BRITISH CHEMICAL ABSTRACTS

B.—APPLIED CHEMISTRY

FEB. 3 and 10, 1933.*

I.-GENERAL; PLANT; MACHINERY.

Recent developments in open-hearth furnace design. R. A. HACKING (J. Soc. Glass Tech., 1932, 16, 293-312 r).—Developments in capacity, roof and porthead design, H₂O-cooling devices, regenerative systems, automatic reversal and combustion control, and wasteheat boiler practice are described. J. A. S.

Measuring the temperature of flowing gases in furnace systems. A comparison between the ordinary thermocouple and suction pyrometers. M. PARKIN and F. WINKS (J. Soc. Glass Tech., 1932, 16, 315-326 T).-The simple thermocouple for measuring the temp. of a flowing gas may be subject to an error of $>100^{\circ}$ due to radiation to or from furnace walls which are at a lower or higher temp. than is the gas. This error is eliminated by the "suction pyrometer," which consists of a thermocouple placed centrally in a quartz tube through which the gases are sucked. The difference between the indications of the two types of instrument increases with the diam. of the thermocouple wire. The Schmidt pyrometer consists of a shielded couple together with a heating coil the current through which is adjusted until the temp. indicated by the couple is unaffected by sucking the gas through the thermocouple sheath. This instrument also gives reliable gas-temp. readings, but is slower, needs more skill in use, and is not so robust as the suction pyrometer. J. A. S.

Heat transmission in rotary kilns. I. W. GIL-BERT (Cement, 1932, 5, 417—425).—Calculations of the rate of heat transmission in kilns ranging from 100 to 400 ft. long have been made. Increase in kiln diam, increases the gas radiation and reduces the convection effect. The conception that the normal wet process must always be wasteful in fuel owing to the production of low-grade heat is misleading as the considerable proportion of heat which is radiated to the material from incandescent coal particles at flame temp. is apparently not taken into account. C. A. K.

Supersaturation control attains close crystal sizing. F. JEREMIASSEN and H. SVANOE (Chem. & Met. Eng., 1932, 39, 594—596).—The metastable field of a supersaturated solution, *i.e.*, the field in which crystallisation can take place only on a previously formed crystal or isomorphous substance, generally has a range of 1—3°, corresponding to 5—15 g. per litre. Fine crystals are not pptd. immediately after the supersaturation is increased above the metastable limit. The region of metastable supersaturation may be increased by the addition of foreign salts and org. substances, but when these cannot enter the crystal lattice they impede

the rate of crystallisation. Important factors in the design of controlled crystallising apparatus are : (1) the solution must not be supersaturated beyond its metastable limit, (2) a large total crystal surface is required and its efficient utilisation must be secured by exposing the crystals to fresh solution supersaturated to the max. degree, (3) crystals must be kept in const. motion, (4) to secure even crystal size, new crystals must be formed at the same rate as fully grown crystals are removed. The use of the Oslo crystalliser for the production of NaNO₃ is described. D. K. M.

Equipment for nitration and sulphonation. R. N. SHREVE (Ind. Eng. Chem., 1932, 24, 1344-1353).-Cast Fe is the material commonly used for both nitrators and sulphonators. They should be cast with the bottom down. Steel is better for "mixed acids." Cr steels are now used for dipping pots for nitrating cellulose. Great care is usually needed to ensure continuous stirring. For low-viscosity liquids the Hough type of nitrator with an outside impellor in a special circulation tube is the best. Some modern nitrators have heating or cooling coils of steel or wrought-Fe tubes in the body to increase heat transfer. Another method (Dopp sulphonator) is to fit steel scraping blades working against the cooling surface. Top-discharge by air pressure or by displacement is safest. Continuous processes are not economical except for a few products required in large quantities, and the improvement of apparatus for batch-working has prevented much development of continuous methods. C.I.

Relationship between viscosity, elasticity, and plastic strength of soft materials, as illustrated by some mechanical properties of flour doughs. I. R. K. SCHOFIELD and G. W. S. BLAIR (Proc. Roy. Soc., 1932, A, 138, 707-718).—A formulation based on Maxwell's "time of relaxation" has been used in a quant. study of the viscous and elastic properties of flour doughs. The length of time of application of a stress in relation to the corresponding time of relaxation determines the relative amounts of elastic and plastic deformation. Flour doughs show an effect similar to the hardening of metals under working, as a result of which the time of relaxation and the viscosity for a given stress depend on the total deformation.

L. L. B.

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Coal-carbonising equipment.—See II. Circulating and heating system for sulphite pulp.—See V. Determining $PO_4^{\prime\prime\prime}$ [in H_2O].—See VII. Melting of glass.—See VIII. Plastics as engineering materials.—See XIII. Vac. filtration etc. of sugar juice. Refining of sugar.—See XVII.

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

PATENTS.

Shaft furnaces for reduction and/or melting. Soc. OXYTHERMIQUE, Assees. of M. FRANKL (B.P. 383,417, 16.11.31. Ger., 18.11.30).—The furnace is formed with a sudden enlargement at the fusion zone and the tuyères extend well into the shaft, so that the max. heat is produced up the centre and the walls of the enlarged zone are protected by a layer of unfused charge. To confine the high temp. to the fusion zone inert gases are injected at the top of the enlargement. B. M. V.

Muffle furnaces. GIBBONS BROS., LTD., and T. E. BRIDGFORD (B.P. 383,949, 27.9.32).—Hollow heating elements for carrying combustion gases across the muffle are themselves provided with hollow walls through which the atm. of the muffle can circulate; methods of construction of these walls are described, the inner surface being of SiC and the outer of nonoxidising refractory material. B. M. V.

Conveying apparatus [for heat-treating furnaces]. F. W. BROOKE and W. H. COSGROVE, ASSTS. to SWINDELL-DRESSLER CORP. (U.S.P. 1,850,617, 22.3.32. Appl., 17.6.30).—Rolls for conveying sheets etc. through such furnaces are built up of short pieces of flanged pipe on which are clamped additional annular discs of equal diam. to the flanges. The form of construction facilitates casting in Ni-Cr or other difficult alloy; the passage of cooling medium through the hollow shaft is not mentioned. B. M. V.

Heat exchanger. C. R. WAGNER, ASST. to GYRO PROCESS CO. (U.S.P. 1,850,429, 22.3.32. Appl., 29.1.29). —In an oil-cracking system, instantaneous cooling is effected in a device similar to a spray condenser, the cooling medium being fresh or cooled oil. From the condenser both the vapour and liquid are led by separate pipes to the rectifier, the liquid being passed through a filter to remove C, if desired. B. M. V.

Rotary tubular heat-exchanging apparatus. H. SIMMON (B.P. 383,740, 12.11.31).—In an apparatus as described in B.P. 380,992 (B., 1932, 1107), the tubes are arranged in co-axial zones, and if the preferred countercurrent flow of cooling liquid is unsuitable owing to deposition of dew the flow may be partly con- and partly counter-current. B. M. V.

Alcoholic solutions used for engine-cooling systems and for like closed circulating systems. CARBIDE & CARBON CHEMICALS CORP., Assees. of H. L. Cox (B.P. 384,089, 9.12.31. U.S., 6.1.31).— \Rightarrow 3% of lard oil or a mixture of it with a mineral oil, with the addition, if desired, of triethanolamine as emulsifying agent, is added to mixtures of H₂O and glycol or glycerin. L. A. C.

Machines for grinding paints, inks, and the like. L. G. HOLMES (B.P. 383,948, 9.9.32).—The grinding roll is vertical and is provided with two or more pockets for supplying the material to the roll and a corresponding no. of grinding blocks. B. M. V.

Centrifugal purifying machine for paper pulp and similar materials. G. GRAUSS (B.P. 383,134, 25.2.32. Fr., 13.6.31).—A centrifuge for the separation of both light and heavy impurities is provided with a fixed spiral conduit to give a preliminary circular motion to the feed. At the point where the pulp turns upwards from the inner feed cone to the bowl, fingers are provided to ensure that the pulp attains full speed and to disintegrate it. The width of the discharge passage for purified pulp is adjustable by raising and lowering an inner flange, and when stopped the bowl can be removed from the machine. B. M. V.

Drip basin for fluid separators. J. P. WALKER (U.S.P. 1,850,430, 22.3.32. Appl., 3.12.28).—In a device of the whirling type for separating liquids from gases, a drip basin is provided to catch liquid deposited on the later baffles and prevent it joining the incoming mixture. B. M. V.

Filter. F. W. YOUNG (U.S.P. 1,850,044, 15.3.32. Appl., 23.8.28).—In an apparatus in which filter cake is removed from a filter drum and passed through a drying chamber by means of a conveyor band which forms a reinforcement for the cake, the band is divided into panels which are pivotally attached to side chains so that on passing in a zigzag course in the dryer the sections of cake are not subjected to bending.

B. M. V. Dialyser frame. E. HEIBIG (U.S.P. 1,849,622, 15.3.32. Appl., 13.6.28. Holl., 12.11.27).—A lattice filling for a dialysing filter frame is described, producing zigzag flow with local eddying. B. M. V.

Filtration and sterilisation of liquids. G. LAK-HOVSKY (B.P. 384,547, 10.5.32. Fr., 4.6.31).—AgCl, as such or as $AgNO_3$ -NaCl mixture, is mixed with the paste to be used for the manufacture of biscuit-ware or porcelain filters so that, on firing, reduction to Ag is complete and the metal is deposited in the pores.

L. A. C. Still for substances of high b.p. METALLGES. A.-G., and W. GENSECKE (B.P. 383,570, 6.6.32).—Condensate which forms on the roof of the still is prevented from running back on to the boiling substance by means of an interior dome which is double, the space between the two ceilings becoming filled with inert gas and the dome thus serving as an insulator as well as a trap for liquid. B. M. V.

Vacuum regulator. W. C. SHIELD (U.S.P. 1,849,252, 15.3.32. Appl., 16.1.29).—The vac. produced by a jet condenser in, e.g., an evaporator is regulated by controlling the supply of cooling H_2O by means of changes of pressure on a diaphragm the lower surface of which is exposed to atm. pressure and the upper surface to the pressure in the evaporator + a column of H_2O of fixed length; the H_2O column is continuously and slowly replenished from an outside source, the overflow being drawn into the condenser, and its height is adjusted by valved by-passes at different heights. B. M. V.

Control for evaporating apparatus. E. M. BERGH (U.S.P. 1,849,267, 15.3.32. Appl., 29.1.30).—In an apparatus as described in U.S.P. 1,849,252 (preceding abstract) other means of adjustment for changes in atm. pressure and for desired changes in vac. are described. *E.g.*, the diaphragm regulator may be connected up by flexible pipes and raised and lowered as a whole, or the diaphragm may be acted on by an adjustable weighted lever as well as by the atm. B. M. V.

Measuring of materials requiring heat for mixing with heavier fractions and the like. W. L. PAYNTER, and FORTH ENGINE & MOTOR WORKS (NEW-CASTLE-UPON-TYNE), LTD. (B.P. 383,418, 17.11.31).— The apparatus is suitable for delivering molten bitumen in the form of spray upon other material cascaded in front of the sprays. It comprises a measuring chamber (A) above a pressure chamber (B), the molten bitumen flowing by gravity from A to B and being delivered from B to the sprays by hot compressed gases. B. M. V.

Pasteurising apparatus. BUAAS MEJERIMASKIN-FABRIKER AFDELING AF AKTIESELSKABET FREDERIKSBERG METALVAREFABRIK (B.P. 383,455, 17.12.31. Denm., 20.4.31).—A no. of thin conical elements are clamped together with collars at the apices and flanges at the bases by means of quickly operated screws so that the whole may be dissembled for cleaning. The liquid to be treated, *e.g.*, milk, and heating and cooling fluids are passed between the cones. B. M. V.

Apparatus for aërating liquids. BELL BROS. (MANCHESTER, 1927), LTD., and C. G. BENSON (B.P. 383,083, 7.12.31).—A vessel in which gas is bubbled into liquid is provided with a float-operated valve in an upward extension of the vessel, to discharge excess gas. B. M. V.

Means for diffusing gas into liquid. WALLACE & TIERNAN Co., INC., Assees. of W. J. ORCHARD (B.P. 383,896, 17.5.32. U.S., 27.5.31).—A diffuser of the porous-pot type is provided with an electrical heater on the gas side whereby the porous wall is heated to a temp. > that of the bulk of the liquid, the object being to prevent formation of solid obstructing compounds. Its use is illustrated in the direct application of Cl₂ gas to H₂O. B. M. V.

Treatment of flue gases, residual trade gases, and the like. LONDON POWER CO., LTD., and S. L. PEARCE (B.P. 383,309, 1.8.31. Addn. to B.P. 334,660; B., 1931, 788).—In the process described in the prior patent, the gases are provided with O_2 by the addition of air before or during treatment until the CO_2 content is reduced to at most 9% and the O_2 increased to at least 10%; alternatively the O_2 may be dissolved in the washing liquid up to a content of $\leq 60\%$ of saturation at room temp. Banks of oxidation catalysts may be provided. B. M. V.

Apparatus for wet separation of dust from gases. E. HAVEAUX (B.P. 382,962, 4.8.31).—The gases are caused to pass downwardly through a no. of inlet passages (A) which alternate with wider outlet passages (B) in which the gases pass upwardly and then horizontally to a common outlet. While changing direction from A to B the gases impinge on the surface of a pool of liquid spaced below the edges of the dividing walls by a distance about equal to the width of A. B. M. V.

Separating apparatus. D. D. PEEBLES (U.S.P. 1,850,333, 22.3.32. Appl., 12.10.29).—In a cyclone separator a pair of curved vanes are attached to a diametral baffle at the end of the outlet pipe, to collect a portion of the swirling gases. B. M. V.

Centrifugal separators. J. Howden & Co., Ltd., and W. H. Howden (B.P. 383,416, 16.11.31).-Dustladen gases are passed through a spiral casing forming the inlet passage to a centrifugal fan, the outer layer of conc. dust being skimmed off by sharp-edged apertures in the scroll wall, the sharp edges being inwards and the countersinks outwards. The dust passes into a settling chamber from which the air passes (through a cyclone separator if desired) to the eye of the same fan as the bulk of the air. B. M. V.

Filter mechanism. O. V. GREENE (U.S.P. 1,850,101, 22.3.32. Appl., 4.5.29).—A form of construction of dry filter panels for gases is described. B. M. V.

Manufacture of smoke filters or collective filters. N. I. HANSEN (B.P. 384,052, 6.11.31).—Fibrous fillers are mixed with powdered, or impregnated with solutions of, org. acids of the order $C_{20}H_{30}O_2$ and/or their salts or esters, or resins, gums, lacs, soaps, etc. having a high affinity for colloidal particles suspended in gases. L. A. C.

Dehydration of gases. HUMPHREYS & GLASGOW, LTD. From CONSOLIDATED GAS CO. (B.P. 384,190, 20.5.32).—A solution is used containing, e.g., 60 pts. of CaCl₂, 40 pts. of H₂O, and 25 pts. of glycerin to prevent freezing. L. A. C.

[Gas] pipette. C. B. FRANCIS (U.S.P. 1,850,499, 22.3.32. Appl., 13.7.26).—A pair of vessels are connected at their lower ends and are > half filled with absorption liquid. The gas sample is bubbled into one by means of a dip pipe (A) and a by-pass (B) to this pipe is provided with an automatic valve permitting gas to leave through B but forcing it to enter through A. B. M. V.

Prevention of fire hazards in operating upon and cleaning containers of inflammable liquids or gases. S. P. JOHNSON and P. S. WILLIAMS, Dedicated to the PEOPLE OF THE UNITED STATES (U.S.P. 1,849,932, 15.3.32. Appl., 25.7.28).—A current of inert, e.g., cooled combustion, gases is passed through the container which is simultaneously sprayed with a washing liquid, e.g., soapy H₂O. B. M. V.

Blast apparatus for [boiler] furnaces. J. GARVIE (B.P. 383,721, 20.10.31).

[Sheet-metal] heat-insulating panel for drying ovens and the like. W. DREISEL (B.P. 383,445, 8.8.31).

[Construction of hyperboloidal] water-cooling towers. L. G. MOUCHEL & PARTNERS, LTD., and M. E. GERARD (B.P. 383,306, 16.7.31).

Protecting devices in kneading and mixing machines. F. AESCHBACH A.-G. (B.P. 383,936, 3.8.32. Switz., 23.7.32).

Vaporisation of liquids.—See XI. Mixing rubber. —See XIV. Sterilising liquids.—See XXIII.

H.-FUEL; GAS; TAR; MINERAL OILS.

Report of further tests by the Director of Fuel Research on the Turner retort installed at the works of the Comac Oil Co., Ltd., Coalburn, Lanarkshire. ANON. (Dept. Sci. Ind. Res., Fuel Res. Bd., 1932, 35 pp.).—The retort is of the vertical, continuously working type, internally heated by means

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of low-pressure steam injected at the base. A vapouroutlet valve at the top of the retort is so designed as to remain closed until the steam entering the retort has raised the pressure therein to a desired max. (e.g., 4 lb./sq. in. above atm.), when it opens and releases the pressure, whereupon it again closes, the process being repeated about 6 times per min. The carbonising unit is a conical Fe casting about 7 ft. high, tapering upwards from 4 ft. to 3 ft. in diam., under which is a cast-Fe cylinder 7 ft. high by 4 ft. in diam. At the base of the retort is a screw extractor gear which takes the wt. of the charge and removes coke at a uniform rate. Two tests were carried out, in one of which the retort was operated under alternating pressure as above described, whilst in the other the pressure was maintained const. at 0.33 lb./sq. in. above atm. The coal used was "Auchlochan Trebles." No serious mechanical difficulties were encountered in the tests, but the operation of the retort was occasionally interrupted by holding up of the charge. The yields of tar, 20.7 and 22.6 gals./ton, respectively, represented 69.6 and $75 \cdot 4\%$ of the yield obtainable in the Gray-King assay; the difference is accounted for by the lower throughput in the second test $(7 \cdot 8 \text{ as compared with } 8 \cdot 3 \text{ tons/day})$. The cokes (yields 13.4 and 13.3 cwt./ton) formed satisfactory domestic fuels. The gas yields were 2170 and 2280 cu. ft., of 862 and 884 B.Th.U./cu. ft., respectively. 0.6 and 0.9 gal. of light spirit per ton of coal, respectively, were recovered by scrubbing the gas. The wt. balances were satisfactory. A. B. M.

Improvement of design of [high-temperature] coal-carbonising equipment. H. C. PORTER (Ind. Eng. Chem., 1932, 24, 1363—1368).—The design of the Becker coke oven is described and illustrated. There has been a slight increase in width recently from 14 to 18 in., especially in cases where a proportion of lowvolatile expanding coal is to be used. Vertical-chamber gas ovens with steaming have been widely installed (in the U.S.A.) and have a thermal balance as good as has a modern coke oven. Space- and gas-velocity data for different types of ovens are given. The use of 2 gas outlets per oven is of benefit in regard to the quality of by-products. C. I.

Action of pyridine bases on coal. L. MALANOWICZ (Chim. et Ind., 1932, 28, 1277–1282).—Increase in the % of H_2O in C_5H_5N from 0 to 10 causes a corresponding decrease of from $\frac{1}{3}$ to $\frac{1}{10}$ of the amount extracted according to the type of coal used, and at the same time an increase in the ratio of γ to β extract (Illingworth). The extraction of lignite by C_5H_5N is not so much affected by the presence of H_2O . The amount extracted by C_5H_5N at its b.p. is about 4 times that at 25°. Lutidine gives more extract than picoline, and the latter more than C_5H_5N , but this effect may be due to the higher b.p. There appears to be no relationship between the extractibility of the coal and its power to absorb C_5H_5N vapour, but the latter is large in those coals which swell most in contact with C_5H_5N liquid.

F. R. S.

Determination of nitrogen in coal and coke F. COUFALÍK (Mitt. Kohlenforsch.-Inst. Prag, 1932, 163-169; Chem. Zentr., 1932, ii, 1108).-Kjeldahl's and Whitaker's methods give low, and Dumas' method gives high, results; Lambris' (original or modified) and Hünerbein and Forster's methods are in accord.

A. A. E.

Hydrogenation of American coals. W. L. BEUSCH-LEIN and C. C. WRIGHT (Ind. Eng. Chem., 1932, 24, 1010—1012).—A no. of American coals were hydrogenated, using PhOH as a dispersion medium, and the products separated by extraction methods. A linear relationship was shown between the % conversion due to hydrogenation and the C content of the original coal. The ratios, fraction sol. in PhOH but not in CHCl₃: fraction sol. both in PhOH and in CHCl₃, determined on the original and the hydrogenated coals, indicated no definite relationship. H. E. B.

Preparing ash-free coke. N. Tz (Azerbaid. Neft. Choz., 1932, No. 3, 89—91).—The operation of Knowles' coking units is described. The retort bottom is at $1310-1320^{\circ}$ and the injected oil is heated to $700-710^{\circ}$. Yields were : cracked distillate 7.93, gas oil 55.02, gas 19.63, coke 16.72, loss 0.7%. CH. Abs.

Testing of coke by the dropping, drum, and pressure-rubbing methods. G. SPECKHARDT (Stahl u. Eisen, 1932, 52, 1066—1070).—Comparative tests on the friability of coke made by these three methods do not give results which can be correlated with one another. The third method gives the most concordant results in a series of tests with the same coke owing to the larger quantity required for the test. Previous breaking of the coke improves its quality only in so far as it eliminates large fissures and gives smaller pieces of greater strength owing to the absence of these fissures. Moisture has no effect on the results of any of the tests. A. R. P.

Automatic cut-off for calorimeters. W. MASTER-TON (Gas World, 1932, 47, 622).—A H₂O reservoir is connected by an S-shaped tube to a U-tube through which the gas passes. A wide tube passes out from the bottom of the reservoir and dips into an open cup having a small hole in the bottom and an overflow pipe higher up. The gas pressure supports the head of H₂O in the S-tube. When the H₂O supply fails the cup and wide tube empty and leave the H₂O in the reservoir unsupported; this discharges into the U-tube and cuts off the gas. A common tap is provided for closing the pipes going to the calorimeter and to the small hole in the cup. R. N. B.

Danger of exhaust gases of internal-combustion engines. H. GÖRLACHER (Gesundheitsing., 1932, 55, 301—304; Chem. Zentr., 1932, ii, 1038).—CO below a limiting concn. is not to be regarded as a toxic constituent, but the hydrocarbon vapours in the exhaust gases are particularly injurious. A. A. E.

Internal corrosion of gas-transmission lines. A. B. ALLYNE (Western Gas, 1932, 8, No. 8, 150).—At 300—400 lb. per sq. in. the effective corrosion conen. of the O_2 is 20—30 times that at normal pressure. The ordinary type of Orsat apparatus is unsuitable for the determination of small amounts of O_2 ; samples were collected in tanks made of Cu pipe and analysed in a Burrell apparatus using CrCl₂ solution as absorbent. The proportion of O_2 present should be $\Rightarrow 0.2\%$. O₂ entered the lines chiefly through leaks in vac.collected gathering systems. Сн. Авs.

Thermal decomposition of Bohemian brown coal producer tar. H. TROPSCH and B. G. ŠIMEK (Mitt. Kohlenforsch.-Inst. Prag, 1932, 89—110; Chem. Zentr., 1932, ii, 1105).—The products of cracking in an Fe tube at 600—900° have been analysed. The chief products are coke and gas; only a little light oil is formed. A. A. E.

Determination of asphaltic substances in brown coal producer tar. B. G. ŠIMEK (Mitt. Kohlenforsch.-Inst. Prag, 1932, 111—131; Chem. Zentr., 1932, ii, 1108).—The tar (2 g.) dissolved in C_6H_6 (10—15 pts.) is treated at about 50° with 50—75 pts. of "normal benzine" specially refined by means of the formolite reaction. The ppt. is collected on a glass filter, washed with normal benzine, and dried in vac. at 70°; it contains the asphalt and insol. substances. Extraction with COMe₂ leaves the latter; from the conc. solution CCl₄ ppts. the carbenes, and the goudrenes are determined by difference. A. A. E.

Cracking of cottonseed oil. G. EGLOFF and J. C. MORRELL (Ind. Eng. Chem., 1932, 24, 1426– 1427).—Cottonseed oil was cracked at 9.5 kg./sq. cm. over a temp. range of 445–485°, yielding coke, gas (163 litres/litre), and 71.1% of distillate (d 0.772, acid val. 33, sap. val. 40). Refined motor spirit (90% distilled < 188°) having d 0.761, C₈H₁₈ no. 55, and consisting of paraffins 37.1%, unsaturated hydrocarbons 27.1%, naphthenes 9.9%, aromatics 25.9%, and Diesel or gas oil were recovered from the pressure distillate. E. L.

Toxicity of benzine. H. Wolff (Farben-Ztg., 1932, 38, 320).—The aromatic hydrocarbons present are considered mainly responsible for the toxicity, but their removal is uneconomic and in any case would adversely affect the solvent power. Freshly distilled turpentine, as well as some of the newer solvents, *e.g.*, Dekalin, Hydroterpin, are relatively free from this drawback. S. S. W.

