (Water Works and Sewerage, 1933, 80, 53—54).—Treatment of H_2O , contaminated with oily industrial waste, with bleaching clay removed taste and odour and assisted in flocculation with alum.

CH. ABS.

Oxidation of nitrogenous material and contaminated river water. B. H. PETERSON and J. HANN

(Proc. Iowa Acad. Sci., 1931, 38, 165).—Carbonaceous material is first oxidised; if sufficient dissolved O_2 remains, free NH_3 is converted into NO_2 , this being accompanied by a conversion of org. N into NH_3 . When nearly all the N is present as NO_2 , further oxidation to NO_3 occurs.

CH. ABS.

Making odour and taste determinations [in water]. J. R. BAYLIS (Water Works and Sewerage, 1932, 79, 425—426).—Odours are determined on a comparative scale by a method which avoids contamination of air containing the odour with other air.

CH. ABS.

Chlorine-tolerant bacteria in water supplies. D. B. CHARLTON (J. Amer. Water Works' Assoc., 1933, 25, 851—854).—Pure cultures were isolated from swimming-pool H_2O (I) (residual Cl_2 0.2 p.p.m.) and the resistance to Cl_2 was compared with *Escherichia coli*, using distilled H_2O as diluent. With residual Cl_2 0.2 p.p.m. the isolated cultures showed a much lower rate of destruction than *E. coli* and were not sterile after exposure for 30—60 min., but at 0.4 p.p.m. disinfection was obtained in a few min. When sterile (I) was used as a diluent 0.5 p.p.m. of Cl_2 was required to produce the same effect. The resistant organisms were mostly pigmented and fluorescent and of little sanitary significance, but to produce a relatively sterile (I) the residual Cl_2 should be 0.4—0.5 p.p.m.

C. J.

Dominick-Lauter medium compared with standard lactose broth for *B. coli* tests [of water supplies]. H. V. STEWART (J. Amer. Water Works' Assoc., 1933, 25, 855—858).—As the result of a no. of comparative trials the Dominick-Lauter medium (cf. B., 1929, 836) is claimed to be much superior to standard lactose broth with regard both to the time required and to the proportion of confirmed presumptives.

C. J.

Most probable numbers of *B. coli* in water analysis. J. K. HOSKINS (J. Amer. Water Works' Assoc., 1933, 25, 867—877).—Reference tables and a formula are given for the computation of the most probable *B. coli* index when the results obtained with the various dilutions or with duplicates are anomalous.

C. J.

Corrosion following water-purification processes. C. A. SMITH (J. Amer. Water Works' Assoc., 1933, 25, 818—821).—To prevent corrosion most waters should have p_{H} 7.5—8.5 and be just saturated with CaCO_3 . Soft waters should be slightly supersaturated with CaCO_3 so as to form a protective film on the metal.

C. J.

Activated C.—See II.

PATENT.

Sewage-disposal apparatus. A. WRIGHT (U.S.P. 1,876,123, 6.9.32. Appl., 28.2.28).— $\text{Ca}(\text{OH})_2$ pptd. sewage sludge is dried on a vac. filter and the cake removed as a ribbon by means of a longitudinal reinforcement of resilient wires. It is passed over a rotary cylindrical drying drum and the dried product is removed from the supporting strands by a comb and is subsequently calcined. The waste gases from the calcining furnace are used to heat the dryer and the resultant ash may be used again as a sewage precipitant.

C. J.

leather]. R. B. MITCHELL, Asst. to ATHOL MANUFG. Co. (U.S.P. 1,876,726, 13.9.32. Appl., 19.9.30).—The powder is extracted with (a) an org. solvent for both nitrocellulose powder (I) and NHPh_2 (II), e.g., certain alcohols or ketones, diluted with a non-solvent for (I), e.g., a hydrocarbon, so that (I) merely swells and facilitates dissolution of (II); (b) a mixture of two org. liquids, one of which is a solvent for (I) and the other for (II), the solvent power of the former being controlled by adjusting the amount of the second solvent, if this does not dissolve (I), or by adding a diluent; or (c) a common solvent for both (I) and (II) in admixture with a solvent for (II) only in sufficient amount to control the solvent power of the common solvent for (I).

W. J. W.

Continuous mutual reaction of liquids.—See I. Nitrocellulose. Carbohydrate esters.—See V.

XXIII.—SANITATION; WATER PURIFICATION.

Prevention of industrial diseases of the skin. H. HALDIN-DAVIS (Chem. & Ind., 1933, 575—578).—A lecture.

Health hazards in the lacquer and finishing industries. V. E. YARSLEY (Synth. and Appl. Finishes, 1933, 3, 80—82, 127—128, 141, 172, 175; 4, 21—24).

Detection of poisonous gases. E. SMOLCZYK (Gasmask, 1933, 5, 36—39).—A review. CH. ABS.

