THE JOURNAL OF THE TEXTILE INSTITUTE

ABSTRACTS

LIST OF ABSTRACTORS

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In some instances a second reference is given in parentheses as "(through *Chem. Abs.*, 1944, 34, 269)", which means that the abstract has been taken from another abstracting Journal and the original publication is not obtainable at the Textile Institute.

In this Section the abstractors give digests of reports published in technical and scientific periodicals of the whole world. The opinions and claims expressed in the abstracts are those of the original authors and it must be understood that the staff of the Textile Institute do not necessarily endorse them.

1—FIBRES AND THEIR PRODUCTION

(B)—ANIMAL

Merino Skinfolds: Origin. N. de la Harpe. *South African Merino Breeders' J.*, 1944, 6, No. 1, 19-20. Selection for greater quantity of wool necessitates selection for more intense activity of the physiological functions of the pelt. Expansion of surface area in the skin of the merino has been powerfully encouraged by selection for fleece density, with the consequent formation of skinfolds. This theory implies the closest relationship between skinfolds and the potentiality for high wool production. W.

Stud Sheep. G. E. McCabe. *South African Merino Breeders' J.*, 1944, 6, No. 1, 15, 17. Pepler's view that skinfolds in stud sheep should be discouraged (these *Abs.*, 1944, A45) is unsound. The ideal sheep has been gradually evolved, and if the stud animal were not developed the sheep would revert to its original hairy covering. W.

Sheep: Development a Necessary Evil. P. H. Brodie. *South African Merino Breeders' J.*, 1944, 6, No. 1, 11, 13. A small amount of skinfold (the animal in full wool appearing entirely plain-bodied) is necessary in stud sheep of the highest merit, so that flock sheep can have sufficient wool covering to make them an economic proposition. W.

Sheep: Maintaining the Ideal Type. T. B. Jordaan. *South African Merino Breeders' J.*, 1944, 6, No. 1, 8-9. Continuous use of only extremely plain-bodied sires would cause loss of staple formation and substance, which are the essential fleece characteristics of a stud merino. W.

(C)—VEGETABLE

Cotton Crop: Influence of Climate. C. B. Doyle. *U.S. Dept. Agric. Yearbook Separate* No. 1805, 1941, pages 348-363. A broad review of the influence of climate on the cotton crop, under the headings (1) Distribution of cotton-growing areas, (2) Weather conditions favourable for cotton, (3) Relation of climatic factors to yield, (4) Effects of exposure and harvesting methods, (5) Commercial types of cotton, (6) Principal regions of production (acreage and yields), (7) Cotton soils of the United States, and (8) Climate of the Cotton Belt. [No bibliography is provided but the review is valuable for its information about the American crop.] C.

Bast and Leaf Fibres: Production in the Americas. L. H. Dewey. *U.S. Dept. Agric. Misc. Publ.*, No. 518, 1943, 95 pages. A useful, illustrated account of the principal vegetable fibres, other than cotton and flax, produced in the Western Hemisphere. The main headings are (1) Classification and nomenclature; (2) Long or multiple-celled fibres, (A) hard or leaf fibres (henequen, sisal, letona, mezcal, zapupe, cantala, lechuguilla, Jaumave lechuguilla, furcraea, piteira, cabuya, fique, chuchao, cocuiza, pitre, common yucca, soapweed yucca, palmilla, banana yucca, mohave yucca, palma pita, palma barreta, Zamandoque, Chaparral yucca, pita floja, phormium, abacá) (B) palm and palm-like fibres (Bahia piassava, Pará piassava, cabbage palmetto, scrub palmetto, pita de corojo, yaray, toquilla, (C) soft or bast fibres (hemp, cadillo, jute, ramie); (3) Short or one-celled fibres (kapok, pochote, Northern pochote, palo borracho, samohu); (4) Miscellaneous (broomroot, treebeard). The botanical names and descriptions are given and the production and marketing of the fibres are described. C.