Chemical treatment of cracked gasolines. I. E. BESPOLOV (Azerbaid. Neft. Choz., 1932, No. 6, 111— 117).—Use of sludge acid containing $\ll 80\%$ H₂SO₄ is permissible provided that fresh H₂SO₄ is employed for final refining. The colour stability of gasolines refined in the vapour phase with clay depends on complete separation of polymerides from the distillate. Vapourphase refining with ZnCl₂ solutions yields an unstable product. CH. ABS.

Treating cracked gasolines with solid soda and anhydrous lime. G. SHUMOVSKI (Grozn. Neft., 1932, 2, No. 5-6, 59-61).—A stable gasoline with a negative doctor test, good Cu-strip test, and Stammer colour of about 1.3 was obtained after treatment with solid NaOH (consumption 0.012% with, 0.11% without, recovery). Treatment with CaO is unsatisfactory. CH. ABS.

Gum test for cracked gasolines. I. E. BESPOLOV and A. DEGTYAREVA (Azerbaid. Neft. Choz., 1932, No. 6, 118-121).—The Cu-dish method is unsatisfactory; evaporation in glass beakers by Littlejohn, Thomas, and Thompson's method is satisfactory. Voorhees and Eisinger's wethod for determining potential gum gives results not in accord with the stability of gasolines in storage. CH. Abs.

Improving the odour of unsaturated light oils. H. VON WINKLER (Chem.-Ztg., 1932, 56, 991—992).— The unpleasant odour and the tendency to resinify of Esthonian petrol, which is highly anti-knock, are removed if the ordinary methods of purification with alkali, acid, and Pb compounds are supplemented by treatment with MeCHO or CH_2O . T. H. P.

[Oil-]refining process with liquid sulphur dioxide. L. EDELEANU (J. Inst. Petroleum Tech., 1932, 18, 900—917).—The history of the Edeleanu process of refining kerosene oils, lubricating oils, etc. with liquid SO₂ is outlined. A. B. M.

Analysis of mineral lubricating oils by fractionation with acetone. M. NOTTAGE (J. Inst. Petroleum Tech., 1932, 18, 943-952).- A Burmese oil (A) (140grade) and a Pennsylvanian paraffin-base cylinder oil (B) have been subjected to repeated extraction with COMe, and the coeffs. of friction of the extracted and residual oils have been determined over the range 18-100° in atm. of air and N2. The reactive constituents, i.e., those more readily sol. in COMe2, amounted to 44-45% of the oils. The extracted oils were fairly good lubricants at room temp. but rapidly deteriorated when heated, the friction rising to a higher val. in air than in N₂, indicating the presence of both oxidisable and polymerisable constituents. By exhaustive extraction with COMe₂ a non-reactive group of constituents, the diluent, was left; this had a low solubility in COMe, (about 2.6 and 0.1 g./100 c.c., for the two oils, respectively) and possessed a coeff. of friction (0.200 and 0.139, respectively) which was independent of the temp, and of the atm. in which the oil was heated. The diluent was colourless for A and dark brown for B. The form of the friction curves for A and its extracts indicated that it contained a group of constituents which tended to promote association in the oil at low A. B. M. temp.

isoPropyl alcohol from refinery gases fractionated with activated charcoal. V. GERE, O. PIPIK, and E. MEZHEBOVSKAYA (Azerbaid. Neft. Choz., 1932, No. 7, 88–93).—Fractions contain EtOH, $Pr^{8}OH$, butadiene, and $C_{4}H_{8}$. CH. Abs.

Hydrogenation catalysts.—See VII. Utilising "Dum" palm.—See XII. Irrigation with gasworks' effluent. Oil sprays. Control of tastes and odours in H₂O [effluents].—See XXIII.

PATENTS.

Gas purification. C. W. GARRISON, Assr. to KOPPERS CO. (U.S.P. 1,850,388, 22.3.32. Appl., 23.1.29). —Fuel gas is purified from H_2S and other acid impurities by washing with aq. NaOPh obtained from the PhOH recovered by extraction of the waste liquor. The NaOPh is decomposed by the CO₂ in the gas with the formation of Na₂CO₃, and the liberated PhOH is volatilised and removed with the purified gas. The fouled solution is revivified by aëration. A. B. M.

Preparation of creosoting compositions. S. P. MILLER, Assr. to BARRETT Co. (U.S.P. 1,849, 198-9, 15.3.32. Appl., [A] 8.6.27, [B] 30.6.27).-(A) The hot

gases and vapours from the coke ovens or other coaldistillation plant are partly cooled in the collecting main (A), e.g., by sprays of gas liquor. Part of the gases and vapours flowing from A to the condensing system is by-passed and, while still hot, is cleaned by electrical pptn. of the tar fog etc. The cleaned gases and vapours are re-mixed with the part that is not cleaned and passed to the condensers, the relative proportions of the two parts being adjusted to give a condensate suitable for use as a creosoting composition. (B) Instead of by-passing part of the gases and vapours the whole may be passed through an electrical precipitator which is operated intermittently in such a manner as to give the required proportion of cleaned and uncleaned gases and vapours. A. B. M.

Reclamation of crank-case or used oils. L. J. IRELAND (U.S.P. 1,851,432, 29.3.32. Appl., 25.8.30).— Used oil and acidulated clay are introduced into a confined space, where the mixture is raised to a temp. sufficient to drive off the more volatile non-lubricating fractions without cracking, and agitated by the continuous passage of a stream of air at a predetermined pressure, thereby effecting complete mixing of the oil and clay and removal of all vapours. The mixture is then filtered hot under pressure. H. S. G.

Compound for treatment of [hydrocarbon] oils. H. H. MORETON, ASST. to O. B. ENGLISCH and C. F. CRAIG (U.S.P. 1,851,203, 29.3.32. Appl., 8.10.28).—C particles, gums, etc. are removed from used or contaminated lubricating oils by treatment with a compound comprising $CaSO_4$ (450 lb.), absorbent clay (450 lb.), and a mixture of 100 lb. of SiO_2 and 1 gal. of H_2SO_4 (100 lb.).

H. S. G.

Treatment of [spent filtering] earths [from oil refining]. H. J. HARTLEY, ASST. to NICHOLS ENGIN-EERING & RESEARCH CORP. (U.S.P. 1,851,627, 29.3.32. Appl., 16.4.29).—Spent fuller's earth, kieselguhr, or "filtrol" is treated with solvents to remove oils, mixed with H_2O to a thick slurry, and fed into the top hearth of a multiple-hearth furnace maintained at 250—800° so that the sudden evolution of steam produces a porous product which is freed from carbonaceous matter by oxidation in the lower hearths. A. R. P.

Apparatus for charging coke ovens. AMER. TAR PRODUCTS CO., INC., Assees. of E. O. RHODES, E. W. VOLKMANN, and J. C. FITZPATRICK (B.P. 384,746, 19.10.31. U.S., 17.10.30).

Conversion of petroleum oil. J. D. SEGUY, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,854,073, 12.4.32. Appl., 16.3.23. Renewed 15.4.29).

Cracking of petroleum hydrocarbons. A. D. DAVID, ASST. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,854,115, 12.4.32. Appl., 12.2.23).

Petroleum refining apparatus. F. A. and J. A. MILLIFF (U.S.P. 1,852,184, 5.4.32. Appl., 11.1.26. Renewed 27.12.28).

Crude oil distilling apparatus. J. J. WALTER (U.S.P. 1,854,086, 12.4.32, Appl., 5.4.29).

Continuous or intermittent vacuum distillation of mineral oils. M. GENSECKE (U.S.P. 1,852,205, 5.4.32. Appl., 24.2.28. Ger., 3.12.26). Apparatus for preheating oil from oil-cracking stills. D. S. JACOBUS, ASST. to BABCOCK & WILCOX Co. (U.S.P. 1,853,165, 12.4.32. Appl., 29.9.21. Renewed 10.3.31).

Treating [distilling and cracking] hydrocarbons. H. T. DARLINGTON, ASST. to M. B. SCHUSTER (U.S.P. 1,852,150, 5.4.32. Appl., 25.4.27).

Cracking of hydrocarbons. E. W. Isom, Assr. to SINCLAIR REFINING Co. (U.S.P. 1,854,937, 19.4.32. Appl., 12.4.29).

Treating [cracking of] hydrocarbons. H. J. HALLE, ASST. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,852,748, 5.4.32. Appl., 1.9.20. Renewed 25.10.28).

Production of lower-b.p. hydrocarbons. C. P. DUBES, ASST. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,853,965, 12.4.32. Appl., 13.1.27).

Topping and cracking of oils. G. W. GRAY (U.S.P. 1,854,836, 19.4.32. Appl., 14.5.29).

Liner for [oil-]cracking apparatus. J. C. BLACK, Assr. to GASOLINE PRODUCTS CO., INC. (U.S.P. 1,851,999, 5.4.32. Appl., 23.3.27).

Treating oil containing bottom settlings from oil wells. M. L. BOND, JUN. (U.S.P. 1,855,042, 19.4.32. Appl., 27.2.28).

Apparatus for cracking hydrocarbon oils. L. KIRSCHBRAUN, ASST. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,852,783, 5.4.32. Appl., 18.2.20. Renewed 21.10.26).

[Continuous] cracking of [hydrocarbon] oil. G. EGLOFF, ASST. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,854,464, 19.4.32. Appl., 23.12.25. Renewed 6.5.29).

Cracking of [hydrocarbon] oil. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,852,960, 5.4.32. Appl., 29.12.20. Renewed 21.11.27).

Cracking of hydrocarbon oils. G. EGLOFF, Assr. to UNIVERSAL OIL PRODUCTS CO. (U.S.P. 1,852,961, 5.4.32. Appl., 1.2.23. Renewed 13.5.29).

Treatment [cracking] of hydrocarbon oil. C. P. DUBBS, ASST. to UNIVERSAL OIL PRODUCTS Co. (U.S.P. 1,854,463, 19.4.32. Appl., 30.7.27).

Treating hydrocarbon oils [to recover gasoline or naphtha]. G. W. GRAY, Assr. to TEXAS Co. (U.S.P. 1,854,835, 19.4.32. Appl., 6.2.28).

Effecting combustion in internal-combustion engines of the liquid fuel injection compression ignition type. H. R. RICARDO (B.P. 384,340, 8.6.31).

Heat-exchanger. Mixing of materials with heavier fractions. Gas-treating apparatus. Dehydration of [fuel] gas. Preventing fire hazards.— See I. Waterproof paper.—See V.

III.—ORGANIC INTERMEDIATES.

Manufacture of formaldehyde by catalytic oxidation and dehydrogenation of methyl alcohol. I. G. NATTA (Giorn. Chim. Ind. Appl., 1932, 14, 545—551). II. G. NATTA and M. STRADA (*Ibid.*, 551—554).—I. Catalytic oxidation of MeOH to CH₂O by air gives yields considerably lower than the theoretical. By Nernst's approx. formula, the equilibrium consts. of the principal reactions possible in the production of CH₂O from MeOH are calc. and the factors determining the yield are discussed. The impossibility of obtaining CH₂O in economical yield by direct synthesis from CO and H₂, even under high pressure, is confirmed. The simple dehydrogenation of MeOH in absence of air, with recovery of the H, formed, is theoretically possible, with high yields, at temp. above 400°. Practical difficulties arise, however, and these are only partly eliminated by the use of high concns. of CO and CO2, which impede harmful secondary reactions. The process is a delicate one, as the conditions of equilibrium correspond with the almost complete decomp. of the CH₂O formed ; hence very short times of contact and definite catalysts in special physical states are proposed. A simple method of determining the ratio between CH2O formed and MeOH decomposed is based on analysis of the residual gases, small losses of MeOH as HCO2H and HCO2Me being neglected.

II. With a catalyst of either Cu silvered in a AgNO₃ bath or platinised Ag kept below about 450-500°, yields of about 90% are obtainable, even on an industrial scale, in the catalytic oxidation of MeOH to CH₂O by air. The production of CH₂O solely by dehydrogenation of MeOH, even when the H2 is recovered, is useless industrially owing to the low yields and to the short life of the catalyst; when, however, CO or CO₂ is present in high concn. yields of 80-90% are obtainable. If, in the latter case, the heat required by the endothermic dehydrogenation is supplied by that of the exothermic oxidation reactions effected by introduction of sufficient O_2 (10-20%), 94-96% yields may be obtained. The CO, formed as by-product in the manufacture of synthetic MeOH hence becomes utilisable. T. H. P.

Preparation of pure carbazole. E. KENNGOTT (Chem.-Ztg., 1932, 56, 969-970).-Crude (25-30%) carbazole is dissolved in 3 times its wt. of creosote heated to 130°, and cooled with slow agitation to 45°. The recryst. product is centrifuged and washed with solvent naphtha, when it is of 89-91% purity on the dry basis. It is then placed in a tar still with its own wt. of creosote, slowly heated to 200°, and additional creosote allowed to run in at the same speed as the distillate comes over; the still-head temp. should be 280-310°. The product of the cryst. distillate is 94.95% carbazole, and is white. This is treated with solvent naphtha, using a reflux condenser at 160°, and again crystallised to yield an anthracene-free product, m.p. 242-243°. It is dried in vacuo. C. I.

Determination of *m*- and *o*-cresols. C. E. SAGE and H. R. FLECK (Analyst, 1932, 57, 773; cf. B., 1932, 927).—The liquid is cooled to 50° before adding HCl to ppt. aldehyde resins. 25 c.c. of H_2O are then added before filtration. T. McL.

Nitration etc. equipment.—See I. Pr⁶OH from refinery gases.—See II. [EtOH from] wood-sugar production.—See XVII. COMe₂-BuOH by fermentation. Alcohols etc. from molasses.—See XVIII. Determination of citronellal.—See XX.

PATENTS.

Catalysts for use in the oxidation of methyl alcohol. W. J. TENNANT. From BAKELITE CORP. (B.P.

381,570, 2.7.31).—A mixed oxide catalyst comprising at least 40% of a Mo oxide is used, the other oxides being preferably those of V, Fe, La, Th, Nd, Zn, and/or Sn. C. H.

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Manufacture of hydroxyketones. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 381,686, 5.9.31).— In the condensation of CH_2O with aliphatic or alicyclic ketones, the neutral aq. or aq.-alcoholic mixture is heated at 50—200°, preferably 100—150°, in absence of condensing agents. Products from CH_2O and $COMe_2$, COMeEt, and cyclohexanone are described. C. H.

Manufacture of wetting, cleansing, and dispersing agents. J. Y. JOHNSON. From I. G. FARBENIND. A.-G. (B.P. 381,204, 25.6.31).—Urethanes above C_4 , having at least 1 double linking and/or OH and/or aryl group, are treated with sulphonating agents. Examples are urethanes, NHR· CO_2R' , in which R and R' are respectively: hydroxybutyl and octadecyl; β -hydroxyethyl and lauryl; Ph and octadecyl; β hydroxyethyl and oleyl; Bu^a and oleyl; H and oleyl; β -hydroxyethyl and Bu^a; β -hydroxy-*n*-propyl and Ph; also urethanes from CH₂Ph or *cyclohexyl* chloroformate and *N-cyclohexyl*- β -hydroxyethylamine. C. H.

Production of chlorocresols. I. G. FARBENIND. A.-G. (B.P. 381,728, 17.10.31. Ger., 29.10.30).—PhMe, or a chlorinated PhMe, is chlorinated and 1 Cl atom is exchanged for OH by means of alcoholic or aq.-alcoholic alkali under pressure at 130—140° for penta-, 160—170° for tetra-, 180—190° for tri-, or 200—210° for dichlorotoluene. C. H.

[Manufacture of] substituted naphthalene derivatives. IMPERIAL CHEM. INDUSTRIES, LTD., W. BRAD-LEY, and R. ROBINSON (B.P. 381,602, 10.7.31).—Cyanides (KCN) react with nitrosonaphthols or arylazonaphthols to give aminonaphthols probably containing a CN group. 1-Nitroso- β -naphthol with aq. KCN at 80—85° gives a product, m.p. 195—200° (decomp.). 1-Amino-4-cyano- β -naphthol, m.p. 235° (decomp.), is obtained from benzeneazo- β -naphthol, and 4-amino-2(or 3)-cyano- α naphthol from benzeneazo- α -naphthol. C. H.

Manufacture of 6-bromo-2-hydroxy-3-naphthoic acid. W. W. GROVES. From I. G. FARBENIND. A.-G. (B.P. 381,947, 14. and 27.7.31).—1:6-Dibromo-2hydroxy-3-naphthoic acid is reduced in alkaline medium (Na₂CO₃ or NaOH), *e.g.*, with glucose or Na₂SO₃. The yield is 86%. C. H.

Manufacture of indophenols of the naphthacarbazole series and of dyes derived therefrom. A. CARPMAEL. From I. G. FARBENIND. A.-G. (B.P. 381,265, 24.7.31).—Naphthacarbazoles are converted by benzoquinone chloroimide into indophenols; these, or their leuco-compounds, yield green-blue to green dyes on thionation. Suitable carbazoles are α -naphthacarbazole, m.p. 225° (leucoindophenol, m.p. 238—240°), its N-Et derivative, m.p. 149° (leucoindophenol, m.p. 208—210°), its 8-OMe derivative, m.p. 225 (leucoindophenol, m.p. 209—210°), and its 4-hydroxy-10-methyl derivative, m.p. 212—214°; β -naphthacarbazole-5-sulphonic acid; 1:2:6:7-dibenzocarbazole, m.p. 231° (leucoindophenol, m.p. 288—290°). C. H.

Synthetic tanning agents.—See XV. Disinfectants etc.—See XXIII.

IV.—DYESTUFFS.

PATENTS.

Manufacture of condensation products [direct cotton dyes] of the anthraquinone series. A. CARP-MAEL. From I. G. FARBENIND. A.-G. (B.P. 381,954, 3.7.31).—A 4-halogeno-1-aminoanthraquinone-2-sulphonic acid is condensed with a primary monoamine of the Ph₂ or hydrogenated Ph₂ series, e.g., 4-aminodiphenyl (green-blue), 2:4'-dichloro-4-aminodiphenyl, m.p. 83° (redder), 1-p-aminophenyl- Δ^1 -cyclohexene (green-blue), 1-amino-4-phenylcyclohexane (blue), monoacetylbenzidine (green-blue), 2-aminodicyclohexyl (blue), or monoacetyldianisidine (green). C. H.

Dyes from indophenols.—See III.

V.—FIBRES; TEXTILES; CELLULOSE; PAPER.

Determination of acids in wool, with particular reference to dyed goods. S. R. TROTMAN and G. N. GEE (J. Soc. Dyers and Col., 1932, 48, 321–325).— Correct results for residual acid in wool are given by the NH₃, NaHCO₃, MgCO₃, and terephthalic acid methods and by Woodmansey's method. The first two methods are tedious and require many washings, and NH₃ is advantageously replaced by triethanolamine. Good results are also obtained by steam-distillation with NaOAc, and by distilling for 15 min. in a Kjeldahl apparatus with suspended CaCO₃. AcOH, HCO₂H, and SO₂ can be determined by distillation. A. G.

Removal of lignin from spruce in concentrated sodium hydroxide solutions. L. S. MACKLIN and O. MAASS (Canad. J. Res., 1932, 7, 451-463).-When spruce chips are heated with 20-40% NaOH solution at 160° for 1-3 hr. (apparatus described) the amount of lignin found in solution increases (only slightly with the higher concns.) with time but decreases with rise in alkali concn.; the rate of dissolution of the lignin in the aq. NaOH varies as the inverse cube of the concn. The pulp still contains lignin which can be peptised in solutions of NaOH but not in H2O. It is suggested that lignin is a lyophilic colloid. In the above digestions it is first obtained in a "colloidally sol." form ; increase in the concn. of NaOH retards its dispersion, but causes a rise in the total delignification. Lignin cannot be dissolved until it is changed into a "dil. alkali-sol. form." H. B.

Hydrolysis of acetate silk. R. HALLER (Helv. Chim. Acta, 1932, 15, 1337—1341; cf. A., 1931, 828).— The course of hydrolysis of acetate silk by 0.5N-NaOH has been followed microscopically, Azo Blue being used to distinguish between the original material and regenerated cellulose. The process is thus seen to take place by layers. With the much more dil. alkali used in technical practice only the outermost layer is hydrolysed, and the dyeing properties of the resulting product are those of a mixture of cellulose and cellulose acetate.

F. L. U.

Chardonnet or nitro-silk. E. BERL (Chim. et Ind., 1932, 28, 1272—1276).—Historical. Nitro-silk can now be made in deniers of one and less; it is stronger than viscose and its strength is less affected by wetting. A. G. B & W-K-C [Babcock & Wilcox-Kimberly-Clark] circulating and indirect heating system for the sulphite pulping process. L. LANG (Paper Trade J., 1932, 95; T.A.P.P.I. Sect., 254-264).—A cooking system is described which employs forced circulation and external heating. The use of a chip distributor in filling the digesters has brought about many economies, owing to greater regularity and the consequent increased charge. Cooking is so uniform and duplicable that digesters can be blown to a time schedule. Greatly increased production together with very large savings in chemicals and steam are claimed. H. A. H.

Problem of classification of chemical pulps. C. C. HERITAGE (Paper Trade J., 1932, 95; T.A.P.P.I. Sect., 269—272).—A programme is outlined, which embraces the standardisation of pulp requirements as regards colour, bleachability, strength and wetness development, and dirt content, as well as a no. of other pulp properties. H. A. H.

Use of white-water in fine paper mills. A. JACKSON (Paper Trade J., 1932, 95; T.A.P.P.I. Sect., 272-274).—Several schemes which permit the max. amount of white-water to be re-utilised are described. NH₂Cl treatment of the fresh water is employed.

H. A. H.

White-water surveys in a fine paper mill. S. HELLBERG (Paper Trade J., 1932, 95; T.A.P.P.I. Sect., 274—276; cf. preceding abstract).—Difficulties encountered during the various papermaking processes, due largely to the increased acidity and temp. of the re-used water, are described. H. A. H.

Nitration equipment.—See I. Utilising "Dum" palm.—See XII. Sugar from wood.—See XVII.

PATENTS.

Treatment of silk fibroin for making aqueous solutions thereof. I. G. FARBENIND. A.-G. (B.P. 384,247, 2.8.32. Ger., 31.7.31).—Silk fibroin is treated at $< -60^{\circ}$ with liquid NH₃ containing a dissolved salt, *e.g.*, KCNS, KNO₃, Cu(NO₃)₂, etc., whereby a structureless, swollen mass of fibroin is obtained, easily separable from the ammoniacal liquor. Alternatively, the fibroin may be dissolved in liquid NH₃ at, *e.g.*, -76° , and subsequently pptd. by adding Mg(NO₃)₂,4H₂O.

D. J. N.

Manufacture of fibrous compositions containing resinous substances. RICHARDSON Co. (B.P. 383,636, 16.5.31. U.S., 16.7.30).—A synthetic, e.g., PhOH-CH₂O, resin in an incompletely stabilised condition is kneaded with an equal wt. of fibrous material (previously wetted to a H₂O content of about 50%) at $65 \cdot 5$ — $104 \cdot 5^{\circ}$ in, e.g., a Werner-Pfleiderer mixer and worked up as described in B.P. 341,542 (B., 1931, 389). D. J. N.

Production of material for conversion into cellulose derivatives. G. A. RICHTER, M. O. SCHUR, and R. H. RASCH, ASSTS. to BROWN CO. (U.S.P. 1,851,330, 29.3.32. Appl., 9.10.26).—Bleached wood fibre of high α -cellulose content (> 93%) is beaten, mercerised with 17.5% aq. NaOH, washed with AcOH and hot H₂O, dried, and nitrated or acetylated. B. P. R.

Production of cellulose pulp. R. W. RICHARDSON and C. S. SHERMAN, Assist to E. I. DU PONT DE NEMOURS

& Co. (U.S.P. 1,851,522, 29.3.32. Appl., 13.4.31).— Highly resinous woods (e.g., jack pine, pitch pine, etc.) are cooked with a liquor containing $(NH_4)HSO_3$, Ca(HSO₃)₂, and H₂SO₃, 5—20% of the combined SO₂ in the liquor being combined with NH₃. B. P. R.

Preparation of α -cellulose pulp by attrition. H. H. HANSON and S. E. SEAMAN, ASSTS. to EASTERN MANUFG. Co. (U.S.P. 1,851,008, 29.3.32. Appl., 28.4.27). —High- α -cellulose wood pulp is converted into a voluminous form particularly suitable for esterification or etherification by passing it (air-dry) through an attrition mill (described). Air is preferably circulated through the mill during the operation. D. J. N.

Production of cellulose from lignified material. R. S. HATCH, ASST. to LIGNO-CELLULOSE CORP. (U.S.P. 1,852,011, 5.4.32. Appl., 8.4.31).—Wood pulp is cooked in an acid bisulphite liquor, the liberated SO_2 from which is circulated continuously through the system by condensing the relief gases in a heat exchanger and returning the condensate to the digester. The SO_2 liberated from this condensate bubbles through the charge and promotes circulation of the liquor. B. P. R.

Production of sulphite cellulose. PATENTAKTIE-BOLAGET GRÖNDAL-RAMÉN (B.P. 384,455, 30.12.31. Swed., 9.1.31).—Wood chips are digested first with hot aq. NaHSO₃, some of the liquor is removed, and other liquor containing excess of SO₂ is added and the digestion completed. Forced circulation and indirect heating are employed. B. P. R.