Hypochlorites as disinfectants. J. GIBSON (Chem. & Ind., 1933, 145—146; cf. B., 1933, 253).—The superiority of coal-tar disinfectants in the presence of org. matter is emphasised by the fact that under these conditions the germicidal vals. of hypochlorites, permanganates, and HgCl_2 actually show a reduction.

V. E. Y.

Chlorine absorption by sewage sludge. W. RUDOLFS (Water Works and Sewerage, 1933, 80, 69).—Rates of absorption of Cl_2 were measured. CH. ABS.

New chemical sewage-purification process. E. A. CAPPELEN-SMITH (Water Works and Sewerage, 1932, 79, 420—422).—Coagulation with $\text{Fe}_2(\text{SO}_4)_3$ and CaO forms a sludge which is filtered and incinerated; basic N compounds are removed by an exchange reaction using zeolite, which is regenerated with subsequent recovery of the NH_3 . The sludge ash is treated with H_2SO_4 to recover $\text{Fe}_2(\text{SO}_4)_3$. CH. ABS.

Ferric coagulation of soft water. E. C. CRAIG and E. H. BEAN (Water Works and Sewerage, 1932, 79, 301—304).—The use of $\text{Fe}_2(\text{SO}_4)_3$ as coagulant is discussed. CH. ABS.

Activated carbon in industrial water purification. A. S. BEHRMAN (Water Works and Sewerage, 1933, 80, 55—59).—The use of pressure filters for H_2O treated with coagulant is described. CH. ABS.

Bleaching clay in water purification. G. D. NORCOM (Water Works and Sewerage, 1933, 80, 53—54).—Treatment of H_2O , contaminated with oily industrial waste, with bleaching clay removed taste and odour and assisted in flocculation with alum. CH. ABS.

Oxidation of nitrogenous material and contaminated river water. B. H. PETERSON and J. HANN

(Proc. Iowa Acad. Sci., 1931, 38, 165).—Carbonaceous material is first oxidised; if sufficient dissolved O_2 remains, free NH_3 is converted into NO_2' , this being accompanied by a conversion of org. N into NH_3 . When nearly all the N is present as NO_2' further oxidation to NO_3' occurs. CH. ABS.

Making odour and taste determinations [in water]. J. R. BAYLIS (Water Works and Sewerage, 1932, 79, 425—426).—Odours are determined on a comparative scale by a method which avoids contamination of air containing the odour with other air.

CH. ABS.

Chlorine-tolerant bacteria in water supplies. D. B. CHARLTON (J. Amer. Water Works' Assoc., 1933, 25, 851—854).—Pure cultures were isolated from swimming-pool H_2O (I) (residual Cl_2 0.2 p.p.m.) and the resistance to Cl_2 was compared with *Escherichia coli*, using distilled H_2O as diluent. With residual Cl_2 0.2 p.p.m. the isolated cultures showed a much lower rate of destruction than *E. coli* and were not sterile after exposure for 30—60 min., but at 0.4 p.p.m. disinfection was obtained in a few min. When sterile (I) was used as a diluent 0.5 p.p.m. of Cl_2 was required to produce the same effect. The resistant organisms were mostly pigmented and fluorescent and of little sanitary significance, but to produce a relatively sterile (I) the residual Cl_2 should be 0.4—0.5 p.p.m. C. J.

Dominick-Lauter medium compared with standard lactose broth for *B. coli* tests [of water supplies]. H. V. STEWART (J. Amer. Water Works' Assoc., 1933, 25, 855—858).—As the result of a no. of comparative trials the Dominick-Lauter medium (cf. B., 1929, 836) is claimed to be much superior to standard lactose broth with regard both to the time required and to the proportion of confirmed presumptives. C. J.

Most probable numbers of *B. coli* in water analysis. J. K. HOSKINS (J. Amer. Water Works' Assoc., 1933, 25, 867—877).—Reference tables and a formula are given for the computation of the most probable *B. coli* index when the results obtained with the various dilutions or with duplicates are anomalous. C. J.

Corrosion following water-purification processes. C. A. SMITH (J. Amer. Water Works' Assoc., 1933, 25, 818—821).—To prevent corrosion most waters should have p_{H} 7.5—8.5 and be just saturated with CaCO_3 . Soft waters should be slightly supersaturated with CaCO_3 so as to form a protective film on the metal. C. J.

Activated C.—See II.

PATENT.

Sewage-disposal apparatus. A. WRIGHT (U.S.P. 1,876,123, 6.9.32. Appl., 28.2.28).— $\text{Ca}(\text{OH})_2$ pptd. sewage sludge is dried on a vac. filter and the cake removed as a ribbon by means of a longitudinal reinforcement of resilient wires. It is passed over a rotary cylindrical drying drum and the dried product is removed from the supporting strands by a comb and is subsequently calcined. The waste gases from the calcining furnace are used to heat the dryer and the resultant ash may be used again as a sewage precipitant. C. J.