West Indian Cotton: History. S. G. Stephens. *Tropical Agriculture,* 1944, **21**, 23-29. The history of cotton growing in the West Indies during the 18th and 19th centuries is reviewed and extracts are given from historical records. Although cotton was found growing in the West Indies in some abundance by the early Spanish settlers in the 16th century, it does not appear to have attracted much attention for the next hundred years. The increased demand for cotton in the 18th century and the appearance of the sugar ant in the West Indies caused a rapid change from cane to cotton growing. The naked and tufted seeded varieties of cotton grown in the West Indies (shrub cottons) could be readily de-linted by roller gins whilst the green-seeded variety grown in the Southern States of America required hand de-linting and did not at first offer any serious challenge to the pre-eminence of West Indian cotton in European markets. After the invention of the Whitney saw-gin in 1793 American cotton production soared and West Indian production declined. In 1801 25,000 bales of cotton were shipped from the West Indies and by 1836 this figure had fallen to 20,000 bales. From then onwards cotton production rapidly diminished except for a short renewal during the American Civil War (1863-5) when cotton exports to Europe from the States were temporarily suspended. Only in the Grenadines did cotton growing persist into the 20th century. There appears to be no reason to suppose that perennial cottons found in the West Indies to-day differ from those cultivated in the 18th and 19th centuries. There is a strong possibility that *G. hirsutum* var. *marie galante* formed the major constituent of the crop. C.

Bollworm: Control. K. P. Ewing and E. E. Ivy. *J. Econ. Entomol,* 1943, **36**, 602-606 (through *Chem. Abstr.*, 1944, **38**, 827^4). Timely applications of heavy doses of calcium arsenate control *Heliothis armigera*. Light or improperly timed applications may result in heavier infestations of this insect on the treated than on undusted cotton plants. This increase is frequently associated with increase in aphid populations owing partly to the attraction of bollworm moths to the aphid honeydew. A more important factor is the reduced feeding of predacious insects on bollworm eggs when aphids are abundant. C.

Boll Weevil and Bollworm: Control. K. P. Ewing and C. R. Parencia, Jr. *J. Econ. Entomol.*, 1943, **36**, 607-610 (through *Chem. Abstr.*, 1944, **38**, 827^2). The comparative effectiveness of reduced dosages of calcium arsenate and the possibility of substituting cryolite for calcium arsenate for boll-weevil (*Anthonomus grandis*) control were investigated. Calcium arsenate, basic copper arsenate, lead hydroarsenate and cryolite were compared for effectiveness against the bollworm (*Heliothis armigera*). The boll-weevil population in the experimental plots was light, and few marked differences were evident between treatments. Calcium arsenate dosages of 8 lb. per acre failed to control the bollworm; 16 lb. per acre resulted in a significantly greater yield of cotton. Basic copper arsenate-sulphur mixture (1 : 2) at 16 lb. per acre equalled calcium arsenate applications of 12·5 lb. per acre in cotton yield. At dosages of 8 lb. per acre, basic copper arsenate, lead hydroarsenate or cryolite resulted in higher yields than the same dosage of calcium arsenate. C.

American Cotton Crop: Post-war Position. I. W. Duggan. *Textile Weekly*, 1944, **33**, 626-630. A report of an address on the post-war prospects for American cotton. The following relevant facts are adduced: Exports of American cotton fell to about 1 million bales in 1940-41, but home consumption reached 11 million bales in 1941-42 and 1942-43. The world's supply of American cotton for 1943-44 is nearly 23 million bales. The "carry-over" at 1st August, 1943, was 11½ million bales, including a disproportionately large bulk of shorter staples and lower grades, but American mills demonstrated in 1942-43 their ability to use more of these growths. The American acreage for the 1943 season was 22 millions, and the crop estimate is 11·2 million bales; the record crop was 18 millions in 1937 and 1926. The acreage under cotton outside the United States in 1942-43 was 46 million and the crop 14 million bales; the largest relative reduction was in Egypt. Present production of continuous filament and spun rayon is equivalent to nearly 8 million bales of cotton. A plea is made for Government assistance to farmers so that the income from cotton may be increased. Nearly one-third of all the farm people in the United States live on cotton farms. C.

(D)—ARTIFICIAL

Cotton Linters: Production and Application. Emily L. Day. *U.S. Dept. Agric., Agric. Econ. Bibl.*, No. 88, 1940, 39 pages. Brief abstracts are given of 205 papers published between 1900 and 1940, classified under (1) General, (2) Methods of recovery, (3) Quality, (4) Commerce, (5) Uses, and (6) Legislation, regulation and adjudication. An index is provided. C.