Apparatus for making cellulose xanthate. J. H. BARTLETT, ASST. to J. C. HINKSON (U.S.P. 1,848,095, 8.3.32. Appl., 9.7.29).—A converter is described in which alkali-cellulose is successively shredded, xanthated, and dissolved in aq. NaOH. It consists essentially of a jacketed, rotatable vessel lined with monel metal and provided internally with toothed cutting knives. The apparatus is also suitable for the prep. of cuprammonium solutions of cellulose. D. J. N.

Purification of viscose. A. F. McConnell, Assr. to PERMUTIT Co. (U.S.P. 1,852,466, 5.4.32. Appl., 11.7.30).—Viscose solution is filtered through a pervious bed of glauconite (greensand) charged with Ca before being spun. B. P. R.

Manufacture of viscose silk. Soc. INDUSTR. DE Mov, and A. HERBECQ (B.P. 383,781, 5.1.32).—Dissolution of protein material (particularly chromed leather) in H_2SO_4 for use in viscose spinning baths is effected under controlled conditions so that the action of the acid is slow and is allowed to continue until H_2S is no longer evolved and degradation of the protein is complete (7 days or more). The prep. of a stock protein solution, and of a typical spinning bath containing it, is described. D. J. N.

Manufacture of artificial threads and fibres. DEUTS. BEKLEIDUNGSIND. G.M.B.H. (B.P. 384,440, 8.12.31. Ger., 10.2.31).—Rayon threads are spun into a coagulating bath containing a stabilised dispersion of kieselguhr, clay, or other insol. material and a substance (e.g., "3-oxymethylene-1: 2-sulphide") having adhesive properties. The threads so obtained are roughened, resemble wool, and are suitable for spinning as staple fibre. Alternatively, the finely-divided material is incorporated with the spinning liquid before it is extruded._____

B. P. R.

Manufacture of delustred rayon. VISCOSE CO. (B.P. 384,224, 29.6.32. U.S., 5.12.31).—The delustring agent used is a chlorinated Ph_2 (cf. B., 1931, 105), preferably one of the higher members of the series of $n \cdot 1.64 - 1.70$. Examples of suitable baths are given. The finished product should contain 4 - 30% of delustrant. D. J. N.

Papermaking. E. LIONNE (U.S.P. 1,847,773, 1.3.32-Appl., 28.9.28).—5—100% or more of a urea- CH_2O resin in jelly stage (prep. given) and preferably containing a material such as Indian gum to retard polymerisation is incorporated with paper pulp in a beater and the resulting paper is dried at room temp. and heavily calendered, preferably without heat. A strong parchment-like paper is obtained. The jelly resin in the paper may be rendered infusible by heat, but the resulting product shows reduced flexibility. D. J. N.

Paper manufacture. C. S. HAMM, Assr. to MEAD PAPERBOARD CORP. (U.S.P. 1,852,158, 5.4.32. Appl., 10.4.30).—Deciduous wood (e.g., chestnut) chips are leached for about 40—70 hr. in H_2O at 96—100°, washed by a countercurrent method, the tannic acid extract is recovered, and the chips are cooked with aq. Na_2SO_3 and aq. Na_2CO_3 , the proportions of which are varied according to the kind of wood and the conditions of leaching. Suitable apparatus is described. B. P. R.

Paper manufacture. A. E. MILLINGTON (U.S.P. 1,853,774, 12.4.32. Appl., 20.11.29).—Wood is chipped to a uniform size, screened, softened in a boiler, passed through tanks where it is converted into a suspension, then through a fibre separator, and finally through a reducing mill where it is reduced to fibres of substantially uniform length. Paper made from the product is exceptionally strong. B. P. R.

[Waterproof] paper manufacture. A. R. HARVEY, Assr. to GARDNER & HARVEY Co. (U.S.P. 1,851,176, 29.3.32. Appl., 13.6.30).—Apparatus is described for preparing an emulsion of bitumen in an aq. suspension of clay and applying this emulsion in predetermined controlled quantity as a layer between two plies of a composite board during its manufacture on a vat machine. D. J. N.

[Apparatus for] production of staple fibres. BRIT. CELANESE, LTD., and F. C. HALE (B.P. 384,335, 4.6.31).

Purifying paper pulp etc.—See I. Improved air for viscose workrooms.—See XXIII.

VI.—BLEACHING; DYEING; PRINTING; FINISHING.

Dyeing of wool without dyes. J. T. GROLL (Pharm. Weekblad, 1932, 69, 1132—1134).—Wool may be dyed by immersion first in 1% NaOH solution containing 1—5% of a phenol and then in dil. NaOCl; if the wool is thoroughly washed before drying, its physical characteristics are unaltered. The colours obtained when the procedure is applied to an albumin or gelatin solution are: PhOH, green; α -C₁₀H₇·OH, cherry-red; β -C₁₀H₇·OH

thymol, yellow-orange; resorcinol, brown. With wool, however, less sharply defined colours are produced. H. F. G.

Scouring of knitted woollen goods containing mineral oil. S. R. TROTMAN and H. HORNER (J. Soc. Dyers and Col., 1932, 48, 325–328).—Mineral oil is less easily removed from wool by scouring than is saponifiable oil. Its removal is aided by increasing the viscosity of the scouring liquor, and by a small (but not by a large) proportion of saponifiable oil. The best scouring assistant is Na silicate. \gg 96% of the total oil is ever removed. A. G.

Analysis of weighted silk. R. T. MEASE (Bur. Stand. J. Res., 1932, 9, 669–677).—A method is given for the rapid determination of silk in commerical products to an accuracy of 1%. Weighting and finishing products are extracted by treatment with hot H_2O , 2% aq. Na₂CO₃, and a solution containing 2% of HCl and 2% of HF. Qual. tests are given for detecting SiO₂, Pb, Al, Sn, Zn, and phosphate in the residue left on burning the material. D. R. D.

Determining acids in dyed wool. Hydrolysis of acetate silk.—See V.

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Dyeing of materials made from cellulose esters or ethers. A. G. BLOXAM. From Soc. CHEM. IND. IN BASLE (B.P. 381,943, 6.7.31).—The materials are dyed while in the stage of manufacture in which they are in swollen condition. Examples are: dyeings with basic azo and triarylmethane dyes, with the acid azo dye 4-aminoazobenzene-4'-sulphonic-acid \rightarrow benzoyl-J-acid, and by development on the fibre. C. H.

Hank dyeing machine. J. SCHLUMPF, Assee. of J. SCHLUMPF & FILS (B.P. 384,955, 12.8.32. Switz., 19.8.31).

Wetting etc. agents.—See III. Wood for dyeing etc. vats.—See IX. Radioactive healing media.— See XX.

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

Intensive working of the lead chamber [sulphuric acid] process by the Gaillard system. H. WOISIN (Chem.-Ztg., 1932, 56, 970-971).—The Gaillard system employs high cylindrical chambers with a "turbo-disperser" at the top fed with dil. H_2SO_4 . The intensification of the reaction up to 17 kg. of 80% H_2SO_4 per cu. m. is produced partly by the internal cooling of the chamber walls by the sprayed acid and partly as a direct result of the spraying. 21 plants are now working. It is not usually possible to produce the whole output at 80% concn., but for many purposes this is no detriment. The capital costs are 20% < with tower plants. C. I.

Determination of nitrite in pickling salt. G. STAMM (Deut. Nahrungsm. Rdsch., 1932, 90–91; Chem. Zentr., 1932, ii, 1093).—The salt (10 g.) in H_2O (100 c.c.) is placed in an I val. flask and titrated rapidly, shaking meanwhile, with KMnO₄ in presence of 10 c.c. of H_2SO_4 (1:9). In subsequent determinations the KMnO₄ is added before acidification, and the titration then

completed. NaCl interferes only when the solution is kept for 20-25 min. A. A. E.

Preparation of a standard solution of "chloride of lime" [for determining hardness of sulphite cellulose]. S. LURE (Bumazhnaya Prom., 1932, 11, No. 5, 57-58).

Reactivity between dolomite and superphosphate components. W. H. MACINTYRE and W. M. SHAW (Ind. Eng. Chem., 1932, 24, 1401-1409) .- It has been shown that dolomite when used as a filler for superphosphates has a better drying action than CaCO₃. Comparative tests of the reaction between CaCO₃ or dolomite and $CaH_4(PO_4)_2$ in aq. suspension showed that with $CaCO_3$ replacement of H was much more rapid and much more CO_2 was evolved. With dolomite many days are needed to obtain equilibrium. The reaction with dolomite consists probably of hydrolysis of $CaH_4(PO_4)_2$, followed by interaction of H_3PO_4 with dolomite, the process being repeated. Dolomites containing excess of Ca above the 1:1 ratio behave as mixtures of CaCO₃ and dolomite. Equilibrium in suspension is reached at the point MgHPO4 unless Mg is in great excess. Primary and secondary phosphates of Ca and Mg when mixed with dolomite in the moist state showed no loss in the air-dry wt. in 1 week. The large loss of CO₂ was balanced by increase in H₂O of hydration. There is no formation of $Ca_3(PO_4)_2$ such as occurs with mixtures with CaCO₃. The drying effect of dolomite is due to the formation of MgHPO₄,3H₂O. CI

Colorimeter for determination of phosphate. H. RICHTER (Chem.-Ztg., 1932, 56, 992).—The method employed by the Vereinigung der Grosskesselbesitzer (Berlin) to determine phosphate in softened feed- or boiler water consists in treating the H_2O with NaCl, H_2SO_4 -molybdic acid solution, and Sn foil, removing the foil, and comparing the blue coloration with those similarly obtained with known quantities of P_2O_5 . As the comparison solutions are unstable, the Ostwald-Energie Company has devised a colorimeter provided with a colour scale stable to light. T. H. P.

Hydrometallurgical acid treatment of carbonate ores. N. P. ASEEV, K. F. BELOGLAZOV, and N. S. GREIVER (Tzvet. Met., 1931, 570—581).—In the treatment of marble, calcite, or limestone with H_2SO_4 , the formation of films of CaSO₄ leads to a sharp min. in dissolution velocity at about 2% H_2SO_4 . The thickness of the affected layer of carbonate depends on the concn. of the solution, but for concns. employed in practice it does not depend on the size of the material to be treated. CH. ABS.

Ammonia leaching of cupriferous sandstones. N. P. ASEEV, K. F. BELOGLAZOV, and N. S. GREIVER (Tzvet. Met., 1931, 703–712).—Recovery of Cu (content $1\cdot 3-1\cdot 8\%$) was less with NH₃ than with H₂SO₄.

CH. ABS.

Preparation of molybdenum catalysts for hydrogenation purposes from molybdenite. H. W. SLOTBOOM (Petroleum, 1932, 28, No. 37, 8-9).—Dried American molybdenite $(52 \cdot 5\%)$ Mo) was fused at 900° with Na₂CO₃, the melt extracted with H₂O, heated to 90°, neutralised with H₂SO₄, and a definite excess of

 H_2SO_4 added. Sufficient active charcoal to decolorise the colloidal solution obtained was added, the mixture set aside for 24 hr., and the charcoal separated. The charcoal thus prepared contained 20.5% Mo and was only slightly inferior as a catalyst to that prepared from pure NH_4 molybdate. H. E. B.

Manufacture of industrial oxygen. G. CLAUDE (Compt. rend., 1932, 195, 919-922).—A summary of improvements in the separation of O_2 from the atm. adopted by Frankl at Oberhausen, with special reference to the author's previous work (cf. A., 1906, ii, 17). C. A. S.

Control of crystal size.—See I. Cyanide solutions [for Au ores].—See X. Titration of dichromates.—See XV. Determining nitrate-N. H₂O-sol. As in sprays.—See XVI. Protective filming of liquids.—See XXIII.

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Distillation of hydrogen halides. E. O. BARSTOW and S. B. HEATH, Assrs. to Dow CHEM. Co. (U.S.P. 1,853,330, 12.4.32. Appl., 13.7.29).—An aq. solution of a hydrohalide, e.g., HCl, is distributed in counterflow to a gaseous current at 300—325°, so as to maintain the emerging vapours at 40—110° and discharge a 20% acid solution. Part of the exit vapours may be reintroduced into the gaseous current. W. J. W.

Manufacture of sodium carbonate from salt residues left by evaporation of alkaline waters. A. C. HOUGHTON and J. G. MILLER (U.S.P. 1,853,275, 12.4.32. Appl., 28.12.29).—Natural brines, particularly those from Owens Lake, Calif., containing Na₂CO₃, NaCl, and Na₂SO₄, are stirred with excess of solid NaCl and Na₂CO₃, H₂O or Na₂CO₃, 10H₂O at 20° until equilibrium is attained, the Na₂SO₄ content being thereby reduced. After the excess salts have settled, the brine is decanted and cooled to cause crystallisation of Na₂CO₃, 10H₂O, which is separated from the motherliquor. The latter is evaporated to cause crystallisation of Na₂CO₃, H₂O, this being washed and heated to give soda ash of high purity. W. J. W.

Preservation of caustic materials [barium oxide and hydroxide]. W. R. JEAVONS and M. J. RENT-SCHLER (U.S.P. 1,851,844, 29.3.32. Appl., 6.5.29).— BaO or Ba(OH)₂ is mixed with 3—4 times its wt. of dry, finely-powdered fireclay for use in clay or other ceramic mixtures to prevent "scum" formation. A. R. P.

Rendering ammonium nitrate non-hygroscopic and non-deliquescent. L. E. D'A. CALLERY (B.P. 383,873, 20.4.32).—Anhyd. $NH_4(NO_3)_2$ is treated with NH_3 until the mass is liquefied and the product is dried by evaporation at $\gg 15^\circ$. H. R.-D.

Treatment of thiocyanogen compounds. C. J. HANSEN, ASST. to KOPPERS CO. (U.S.P. 1,853,679, 12.4.32. Appl., 9.8.28. Ger., 6.7.28).—NH₄CNS is decomposed by heating it in a closed vessel under pressure with H_2SO_4 and a thiosulphate, there being no action on the vessel. W. J. W.

Preparation in partially dehydrated form of metallic compounds normally containing water of crystallisation, [e.g., calcium chloride]. S. B. HEATH, Assr. to Dow CHEM. Co. (U.S.P. 1,851,309, 29.3.32. Appl., 2.3.29).—Aq. CaCl₂ is evaporated until the temp. rises to 177—186° and crystals of CaCl₂, H₂O separate; the slurry is then passed over rollers to cause the formation of flakes of the monohydrate, and these are dried in a current of cool dry air. A. R. P.

Production of double salts of calcium nitrate. LONZA ELEKTRIZITÄTSWERKE U. CHEM. FABR. A.-G. (B.P. 384,142, 26.2.32. Switz., 4.3.31. Addn. to B.P. 343,636; B., 1931, 489).—To produce double salts of the type $5Ca(NO_3)_2$, MNO_3 , $10H_2O$ (M = NH₄ or K), as in the prior patent, hot solutions containing 75—82% (preferably about 78%) of $Ca(NO_3)_2$ and having 5 mols. of $Ca(NO_3)_2$ per 1.5—2.5 mols. of NH₄NO₃ are crystallised by slow cooling, the crystals being separated from the still hot mother-liquor. F. Y.

Manufacture of pure aluminium oxide. Y. TATSUMI, T. IKEBE, and K. OKAZAKI, ASSTS. to MITSUI MINING CO. (U.S.P. 1,853,097, 12.4.32. Appl., 13.11.28. Jap., 16.11.27).—Siliceous aluminous materials are fused in an electric furnace with Fe- and C-containing materials and CaO, the impure Al₂O₃ produced being separated from the layer of ferrosilicon and treated with HCl to free it from CaO and carbides of Ca and Al. W. J. W.

Manufacture of titanic oxide for use as a pigment. K. LEUCHS (U.S.P. 1,853,626, 12.4.32. Appl., 20.11.26. Ger., 27.11.25).—Ti ores are treated with H_2SO_4 and dissolved in H_2O . Part of the solution is treated with a base to ppt. Ti hydroxide, and this is redissolved in the remainder of the solution so as to increase the proportions of TiO₂ and H_2SO_4 to 1:1 and reduce the Fe content, a concn. of 18% SO₄" being maintained. The solution is then heated to 100°, whereby 90% of the TiO₂ is pptd. free from Fe. W. J. W.

Preparation of titanium hydroxide. J. BLUMEN-FELD, ASST. to KREBS PIGMENT & COLOR CORP. (U.S.P. 1,851,487, 29.3.32. Appl., 15.5.30).—Ti $(SO_4)_2$ solutions containing > 400 g. of free and combined H₂SO₄ per litre are boiled with a separately prepared solution of colloidal Ti hydroxide. A. R. P.

Production of colloidal solutions of metal iodides. V. KLOPFER (B.P. 384,217, 20.6.32).—I is dissolved in oil and mixed with an oily solution of a fatty acid salt or resinate of a metal, whereupon the metal iodide is produced by substitution. Suitable media are, *e.g.*, olive or arachis oil and Cu oleate, Hg stearate, or Pb linoleate. F. Y.

Manufacture of sulphur dioxide. J. Y. JOHNSON, From I. G. FARBENIND. A.-G. (B.P. 384,449, 18.12.31).— Oleum is made to react with S at $80-150^{\circ}$ (preferably $100-115^{\circ}$); e.g., oleum preheated to 125° flows upwards over lumps of S contained in a tower provided with outlets for H_2SO_4 and SO_2 half-way up and near the top, respectively. L. A. C.

Coloured pigments.—See XIII. Fertilisers. Fungicide.—See XVI. Waste water containing sulphides.—See XXIII.

VIII.—GLASS; CERAMICS.

New method of melting glass and silicates. G. A. Zoros (J. Soc. Glass Tech., 1932, 16, 284-292 T).----Melting is carried out in a horizontal rotating cylinder

lined with brick and heated from one end by a flame directed along its axis. The cylinder is rotated fast enough to cause the charge to be spread uniformly over its (inner) surface, thereby greatly increasing the thermal efficiency (65% compared with 12—14% for the modern tank furnace) and producing a more uniform glass.

J. A. S.

Volatilisation and vapour tension at high temperatures of the sodium silicate-silica glasses. E. PRESTON and W. E. S. TURNER (J. Soc. Glass Tech., 1932, 16, 331-349 T).-The variation of the rate of volatilisation of a series of glasses (48.85-11.83% Na₂O, 51·15-88·17% SiO₂) with temp. and time has been studied. The ratios of the rate of volatilisation and the v.p. of the two extreme members of the series were found to be the same. If the loss by volatilisation be plotted against the Na₂O content for different periods of time, the curves will consist of two intersecting straight lines, indicating that the molten glass does not consist of Na₂O and SiO₂ (products of dissociation) but is composed of a mixture of Na₂O,SiO₂ and Na₂O,2SiO₂ when the Na₂O content is > 34% and a mixture of Na₂O,SiO₂ and SiO₂ for < 34% Na₂O. This hypothesis is confirmed by similar evidence derived from the temp. coeff. of volatilisation and the relationship $10^{5}/t \cdot \log[(A-2x)/A] = K$, t being the time, x the amount of Na₂O lost by volatilisation, and A the amount originally present. J. A. S.

Effect of age on the strength of commercial glassware. J. B. MURGATROYD (J. Soc. Glass Tech., 1932, 16, 350—355 T).—No change was found in the thermal endurance, bursting pressure, or impact strength of several groups of glassware after storage (a) in a warm dry atm., (b) in the open without cover, for periods up to 4 months from the date of manufacture. J. A. S.

New type of shatter-proof glass. M. NAPHTALI (Chem. & Met. Eng., 1932, 39, 601).—Sheets of glass cut to the required dimensions are heated to the desired temp. and cooled by properly adjusted air currents. The glass ("Sekurit") has a resistance, to compression, of > 70,000 lb.; to tension, of 2750—8250 lb.; and to bending, of 27,500—40,000 lb. per sq. in. When broken by violent impact the glass falls into small rounded pieces. D. K. M.

Fluxing of silica. The silica equilibrium diagrams. J. F. HYSLOP (J. Soc. Glass Tech., 1932, 16, 327-330 T).—According to their fluxing action on SiO₂ (indicated by the respective eutectic temp.) the basic oxides fall into the following groups in order of decreasing eutectic temp.: (a) MgO, Al₂O₃, CaO, ZnO, SrO, BaO, (b) FeO, MnO, PbO, (c) Li₂O, Na₂O, K₂O. With the alkaline-earth oxides it is found that the amount of RSiO₃ which can exist at the m.p. of SiO₂ without solid separating out is a linear function of the at. no. of R. In the system RO-Al₂O₃-SiO₂ low ternary eutectics are associated with low RO,Al₂O₃ eutectics. J. A. S.

Firebrick with increased alumina content. P. P. BUDNIKOV, A. O. BATT, A. A. GREBENIK, and W. J. ENDOVITZKIJ (Feuerfest, 1932, 8, 161–163).—Measurements of mechanical strength (hot and cold), refractoriness, after-contraction, porosity, thermal endurance. slag erosion, and composition and examination of structure were made on pressed brick manufactured on the semi-technical scale from various mixtures of Ukraine clay (Tschassov-Jar) and secondary kaolin from Wolnowacha. Full technical details are given for the manufacture of satisfactory 40% Al₂O₃ brick with a softening point of 1400° under a load of 28 lb./sq. in.

J. A. S.

Disintegration phenomena in blast-furnace bricks. F. HARTMANN (Stahl u. Eisen, 1932, 52, 1061-1066) .- Besides the purely physical causes for the destruction or deterioration of the brick linings of blast furnaces (e.g., by friction with large angular pieces of ore, coke, or flux, by uneven expansion, and by sintering), failure may occur by chemical reaction with the constituents of the charge. The chief cause of failure is the deposition of C in the pores of the brick by thermal decomp. of CO into CO₂ and C; this action is catalysed by the presence of free Fe_2O_3 in the brick but not by $FeSiO_3$, hence the brick should be burned at a temp. sufficiently high to cause complete combination of the Fe oxides with the other constituents. The presence of Zn in the charge results in the deposition of metallic Zn in the pores of the brick, and the oxidation of this to ZnO expands and cracks the brick; the ZnO also forms glassy reaction products with the brick constituents and the surface of the brick readily slags away. For smelting zinciferous ores, therefore, the furnace bricks should have the min. porosity and permeability to gases. The presence of CaF₂ in the charge produces vapours containing F compounds which disintegrate the bricks owing to the high mineralising power of F causing the formation of new mineral constituents, e.g., sillimanite. A. R. P.

PATENTS.

Manufacture of non-splintering glass. CONSORT. F. ELEKTROCHEM. IND. G.M.B.H. (B.P. 384,153, 18.3.32. Ger., 25.3.31).—Adhesives capable of flowing at a raised temp., e.g., cellulose derivatives, polymerised vinyl, acrylic, or itaconic esters, are introduced, e.g., by a fine Cu tube, between heated layers of glass and, if desired, an interposed layer of, e.g., celluloid, spaced at a suitable distance apart. L. A. C.

Manufacture of glazes or enamels. T. GOLD-SCHMIDT A.-G. (B.P. 384,538, 25.4.32. Ger., 28.9.31. Addn. to B.P. 383,186; B., 1933, 62).—Pb or Pb K silicates which have been prepared by a melting process are used. L. A. C.

Article of manufacture. [Precious-metal-coated vitreous body.] L. SMEDE and E. B. SHAND, ASSTS. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,852,093, 5.4.32. Appl., 7.11.28).—The glazed vitreous body (preferably porcelain) is coated with a glaze containing \lt 7% of metallic residue (e.g., 4.3% Pt, 3.1% Au, 3.0% Bi, as chlorides or metals) and fired at 450—800° (according to the firing schedule), to form an adhesive coating of metal thick enough to be "tinned" with solder. J. A. S.

Firing of ceramic ware. W. PODMORE (B.P. 383,933,28.7.32).—The ware (particularly bone china) is supported in the saggers upon a bedding of a calcined 1:2 mixture of Al(OH)₃ and SrSO₄. H. R.-D.

Earthenware body for manufacture of pottery. J. E. TAMS (B.P. 384,623, 31.8.32).—The body consists of ball clay 20, china clay 34, flint 37, asbestos powder 6, and Cornish stone 3 pts. by wt., and is suitable for slip-casting. H. R.-D.

Synthetic spinel. E. ANCOT, ASST. to WIEDE'S CARBIDWERK FREYUNG M.B.H. (U.S.P. 1,852,097, 5.4.32. Appl., 28.1.29. Ger., 14.8.28).—A rose-pink spinel is made by fusing, e.g., a mixture of MgO + Al₂O₃ base (600 pts.), Fe₂O₃ (10 pts.), BeO (0.5 pt.), and TiF₄ (0.2 pt.). J. A. S.

Dense mix for refractories and its preparation. R. P. HEUER, Assr. to GEN. REFRACTORIES Co. (U.S.P. 1,851,181, 29.3.32. Appl., 18.3.30).—The mixture of particle sizes necessary to give max. d is studied by ternary diagrams. J. A. S.

Refractory. J. H. GILL (U.S.P. 1,852,713, 5.4.32. Appl., 17.10.29).—A mixture of 30—60% of clay (containing approx. 46% SiO₂, 36% Al_2O_3), 10—20% of tale, 15—25% of fused Al_2O_3 , and 15—25% of hardwood sawdust is made semi-plastic, dried, and fired at 1200°. J. A. S.

Securing metal to porcelain. BRIT. THOMSON-HOUSTON CO., LTD., and R. ADKINS (B.P. 384,330, 26.5.31).

Filtering and sterilising liquids.—See I. Caustic materials [for clay etc.].—See VII.

IX.—BUILDING MATERIALS.

Thermo-technical basis of cement burning. W. EITEL and H. E. SCHWIETE (Zement, 1932, 21, 361—367; Chem. Zentr., 1932, ii, 1058).—The sp. heats of the materials, of clinker constituents, and of clinker have been determined. The thermal balance for the burning of 1 kg. of material to clinker is considered; an ideal val. is 437 kg.-cal. A. A. E.

Hardening and corrosion of cement. K. E. DORSCH (Cement, 1932, 5, 337-347, 426-433).-The hydration of the individual constituents of cement was studied microscopically as well as that of normal and aluminous cements. Normal cement grains were totally surrounded by needle-shaped crystals in 24 hr. and in 4-5 days hexagonal crystals and amorphous gel were observed. Aluminous cements showed, in general, the same course. The addition of the latter to normal cement leads to rapid setting, which still occurs if only an aq. extract of the cement is added, the sol. component apparently being CaO, Al₂O₃ which is metastable only in solution. 2CaO,SiO₂ is the only silicate capable of existence in the presence of CaO, Al₂O₃, and accordingly the addition of a trace of Portland cement to aluminous cement will result, as vice versa, in the instant setting of the cement. C. A. K.

Stability of hardened blast-furnace cement against sulphate solutions and distilled water. R. GRÜN and H. BECKMANN (Angew. Chem., 1932, 45, 739—743).—Powdered cement was shaken for $\frac{1}{2}$ —26 hr. with the solutions to be studied and the latter were then analysed. MgSO₄ acts more readily on CaO than on combined Ca, and accordingly increased proportions of blast-furnace slag in the cement reduced the action. Similar results were given with distilled H_2O . Comparison of these shaking tests with storage tests extending over 2 years shows similarity in results. Tests are given in detail. C. I.

Tensile strength tests of Portland cement. A. C. DAVIS (Cement, 1932, 5, 441-454).—The prep. of testpieces and the method of testing are described.

C. A. K. Setting of plaster of Paris. IV. Sodium and potassium borates and their effects on the setting. C. S. GIBSON and R. N. JOHNSON (J.S.C.I., 1932, 51, 399-403 т; cf. ibid., 25).-К₂В₁₀О₁₆,8Н₂О is stable at 105°, whilst $Na_2B_{10}O_{16}$, 10H₂O is unstable; both retain 1 mol. of H₂O at 200° and are dehydrated completely at 350-400°. K₂B₄O₇,4H₂O is unchanged at 100°, whilst Na₂B₄O₇,10H₂O is almost completely dehydrated. No evidence of the retention of 1 mol. of H₂O by these compounds was found. Solutions of each of these borates at all concns. retard the setting of plaster of Paris, the effect increasing with the concn. At concns. > 0.05Nthe diborates act more powerfully than the pentaborates. The borates also reduce the expansion of the plaster on setting, the K salts being slightly more effective than the Na salts. With the aid of borate solutions, harder plasters can be obtained than with H₂O alone ; these have the advantages of a slow set and a small expansion. E. S. H.

Modern methods of wood preservation. G. GUNN (Chem. & Ind., 1932, 1072—1074).—A review.

Properties and applications of timber. A. H. LOVELESS (Chem. & Ind., 1932, 1052–1054).—A summary.

Heat transmission in rotary kilns.-See I.

PATENTS.

Burning of cement, lime, and similar materials. H. A. GILL. From F. L. SMIDTH & Co. A./S. (B.P. 384,060, 16.11.31).—Heat is economised by withdrawing part of the calcined charge of a rotary kiln or an independent heat-transferring material and mixing it with the raw charge, which is thereby precalcined. This part of the process may be carried out in a separate drum under the kiln, or in a series of tubes arranged around and rotating with the kiln tube. C. A. K.

Portland cement composition. H. H. STEINOUR, Assr. to RIVERSIDE CEMENT Co. (U.S.P. 1,852,595, 5.4.32. Appl., 4.10.30).—A normal Portland cement is ground with native 0.5—2% of Ca borate (colemanite) and 1—10% of oxychloride, the ratio of the latter to the former being 2—5:1. Such cements have high early strength and satisfactory setting properties. C. A. K.

Manufacture of Portland cement. P. R. WHELAN (U.S.P. 1,852,547, 5.4.32. Appl., 11.4.28).—CaO rendered incandescent by the burning of an intermixed combustible material is mixed with clay heated separately so that a fused product containing > 69% of combined CaO (RO) is produced. The molten mass is superheated and separated from excess CaO. C. A. K.

Oxychloride cement compositions. M. CERVELLO (B.P. 384,043, 24.10.31).—Separate mixtures A, B, and C are made and then B and C are added slowly to and

kneaded into A. A consists of a mixture of magnesite calcined at 700—900°, siliceous material, potash alum, and a mineral colouring matter; B is a mixture of solutions of MgCl₂, HCl, and ZnSO₄ and/or Fe₂(SO₄)₃; and C a mixture of sawdust, cork dust, cellulose materials, olein and/or glycerin, petroleum jelly and mineral oil, and a polishing wax, e.g., stearine, carnuba wax, or gum lac. The plastic mass is then moulded in conjunction with strips of wood in grid-like moulds to form paving blocks etc. C. A. K.

Manufacture of structural material. H. C. PEFFER, R. L. HARRISON, and D. E. Ross, Assrs. to ROSTONE, INC. (U.S.P. 1,852,672, 5.4.32. Appl., 18.2.29).—A mixture of an alkaline earth and a clay containing a hydrated aluminosilicic acid is moulded and heated by steam under pressure. C. A. K.

Treating articles of wood used in dyeing, bleaching, and like textile-finishing operations to render them acid- and water-proof. T. WAREING (B.P. 384,369, 31.8.31).—The articles, after drying, are immersed for 1 hr. in a synthetic resin (preferably Bakelite, Mark XUB, 1657) at about 150° and stoved for 3 hr. at about 176°, the process being repeated if necessary. [Stat. ref.] L. A. C.

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

Maintenance of German blast furnaces with native iron ore. W. LUYKEN (Chem.-Ztg., 1932, 56, 992—993).—The causes of the diminution in the proportion of German ore worked are discussed and means for its increase suggested. T. H. P.

Effect of sodium carbonate on low-temperature reduction of iron ores. G. C. WILLIAMS and R. A. RAGATZ (Ind. Eng. Chem., 1932, 24, 1397-1400).— The interaction of 2 pts. of hæmatite or magnetite with 1 pt. of coke at $800-950^{\circ}$ is promoted by addition of Na₂CO₃ in proportions up to 5% of the mixture. The yield of metallic Fe is in any case small at 800° , but increases with temp. and Na₂CO₃ content until at 950°, with 5% of Na₂CO₃, reduction was complete under the conditions of the experiment in 2·5 hr. C. I.

Volume changes of cast iron during casting. C. M. SAEGER, JUN., and E. J. ASH (Trans. Amer. Foundrymen's Assoc., 1932, 3, 172—187).—Vol. changes of 8 types are recorded. The coeff. of liquid shrinkage over the temp. range studied was 0.011% per 1°. During solidification grey Fe expanded 1.65%, whilst low-C, low-Si Fe contracted 5.85%. All grey and white cast irons undergo expansion during or immediately after solidification; it begins at 1130° and is maximal at 1070°. CH. ABS.

Molybdenum-manganese alloy steels. W. F. Rowden (Metallurgia, 1932, 7, 9–10).—Addition of 0.2—0.4% Mo to steel with 0.15—0.3% C and 1.4— 1.7% Mn increases the yield point, elastic limit, ductility, and impact val. Hardening in oil from 850° followed by tempering at 650° gives a tensile strength of 52 tons/sq. in. with an impact strength of 80 ft.-lb. for the steel with 0.3% C, 1.75% Mn, and 0.18% Mo. Cross-sectional area has very little effect on the mechanical properties of the heat-treated alloys. A. R. P.

Chemical analysis of modern alloy steels. W. W. STEVENSON (Ind. Chem., 1932, 8, 213-216, 256-259, 291-294, 320-323).—Modern methods for the determination of C, Si, S, P, Mn, Ni, Cr, Cu, Al, W, Mo, V, Ti, and Zr are given in detail. A. R. P.

Determination of alumina and silica in steel by the hydrochloric acid residue method. J. G. THOMPSON and J. S. ACKEN (Bur. Stand. J. Res., 1932, 9, 615-623).—The steel is treated with dil. (1:2) HCl on the steam-bath. By washing the residue with hot 3% Na₂CO₃ solution, hydrated SiO₂ formed by decomp. of silicides is removed, and the SiO₂ originally present as such or as silicates is left mixed with the Al₂O₃. Since these may be readily separated and determined, this method may be used for the determination of SiO₂ and Al₂O₃, and is more rapid than the HNO₃ and Br methods. It gives accurate results for Al₂O₃, except when large amounts of Al nitride are present. If Mn silicates are present the recovery of SiO, is not quant. MnO,SiO2 is scarcely decomposed by HCl, but $2MnO,SiO_2$ dissolves without pptn. of SiO_2 . The presence of these compounds also interferes with the determination of Mn. D. R. D.

Nitrogen content of some standard-sample steels. J. G. THOMPSON and E. H. HAMILTON (Bur. Stand. J. Res., 1932, 9, 593—595).—The N present (0.005-0.028%) in various standard steels has been determined. The N content remains const. over a period of 13 years. D. R. D.

Strength [of hardened steels] in relation to the original structure. O. VON KEIL and O. JUNGWIRTH (Stahl u. Eisen, 1932, 52, 1221—1223).—Tests on two plain C steels (0.4-0.5% C and 0.7 and 1.7% Mn), a Cr-Ni steel (0.66% Cr, 3.45% Ni), and a Cr steel (1.27% Cr) show that forging above 1050° has a bad effect on the tensile properties which may be remedied almost completely by the ordinary hardening treatment (quenching from 850° and tempering at 200-300°). The structure developed by the overheating is, however, not entirely removed by this treatment, but can be removed by normalising at 950° prior to hardening. The coarser the original grain size (*i.e.*, before heat-treatment) the lower is the temp. required for correct tempering. A. R. P.

Heat-treatment of metals. P. SCHOENMAKER (Chem. Weekblad, 1932, 29, 682-686).—A general account of the influence of heat-treatment on the mechanical properties and microstructure of steels and duralumin, and particularly of the slow changes which occur on "soaking." H. F. G.

Heat-treating and forging some light alloys. ANON. (Metallurgia, 1932, 7, 17–18).—For the heat treatment of duralumin, "Y" alloy, and the "RR" alloys gas furnaces give as good results as electric furnaces, provided that the temp. is controllable within ± 7 —10° and that the flame is not allowed to come in contact with the metal; if this occurs blisters develop under the skin, due to gas adsorption. In making stampings from extruded bars, which are more economical for this purpose than forgings, annealing should be as short as possible to avoid coarse crystal growth. Hardening of "Y" alloy is attributed to pptn. of Mg₂Si and a ternary compound containing Cu, Ni, and Al, and hardening of "RR56" alloy to pptn. of Mg₂Si, NiAl₃, a little CuAl₂, and perhaps some of the ternary compound. Inclusion of Fe in the latter alloy forms FeAl₃, which inhibits ageing at low temp. To detect flaws or cracks in forgings, etching in a 1:4 mixture of HF and 10% H_2SO_4 for 6–8 min. followed by dipping in dil. HNO₃ is recommended. A. R. P.

Prevention of recrystallisation by preliminary short annealing. A. A. BOCHVAR (Tzvet. Met., 1931, 587—594).—Preliminary annealing of Sn for a few sec. at temp. \lt 15° higher than the (possible service) temp. of the long annealing prevents further appreciable grain growth. CH. ABS.

Graphical analysis in [sulphide ore] flotation : its application in the selective flotation of chalcopyrite in pyritic ores. M. MORTENSON (Tidsskr. Kjemi Berg., 1932, 12, 253-256).—A graphical method is described for determining the optimum conditions for ore flotation, the diagrams employed giving curves both for equi-extraction and equi-concn. Results are given of a no. of tests on the flotation of chalcopyrite in ores containing pyrrhotite and marmatite, using various K xanthates as collectors and pine oil as foaming agent, together with Na₂CO₃ or Ca(OH)₂. Addition of KCN appeared to be without effect in the case of the Norwegian ores used. H. F. H.

Copper age in ancient China. I. T. Dōxo (Bull. Chem. Soc. Japan, 1932, 7, 347—352).—Analyses of ancient Chinese spear-heads indicate the existence of a Cu age between the stone and bronze ages. In some cases the Cu contains Pb, probably added to lower the m.p. The composition of bronze-age implements is deduced from Chinese texts. D. R. D.

Black oxidised finishing [of copper and brass]. L. C. HUDGINS and H. A. CAMERON (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 3, 17-20).—The aq. NH₃-basic Cu carbonate for brass and the alkali sulphide bath for Cu are discussed. CH. ABS.

Temporary rust preventers. E. C. J. MARSH and E. MILLS (Aircraft Eng., 1932, 4, 57-62).—An approximation to self-healing is obtained with media (oils etc.) having the correct viscosity and surface tension to restore the uniformity of the damaged film. Results of tests on greasy and varnish media are tabulated. Lanolin, which affords the best protection, is preferably applied as a 50% solution in white spirit or C_6H_6 . Neutralisation of lanolin with alkali does not reduce the rate of subsequent development of acidity, and the necessary introduction of solids increases the porosity of the film. Alkalis, waxes, soap, greases, sol. oils, and non-drying varnishes should be avoided. CH. ABS.

Strains in electrolytic copper deposited in presence of colloids. P. JACQUET (Compt. rend., 1932, 195, 952—954; cf B., 1932, 431).—Using the same method as before, the effects of serum-albumin from ox blood, the same prepared by means of COMe₃ (cf A., 1920, ii, 568; i, 684), gum arabic, gum tragacanth, glycine (cf. A., 1930, 707; 1931, 36), and dextrin are compared with that of gelatin. All, but in decreasing degree in the above order, cause contraction, the orde being qualitatively that of increasing Au no. C. A. S.

Production methods used in chromium plating. B. G. DAW (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 6, 23—27).—A survey. By the use of continuously moving cathodes better deposits are obtained, the plating voltage is reduced, and the throwing power improved. CH. ABS.

Chromium plating at high current densities. A. WILLINK (Monthly Rev. Amer. Electroplaters' Soc., 1932, 19, No. 1, 40–49).—Advantages and disadvantages of Cr plating at high temp. and c.d. are discussed.

CH. ABS.

Base metals used in industrial chromiumplating applications. A. WILLINK (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 8, 12—19).— A discussion. Failure of Cr-plated tools and dies is usually attributable to deformation of the base metal beyond its elastic limit. CH. ABS.

Deposition of chromium on articles made from sheet zinc. C. H. PROCTOR (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 6, 28-34).—The solutions and conditions for cleaning the Zn are described. Deposition of Cu prior to Ni plating and then Cr plating is advantageous. CH. Abs.

Depositing chromium on electric appliances. F. A. MAURER (Monthly Rev. Amer. Electroplaters' Soc., 1932, 19, No. 5, 21–26).—Plating of flat-irons with Cu, Ni, and then Cr is described. Ch. Abs.

Pitting in nickel-plating solutions. W. M. PHIL-LIPS (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 4, 9—11).—Pits are due to preferential deposition of H or dirt particles; Cu and Fe may contribute. Pits may also be caused by removal of projections during polishing. Cu and Fe in a Ni-plating bath of low $p_{\rm H}$ tend to plate out, thereby reducing pitting, but this is not so with baths of high $p_{\rm H}$. The action of oxidising agents in reducing pitting is explained.

CH. ABS.

Plating of zinc-base die castings. R. J. WIRSHING (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 8, 9—12, 26—31).—Total deposits on steel should be $\not\leftarrow$ 0.001 in. thick; only the Cr coating may be thin. At least 2 dissimilar metals, including the Cr "flash," should be plated. These conclusions were applied to Zn (0.0005 in. Cu, 0.0005 in. Ni, and Cr flash), good resistant deposits being obtained. Use of the thick Cu deposit permitted the use of a low- $p_{\rm H}$ Ni solution. CH. ABS.

Life of plated zinc as affected by the thickness of the coating. E. A. ANDERSON (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 8, 19–31).—Corrosionresistance increases rapidly with increasing thickness of the Ni undercoat. Only 12% of commercial plated Zn articles had deposits of the required thickness (0.0003 in.) for acceptable service; 4% had deposits < 0.0001 in. thick. CH. ABS.

C. China Manufacture

Anodic phenomena in cadmium-plating solutions. G. SODERBERG (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 2, 9-15).-Anodic polarisation (in a cyanide bath) increased fairly regularly up to about 0.2 volt when the c.d. was increased from 0 to 20-30 amp. per sq. ft. With further increase in voltage the c.d. remained practically const. uptil about 3 volts anode polarisation had been reached, after which it again rapidly increased with voltage. The c.d. at which breaks occurred in the c.d.-anode polarisation curves depended on the free [CN']. A steel anode gave immediately a const. potential, practically independent of c.d. and solution composition. With steel and Cd anodes in the same solution, no current passes through the steel unless the Cd anodes are polarised. Although the use of steel anodes alone produces K₂CO₃ from KCN, this does not occur when Cd anodes are also CH. ABS. present.

Gold-plating solutions for production work. J. L. MERICOLD (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 5, 26–32).—Immersion, salt-H₂O, and electrolytic methods are discussed. CH. ABS.

Loss of oxygen in cyanide solutions [for gold dissolution]. H. V. WALLACE (Min. and Met., 1932, 13, 522-523).—The O_2 content of aq. KCN, and consequently its power of dissolving Au from ores, is considerably reduced by accumulation of fine Fe from the tube-mill circuits, hence it is recommended that worn-out grinding balls should be periodically removed from the mills and the ore pulp passed over magnetic separators before entering the leaching circuit.

A. R. P.

Preparation of specimens for exposure tests of electroplated coatings on steel. ANON. (Monthly Rev. Amer. Electroplaters' Soc., 1932, 19, No. 5, 6— 15).—A report of a joint committee of the American Electroplaters' Society, the American Society for Testing Materials, and the U.S. Bureau of Standards.

CH. ABS.

Progress report on exposure tests of plated coatings. P. C. STRAUSSER (Month. Rev. Amer. Electroplaters' Soc., 1932, 19, No. 2, 15–27).

Standardisation of chemical methods of testing metallic coatings. N. A. ISGARISCHEV and N. P. EGOROVA (Tzvet. Met., 1931, 713—719).—Bauer's method $(H_2SO_4 \text{ and } As_2O_3)$ for the determination of thickness and Wernlund's method (AcOH and H_2O_2) for the detection of holes in Zn coatings are preferred; the CuSO₄ method is untrustworthy. CH. Abs.

Blast-furnace bricks.—See VIII. Drinkingwater pipes.—See XXIII.

PATENTS.

Treating and recovery of gangue from metals [sponge iron]. W. H. SMITH, Assr. to GEN. REDUCTION CORP. (U.S.P. 1,851,376, 29.3.32. Appl., 12.8.29).— The mixture of sponge Fe and gangue obtained by reduction of Fe ores is mixed with Na_2CO_3 and the mixture heated to convert the acid constituents of the gangue into sol. Na salts, which are subsequently leached out. A. R. P. Production of [iron-silicon] alloys. P. H. BRACE, Assr. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,849,476, 15.3.32. Appl., 27.2.28).—Si vapours or mixtures of H_2 with vapours of a Si compound are passed into molten Fe in an induction furnace the pressure in which is < 1 atm. A. R. P.

Production of grey cast iron from iron-silicon alloys. W. J. MERTEN, Assr. to WESTINGHOUSE ELEC-TRIC & MANUFG. Co. (U.S.P. 1,849,502, 15.3.32. Appl., 16.4.28).—Baled Si-Fe alloy scrap with < 0.2% C is melted with < 5% of ferromanganese in a cupola, using a small quantity of CaCO₃ as flux and just sufficient coke to melt the charge. A. R. P.

[Heat-]treating [and working] iron-silicon alloys. M. G. CORSON, Assr. to DURIRON CO., INC. (U.S.P. 1,852,836, 5.4.32. Appl., 9.5.28. Renewed 20.2.32).— C-free Si-Fe alloys with 5—14% Si are cast into moulds preheated at 850° and immediately the metal solidifies the moulds are opened and the metal is transferred to an annealing furnace at > 1050°. When a homogeneous solid solution is obtained the metal is forged hot into the desired shape, and then allowed to cool very slowly from 900° to 500° to allow the duplex structure which forms at 1040—900° to become reconverted into a homogeneous solid solution. Addition of up to 1% Ni to the alloys assists in promoting the structural changes.

. A. R. P.

Heat-treatment of steel. W. M. CROSS, Assr. to (LORD) SOUTHBOROUGH (U.S.P. 1,810,696, 16.6.31. Appl., 8.4.29).—Part of the gases from the heat-treating chamber is passed over briquettes made from a mixture of CaO and boiler ash or exhausted carburising material containing a small amount of C, and passed back through the treating chamber (cf. U.S.P. 1,712,253; B., 1929, 563). A. R. P.

[Heat-]treatment of steel. H. C. KNERR, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,842,272, 19.1.32. Appl., 13.9.28).—The apparatus comprises a high-frequency induction furnace containing a cylindrical graphite pot packed in a refractory sand; the upper third of the pot is of larger internal diam. than the lower part and contains a metal shield spaced slightly from the walls of the pot. The pot is filled with a fused salt which covers about one third of the shield, and a burning gas flame is played on to the surface of the salt to prevent ingress of O_2 into the bath during the heat-treatment; this arrangement prevents excessive wear of the pot at the air line and contamination of the melt with particles of graphite. A. R. P.

[Hardening] treatment of metals. E. G. HERBERT (B.P. 380,816, 22.6.31).—After the usual heat-treatment or other method of hardening metals the hardness fluctuates periodically before eventually attaining a const. val. which is generally < the max. at some or all of the peaks in the hardness curve. The max. hardness at any peak may be stabilised by subjecting the metal to any of the known demagnetising treatments, or by placing it for a short time in a const. magnetic field; on further ageing, the hardness generally rises smoothly to a const. max. much > that obtained at any stage of the usual treatment. A. R. P. Obviating or reducing cold-shortness in steels containing phosphorus. VEREIN. STAHLWERKE A.-G. (B.P. 383,453, 15.12.31. Ger., 15.12.30).—To prevent the embrittling effect of > 0.05% P in steel containing < 0.03% C, from 0.4 to 3% Cr is added according to the P content. A. R. P.

[Steel for] homogeneous armour plate. F. KRUPP A.-G. (B.P. 380,742, 6.4.32. Ger., 25.4.31).— The steel contains 0.28—0.45% C, 2—4% Cr, 0.15—1% Mo, and 0—3.3% Ni. Mo may be wholly or partly replaced by twice as much W. The Ni content is increased with increasing thickness of the plate.

A. R. P.

Coating of iron or steel. S. R. SHEPPARD (B.P. 382,287, 21.7.31).—The metal is coated with Al by any known process and the coated alloy is subjected to anodic oxidation in any of the usual baths.

A. R. P.

Treatment of metals. [Case-hardening of molybdenum steel.] F. J. METZGER, ASST. to AIR REDUCTION CO., INC. (U.S.P. 1,851,861, 29.3.32. Appl., 9.3.28).—The articles are heated at $400-600^{\circ}$ in a mixture of CaCN₂ and Ca(OH)₂ or other compound which evolves H₂O on heating. A. R. P.

Material [inhibitor] for selectively controlling metal [steel] pickling in acid baths. J. H. GRAVELL, Assr. to AMER. CHEM. PAINT Co. (U.S.P. 1,852,648, 5.4.32. Appl., 2.10.28).—A 2:3:5 mixture of diotolylthiocarbamide, evaporated cellulose pulp waste liquor, and NaCl is claimed. A. R. P.

[Inhibitor for] cleaning and pickling of metals. W. L. SEMON, ASST. to B. F. GOODRICH CO. (U.S.P. 1,852,194, 5.4.32. Appl., 19.4.29).—Saturated heterocyclic compounds containing C, N, and S or O in the ring are claimed: *p*-hydroxy-*N*-phenylmorpholine, rhodanine, and xanthane hydride are specifically mentioned. A. R. P.

Furnace for detinning metal plates or other articles or surfaces coated with block tin or other like material. LEEDS DE-TINNING, LTD., and F. CALVERT (B.P. 383,669, 21.8.31).—Heat from one or more combustion chambers passes over a no. of intermittently tilting trays which form the bottom of a furnace so that the material is heated by radiant heat. C. A. K.

Coating non-metallic substances with metals. M. OW-ESCHINGEN (B.P. 382,704, 11.9.31).—Articles made of condensation products of, e.g., CH_2O and casein are freed from fatty substances, soaked in 3-4%aq. quinol or other reducing agent, and immersed in a solution of a reducible metal, e.g., aq. AgNO₃. The deposited metal is then polished. A. R. P.