Unbleached Pulp: Action of Nitrogen Dioxide on —. G. L. Clarke. *Paper Trade J.*, 1944, **118**, *TAPPI*, 62-66. In an attempt to replace chlorine entirely or partly by other bleaching agents, experiments were made on the effect of nitrogen dioxide on unbleached pulp. When liquid nitrogen dioxide was introduced into an aqueous pulp suspension and the mixture was heated for 1 to 1·5 hours at about 90° C., the lignin constituent was so changed that it could be removed by hot caustic extraction. Since nitrogen dioxide in the presence of water is converted into a mixture of nitrous and nitric acids, the delignification cannot be carried to completion without considerable damage to the cellulosic constituent, which limits the use of nitrogen dioxide to the first stage of bleaching, comparable with the chlorination stage. After extraction with a small amount of hot caustic soda, the partly bleached pulp may be bleached to the desired colour with hypochlorite. If the brightness is limited to 70 to 75, a considerable amount of chlorine bleaching agents may be replaced by nitrogen dioxide. Pulp bleached in this manner had physical properties which were not very different from those of pulp bleached by the chlorine-hypochlorite method with cold caustic extraction between the stages. The α-cellulose content of the two pulps was about the same, but the viscosity was lower for the nitrogen dioxide-bleached pulp, probably as a result of the action of the nitrous and nitric acids formed. The indications were that the combined action of these two acids is responsible for the bleaching effect. It is suggested that the reaction comprises two phases, the nitration of the lignin residue and the oxidation of the nitrolignin, the latter phase resulting in the solubilization of the modified lignin. The nitrogen content of the treated pulp and the results of experiments with mixtures of sodium nitrite and nitric acid and with nitrogen dioxide and nitric acid seem to support this hypothesis. C.

Sunflower Stalk Pulp: Production. K. H. Rauch. *Angew. Chem.*, 1940, **53**, 568-573 (through *Brit. Chem. Physiol. Abstr.*, 1944, B II, 37). A pulp which, after normal refining, was suitable for viscose was obtained by digesting sunflower stalks (fat + resin + wax 6·4, lignin 30, cellulose 37·6, ash 4·3 per cent.) with a liquor containing calcium oxide 0·98, free sulphur dioxide 1·86, and combined sulphur dioxide 1·08 per cent. for 36 hours at 115-125° followed by bleaching for 10 min. at 30° with bleaching powder. The yield was 32·2 per cent. (α-cellulose 84·6 per cent.) and molecular size (viscosity method) 92,000. Analytical data are tabulated for pulps either isolated in the laboratory by hydrolysis (sulphuric acid alone or followed by caustic soda) and oxidation (nitric acid, chlorine, chlorine dioxide, or bromine) methods, or obtained on the semi-commercial scale by the caustic soda and kraft processes. A stable cellulose flour suitable for cattle fodder is obtainable as a by-product of the mechanical pre-treatment of the stalks. C.

Man-made and Natural Fibres: Names and Sources. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials,* 1943, 356-365. Lists are given of all the fibres that are available in commercial quantities, grouped into (1) man-made fibres and filaments, (2) animal fibres, (3) mineral fibres, (4) seed hairs, and (5) bast and leaf fibres. The names are in alphabetical order and parallel columns give synonyms, verbal descriptions (occasionally) and sources. Scientific names are in italics and the most common names in capital letters. C.

PATENTS

Protein Filaments: Hardening. A. McLean, S. R. Swift and Imperial Chemical Industries Ltd. B.P.559,818 of 2/9/1942:7/3/1944. A process for the production of protein filaments comprises extruding a solution of the protein, e.g. vegetable globulin or casein, into a coagulating medium, washing the filaments in an anti-swelling medium, maintaining the filaments in a solution containing an anti-swelling agent, e.g. sodium chloride, together with urea, thiourea, biuret, or like bifunctional amide, and thereafter treating the filaments under acid conditions and while they are still impregnated with the solution with a hardening aldehyde capable of reacting with the bifunctional amide in the presence of acid to produce an insoluble condensation product. For the production of staple fibre, the washed coagulated filaments may be cut and the staple fibre steeped in the solution containing the amide. C.