Metal tube. G. E. NEUBERTH, ASST. to TUBE REDUC-ING CORP. (U.S.P. 1,842,280, 19.1.32. Appl., 11.4.31).— Claim is made for drawn metal tubes in which the longitudinal surfaces of the crystals appear to be made up of elongated fibres and the transverse sections exhibit numerous fold lines but are free from slip lines.

A. R. P.

Ore flotation. G. H. RUGGLES (U.S.P. 1,852,481, 5.4.32. Appl., 9.11.29).—A 2% suspension of CaO in 2% aq. Na₂S is kept continuously circulated to and

from a tank, and portions are withdrawn as required for addition to the flotation cells. A. R. P.

Extraction of copper from ores. E. EISENHAUER, JUN., Assr. to C. A. PALMER (U.S.P. 1,848,416, 8.3.32. Appl., 16.6.30).—Cu ores containing carbonate and silicate are leached with dil. H_2SO_4 to remove the former. HCl is then added to decompose the latter, and the filtered solution is treated with Fe to ppt. the Cu. The spent solution is used in the carbonate leaching stage. A. R. P.

Separation of metal mixtures [copper matte and alloys] into their different components. J. KOHL-MEYER, Assr. to AMER. LURGI CORP. (U.S.P. 1,846,738, 23.2.32. Appl., 29.5.28. Ger., 31.5.27).—Zn, Sn, Pb, and S are removed from Cu alloys or Cu matte by blowing the molten material under a layer of powdered fuel with air in a rotary furnace. A. R. P.

Art of metallurgy. [Copper alloy.] C. D. RUSSELL, Assr. to RUSELITE CORP. (U.S.P. 1,850,416, 22.3.32. Appl., 21.7.30).—A Cu alloy with high tensile strength, tenacity, and ductility contains 3-12 (7)% Al, 0.1-5(2)% Mo, and 0.1-3 (2)% Ta. Cr may replace some or all of the Ta. A. R. P.

Copper[-beryllium-chromium] alloys. O. DAHL, Assr. to GEN. ELECTRIC Co. (U.S.P. 1,847,929, 1.3.32. Appl., 26.6.31. Ger., 31.7.30).—Alloys of Cu with $\geq 6\%$ Cr + Be (Be $\geq 1\%$), the two metals preferably being present in the proportions required to form CrBe, are claimed; they may be hardened by quenching from $> 800^{\circ}$ and tempering at 500—550°. A. R. P.

Froth flotation [promoters] for [zinc and copper] ores. (A-C) L. J. CHRISTMANN, (A, B) G. B. WALKER, and (C) S. A. FALCONER, ASSTS. to AMER. CYANAMID Co. (U.S.P. 1,852,107—9, 5.4.32. Appl., [A] 11.12.29, [B] 13.12.29, [C] 27.1.30).—Claim is made for (A) an aminomercaptobenzthiazole, e.g., the Na salt of 6dimethylamino-2-mercaptobenzthiazole, (B) 2-mercapto-5-thion-4-phenyl-1: 3 : 4-thiodiazole, and (C) a dithiocarbazide, e.g., the Na salt of the Ph compound.

A. R. P.

b

[Brass] alloy. R. A. WILKINS, ASST. to REVERE COPPER & BRASS, INC. (U.S.P. 1,851,928, 29.3.32. Appl., 24.9.31).—Free-cutting brasses capable of hot-rolling and drawing contain 60-70% Cu, up to 3% Pb, and up to 2% Si, and the remainder Zn. Alloys containing 70% Cu, 1% Pb, and 1.25% Si or 65% Cu, 1% Pb, and 1% Si are specifically claimed. A. R. P.

[Copper-zinc] alloy. C. W. THOMAS and V. W. ALLEN, ASSTS. to REVERE COPPER & BRASS, INC. (U.S.P. 1,851,140, 29.3.32. Appl., 26.9.30).—Addition of 0·1— 0·25% Al to Zn-Cu alloys with 64—95% Cu increases the plasticity and improves the deep-drawing properties. A. R. P.

[Copper-nickel] alloy. J. C. R. STONE (U.S.P. 1,851,218, 29.3.32. Appl., 12.6.31).—Homogeneous, malleable, ductile, and acid-resistant Ni-Cu alloys contain 17—35 (28)% Ni, 0.5—2 (1.5)% Sn, and 0.4—1.5 (0.5)% Pb, the Pb always being in excess of the Sn. A. R. P.

Treatment of zinc skimmings. K. V. B. Ross-MAN, ASST. to FEDERATED METALS CORP. (U.S.P. 1,851,130, 29.3.32. Appl., 29.1.29).—The skimmings are ground and the metallic particles removed by screening. The undersize is then passed downwards through a multiplehearth furnace, the top hearth being maintained at 100° and the lowest at 750° so that the chlorides are decomposed in the upper zones and the material is completely oxidised in the lower. A. R. P.

 Zinc-base die-casting alloy.
 E. A. ANDERSON

 and G. L. WERLEY, Assrs. to NEW JERSEY ZINC Co.
 (U.S.P. 1,852,441, 5.4.32. Appl., 19.8.30).—The alloy

 contains 2—10 (4)% Al, 0.01-0.3 (0.1)% Mg, and
 0.05-2 (1)% Cu; the Zn used contains < 0.01% Cd + Pb.

Magnesium-base alloy. R. T. WOOD, Assr. to AMER. MAGNESIUM CORP. (U.S.P. 1,850,613, 22.3.32. Appl., 12.9.31).—The alloy contains 0·1—15% Sn, 0·1—5% Mn, and one or more of the following : 0·1— 5% Pb, 0·1—10% Cd, 0·1—2% Ca, and 0·1—2% Ba. A. R. P.

Treatment of aluminium. F. M. CLARK, Assr. to GEN. ELECTRIC Co. (U.S.P. 1,846,844, 23.2.32. Appl., 16.7.29).—Al is provided with an insulating coating by immersing it at $65-75^{\circ}$ in a solution containing 2-6% NaOH, $2\cdot5-12\%$ Na₂SiO₃, and $1\cdot5-2\cdot5\%$ NH₃.

A. R. P.

Treatment of aluminium. F. C. FRARY, Assr. to ALUMINUM CO. OF AMERICA (U.S.P. 1,847,555, 1.3.32. Appl., 16.2.31).—Gas, dross, and oxide films are removed from Al by passing $TiCl_4$ vapour through the molten metal. A. R. P.

Surface treatment of aluminium or aluminium alloys. R. S. DUNHAM, Assee. of M. TOSTERUD (B.P. 381,402, 17.12.31. U.S., 17.12.30).—The metal is immersed for 10—15 min. in a solution containing $Na_2CO_3 20$ and $K_2Cr_2O_7 5$ g. per litre, rinsed, and placed in hot saturated aq. KMnO₄ for 2—5 min., whereby it acquires a brown, adherent, protective film of oxides. A. R. P.

Production of an aluminium alloy. D. R. TULLIS and P. OAKLEY (B.P. 382,749, 27.10.31).—An alloy of Al with 0.1-1% Cr, 0.2-2% Mn, 0.1-1% Ti, and 0.5-5% Mg is claimed. The grain structure is refined by passing the vapour of BCl₃, VCl₄, or VOCl₃ through the molten metal. A. R. P.

[Aluminium] alloy. C. D. RUSSELL, Assr. to RUSELITE CORP. (U.S.P. 1,850,355, 22.3.32. Appl., 3.8.31).—An alloy containing > 85% Al, 0.05—5% Mo, 0.05—5% Cr, 2—14% Zn, 0.1—0.5% Ti, and 0.1— 0.5% Zr is claimed. For automobile connecting rods the alloy contains 90% Al, 0.75% Cr, 0.75% Mo, 0.25% Ti, 0.25% Zr, and 8% Zn. A. R. P.

Obtaining indium and zinc from ores [e.g., blende]. W. S. MURRAY, ASST. to ONEIDA COMMUNITY, LTD. (U.S.P. 1,847,622, 1.3.32. Appl., 17,5.29).— Roasted blende is leached with H_2SO_4 to obtain aq. $ZnSO_4$ containing about 0.5% H_2SO_4 and all the In. This solution is agitated with air and a further small quantity of calcine to produce a slightly basic $ZnSO_4$ solution free from In. This solution is electrolysed to recover Zn and regenerate H_2SO_4 for leaching, the ppt. from the previous stage is dissolved in H_2SO_4 , and the filtered solution treated with Zn to ppt. the In etc. This ppt. is digested with dil. H_2SO_4 , which dissolves the In, and the feebly acid solution is treated with H_2S to recover the In. A. R. P.

Carbonising metals [nickel for electron tubes]. H. M. ELSEY, ASST. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,851,573, 29.3.32. Appl., 14.8.29). —Ni or Ni-Cr wire or ribbon is oxidised superficially, reduced in H_2 , and heated at 700—1000° in an atm. of C_2H_2 and gasoline until the porous surface is uniformly coated with C. A. R. P.

Chromium-plating process. D. J. BLOCK, Assr. to APOLLO METAL WORKS (U.S.P. 1,852,797, 5.4.32. Appl., 30.11.28).—The cathode is surrounded by a double-walled porous cell packed with a mixture of absorbent charcoal and MnO_2 to remove and oxidise the H₂ formed at the cathode. A. R. P.

Revitalising chromium-plating solutions. T. P. THOMAS, ASST. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,851,603, 29.3.32. Appl., 8.10.27).—CrO₃ plating solutions containing too high a proportion of Cr^{...} may be regenerated by electrolysis with a small cathode and a large Pb anode, the c.d. at the cathode being 3—5 amp./sq. in. and at the anode < 0.3 amp./sq. in.

A. R. P.

[Means for] distribution of the blast in cupolas. O. REUSS (B.P. 384,042, 24.10.31. Ger., 24.10.30).

Furnaces for melting. Conveying apparatus.— See I. Precious-metal coated vitreous body.—See VIII. Inductor-type [melting] furnace. Arcwelding electrode.—See XI.

XI.—ELECTROTECHNICS.

Electrolytic Cu. Plated coatings.—See X. Alkyd resins.—See XIII.

PATENTS.

[Electric] induction furnaces. UGINE-INFRA Soc. ANON. (B.P. 384,434, 1.12.31. Fr., 28.1.31).—A muffle of reversible ferromagnetic material, *e.g.*, of ferrocobalt, is closely surrounded by a cylinder of substantially non-magnetic material, *e.g.*, Ni. J. S. G. T.

Electric [induction] furnace. I. RENNERFELT (U.S.P. 1,851,984, 5.4.32. App., 21.6.27. Swed., 3.7.26. Renewed 31.12.31).—Spirally-wound flat "pancake" coils, preferably of Cu tube through which H_2O flows, suitably connected to each other and to a source of high-frequency currents are arranged to induce currents either directly in the furnace charge or in a heater. Means, *e.g.*, a battery of condensers or a synchronous machine, are provided to increase the power factor of the circuit. J. S. G. T.

Inductor-type furnace. E. F. NORTHRUP, Assr. to AJAX ELECTROTHERMIC CORP. (U.S.P. 1,852,214-5, 5.4.32. Appl., [A] 17.11.28, [B] 16.10.28).-(A) A stiffening or protecting frame of non-magnetic steel is employed as a stray-field eliminator in a coreless-type inductor furnace. (B) Current of two different frequencies circulates about the molten metal, heating being effected principally by that of higher frequency while stirring is done chiefly by that of lower frequency. J. S. G. T.

112

Arc-welding electrode. W. B. MILLER, Assr. to OXWELD ACETYLENE Co. (U.S.P. 1,852,021, 5.4.32. Appl., 22.9.28).—A core of Cr coated with a Mg-Mn-Si alloy (5—50%; composition given), the constituents of a borosilicate glass (\lt 50%), and a binder, all in powdered form, is used. J. S. G. T.

Insulation of magnetic bodies [dust cores]. C. D. OWENS, ASST. to BELL TELEPHONE LABS., INC. (U.S.P. 1,853,924, 12.4.32. Appl., 1.7.31).—Finelypowdered magnetic material, e.g., Permalloy, mixed with a H₂O-sol. org. acid, e.g., tartaric acid, Na silicate, ceramic material, e.g., talc, and H₂O is dried to a moist condition, set aside for 4—24 hr., compressed, and annealed. J. S. G. T.

Apparatus for the vaporisation electrically of liquids. G. KILCHHOFER (B.P. 384,540, 29.4.32).— Interruption of the heating current is controlled by a cap closing the evaporation vessel. J. S. G. T.

Electrolytic condensers. TELEPHON-APPARAT-FABR. E. ZWIETUSCH & CO., G.M.B.H. (B.P. 384,559, 17.5.32. Ger., 23.6.31).—Metal wire electrodes covered with fibrous material, *e.g.*, cotton or paper, are used.

J. S. G. T.

Electrode systems for electrolytic condensers and rectifiers. N. V. PHILIPS' GLOEILAMPENFABR. (B.P. 384,203, 7.6.32. Holl., 26.6.31).—A corrugated Zr electrode rests on a hollow, perforated, ebonite support in a Cu vessel containing anhyd. glycerin, and, if desired, KH_2PO_4 . J. S. G. T.

Light-reactive cells. E. FALKENTHAL (B.P. 383,990, 27.8.31. Ger., 30.8.30).—Extremely intimate contact between the photosensitive layer and the covering layer is secured by mechanically applying finely-powdered material, e.g., by rubbing, spraying, dusting, &c.

J. S. G. T.

[Glow-]discharge device electrode. F. SKAUPY, Assr. to GEN. ELECTRIC Co. (U.S.P. 1,852,826, 5.4.32. Appl., 30.4.23. Ger., 2.5.22).—Base-metal electrodes, *e.g.*, of Ni, one at least being coated with Ba, preferably prepared by heating Ba azide, are mounted in an envelope filled with Ne. J. S. G. T.

Manufacture of thermionic electrodes for electric-discharge tubes. GEN. ELECTRIC CO., LTD., and J. T. RANDALL (B.P. 384,067, 20.11.31).—A mixture containing BaCO₃ and water-glass in excess of that required to act as binder, and, if desired, a small proportion of an org. binder, is heated, preferably in H_2 or *in vacuo*. J. S. G. T.

Carbonised non-emissive electrode [for electrondischarge devices]. C. B. UPP, Assr. to WESTING-HOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,852,865, 5.4.32. Appl., 21.2.27).—A metal electrode, *e.g.*, of Ni or W, superficially carbonised by heating at 800— 1000° in C_2H_2 or other gas, is claimed. J. S. G. T.

Producing metal vapour in vacuum or gas-filled discharge tubes. RADIO-A.-G. D. S. LOEWE (B.P. 384,351, 15.7.31. Ger., 17.7.30).—Suitable highly emissive cathodes are made by performing an aluminothermic reaction outside the discharge tube, placing a small portion of the cold aluminothermic product, *e.g.*, a mixture of BaO and Al, inside a vac. chamber in the tube, and heating to vaporise the Ba; as reducing agent Mg or K may be used. J. S. G. T.

Galvanic batteries. E. D. CARDEN (B.P. 384,515, 24.3.32).

[Folded perforated metal strip] electrodes of alkaline-type electric accumulators. IONIC ALKAL-INE BATTERIES, LTD., and C. J. BERG (B.P. 384,546, 10.5.32).

Vapour electric [arc-discharge] apparatus. BRIT. THOMSON-HOUSTON CO., LTD., Assees. of E. H. REID (B.P. 383,961, 20.5.31. U.S., 20.5.30).

Electron-emitting cathode heated by an auxiliary glow discharge. J. KREMENEZKY, C. SCHÖNBAUER and P. VON KALOCSAY (B.P. 384,099, 22.12.31: Austr., 24.12.30).

Creosoting compositions.—See II. Plating of metals.—See X. Sterilisation of liquids.—See XXIII.

XII.—FATS; OILS; WAXES.

Formation of volatile fatty acids on keeping rye and wheat fats exposed to air. S. C. L. GERRITZEN and M. KAUFFMAN (Chem. Weekblad, 1932, 29, 742— 745).—Rye and wheat fats undergo oxidation when exposed to air, especially in thin layers, with the formation of volatile fatty acids (HCO_2H , AcOH in traces, butyric and decoic acids in larger amounts) and their glycerides. More complex changes take place also, involving intramol. changes. The changes are due entirely to oxidation, and the presence of light or microorganisms is not essential. The I val. also decreases,

S. C.

Kusum oil in soap-making. R. L. DUTTA, T. BASU, and P. K. GHOSE (Perf. Ess. Oil Rec., 1932, 23, 427-428).—Kusum oil, expressed from Schleichera trijuga, the host tree of the best grade of lac, has: $d^{32} 0.909$, acid val. (after keeping for 3 months) 14.0, sap. val. 215.8, I val. 57.5, titer of fatty acids 46.5°. The soap gives a scanty and greasy lather, but forms a thick emulsion when mixed with H₂O and has excellent cleansing and emulsifying powers. It does not develop rancidity and its incorporation (2-15%) in a soap charge improves the lathering qualities and softens the soap. E. H. S.

Constitution and possibility of utilising nuts of the "Dum" palm. I. UBALDINI and L. BISSI (Giorn. Chim. Ind. Appl., 1932, 14, 555-562).-The fruit of this palm, which covers large areas in Erythrea, consists of hard seeds and residues containing (%): $H_2O \ 10.7$, ash 1.49, 3.52; Et₂O-sol. fat 8.78, 0.49; 9.3:EtOH-C6H6 extract 3.2, 8.9; nitrogenous substances 5.78, 3.57; lignin 8, 29.2; pentosans trace, 21.16; polysaccharides (less pentosans) 62.05, 23.86. The seed fat has d¹⁵ 0.922, m.p. 26°, solidification point 19°. Zeiss butyrorefractometer val. 41.55 at 40°, acid val. 1.8, sap. val. 223, I val. 31.2. The seeds contain about 50% of mannans and, on hydrolysis with dil. (1%) H2SO4 under pressure at 160°, yield 56-58% of sugars containing 80-83% of mannose. When distilled at low temp. (below 485°), the residue yields (%): C 30.65, pyroligneous liquid $21 \cdot 3$, oily tar $32 \cdot 45$, gas + loss $15 \cdot 6$. This C and also that obtained from the seeds have high

absorptive powers and decolorising powers surpassing those of commercial activated carbons. T. H. P.

Characterisation of stand oils and the like by viscosity. H. WOLFF (Farben-Ztg., 1932, 38, 321— 322).—The risk of characterising viscous colloidal products, *e.g.*, stand oils, by viscosity measurements is stressed, since the method of determination, change of temp., variation in "structure" in manufacture or on storage, effect of small additions of thinners, etc. can give rise to contradictory results. The factors mentioned are discussed and typical results graphed.

S. S. W.

Kinetics of oil drying. N. FUCHS (Kolloid-Z., 1932, 61, 365—370).—The velocity with which O_2 is taken up by a film of linseed oil in presence of a Co drier is independent of the thickness of the film up to a certain val. The oxidation velocity, W, is related to the concn., C, of O_2 by the relation W = aC/(b + C), where a and bare consts. The limiting thickness of film (see above), which is of practical importance in painting, is proportional to the sq. root of the duration of drying.

E. S. H.

Analysis of oils ; application to Chinese edible oils. T. Y. TANG (Acad. Sinica Inst. Chem. Mem., 1930, No. 2, 1—24).—Solid saturated fatty acids are : peanut 13.35, soya bean 8.21, sesamé 10.81, rapeseed 12.70. Prep. of the Pb, Mg, Zn, Ba, and Ca salts in 90% EtOH is employed for determination of the acids. CH, ABS.

B.P., 1932, antimony trichloride colour test for cod-liver oil. TINTOMETER, LTD. (Analyst, 1932, 57, 772).—The limit recommended in this test corresponds with the colour of the Lovibond blue glass No. 6.0.

T. McL.

Sulphonation equipment.—See I. Cracking of cottonseed oil.—See II. Rust prevention.—See X. Fluorescence analysis of oils etc.—See XV. Milk fat.—See XIX.

PATENT.

Compound for purifying [fatty] oils. H. H. MORETON, ASST. to O. B. ENGLISCH and C. F. CRAIG (U.S.P. 1,851,204, 29.3.32. Appl., 8.10.28).—Cottonseed oils are bleached and purified by treatment with a 1:1 mixture of CaSO₄ and filtering clay. H. S. G.

XIII.—PAINTS; PIGMENTS; VARNISHES; RESINS.

Micrography of litharge and red lead. K. E. KRAUSE and E. N. ROSLJAKOVA (Farben-Ztg., 1932, 38, 292—293).—The difficulties of preparing representative slides of heterogeneously dispersed pigments are discussed. Brushing the dispersion on to the slide with a fine soft brush, with subsequent hot-air drying, and sealing with Canada balsam and cover glass, is considered to avoid the mechanical disruption of coarse particles, or their segregation, and the possibility of agglomeration of primary particles. The use of peptising agents, *e.g.*, PhNO₂, is also mentioned in this connexion. Photomicrographs of various samples of PbO and Pb₃O₄ are given. S. S. W.

Behaviour of pigments in cellulose lacquers. G. ZERR (Farbe u. Lack, 1932, 569-570, 580, 593-594).—A general discussion is given of the physical properties and grinding of colouring materials suitable for nitrocellulose lacquers. Pigments should be more or less basic in order to remove the free HNO_3 which is formed under the influence of ultra-violet light. Dyes which are light-resistant in oils are frequently not so in cellulose lacquers. The oil absorption val. of a pigment is a measure of its absorptive power for nitrocellulose lacquers. Reduction of absorption by addition of a white substrate may reduce also the light-resistance; hence white substrates should be avoided by using colouring matters of high covering and staining power. The various pigments and dyes in common use are reviewed. S. M.

Pigmented water-finishes [for leather]. O. WIEBER (Farbe u. Lack, 1932, 581—582, 595—596).— An account is given of the composition and application of leather finishes containing various inorg, and org. pigments in aq. media. Up to 3% of shellac is used as the binding material together with a common plasticiser and casein, albumin, Zn stearate, etc. to improve the gloss. The main weakness is comparatively low resistance to wet rubbing. S. M.

Swelling of pigmented films. H. WAGNER (Farben-Ztg., 1932, 38, 266-268).—The significance of "swelling" as an initial stage of paint failure is stressed. The additive nature of the swelling capacity of both pigment and vehicle in a paint film is demonstrated, adsorption and solvation providing inhibition of swelling in some cases, whilst active pigments may support it by soap formation. The influence of solubility in H₂O, particle surface, etc. and the failure of Cd pigments on exposure are illustrated by photomicrographs. S. S. W.

Differences in durability between brushing and spraying nitrocellulose lacquers. W. FLERUS (Farbe u. Lack, 1932, 571—572).—The limitations, application, and properties of the components of brushable lacquers are discussed. Attack of undercoats is caused by excessive solvent power of the solvents, of which glycol and its derivatives are the most satisfactory. In the presence of shellac, which is frequently used in conjunction with high- η nitrocotton, tiny air bubbles are formed which reduce the durability. For one brushed-on coat to suffice, any colouring matter introduced must possess high covering power. S. M.

Alkyd resins in industry. R. H. KIENLE and C. S. FERGUSON (Chem. & Met. Eng., 1932, **39**, 599—600).— The characteristics of such resins are described. Alkyd resins are classified as (a) non-convertible by heat, viz., those prepared from dihydric alcohols and dibasic acids, e.g., glycol and phthalie anhydride; (b) heatconvertible, such as those from alcohols (with \leq 3 OH groups) and polybasic acids, e.g., glycerol and phthalic anhydride; and (c) "element "-convertible, viz., those made from unsaturated acids or alcohols, e.g., the unsaturated oxidisable acids of a drying oil. The lastnamed are used as modifying agents or as an integral part of the resin. Alkyd resins may be used as cements, binders for cold-moulded compounds, e.g., in the production of foundry cores, as flexible resins, and in the paint and electrical (insulating varnish) industries.

D. K. M.

Plastics as engineering materials. H.M. RICHARDson (Chem. & Met. Eng., 1932, 39, 597-598) .- The chief characteristics of plastics are enumerated. Plastics may be classified as: (1) laminated, using synthetic resin binder of the PhOH-CH₂O type (not resistant to conc. strong acids or alkalis) with such fillers as cotton or asbestos cloth for tank linings, strong cotton duck for gears, paper for insulating material or piping, dense paper or fabric into which graphite has been incorporated for bearings; (2) hot-moulded, using synthetic resin binder with wood-flour (best mouldability), fabric, or asbestos (resistant to 247°) as filler; (3) cold-moulded, with org. binder and asbestos filler to withstand 232-316°; (4) cold-moulded with inorg. binder and asbestos filler, to withstand 982°. D. K. M.

Modified Storch-Morawski reaction for resins. A. KRAUS (Farben-Ztg., 1932, 38, 322).—The modified reaction described by Leppert and Majewska (B., 1932, 997) is found to give distinctive colorations with resins in general (not rosin alone), particularly if the reaction solution be diluted with a H_2O -free, indifferent solvent, *e.g.*, C_6H_6 , white (petroleum) spirit. The solubility in Ac₂O (hot and cold) and the coloration—immediate and after 12 min. (diluted)—afford identification of resins, and the appropriate information is tabulated for a range of natural and synthetic resins. S. S. W.

Influence of orpiment in shellac on protective properties of varnish. M. RANGASWAMI (Indian Lac Res. Inst., Bull., 1932, No. 10, 7 pp.).—Comparative tests to determine the effects of large proportions of orpiment in shellac show that the colouring matter of the shellac is not chemically attacked, the H_2O -resistance and durability of the resultant film are unaffected, the scratch-hardness and abrasion resistance are only slightly reduced, and that orpiment does not impart any protective action. S. M.

Kinetics of oil drying.-See XII.

PATENTS.

Refining of turpentine. I. W. HUMPHREY, Assr. to HERCULES POWDER Co. (U.S.P. 1,854,165, 12.4.32. Appl., 22.6.26).—The odour and colour of wood turpentine are reduced by thorough agitation at room or cold temp. with 60—80% aq. EtOH, 95% AcOH, or various other substances followed either by washing or re-distillation. S. M.

Manufacture of inorganic coloured pigments. I. G. FARBENIND. A.-G. (B.P. 384,473, 8.2.32. Ger., 7.2.31).—At least one pure oxide or salt of V, Cr, Mn, Fe, Co, Ni, Cu, or U is heated at 800—1100° with varying proportions of a pigment basis which is prepared by heating to below fusion a mixture of at least two pure oxides or salts of Zn, Mg, Ti, Si, Al, Zr, Ca, Ba, Sr, Be, Sn, Ce, or W. The product may be subsequently oxidised or reduced. S. M.

(A) Graining ink. (B) Finishing of surfaces. J. M. VERDEROSA, ASST. to E. I. DU PONT DE NEMOURS & Co. (U.S.P. [A] 1,851,469 and [B] 1,851,470, 29.3.32. Appl., [A] 9.7.28, [B] 26.12.29).—(A) The pigment is suspended in an aq. solution of glycol and gum arabic (or other sol. gum), the proportions of which are varied with the setting time required. (B) Nitrocellulose lacquers are used for both the base and the finishing coats. S. M.

Production of [stoving] lacquers, varnishes, and enamels. A. J. DUCAMP and M. E. A. BAULE (B.P. 383,856, 24.3.32. Fr., 24.3.31).—A stoving varnish is prepared by mixing the oil left after distilling heptaldehyde and undecenoic acid from castor oil with a metallic salt or oxide, which acts as drier, and excess of naphthenic, oleic, or other unsaturated acid. S. M.

Manufacture of [smooth, crystal] coating composition. G. KLINKENSTEIN, ASST. to MAAS & WALDSTEIN Co. (U.S.P. 1,852,581, 5.4.32. Appl., 15.5.30).—The crystal-containing lacquer is applied to a priming coat, preferably of cellulose acetate which may also contain a pigment. This is rubbed with a pigment or metallic powder ground into a japan or glue-size or H_2O -sol. gum, free from nitrocellulose, and finishing coats of usual type are added. S. M.

Coating composition. J. EISENSTEIN, Assr. to D. S. BEEBE, K. E. ANDERSON, W. C. DUNN, and J. EISENSTEIN (CHICAGO PAINT CO.) (U.S.P. 1,852,706, 5.4.32. Appl., 30.3.28).—Mixtures of casein, $CO(NH_2)_2$, hexamethylenetetramine, and a partly (at least) sol. alkali, *e.g.*, CaO, in finely-divided uncombined form, are claimed for use as liquid coating compositions on addition of H_2O . S. S. W.

Refining of rosin. I. W. HUMPHREY, Assr. to HERCULES POWDER CO. (U.S.P. 1,852,245, 5.4.32. Appl., 14.11.29).—Colouring matter is removed from wood- and gum-rosin by either agitating in solution or heating with a tri- or di-hydric alcohol, *e.g.*, glycerin, butylglycerol, or a glycol. Furfuraldehyde or PhOH can be used for previous or final treatment. S. M.

Production of [neutral] rosin oils. I. W. HUM-PHREY, Assr. to HERCULES POWDER Co. (U.S.P. 1,852,244, 5.4.32. Appl., 19.5.27).—When rosin is heated at 150—325° with about 2% of fuller's (or other siliceous) earth or activated C its abietic acid content is converted into a neutral hydrocarbon oil. Direct distillation with the catalyst gives an oil of decreased acid val.; for a neutral oil preheating for several hr. is necessary. S. M.

Production of synthetic resins. CHEM. FABR. DR. K. ALBERT G.M.B.H. (B.P. 381,200, 23.6.31. Ger., 19.9.30).—Alkali-metal compounds of phenol-alcohols are condensed with halogenated polyhydric aliphatic alcohols, preferably in alcoholic alkali. Examples are : α -chlorohydrin and the product from technical cresol and CH₂O; ethylene chlorohydrin or $\alpha\alpha'$ -dichlorohydrin and 4:4'-dihydroxy-3:3':5:5'-tetra(hydroxymethyl)diphenylpropane. C. H.

Polyhydric alcohol-polybasic acid synthetic resin. D. R. MAY, ASST. to WESTINGHOUSE ELECTRIC & MANUFG. Co. (U.S.P. 1,852,178, 5.4.32. Appl., 19.11.27).—Glycerol and phthalic anhydride or similar materials are partly polymerised by heating together rapidly until a viscous mass is obtained which solidifies on cooling. After powdering the cooled resin, polymerisation is completed under controlled conditions, e.g., 2—12 hr. at 100° followed by 4—6 hr. at 225°, while agitating the particles in a rotating oven.

S. S. W.

Manufacture of [porcelain-like] artificial masses. I. G. FARBENIND. A.-G. (B.P. 383,904, 1.6.32. Ger., 3.6.31).—Molten chlorinated naphthalenes (approx. 50% Cl) are treated with 20—50% of talcum, kaolin, chalk, white lead, or of other insol. material or pigment. The masses soften when heated. S. M.

Extrusion of cellulosic plastic compositions. MEIGS, BASSETT & SLAUGHTER, INC. (B.P. 384,321, 2.3.31. U.S., 4.3.30).—Celluloid and other cellulosic plastics are extruded through an orifice into a bath of the aq. solvent to which more H_2O is gradually added. Sheets for safety glass are thus made. (Cf. B.P. 378,052; B., 1932, 997.) S. M.

Method and apparatus for making [patterned] linoleum. Armstrong Cork Co., Assees. of A. C. PERRY (B.P. 384,959, 16.8.32. U.S., 23.6.32).

Grinding paints, inks, etc.—See I. Fibrous compositions [with resin].—See V. Ti pigment.— See VII. Wood for dyeing etc. vats.—See IX.

XIV.—INDIA-RUBBER; GUTTA-PERCHA.

Superficial affinity of caoutchouc for fillers. E. VELLINGER (Compt. rend., 1932, 195, 1015—1016; cf. A., 1933, 21).—The strengthening effect on rubber of certain fillers, *e.g.*, lampblack, is due to their adsorbing the resin in approx. the same way as the caoutchouc proper; both reduce the interfacial tension of a C_6H_6 solution of the resin in very similar fashion. C. A. S.

Effects of addition of selenium on the properties of vulcanised rubber. G. GALLIE and J. R. SCOTT (J. Res. Assoc. Brit. Rubber Manufrs., 1932, 1, 111–113). —A preliminary examination of a practically "pure" stock showed no acceleration of vulcanisation by Se, but a distinct toughening as revealed by increased tensile strength, rigidity, and plastometer hardness, and reduced swelling and permanent set. The resilience was not appreciably affected (cf. B., 1923, 412A). D. F. T.

PATENTS

Making artificial dispersions of rubber in water. H. D. ELKINGTON, and FLINTKOTE CORP. (B.P. 383,832, 2.3.32. Addn. to B.P. 380,703; B., 1932, 1043).— Rubber plasticised together with an org. colloid, such as a H_2O -sol. gum, a carbohydrate, or casein, or with a substantial quantity of an inert non-colloidal filler, is dispersed in a continuous phase consisting of an aq. paste of a non-colloidal mineral powder, respectively without and with the additional presence of an org. colloid of the type already indicated. D. F. T.

Mixing of rubber. G. E. HEYL (B.P. 384,620, 26.8.32).—Intimate mixing is effected by separately reducing to colloidal fineness mineral ingredients, *e.g.*, pigments, in a high-speed impact tearing and shearing mill, then incorporating these in the rubber in the ordinary way, and reducing the completed mixture to colloidal fineness in a similar mill. The process is especially applicable to the production of fibrous rubber mixtures in which the fibre is supplied by unvulcanised rubber material such as tyre-cover trimmings. D. F. T. [Manufacture of] rubber and like compositions. E. A. HAUSER and A. GILL (B.P. 384,030, 15.8.32).— Ebonite-like material is formed by mixing a conc. aq. dispersion of rubber with sufficient cement, especially alumina cement, to cause it to gel irreversibly and a quantity of vulcanising agent $\langle 25\% \rangle_0$ of the dry rubber of the dispersion. The mixture is shaped, e.g., by spraying or spreading on to the surface of articles intended to resist acid, for which latter purpose the cement amounts desirably to $\langle 15\% \rangle_0$ of the rubber in the mixture. [Stat. ref.] D. F. T.

Vulcanisation of rubber. GOODYEAR TIRE & RUBBER CO. (B.P. 383,775, 29.12.31. U.S. 4.5.31).— Vulcanisation is accelerated, with formation of products of superior tensile and ageing qualities, by a substance of the formula NHR·X·NHR', X, R, and R' being aliphatic hydrocarbon residues and R and R' $\mathbf{\mathbf{x}} \mathbf{C}_2$; e.g., dibutylethylenediamine or its additive compound with H₂O, CO₂, or CS₂, *i.e.*, the corresponding hydrate, carbamate, or dithiocarbamate.

D. F. T.

Vulcanisation of rubber. M. H. HUBACHER, Assr. to RUBBER SERVICE LABS. Co. (U.S.P. 1,851,767, 29.3.32. Appl., 14.10.29).—The reaction product of a halogensubstituted aryl alkyl ether such as phenyl chloroethyl ether and an arylamine, e.g., benzidine, is applied as an antioxidant. Examples are β -phenoxyethyl-aniline or - α -naphthylamine, β -naphthoxyethyl- β -naphthylamine. D. F. T.

Treatment of rubber [in vulcanisation]. NAUGA-TUCK CHEM. Co., Assees. of S. M. CADWELL (B.P. 383,679, 7.9.31. U.S., 11.9.30).—Premature vulcanisation of rubber containing a vulcanising agent and an accelerator, e.g., tetramethylthiuram disulphide or mercaptobenzthiazole, is checked by incorporating an acidic substance such as $ZnCl_2$, $CH_2Cl \cdot CO_2H$, $(NH_4)_3PO_4$. When desired the activity of the retarder in the stock which has been shaped, e.g., into tubes, is destroyed by subjecting it to an atm. containing NH₃, preferably at higher temp. and pressure, and conveniently by inflation with this gas ; the material is then vulcanised. D. F. T.

Desulphurisation of rubber materials. H. H. CULMER (U.S.P. 1,851,694, 29.3.32. Appl., 8.11.28).— Scrap rubber materials containing fibre, e.g., old tyres, are comminuted and after wetting are mixed with a neutralising agent such as NaOH and treated with O_3 , whereby the S is eliminated. The process may be modified by bringing the mixture into intimate contact with O_3 , air, and steam at about 112° D. F. T.

Manufacture of rubber conversion products. H. L. FISHER, Assr. to B. F. GOODRICH Co. (U.S.P. 1,852,294-5 and 1,852,345-6, 5.4.32. Appl., 28.12.26. Cf. U.S.P. 1,605,180; B., 1927, 85).—Conversion products similar to those obtained earlier (*loc. cit.*) are prepared by heating (A) a liquid mixture of rubber and a solvent, *e.g.*, vulcanised rubber in $C_2H_2Cl_4$ or unvulcanised rubber in C_6H_8 , with PhOH and HCl or HBr, the solvent and PhOH being subsequently removed by distillation; (B) a mixture of rubber, PhOH, and a compound capable of generating the isomerising agent, *e.g.*, a Cl, HCl, or S_2Cl_2 derivative of rubber, pinene hydrochloride, NHPh₂,HCl, SnCl₄, HgSO₄, etc.; (c) a mixture of dissolved rubber, e.g., in C_6H_6 , with PhOH and an org. sulphonic acid or a sulphonyl chloride; (D) a mixture of rubber solution with PhOH and dil. H_2SO_4 . D. F. T.

XV.—LEATHER; GLUE.

Sulphito-chrome[-tanning] liquors. C. VAN DER HOEVEN (Collegium, 1932, 843-853).-A sulphitochrome liquor was prepared from 3 mols. of Na2SO3 and 1 mol. of chrome alum and analysed at intervals. No SO_4'' residues and about 0.7 mol. of SO_3/Cr were found in the Cr complex after the liquor had been left for 12 days. During this period the $p_{\rm H}$ val. of the liquor diminished gradually; the Cr absorbed by hide powder from the liquor increased appreciably at first and again about the 7th day, attaining a max. on the 10th day. With 0.5 mol. of Na_2SO_3 , the pptn. val. gradually increased on keeping, but with larger quantities of Na₂SO₂ it quickly reached a max. and then diminished progressively on being kept. The tanning properties of these sulphito-chrome liquors could not be determined from the basicity val. and the composition of the Cr complex; the pptn. and $p_{\rm H}$ vals. are the more useful for this purpose. D. W.

Diphenylamine as indicator in the titration of dichromate, and a method of analysing used [one-bath] chrome[-tanning] liquors. W. ACKER-MANN (Collegium, 1932, 828-830).—An intense blue coloration appears on the addition of Fe^{\cdots} salts to a H₃PO₄ solution of NHPh₂ in presence of a trace of K₂Cr₂O₇. This reaction is used in titrating K₂Cr₂O₇. Used chrome-tanning liquors are oxidised with H₂O₂, excess of the latter is destroyed with Ni salts, NHPh₂ is added, and the dichromate titrated with 0·1N-Fe^{\cdots} salt until the blue colour disappears. D. W.

Soluble solids of tannin solutions and methods of estimation [in tannin analysis]. H. C. REED (J. Amer. Leather Chem. Assoc., 1932, 27, 589—600).— The Riess method (B., 1930, 731) of filtration is criticised. All filtrations should be carried out with one type of paper (Munktell's No. 1 F), which should be pleated and kept full of tannin solution. The tannin solution should be mixed with 2 g. of kaolin, the first 150 c.c. of filtrate should be rejected, and the sol. solids determined in the successive 110-c.c. fractions. All filtrates should be clear except those from ordinary quebracho extract. D. W.

Analysis [of tannin extracts, oils, etc.] by fluorescence with the "Callophane" apparatus. M. AUERBACH (Collegium, 1932, 825—828).—This apparatus can be used to identify quebracho, sulphite-cellulose waste, and pine-bark extracts respectively; up to 1% of mineral oil can be detected in neatsfoot oil, and sharkliver oil is detectable thereby in cod oil. D. W.

Pickling [of hides]. III. Effect on time and temperature. E. R. THEIS and A. W. GOETZ (J. Amer. Leather Chem. Assoc., 1932, 27, 570–577; cf. B., 1931, 1148).—The rate of acid absorption is increased by raising the temp., up to a period of 8 hr.; thereafter it becomes practically const. for temp. $\gg 32 \cdot 2^{\circ}$. Above 32° the acid absorption is decreased as the temp. is

raised. NaCl is absorbed by the skin immediately after immersion in the pickle, and NaCl absorption is unaffected by the time or temp. of pickling. The amount of absorbed acid was increased by increasing the time of immersion of the skins in the pickle, up to a period of 10 hr., after which it was practically const. The final $p_{\rm H}$ of the pickle was increased as both time and temp. were increased respectively, as also was the protein hydrolysis. D. W.

Beaming and tanning of glazed kid. A. GRYN-KRAUT (J. Amer. Leather Chem. Assoc., 1932, 27, 577–589).—A lecture. D. W.

Leather finishes.—See XIII.

PATENTS.

Bating of hides and skins. K. H. GÖLLER (U.S.P. 1,851,763, 29.3.32. Appl., 18.12.28).—Hide wastes and other albuminous substances are mixed with 2—3 times their quantity of H_2O at 20—30°, suitable inorg. salts are added, and the whole is allowed to hydrolyse, preserved with PhMe, mixed with wood dust, and used for bating. D. W.

Manufacture of synthetic tanning substances and method of tanning skins therewith. "PROFIL" (B.P. 383,381, 16.10.31. Fr., 17.10.30).—CO(NH₂)₂ is combined with CH₂O and sulphides such as $(NH_4)_2S$, NH₄HS, $(NH_4)_2S_5$, NH₄CNS, or Ca(CNS)₂, and the products are condensed with sol. sulphonated derivatives of phenols, cresols, naphthols, or aromatic hydrocarbons. The solutions formed are then partly neutralised with oxides or hydroxides of Al, Mg, Na, or K, and used alone or with other tanning materials for tanning raw skins. D. W.

Preservative [for glue].-See XXIII.

XVI.—AGRICULTURE.

Persian agriculture. P. VAGELER (Z. Pflanz. Düng., 1932, 27A, 21-64).—Analytical and mineralogical data of Persian soils are recorded and their agricultural possibilities discussed. A. G. P.

Electrolyte concentration in soils. Relationships between carbonate and silicates in solution. J. FURLANI (Jahrb. wiss. Bot., 1932, 77, 252-281).-In the presence of carbonates, exposure to CO2 considerably increased the solubility of silicates, especially of K, high CO3" content and low temp. being particularly favourable. In the case of Ca silicate high temp. and greater solubility are associated. The buffer capacity of silicate-carbonate solutions is small except when the ratio of carbonate to silicate is very high. Aluminosilicates resembling felspars in composition and prepared by fusion have low solubility but a greater tendency to sol-complex formation than have zeolitic silicates. Changes of $p_{\rm H}$ of the substances with temp. are considerable. With increasing K and Ca contents of silicate solutions there is a transition of SiO, from the gel form to true solution. Effects of temp. changes on the $p_{\rm H}$ of silicate-carbonate solutions are examined. In Ca silicate-carbonate solutions having high proportions of SiO₂ the Ca" of the silicate contributes to the titratable alkalinity. Gel-solchangesinmixed suspensions of silicic acid and CaCO₃, and the corresponding proportions of "bound" H_2O involved are discussed. A. G. P.

Leaching of mineral matter in some Alberta soils. A. LEAHEY (Sci. Agric., 1932, 13, 7-15).-In brown earths examined, leaching of Si, Al, Fe, Ca, Mg, and P was small. In black soils Ca was leached, but little movement of Al and Fe had occurred. In grey woodland soils Ca was leached to considerable depths and translocation of Al and Fe was very marked.

A. G. P.

Solubilisation of soil materials by the repeated extraction method. T. SAIDEL and G. PAVLOVSCHI (Ann. Agron., 1932, 2, 459–503).—Mathematical relationships between the concn. of individual ions in successive soil extracts are examined. Results are applied to considerations of the relative solubility of plant nutrients and of exchange and hydrolytic acidity.

Compositions and properties of organic substances of the soil under a pine stand of the Okhten forest. V. I. KOZHIN (Pedology, Russia, 1931, 26, No. 4, 14—33).—The soil was extracted with Na₂CO₃ and humic acid was pptd. with HCl. The filtrate was neutralised with NH₃ and acidified with AcOH, Cu acetate then being added to ppt. the *apo*crenic acid. To the filtrate NH₃ was added in sufficient quantity to ppt., but not to redissolve, crenic acid. In some soils the sum of humic, *apo*crenic, and crenic acids was < the total org. matter extracted. CH. ABS.

Soil acidity. S. KUHN (Z. Pflanz. Düng., 1932, 27A, 73—84).—The " $p_{\rm H}$ span" [*i.e.*, $p_{\rm H}({\rm H_2O}) - p_{\rm H}({\rm KCl})$] in soils is not related to their CaCO₃ content, or, directly, to the degree of saturation with bases, or to the electrical conductivity. In 360 soils examined, $p_{\rm H}({\rm H_2O})$ was invariably higher than $p_{\rm H}({\rm KCl})$. The " $p_{\rm H}$ span" is influenced by the sol. salt content of soils and by the nature of the adsorbed bases, a high proportion of univalent bases being associated with a wider "span." A. G. P.

Changes in soil reaction during a year and the ratio between the $p_{\rm H}$ value in water and in potassium chloride. L. POZDENA (Z. Pflanz. Düng., 1932, 27A, 87—96).—Variations in $p_{\rm H}({\rm H_2O})$ and $p_{\rm H}({\rm KCl})$ show a general similarity. In soils poor in bases variations are wider than in more saturated soils. In acid soils $p_{\rm H}({\rm KCl})$ is less const. than $p_{\rm H}({\rm H_2O})$, but is always the lower val. In alkaline soils $p_{\rm H}({\rm KCl})$ is the more const. and is sometimes higher and sometimes lower than $p_{\rm H}({\rm H_2O})$. A. G. P.

Overliming acid soils. A. R. MIDGLEY (J. Amer. Soc. Agron., 1932, **24**, 822–836).—Flax, rape, mustard, lucerne, and clovers are susceptible to injury by CaO applied to acid soils in large excess of their actual CaO requirements. Such injury does not result from overliming neutral or alkaline soils. The injury is not due to the high $p_{\rm H}$ produced, to reduction of the availability of other nutrients, or to high nitrite or Ca(HCO₃)₂ accumulations in the soil. The toxicity of overlimed soil disappears with time and is considerably reduced by applications of org. matter or of Ca silicate.

A. G. P.

Exchange reaction of difficultly soluble carbonates with permutits. E. UNGERER (Z. Pflanz. Düng., 1932, 27A, 68—73).—Exchange of bases occurs between $BaCO_3$ or $CaCO_3$ and univalent permutits (Li, NH₄, K). The extent of the reaction increases with the proportion of permutit present, up to a max. val. The activity of the permutits in this respect was in the order Li > NH₄ > K. BaCO₃ was more reactive than $CaCO_3$. The occurrence of alkaline carbonates in soils after treatment with fertilisers containing Na or flooding with sea-water is thereby explained. A. G. P.

Cataphoretic determination of the fertiliser requirement of soil. II. Phosphate requirement. A. REIFENBERG (Z. Pflanz. Düng., 1932, 27A, 84–86; cf. B., 1932, 478).—Results of determinations of the $PO_4^{\prime\prime\prime}$ requirement of soils by the author's method show a general qual. agreement with those of Mitscherlich and of Lemmermann. A. G. P.

Efficiency factors and their use in determining optimum fertiliser ratios. W. A. HUELSEN (J. Agric. Res., 1932, 45, 675-704).—Efficiency factors, representing yield increases per unit nutrient applied, vary with the nature and proportion of other nutrients present. The interdependence of efficiency factors of N, P, and K is examined and a method developed for ascertaining optimum ratios of fertilisers. A. G. P.

Determination of nitrate nitrogen in fertilisers by the copper-zinc dust method. T. ARND (Angew. Chem., 1932, 45, 745; cf. B., 1932, 201).—2.5 g. of CuCl₂,2H₂O are dissolved in 200 c.c. of H₂O and shaken with 100 g. of Zn dust. The Cu–Zn "dust" is quickly filtered, washed, and dried without warming. 0.25—0.5 of the sample is dissolved in 300 c.c. of H₂O, 25 c.c. of MgCl₂ solution are added together with 10 g. of this dust and 1 g. of MgO, and NH₃ is distilled over and determined. C. I.

Irrigation with ammoniacal liquor mixed with town-sewage effluent, 1931. R. WELDERT, R. KOLK-WITZ, H. KÖHLER, and H. BAUSCH (Gas- u. Wasserfach, 1932, 75, 926—930).—Further trials are recorded (cf. B., 1932, 74), in which 3% of ammoniacal liquor was mixed with sewage effluent for irrigation. Temporary injury to young grass occurred, but after its recovery no ill effects on milch cows or flavour in milk were produced. Vegetable crops also were uninjured and yields were increased without residual taste or odour from the gas liquor. A. G. P.

Effect of seed disinfection on the oat crop in Northern Ireland. A. E. MUSKETT and H. CAIRNS (Ann. Appl. Biol., 1932, 19, 462—474).—For the control of smut in oats $CuSO_4$ and Cu carbonates had some val. but caused injury to seed. $CaSO_4$ and S were ineffective. CH_2O gave complete control by sprinkling or by steeping, but the former is less liable to cause injury. Org. Hg preps. were still more successful, probably owing to the retention of the fungicide by the seed after sowing, with consequent protection during the germination and seedling stages. A. G. P.

Experiments with chemical herbicides. G. L. GODEL (Canad. J. Res., 1932, 7, 499-519).—The subject of weed control by chemicals in growing crops

A. G. P.

(mainly with reference to prairie conditions) is discussed. Infestation of wheat, oats, barley, rye, maize, sweet clover, western rye grass, lucerne, and brome grass by stinkweed and wild mustard is reduced by the following (effectiveness in the order quoted): NaClO₃ (best), Na₂Cr₂O₇, Cu(NO₃)₂, CuSO₄, H₂SO₄, Fe sulphate, and NaCl. Under Saskatchewan conditions, only a few species of weeds can be controlled successfully. Wheat and oats are resistant to H₂SO₄ sprays ; barley and spring rye are intermediate whilst maize is susceptible. Other factors discussed are : the sprayer, weather conditions, and experimental (field) technique. H. B.

Oil sprays used in the control of the Californian red scale (*Chrysomphalus aurantii*, Mask.) on lemons. W. EBELING (J. Econ. Entom., 1932, 25, 1007—1012).—The insecticidal efficiency of, and the foliage injury due to, oil sprays was directly proportional to the heaviness of the oil and to the % of oil in the spray, and inversely to the amount of spreader used. The % of unsulphonatable oil had little effect on the insecticidal properties of the spray, but was inversely related to the amount of foliage injury caused.

A. G. P.

Insecticidal studies of Midcontinent distillates as base for pyrethrum extracts. Household sprays. H. H. RICHARDSON (Ind. Eng. Chem., 1932, 24, 1394—1397).—Considerable differences in the boiling ranges of petroleum distillates used in the prep. of household fly sprays are recorded. Max_{*} toxicity of fractions in the range $150-270^{\circ}$ was found in the fraction $203-260^{\circ}$, but the fraction of wider boiling range $192-269^{\circ}$ was equally effective and its production more convenient. Differences in the toxicity of distillates persisted in pyrethrum extracts prepared with them. A. G. P.

Effects of oil spray on the navel orange. D. D. PENNY (J. Econ. Entom., 1932, 25, 1002-1007).--Oil spraying gave more complete scale control and induced better vegetative stimulation than that on fumigated trees. Oil of 100 sec. viscosity applied in autumn suppressed blossom formation to a greater extent than did oil of 55 sec. viscosity. Whale oil soap proved the most satisfactory emulsifier. Oils of viscosity 65 sec. or over was necessary for the control of red spider eggs. A. G. P.

Bordeaux [mixture] deposition. G. L. HOCKENYOS and G. R. IRWIN (Phytopath., 1932, 22, 857-860).— Wetting agents (casein, blood-albumin) increase the uniformity of Bordeaux deposits without decreasing the Cu deposited per unit area. Great irregularity of Cu deposit occurs when sufficient spray is used to cause a run-off. A. G. P.

Water-soluble arsenic in oil emulsion-lead arsenate combination sprays. R. H. ROBINSON (J. Econ. Entom., 1932, 25, 995–1001).—Use of alkaline caseinates in the prep. of oil emulsions leads to the production of injurious proportions of sol. As when the emulsions are combined with Pb arsenate. Similar results are produced by the use of alkaline H_2O for spray mixing. CaO (0.5 lb. per 100 gals.) reppts. the sol. As. In field practice it is recommended to prepare the oil emulsion, add CaO, and stir in Pb arsenate immediately before use. A. G. P.

Fungicidal value of pine-tar oil and copper resinate. E. R. DE ONG (Phytopath., 1932, 22, 861– 864).—Oil-sol. Cu resinate may be used in conjunction with specially treated pine-tar oil and with petroleum oils to produce a combined fungicide-insecticide. A. G. P.

Comparison of tobacco dust with other forms of nicotine in the control of yellow spot disease of pineapples. W. CARTER (J. Econ. Entom., 1932, 25, 1031—1035).—Tobacco dust was more effective than any other nicotine prep. examined. A. G. P.

Fusarium bulb rot of narcissus. P. H. GREGORY (Ann. appl. Biol., 1932, **19**, 475–514).—The steeping of bulbs in CH_2O solutions soon after lifting and prior to the customary hot- H_2O treatment for eel worm i suggested for the control of this disease. A. G. P

Vapour-heat treatment as applied to the control of narcissus pests. R. LATTA (J. Econ. Entom., 1932, 25, 1020-1026).—Narcissus bulb flies may be controlled by this process if 2 hrs.' exposure at 44° is allowed. A. G. P.

Effect of sulphur on wireworms. R. E. CAMPBELL and M. W. STONE (J. Econ. Entom., 1932, 25, 967—970). —Heavy applications of S (1000 lb. per acre) considerably reduced the $p_{\rm H}$ of soil, but did not control wireworm. A. G. P.

Carbon disulphide as a control for wireworms. M. C. LANE and K. E. GIBSON (J. Econ. Entom., 1932, 25, 958—967).—Best results were obtained by 1-oz. injections at distances of 18 in. A loose, damp soil is required in which the diffusion distance is approx. 17 in.

A. G. P.

Attractiveness of various aromatic compounds to adults of the wireworms *Limonius (Pheletes) canus*, Lec., and *L. californicus*, Mann. R. S. LEHMAN (J. Econ. Entom., 1932, 25, 949–958).—Among 150 substances examined, butyric, hexoic, lactic, and valeric acids proved to be sex attractants. A. G. P.

Reactivity between dolomite and superphosphate.—See VII. A. G. P.

PATENTS.

Manufacture of ammonium magnesium phosphatic fertilisers. E. URBAIN (B.P. 383,997, 3.9.31. Fr., 2.12.30. Addn. to B.P. 379,433; B., 1932, 955).— A mixture of an acid phosphate, e.g., superphosphate, and a salt, e.g., $(NH_4)_2SO_4$, which by double decomp. with it forms $NH_4H_2PO_4$, is treated with MgO and sufficient H_2O to supply the H_2O of crystallisation. L. A. C.

Preparation of a mixed fertiliser containing easily assimilable phosphates and nitrogen. CHEM. FABR. KALK G.M.B.H., and H. OEHME (B.P. 384,428, 27.11.31. Ger., 28.11.30).—Superphosphate and NH₃ are passed in the same direction through, *e.g.*, a rotary tube. L. A. C.

Manufacture of colloidal fungicidal metallic composition. H. W. BANKS, 3RD, ASST. to LOOMIS, STUMP, & BANKS (U.S.P. 1,853,397, 12.4.32. Appl., 5.1.26).—Bentonite clay is mixed with ammoniacal

 $CuCO_3$ solution and the NH_3 is removed to ppt. the $CuCO_3$ in the clay. L. A. C.

Ca(NO₃)₂ double salts.—See VII.

XVII.—SUGARS; STARCHES; GUMS.

Extraction of juice from dry cossettes by the press method. G. S. BENIN, A. A. MAKSIMOV, and J. I. SAENKO (Nauk. Zapiski Tzuk. Prom., 1932, 19, 63— 70).—Extraction by pressing is more advantageous than the diffusion process. CH. ABS.

Boiling methods [for sugar juices] in Peru. R. NEUMANN (Internat. Sugar J., 1932, 34, 481).—Calculations showing the less quantity of massecuite in process in the 3- as compared with the 2-massecuite system of boiling, and also its lower steam consumption, are given. In Peru, where the juices during certain periods average 87—88°, the author believes that the 3-strike system should exclusively be used. Its methodical operation facilitates the production of good-quality sugars and exhausted molasses with an appreciable reduction in the quantity of massecuite, giving a greater boiling-house capacity. J. P. O.

Correlation between composition and coloration of sugar solutions on heating. O. REISS (Z. Zuckerind. Czechoslov., 1932, 57, 89–92).—Laboratory experiments are described demonstrating that on heating solutions ($d \ 1.115$) of refined sugars in autoclaves to 150° the more colour is formed the greater are the ash and invert sugar contents. The presence of FeSO₄, NH₄Cl, (NH₄)₂C₂O₄, CaCl₂, and Na glutamate in quantities from 0.01–0.05% on the wt. of sugar very greatly increased the coloration. J. P. O.

Precipitation of calcium carbonate [in sugarjuice clarification]. J. F. WILLIAMS (Internat. Sugar J., 1932, 34, 468-472).-In carbonatating sugar solutions at 50° gassing should be continued until $p_{\rm H}$ 8.6— 9.0 is reached, in order to obtain a min. of Ca" in the filtered liquid. At 30° the min. conductivity occurs at $p_{\rm H}$ 9.3, but the higher temp. is more advantageous, a larger-grained ppt. being formed, giving a better rate of filtration, besides which the troublesome "hydro-sucrocarbonate " is more rapidly decomposed, the intensity of foaming is less, and colour removal is more thorough. Simultaneous addition of CaO and CO2 (as in de Haan's process) conduces to the formation of a more granular ppt., and without the formation of any "hydro-sucrocarbonate." On the other hand, the presence of colloids tends to decrease particle size. J. P. O.

Purification of [sugar] diffusion water. I. B. MINTZ, B. E. KRASILSHCHIKOV, and V. V. UDAVICHENKO (Nauk. Zapiski Tzuk. Prom., 1932, 19, 49–58).—A min. quantity (0.05% on wt. of beets) of CaO removes colloidal impurity and facilitates circulation in the diffusion battery. The Levitzki installation is too complicated. Purification by mixing with filter-press mud is advocated. The optimum $p_{\rm H}$ for coagulation by CaO is 11. CH. ABS.

The Schneider non-sugar formula for determining the purifying effect. W. PAAR (Deuts. Zuckerind., 1932, 57, 795–796).—Use of the following formula expressing the sugar val. of a solution is advocated: Y = 100[1 - (Aq/u)/(Bq/u)], in which Y is the amount of crystal sugar in a massecuite, Aq the purity before purification, Bq the same after purification, and u the "impurity" of the juice. A table gives the vals. of q/u at different purities. J. P. O.

Continuous first carbonatation [of sugar juice], combined with automatic vacuum filtration. P. HONIG and W. THOMSON (Arch. Suikerind. Nederl.-Indië, 1932, III, Meded. No. 15, 1141—1180).—A continuous apparatus which has given satisfactory results in first carbonatation is described, having yielded juice more uniform than in ordinary discontinuous work, whilst the filterability of the ppt. was certainly better. It also demanded less attention, and the cost of the installation was not greater. Leaving this apparatus, the juice went to a Borden thickener and an Oliver filter, the capacity per unit of filtering surface of which was superior to the present system, and the consumption of H_2O at least as low. J. P. O.

Apparatus for the rapid determination of the sugar content of carbonatation scums. V. STANĚK and P. PAVLAS (Z. Zuckerind. Czechoslov., 1932, 57, 97—101).—A large sample of the scums (2—3 kg.) is stirred with H_2O for 3—5 min. in a mixer (having a content of 7—12 litres), then a proportionate vol. of the suspension is treated as usual with aq. ZnCl₂, filtered, and polarised, the proportions of H_2O in the mixer and of suspension drawn off being such that the quantity of scums taken for the polarisation is 30 g. in 100 c.c., as customarily. This method is more rapid than the official one, and should give more accurate results owing to the greater amount of sample employed. J. P. O.

Improving sulphitation [of cane juices]. J. KREYGER (Arch. Suikerind. Nederl.-Indië, 1932, 40, No. 34, II, 707—712).—A pressure vessel was employed from which the milk-of-lime at $d \ 1.074$ was forced by compressed air through a suitable spray nozzle placed in the sulphiter just above the sieve plate. This method of working brought about a good admixture in the sulphiter, and an improved utilisation of the S was realised. A saving of 14% of S was obtained. J. P. O.

Italian molasses. M. CATENACCI (Ind. Sacch. Ital., 1932, 25, 304—319, 353—357).—On comparing the results of complete analyses of the molasses from 45 of the 52 beet-sugar factories in Italy, it was not possible to note any differential characters that would distinguish molasses produced from beets grown in different regions, or from factories using different processes, or again between molasses from factories and refineries. It was possible, however, to observe a strict positive proportionality between the purity and % total N, harmful N, and NH₂-N. Colour, surface tension, viscosity, and org. non-sugar (particularly N) decrease as the $p_{\rm H}$ increases. J. P. O.

A study of caramel colour. J. B. SHUMAKER and J. H. BUCHANAN (J. Sci. Iowa State Coll., 1932, 6, 367-379).—Sucrose was caramelised at 190°, 210°, and 220° for different periods of time, the latter factor being plotted against the loss of wt. observed in the 3 series. It was found that the regions in which definite compounds are formed are the same, these conforming to the requirements for the formation of isosaccharosan, caramelan, and caramelen. Caramels of low mol. wt. possess low colour val., and all caramels behave as electronegative colloids under electrophoresis. J. P. O.

Economics of the production of sugar from wood. H. CLAASSEN (Chem.-Ztg., 1932, 56, 989-991).-No reliable data are available for the cost of wood sugar prepared by either the Scholler or the Bergius process. For the former a yield of about 40% of sugar (on dry wood) or 22-27% of EtOH is claimed and for the latter 78% of dry sugar containing 85% of reducing carbohydrates, i.e., 60% on the wood. Data as to the yields from forest wood are most uncertain, and in published calculations of the costs of the two processes no attention is given to the high costs of transport, cleaning from unusable material, storage, etc. The subject is considered under three headings : (1) Wood-sugar production. Scholler's process yields 3-4% sugar solution which, on evaporation (at high cost), gives dark brown syrup of deficient sweetness and bad flavour, and hence utilisable only in mixed fodders. The Bergius product also can be used only as fodder, as it is tasteless and would cost too much to convert into pure glucose. Bergius' claim that wood sugar has the same feeding val. as starch is incomprehensible; the "starch val." of sucrose is 83% and that of wood sugar would be only 68%. On this basis, the price of unit starch val. as wood sugar is (in Germany) the same as with other saccharine fodder materials, but the appetising effect is absent from wood sugar, which, moreover, could not compete with barley and maize at their world prices. (2) Alcohol production. The price economically possible for EtOH from wood sugar for mixing with petrol barely covers its calc. cost, and if the heavy import duty on petrol were decreased, would fall below such cost. (3) Fodder yeast production. If the price of fermentable sugar as wood sugar is taken at the low figure 14.4 marks per 100 kg. and the costs of other ingredients and of working and overhead charges are included, the cost price of fodder yeast becomes 83.5 marks per 100 kg. This compares very unfavourably with the present market prices of dried brewery yeast (35 marks), fish or meat meal (22), and groundnut or soya meal (10-11). It is concluded that the wood-sugar industry cannot exist without protection. T. H. P.

Determination of reducing sugars in raw sugars etc. by the pot method. H. MAIN (Internat. Sugar J., 1932, 34, 460—461).—Advantages of the author's " pot method" (cf. B., 1932, 956) are that the results appear automatically and definitely, and are independent of any personal source of error. It eliminates the effects of over-heating, and obviates the tedious manipulations of many other methods. Any result obtained can at once be checked by a parallel determination in a solution prepared to contain the amounts of sucrose and invert sugar reported in the sample tested. It is applicable to the purest sugars, as well as to the lowest cane and beet products. Directions are given for ascertaining in an unknown sample in which column of the tables the amount of invert sugar present will be found. J. P. O.

Determination of lævulose [fructose] in crude products. R. F. JACKSON, J. A. MATHEWS, and W. D. CHASE (Bur. Stand. J. Res., 1932, 9, 597-613).-Methods are given for the determination of total reducing sugar and fructose in the liquors obtained in the extraction of fructose from Jerusalem artichokes etc., and in honey, fruit juices, etc. The polysaccharides are first hydrolysed by heating with HCl, the total reducing sugar is determined by Lane and Eynon's method (A., 1923, ii, 193), and the fructose by Nyn's method (B., 1925, 21) or by polarimetric measurements at two temp. (cf. A., 1932, 835). D. R. D.

Properties of large and small grains of [barley] starch. J. GRÜSS (Woch. Brau., 1932, 49, 389–391). —The viscosities of the large (A) and small (B) grains of barley starch, as determined by the adhesion method on starch paste, were approx. 1:3. This relationship corresponded to contents of 12.8% of amylopectin in Aand 34.8% in B. When the dry starch was saccharified by amylase, the starch of A yielded 69.3% of maltose and dextrins with an unsaccharified residue of 26.6%, whilst B, owing to their greater surface, yielded 86.2% of saccharified products with a residue of 10.3% of unsaccharified starch. If the starch was first made into paste form before saccharification, A gave a slightly greater amount of saccharification products. C. R.

Consistency changes in starch pastes. G. V. CAESAR (Ind. Eng. Chem., 1932, 24, 1432—1435).—A "consistometer" is described for measurement of the consistency of starch pastes during heating, the principle involved being the continuous recording of the energy required to rotate stream-lined stirring paddles in the paste. Curves are given showing the changes of consistency with temp. for commercial tapioca flour, and sago, maize, potato, and wheat starches of various concs. The effect of aq. NaOH on the consistency of tapioca flour pastes has been studied in detail. The chemical and physical nature of starch paste is discussed theoretically. J. W. S.

Utilising "Dum" palm.—See XII. Fermentation of molasses.—See XVIII.

XVIII.—FERMENTATION INDUSTRIES.

Effect of type of yeast on the quality and bouquet of wine. G. MEZZADROLI, A. AMATI, and L. SGARZI (Giorn. Biol. appl. Ind. chim., 1931, 1, 161—171; Chem Zentr., 1932, ii, 1089—1090).—With white wine marked differences in composition were observed when *Saccharomyces cerevisiæ* and *S. ellipsoideus* were used, and when the fermentation temp. was 28° instead of 22°. A. A. E.

De-acidification of spirits. C. LUCKOW (Pharm. Zentr., 1932, 73, 785–787).—Examples are given of the successful treatment of brandy, wines, and the like with $CaCO_3$ for the removal or reduction of acidity. E. H. S.

Determination of menthol in brandy. A. HANAK (Arch. Pharm., 1932, **270**, 435—441).—The 3-fold diluted (H₂O) brandy is shaken with CCl_4 and the increase in vol. of the CCl_4 measured; the results are compared with those obtained using solutions of menthol in dil. EtOH of known concn. The apparatus used is described. H. B.

Extractives of rum. W. PARTRIDGE (Analyst, 1932, 57, 772).—The total solids vary from 0.30 to 1.13% wt./vol., and usually from 0.30 to 0.80%. T. McL

Dehydration of [ethyl] alcohol. E. MERCK ; also USINES DE MELLE (Angew. Chem., 1932, 45, 758, 759).— Claims for priority, and of patent rights (cf. B., 1933, 11), are made. H. F. G.

Dehydration of [ethyl] alcohol. R. FRITZWEILER and K. R. DIETRICH (Angew. Chem., 1932, 45, 758— 759, 759).—A reply to the above. H. F. G.

Utilisation of molasses by fermentation to higher alcohols. R. ARROYO (Internat. Sugar J., 1932, 34, 482).—A native strain of *B. acetobutylicum* was found capable of converting 27—30% of the total sugars present in final cane molasses into a mixture of Bu^aOH, COMe₂, and EtOH. An average yield of 28.5% was obtained on the wt. of total sugars present, the three products being produced simultaneously in the ratio of 16:4:1. An average laboratory yield obtained from 1 gal. of ordinary final molasses was: Bu^aOH 1.47 COMe₂ 0.38, EtOH 0.10 lb. J. P. O.

Acetone-butyl alcohol fermentation. V. K. SCHAPOSCHNIKOV (Bull. Nauch-Issledov. Khim. Farm. Inst., 1930, 12–13).—Fermentation of steamed and autoclaved maize by Chistyakov's bacteria (28–32 hr.) is described. CH. Abs.

Sugar from wood.—See XVII. Pepsin wines.— See XX.

XIX.—FOODS.

Testing dog-biscuit flours. A. S. CARLOS (Food, 1932, 2, 95—96).—In order to control the wide variations in the hardness of dog biscuits derived from the usual low-grade flours, a correlation of this factor with the N content of the flour has been studied. Three recorded tests show the breaking strain of biscuits to increase from 36 to $161 \cdot 3$ lb. with a rise in the N content of the flour from $1 \cdot 35$ to $2 \cdot 76\%$. An apparatus for carrying out the test is described; it consists of a 20-lb. pivoted lever arm with a sliding 3-lb. wt. applying pressure through an attached stud. H. R. J.

Heat-coagulation of milk. II. Influence of various added salts on heat-stabilities of milks of different concentrations. B. H. WEBB and G. E. HOLM (J. Dairy Sci., 1932, 15, 345-366).-The effect of temp. on the time of coagulation of conc. skim milks may be represented by a logarithmic curve. More conc. milk is less affected by heat than less conc. milk. Effects of preheating on heat-stability are recorded. The heatstability of milks having 18% of solids-not-fat could not be predicted from that of the original fresh samples. Two classes of milks are differentiated, viz., those stabilised by positive and those by negative electrolytes. In milks of low concn. electrolytes exhibit crit. ranges of concn. within which their effects on heat-stability are relatively great. A. G. P.

Nephelometric method for determining milk fat. M. HAHN, W. STRAUSS, and K. N. KYRIAZIDIS (Z. Hyg., 1932, 114, 347—357).—Method and apparatus are described. Results agree closely with Gerber vals. Pasteurisation does not affect turbidity, but boiling leads to altered vals. A. G. P.

Irradiated milk. Influence of intensity and character of the radiations on the antirachitic potency. G. C. SUPPLEE, H. H. BECK, and M. J. DORCAS (J. Biol. Chem., 1932, 98, 769-782).—Reflected, unscreened radiations from C and quartz-Hg vapour arcs produce a higher antirachitic potency than when screened by mica etc. Within the antirachitic range a definite intensity is necessary for efficient utilisation of energy for activation; the increase in potency then follows definite principles, but is influenced to a certain extent by the character of the applied energy.

F. O. H.

Substances adsorbed on fat globules in cream and their relation to churning. I. Churnability of artificial emulsions prepared with the known emulsifying agents of cream. H. F. WIESE and L. S. PALMER (J. Dairy Sci., 1932, 15, 371–381).—Stable emulsions of butter fat were prepared in dispersions of Ca caseinate, lactalbumin, globulin, and phospholipins. These resembled whole milk, but showed abnormalities. either in cream separation or churning. Best cream separation occurs from phospholipin emulsions, and best churning from those made with lactalbumin. A. G. P.

Effect of temperature of pasteurisation on the acid coagulation of skim milk. L. M. THURSTON and J. L. BARNHART (J. Dairy Sci., 1932, 15, 401-405).— The firmness of curd produced by lactic organisms in raw skim milk pasteurised at $62 \cdot 8$ - $73 \cdot 9^{\circ}$ was approx. twice that from similar milk pasteurised at $79 \cdot 4$ - 85° . Rising temp. of pasteurisation (notably when $> 68 \cdot 3^{\circ}$) reduced the [H] and the amount of acid present at the time of coagulation. A. G. P.

Acidity of Gorgonzola and Stilton cheeses. W. PARTRIDGE (Analyst, 1932, 57, 771–772).—The acidity may vary from 0.36 to 2.14%, calc. as lactic acid. Hypersensitive subjects are apt to object to the flavour when > 1.5% of acid is present. T. McL.

Sulphurous acid in dried fruits. P. F. NICHOLS (J. Assoc. Off. Agric. Chem., 1932, 15, 360—362).—The volumetric and gravimetric methods of determining SO_2 in dried fruits are equally reliable; I is used as the oxidant in both cases. No non-S, I-reducing substances were distilled over, using either HCl or H_3PO_4 . The higher results obtained using HCl were probably due to an effect on the dissociation of the sulphite compounds. The accuracy of the volumetric method is improved by placing the receiver in ice- H_2O . W. J. B.

Effect of adjusted $p_{\rm H}$ on the extraction of pectin and ash from fruit. L. A. SALINGER (J. Assoc. Off. Agric. Chem., 1932, 15, 389—392).—Adjustment of the $p_{\rm H}$ of an infusion of raspberries in sugar solution from $3 \cdot 6$ to $2 \cdot 2$ (approx.) with subsequent boiling for 1 hr. and filtration gave a slightly lower extraction of pectin and higher extraction of ash. When HCO₂H was used the effect was > when tartaric acid was used.

W. J. B.

Soluble solids in fruit products. L. H. MCROBERTS (J. Assoc. Off. Agric. Chem., 1932, 15, 375—389).—The refractometer is the most reliable means of determining the sol. solids, especially in the presence of considerable amounts of sucrose. It is assumed that the sol. solids have the same n in solution as an equal concn. of sucrose. The correction for the tartaric and citric acids in fruits is negligible. Alternatively, drying in vac. at 70° is recommended. W. J. B.

Vitamin-C in canned citrus fruits. C. R. FELLERS and P. D. ISHAM (J. Home Econ., 1932, 24, 827-832). —Canned fruits after 9 months' storage contained as much vitamin-C as the fresh fruits. CH. ABS.

Vitamin- B_1 and $-B_2$ contents of raw and cooked broccoli. H. E. MUNSELL and H. B. KIFER (J. Home Econ., 1932, 24, 823–826).—Cooking destroys 50% of the vitamin- B_1 and some of the $-B_2$. CH. ABS.

Iron loss in cooking broccoli. M. G. FLANLEY and E. M. JOHNSON (J. Home Econ., 1932, 24, 821–823).— Raw broccoli contains 0.00106% Fe; 51% is lost by cooking for 20 min. CH. ABS.

Bacteriological condition of ice for consumption. W. C. DE GRAAFF (Pharm. Weekblad, 1932, 69, 1124—1132).—The Dutch regulations of 1919 are discussed, and results of the examination of many commercial samples are given. It is proposed that the streptococcus titre (min. vol. in which streptococci can be detected after 24 hr. at 37° in glucose broth) should be provisionally fixed at 0.001 c.c. (max.). H. F. G.

Viscosity etc. of flour dough.—See I. Analysis of edible oils.—See XII. Sugar from wood.—See XVII. Milk waste.—See XXIII.

PATENTS.

Malted milk process. A. A. Scott, Assr. to NESTLÉ'S FOOD Co., INC. (U.S.P. 1,851,988, 5.4.32. Appl., 9.5.29).—A process for converting malted milk syrup into spherical hard porous balls is claimed. The product has a thickened outer skin which prevents H₂O absorption; a chocolate coating may also be added if desired. E. B. H.

Lactobacillus acidophilus milk product and its manufacture. S. M. FARR (U.S.P. 1,851,165, 29.3.32. Appl., 16.5.27).—To increase the bacterial nos. of acidophilus milk, the acidity is periodically reduced from 0.7—0.8% to 0.1—0.3% as lactic acid by the addition of an alkaline solution. The casein is then pptd. by rennin and separated as a bacteria-impregnated curd by centrifuging. This is mixed with butter, NaCl, sugar, or honey and covered with an air-impervious coating, such as chocolate. E. B. H.

Protection of fresh fruits against blue mould and the like. E. M. BROGDEN and M. L. TROWBRIDGE, Assrs. to BROGDEX Co. (U.S.P. 1,852,144, 5.4.32. Appl., 15.12.24. Renewed 21.3.31).—Development of mould on fruit during storage is prevented by washing in a warm solution containing $Na_2B_4O_7$ and $NaHSO_3$. Machinery for the process is described. E. B. H.

Mixing apparatus [for feed-stock etc.]. Pasteurising apparatus.—See I.

XX.—MEDICINAL SUBSTANCES; ESSENTIAL OILS.

Loss in activity and formation of turbidity in pepsin wines. W. BRANDRUP (Pharm. Ztg., 1932, 77, 1334; cf. B., 1932, 623).—Milk, gelatin, and eggalbumin, all of which ppt. most of the pepsin, cannot be used for the clarification of pepsin wine. Turbidity in the finished wine is caused only by contact with metals, and if a metal filter has to be used then the pepsin should be added afterwards. If a tinned Seitz filter is used the previous addition of HCl is not effective in diminishing subsequent turbidity. A silvered filter does not produce turbidity. E. H. S.

Determination of iodine in tincture of iodine and in Lugol's solution. C. STAINIER and L. LECLERCQ (J. Pharm. Belg., 1932, 14, 283–285; Chem. Zentr., 1932, ii, 1049).—Free I is determined in the usual way, and total I by means of KIO₃ and CaCO₃. A. A. E.

Determination of nitroglycerol in solution. N. SCHOORL (Pharm. Weekblad, 1932, 69, 1173—1177).— For the 1% solution of the Dutch Pharmacopœia the following method is sufficiently accurate for control purposes: 10 c.c. are added to 25 c.c. of 4N-NaOH, and when the solution becomes clear 5 c.c. of 10% CuSO₄ solution, 100 c.c. of H₂O, and 2 g. of Al are added. The NH₃ evolved on distillation (for 30 min.) is absorbed in 5 c.c. of 0.1N-HCl, and the excess of acid is titrated. The colorimetric method, using salicylic acid, is not sufficiently accurate. H. F. G.

Essential oil of white pine (Podocarpus dacrydiodes). G. J. E. HUNTER (J.S.C.I., 1932, 51, 394– 397 T).—Distillation of twigs and leaves gave 0.16%of oil $[d_{20}^{20} 0.9088, n_{20}^{20} 1.4979, \alpha_{15}^{15} -12^{\circ},$ free acid (as AcOH) 0.24%, esters (as $C_{10}H_{17}$ ·OAc) 1.5%, alcohols (as $C_{10}H_{18}O$) 8.5%, aldehydes 1-2%, acids and phenols 1%] from which terpene alcohols were absent. Dehydrogenation of the sesquiterpene mixture (dicyclic 26%, tricyclic 73.8%) yielded azulene and cadalene. Cadinene (or an isomeride) was present and possibly caryophyllene. About 89% of sesquiterpenes containing a methylene linking were present, and on hydrogenation this group was the first to be attacked. E. H. S.

Essential oil of Dacrydium cupressinum. M. S. CARRIE (J.S.C.I., 1932, 51, 367–368 T).—The oil contained 20% of terpenes (cf. *ibid.*, 1925, 44, 42 T), mostly α -pinene, 9.4% of a tricyclic sesquiterpene (b.p. 132– 135°/20 mm., d_{20}^{20} 0.9238, n_D^2 1.5010, $[\alpha]_D$ +17.57°) from which no cryst. derivative could be obtained, and 31% of a liquid diterpene fraction (b.p. 150–154°/1 mm., d_{15}^{15} 0.9763, n_D^{15} 1.5211, $[\alpha]_D^{15}$ +15.17°) assumed to contain 85% of a tetracyclic diterpene and 15% of a saturated diterpene. E. H. S.

Essential oil of Libocedrus Bidwillii. K. S. BIRRELL (J.S.C.I., 1932, 51, 397–398 T).—Distillation of 2 samples of leaves and twigs gave 0.24% and 0.21%of oil having, respectively: $d^{16} 0.8795$, $d^{20} 0.8660$; $n_D^{16} 1.4880$, $n_D^{2} 1.4763$; $[\alpha]_D^{15} -19.01^{\circ}$, —; terpenes (α - and β -pinene) 35%, 62%; sesquiterpenes 45%, 18%. Sample 2 was from foliage of much less mature trees. The sesquiterpene fraction was probably a mixture of three individuals; cadalene was the only dehydrogenation product and zingiberene and a diterpene were possibly present. Cedrene was absent (cf. *ibid.*, 1923, 42, 350 T). E. H. S.

Tenth Report of the Essential Oil Sub-Committee to the Standing Committee on Uniformity of Analytical Methods. Determination of citronellal (Analyst, 1932, 57, 773—774; cf. B., 1932, 161).— The NH₂OH method of determination is standardised. The reaction is carried out at 0° and HCl is titrated as liberated with 0.5N-KOH (in 90% EtOH) using *p*-dimethylaminoazobenzene as indicator. When the red colour no longer develops, the mixture is set aside at room temp. for 1 hr. before completing the titration. A correction factor of 1.008 is required since the endpoint of the titration occurs at a $p_{\rm H}$ different from that of NH₂OH,HCl. T. McL.

Occurrence of a number of varieties of Eucalyptus radiata (E. numerosa) as determined by chemical analyses of the essential oils. A. R. PENFOLD and F. R. MORRISON (J. Proc. Roy. Soc. New South Wales, 1932, 66, 181-193).-Analysis of the essential oils from the leaves and terminal branchlets of E. radiata (from Nullica, New South Wales) reveals the existence of 3 varieties, indistinguishable botanically, characterised by the following compositions of the essential oils : (i) type : piperitone (I) 5-10, phellandrene (II) 60-80, cineole (III) 0%, and piperitol (IV); (ii) variety A: (I) 50, (II) 40, (III) 0%, and (IV); (iii) variety B: (I) 20-30, (II) 40, (III) 12-15%, and (IV). The sucker growths from the stumps of felled trees contain the same type of oil as the original leaves. The crushed leaves of varieties A and B may be distinguished from those of the type by the more pronounced odour of (I). The varieties with the larger content of (I) may be of economic importance. R. S. C.

Determination of cineole in eucalyptus oil. P. A. BERRY and T. B. SWANSON (Perf. Ess. Oil Rec., 1932, 23, 412).—F.-p. and o-cresol methods both yield closely similar results, but the former is the more rapid although limited to oils containing \lt 70% cineole. The o-cresol method (suitable for oils containing > 50% cineole) is recommended as the better method for general use. Using oils of standard quality the error of either method should not exceed $\pm 1\%$ cineole. Cuminal and cryptal when present in amounts > 8% cause higher results for the apparent cineole content ; terpineol $\Rightarrow 12.5\%$ does not affect the result. E. H. S.

[Physical constants of] o-cresol[-cineole compound]. F. M. POTTER and H. B. WILLIAMS (Perf. Ess. Oil Rec., 1932, 23, 414).—The f.p. of cineole is $1\cdot3^{\circ}$ (cf. B., 1933, 92) and of the o-cresol compound $55\cdot75^{\circ}$. The following figures for the crystallising point and purity, respectively, of o-cresol are : $31\cdot0^{\circ}$, $100\cdot0^{\circ}$; $30\cdot7^{\circ}$, $99\cdot5^{\circ}$; $30\cdot4^{\circ}$, $99\cdot0^{\circ}$; $30\cdot1^{\circ}$, $98\cdot5^{\circ}$.

E. H. S.

Nitration and sulphonation equipment.—See I. B.-P. test for cod-liver oil.—See XII. Tobacco dust [as insecticide].—See XVI.

PATENTS.

Preparation of radioactive healing media. E. SIMON (B.P. 384,124, 3.2.32. Czechoslov., 26.3.31).— Textile fabric impregnated with a solution of $RaCl_2$ is treated with a solution of a pptg. agent, e.g., Na_2SO_4 , thus depositing an insol. radioactive salt on or in the fabric. Thereafter the fabric may be given a protective coating of, e.g., wax. E. H. S.

[Manufacture of a] condensation product of diethyl ester of methylenedisalicylic acid di-*p*aminobenzyl ether [ethyl 4 ; 4'-di-*p*-aminobenzyloxydiphenylmethane-3 : 3'-dicarboxylate] with pyruvic acid. S. L. SUMMERS (U.S.P. 1,813,364, 7.7.31. Appl., 30.10.24).—Methylenedisalicylic acid is esterified with *p*-nitrobenzyl chloride, reduced with hyposulphite, and esterified with EtOH. The ester is useful against rheumatism and arthritis and in cases of gallstones and diabetes. C. H.

Production of organic salts of bismuth. Boot's PURE DRUG Co., LTD., F. L. PYMAN, and A. P. T. EASSON (B.P. 381,362, 29.10.31 and 6.1.32).—Oil-sol. Bi salts of 1-carbalkoxy-1-cyclohexylacetic acids and 1-acyloxycyclohexyl-1-carboxylic acids are described. In the examples the alkyl is Et (m.p. 22—23°), Pr (m.p. 41—42°), Bu (m.p. 45—46°), and the acyl is Ac (m.p. 57—58°, from the hydroxy-acid, m.p. 108—109°). The products are preferably purified by dissolution in C₆H₆. C. H.

Cosmetics. H. W. FIEDLER (B.P. 383,631, 14.5.31. Ger., 21.5.30).

Colloidal I.-See VII. Disinfectant.-See XXIII.

XXI.—PHOTOGRAPHIC MATERIALS AND PROCESSES.

Reflection densitometer for photographic papers. C. W. KENDALL (Rev. Sci. Instr., 1932 [ii], **3**, 668—674). —The construction of an instrument based on the inverse square principle is described. C. W. G.

PATENTS.

Photographic emulsions. I. G. FARBENIND. A.-G. (B.P. 384,188, 19.5.32. Ger., 20.5.31).—Emulsions are stabilised by adding, before coating, 0.005-0.01% of one or more sec. or tert. aryl- or aralkyl-amines, e.g., NHPh₂, NPh₃, NPh₂Me, in H₂O or EtOH solution. J. L.

Production of coloured photographs. F. LEJEUNE (B.P. 384,312, 30.4.31).-Gelatin relief images of the separate colour components of a picture are prepared, soaked in appropriate metal salt solutions, and brought into close contact, with mechanical pressure if desired, with a receiving gelatin layer, which, after each imbibition, is treated with appropriate solution to ppt. the metal salt. The colours blue, yellow, and red are produced in order, using a ferrocyanide, a chromate or dichromate, and a Ni salt in the relief, and developing the print with an Fe salt, Pb(NO₃)₂, and dimethylglyoxime, respectively. The developing compounds may be incorporated in the receiving layer, when coating, in H₂O-insol. form as PbCO₃, by adding dimethylglyoxime, and by treating the coating with aq. FeCl_a. J. L.

Colour photography and kinematography. J. E. THORNTON (B.P. 384,324, 3.3.31).—The bi-pack principle is extended to 4-colour photography, 4 films in superimposed pairs or 2 double-width films superimposed being used. A grid mirror of the partly reflecting, partly transmitting type is used to divide the image into 2 parts, with suitable lens systems. J. L.

Sensitive negative material for 4-colour photography and kinematography. J. E. THORNTON (B.P. 384,336, 3.3.31. Cf. B.P. 384,324; preceding abstract).— In the 4-picture system, the front 2 pictures are on slowspeed emulsion sensitive to blue and green light and of low Ag content and very transparent, and the back 2 pictures on high-speed panchromatic emulsion sensitive to yellow and red. If 4 films are used 4 correspondingly sensitised emulsions may be used. In every case the

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yellow and red will be behind the blue and green negatives, respectively. Suitable filters are incorporated by the usual methods. J. L.

Colour photography for kinematograph and other forms of pictures. J. E. THORNTON (B.P. 383,976, 11.7.31).—A 2-colour lenticular film process is described. [Stat. ref.] J. L.

XXII.—EXPLOSIVES; MATCHES.

Rate of burning of colloidal propellants. F. R. W. HUNT and G. H. HINDS (Proc. Roy. Soc., 1932, A, 138, 696—707).—The experimental data given by Crow and Grimshaw (B., 1932, 289) have been re-examined, with the object of deciding between the conflicting laws recently deduced for the rate of burning of colloidal propellants (*loc. cit.*, and B., 1930, 395). A method of analysing pressure-time curves obtained from closedvessel experiments is developed, whereby two functions of the pressure are plotted against time. One yields a straight line if the rate is proportional to d, the other if it is proportional to the pressure. Evidence of a departure from the pressure law is found with only one of the four propellants used by Crow and Grimshaw. L. L. B.

Nitration etc. equipment.—See I. Determining nitroglycerol in solution.—See XX.

PATENTS.

Percussion cap. H. E. KAISER, ASST. to HERCULES POWDER Co. (U.S.P. 1,852,054, 5.4.32. Appl., 24.6.31). —A priming charge consists of 5—80% of diazodinitrophenol and 1—40% of *p*-phenylenediamine dipicrate, with or without $Ba(NO_3)_2$ and ground glass in equal amounts. W. J. W.

Manufacture of igniting charges for detonating and percussion caps. E. von HERZ (B.P. 384,608, 15.7.32. Appl., 15.7.31).—Heavy-metal salts and esters of nitrotetrazole are used alone, or in combination with other initiating explosives or O_2 carriers. Limiting charges, with respect to tetryl, of basic Pb, Hg, and Ag nitrotetrazoles are 0.02, 0.006, and 0.005 g., respectively, as compared with 0.02 g. for Pb azide. Addition of 10 and 20% of Hg nitrotetrazole to Hg fulminate lowers the limiting charge of the latter from 0.23 to 0.04 and 0.02 g., respectively. W. J. W.

Explosives capsules for blasting detonators and the like. O. MATTER (B.P. 383,642, 24.2.31).—The container consists of a rust-resisting steel alloy and a primary charge of Pb azide. H. R.-D.

Stabilisation of blasting explosives. V. H. WILLIAMS, and IMPERIAL CHEM. INDUSTRIES, LTD. (B.P. 383,630, 13.5.31 and 15.2.32).—The deleterious effect of Ca and Mg salts in NaNO₃, used for blasting explosives, on the stability of the latter is overcome by incorporating 0.5-2% of a weakly alkaline phosphate, especially (NH₄)₂HPO₄. The stability of explosives not containing NaNO₃ is also improved by addition of the phosphate. W. J. W.

[Non-corrosive] priming mixture [for shot shells]. J. D. MCNUTT, Assr. to WINCHESTER REPEAT-ING ARMS CO. (U.S.P. 1,851,398, 29.3.32. Appl., 21.6.30). —The mixture contains, approx., Hg fulminate 45, basic Pb nitrate 8, $Ba(NO_3)_2$ 30, Sb sulphide 5, Ca silicide 4, and Pb(CNS)₂ 8%. W. J. W.

XXIII.—SANITATION; WATER PURIFICATION.

Detection of ethylene oxide in residual gas. W. DECKERT (Angew. Chem., 1932, 45, 758; cf. B., 1932, 1010).—The gas is passed through 1—2 c.c. of 40% KCNS solution, warmed in the hand to about 30°. If phenolphthalein is used as indicator, 50 c.c. of air containing 0.5 g. $(CH_2)_2O$ per cu.m. give a positive reaction within 2 min. H. F. G.

Operating Dunbar sewage filters. H. L. THACK-WELL (Eng. News-Rec., 1932, 109, 676-677).—A small plant at Tyler, Tex., designed for a max. flow of 10⁶ gals./ day and consisting of settling tank, primary and secondary Dunbar filters, with sludge digestion and covered drying beds, is described. Operating difficulties due to serious overloading and acidity caused by infiltration of highly acid ground-water have been encountered.

C. J.

Protection of operatives in water-works from injurious effects of calcium hydroxide. H. LEHMANN and A. HELLER (Gas- u. Wasserfach, 1932, 75, 967—970). —Two treatment plants were studied, in one of which $Ca(OH)_2$ from paper bags was emptied by hand through a trap in the floor with no special ventilating device. In the other a closed, automatic bag-opening machine was used with ventilating exhaust. The air contained up to 0.30 mg. CaO per litre, producing discomfort to anyone in the room, and 0.07 mg., respectively. Tests were also made with a glass filter with pores of known size, the collected dust being photographed. C. I.

Dissolved oxygen and oxygen consumed in lake waters of N.E. Wisconsin. C. JUDAY and E. A. BIRGE (Trans. Wisconsin Acad. Sci., 1932, 27, 415–486).— Dissolved O_2 was $3 \cdot 4$ — $12 \cdot 4$ mg. per litre. The vertical distribution of O_2 was studied. The O_2 gradients showed marked differences. The O consumed was $1 \cdot 2$ — $34 \cdot 5$ mg. per litre. CH. Abs.

Biological control as affecting [waterworks'] plant operation. C. WILSON (J. Amer. Water Works' Assoc., 1932, 24, 1792—1799).—Systematic observations of the biological condition of reservoirs etc. are useful in preventing or eliminating tastes and odours due, directly or indirectly, to plankton organisms.

C. J.

Iron and lime in removal of manganese [from water]. E. C. CRAIG, E. L. BEAN, and R. W. SAWYER (J. Amer. Water Works' Assoc., 1932, 24, 1762–1780). —Mn is completely removed from soft, coloured water at Providence, R.I., by treatment with copperas and CaO, maintaining $p_{\rm H}$ 10 for coagulation. C. J.

Report of Committee on Control of Tastes and Odours [in water supplies]. ANON. (J. Amer. Water Works' Assoc., 1932, 24, 1738—1749).—The limitations of the various methods adopted for the determination and elimination of offensive tastes and odours are described. Methods of determination recommended for general use in plant control are given, together with a method for determining PhOH in water supplies and coke-oven effluents. C. J.

Sterilisation of water for domestic use by means of metallic silver. A. KLING (Bull. Acad. Méd., 1932, 107, 830-839; Chem. Zentr., 1932, ii, 1051).-In contact with Ag, H₂O dissolves about 10⁻⁵ g. per litre ; the solution is toxic to B. coli and B. typhosus. A. A. E.

Use of lead and copper tubes for drinking-water pipes. G. NACHTIGALL (Gas- u. Wasserfach, 1932, 75, 941-949).-The Pb and Cu contents of Hamburg H₂O which has been allowed to remain in Pb and Cu pipes for some months has been determined. The H₂O has pH 7.3-7.4, and contains 49-60 mg. Cl', 52 mg. SO3", 7 mg. O2, and 22 mg. CO2 per litre. After being for 9 hr. in new Pb pipes the first 500 c.c. of H₂O drawn from the tap contained > 2 mg. Pb per litre ; 4 months after installation of the pipes the val. was 0.5 mg., and after 6 months 0.3 mg. per litre. The corresponding val. for Cu pipes was in all cases 3 mg. per litre, and even several years later a similar amount of Cu was found in the H₂O. No effect on the health of the users of this H_oO has been observed. A. R. P.

Colorimetric determination of lead, especially in water. O. LIEBKNECHT and L. GERB (Angew. Chem., 1932, 45, 744-745) .- In order to stabilise a PbS coloration and to permit direct titration methods a protective colloid is required. A suitable reagent is 1 c.c. of 1% gum arabic solution, 0.5 c.c. of 30% AcOH, and 0.1 c.c. of 10% Na2S,9H2O solution. A good alternative to the use of a known Pb solution is to match the colour to that of an alkaline humate solution standardised by Pb. C. I.

Factors affecting the o-tolidine test [for water]. E. W. STEEL (Proc. Texas Water Works Short Sch., 1931, 13, 79-80).-With proper apparatus the test is sensitive to 0.005 p.p.m. of excess Cl. If the H_oO is very alkaline a blue colour appears; more o-tolidine may be added without affecting the accuracy. $H_2O < 17^\circ$ or $> 35^{\circ}$ gives slightly incorrect results. Direct sunlight causes low vals. NO2 ions (2-6 p.p.m.) cause false colour; Fe and Mn interfere under certain conditions. CH. ABS.

Anaërobic stabilisation of milk waste. A. M. BUSWELL, C. S. BORUFF, and C. K. WIESMAN (Ind. Eng. Chem., 1932, 24, 1423-1425).--Raw, unsettled, and untreated buttermilk or whey wastes can be stabilised by anaërobic digestion when fed at rates of 1/20-1/30 of the fermentation tank vol. per day. Ripe sewage sludge is used as the seeding agent and asbestos fibre may be added as a contact material. No sludge is produced, as 95% of the org. matter is gasified, yielding 8-12 cu. ft. of gas (550 B.Th.U.) per lb. of dry solid added. The effluent containing the remaining 5% can be dealt with on trickling filters. The capital cost of such complete treatment plant is estimated at \$8.7 per lb. of solids treated per day. C. J.

Protective filming of liquids. C. W. B. JEPPE and B. SEGAL (J. Chem. Met. Soc. S. Afr., 1932, 33, 131-136).-Films of fuel oil 0.001 in. thick. reduce the rate of evaporation of "standing" H2O by 85-90% under mine conditions where the temp. is high and ventilation rapid ; the films have an effective life of 3-4 days and are readily renewed. Spraying oil atomised with H₂O on the mine walls to provide oil films

0.001 - 0.002 in. thick serves to improve considerably dust conditions; these films require renewal only at intervals of several weeks. Thin oil films are also satisfactory for preserving the titre of H2O2 and NaHSO3 solutions for > 1 week. A. R. P.

White-water for paper mills .-- See V. Determining PO4" [in H2O].-See VII. Irrigation with sewage-gasworks effluent mixture .-- See XVI.

PATENTS.

Refuse destructors. WOODALL-DUCKHAM (1920), LTD., and S. SYMINGTON (B.P. 384,168, 11.4.32) .- In a water-jacketed furnace the joints connecting the shell of the shaft with the upper part of the water-jacket are protected from damage due to the impingement of hot gases by a protective ring of refractory material. C. J.

Sewage-disposal plant. A. S. ADAMS, Assr. to W. L. PEARSON, H. C. McCall, J. P. MILLER, and L. T. MESSER (U.S.P. 1,851,030, 29.3.32. Appl., 9.12.29).-A form of closed settlement tank is claimed in which the upper portion is reduced in width to form a gastight chamber. The influent and effluent channels and the dosing tank are also enclosed and the former are divided into separate gastight sections by suspended curtain baffles the lower edges of which are below the sewage level. Suitable means for observation and sludge removal are provided. C. J.

Disinfectant and preserving agent. F. GÜNTHER, K. VIERLING, and W. PUNGS, Assrs. to WINTHROP Снем. Со. (U.S.P. 1,851,007, 29.3.32. Appl., 30.4.27. Ger., 20.4.26).-A compound, crystallising from C6H6 (m.p. 114-115°), and other oily constituents (b.p. > 200°) obtained as by-products in the synthetic manufacture of thymol from *m*-cresol are claimed as suitable disinfectants for tooth-pastes etc., and as C. J. preservatives, e.g., for glue.

Improvement of air conditions in workrooms in which artificial products of viscose are manufactured. W. Schulz, Assr. to Amer. Glanzstoff CORP. (U.S.P. 1,851,873, 29.3.32. Appl., 23.8.30. Ger., 30.9.29).-A highly dispersed gaseous alkaline product, e.g., 0.1% NH₃, is added to the H₂O used as humidifying agent. C. J.

Sterilisation of liquids [especially drinking water]. G. A. KRAUSE (B.P. 384,466, 25.1.32. Ger., 29.1.31).—An oligodynamically active metal is supplied to H_oO from electrodes, the c.d. used being so low that no electrolytic action takes place other than dissolution of the metal (e.g., Ag, Cu) from the anode. The electrodes may be kept in motion during the process and the anode brushed or washed to remove deposits. The electrodes may consist of small pieces of metal in perforated baskets. L. A. C.

Treatment of waste waters [containing sulphides]. J. W. SCHWAB and C. E. BUTTERWORTH, Assrs. to KOPPERS Co. (U.S.P. 1,851,987, 5.4.32. Appl., 22.8.29).-The polluting "bleed" water resulting from the Frasch process of S mining can be freed from dissolved sulphides by the action of CO₂, e.g., flue gases, and subsequent aëration. C. J.

Sterilisation of liquids. Diffusing gas into liquid.—See I.