Soybean Protein: Production. Ford Motor Co. Ltd. B.P.559,848 of 11/5/1942: 8/3/1944 (Conv. 10/5/1941). Protein suitable for use in the production of artificial fibres, paints, sizes, etc., is obtained by extracting protein from soybeans by means of alkali solutions, clarifying the protein solution, treating it with acid, decanting the liquor from the protein precipitate, dehydrating the precipitate by slowly freezing at a rate which encourages the formation of large ice crystals, thawing the frozen precipitate, and then decanting the water from the protein. C.

Fibrous Pulp Liquid Treatment Apparatus. Thames Board Mills Ltd., M. H. Morley and H. N. Baker. B.P.559,909 of 5/3/1942:10/3/1944 and 559,913 of 12/6/1942:10/3/1944. (1) A device for the treatment of fibrous pulp material with liquor consists of a tubular chamber of greater length than diameter having outlet perforations for excess liquor adjacent the discharge end only of the chamber, means to feed fibrous material and a digesting liquor to the inlet end of the chamber, a rotating screw conveyor in the chamber adapted to apply mechanical pressure to the fibrous pulp material while it is in the chamber, and steam inlets spaced along the walls of the chamber. (2) In apparatus of the type described in (1), a gear wheel mounted on an axis at right angles to the axis of the screw conveyor in the tubular chamber meshes with the flights of the conveyor to apply pressure to the material and is disposed to lie partly within a feed hopper for the tubular chamber and partly in a housing on one side of the tubular chamber. C.

Rayon Staple Cutting Apparatus. American Viscose Corporation. B.P. 559,995 of 19/8/1942:15/3/1944 (Conv. 10/4/1942). In apparatus for cutting rayon staple, means are provided for continuously varying the rate of delivery of the continuous filament to the cutting device by varying the distance from the feeding device to the cutting device during operation, e.g. by moving the cutting device continuously toward and away from the feeding device. C.

Staple Fibre Cutting Apparatus. American Viscose Corporation. B.P.560,018 of 19/8/1942:15/3/1944 (Conv. 10/4/1942). In apparatus for cutting continuous filaments into staple fibres wherein the distance between cuts can be varied by varying the rate at which the filaments are delivered to the cutting device, the feeding device comprises a variable-speed delivery roller or a rotatable member of non-circular cross-section which is driven either at constant or varying angular velocity. C.

Wetting Agents: Application in Viscose. Rayonier Inc. U.S.P.2,331,935/6. The conversion of refined pulp, containing not more than 0·15 per cent. of matter extractable by ether, into viscose is assisted by (1) adding to the mass before xanthation is complete an anionic surface-active agent that is soluble in the alkalis employed or (2) adding to the pulp a cation-active quaternary ammonium salt compatible with the alkali. The amount of wetting agent used is 0·01-0·15 or 0·20 per cent. of the weight of bone-dry pulp. C.

Glass Fibres: Spinning. G. von Pazsiczky (Hamburg; vested in the U.S. Alien Property Custodian). U.S.P.2,331,944/5/6. (1) Roughened glass fibres are obtained by blowing hydrofluoric or phosphoric acid vapours against the molten glass as it is being drawn into filaments. (2) Curly fibres are obtained by spinning a mixture of two glasses that differ in coefficient of expansion. Streams of the molten glasses flow together to orifices. (3) The claim is for a melting receptacle in which the molten glass flows in a thin film over a dam to the spinning compartment. C.

Rayon Spinning Bucket. American Viscose Corporation. U.S.P.2,332,314. A centrifugal spinning bucket is fitted with means for draining solutions or suspensions from its immediate surroundings and means for spraying it intermittently during operation. The effluent is automatically switched from one channel to another when spraying occurs. C.

Cotton Drying Machine. M. I. Teague (Rochester, Texas). U.S.P.2,332,413. The claim is for a machine in which a screen is arranged over the inner end of the air intake tunnel and a rotary brush works inside the screen to remove foreign matter. C.

Vinylidene Chloride Polymer Yarn: Preparation. Dow Chemical Co. U.S.P. 2,332,485. A group of filaments of normally crystalline vinylidene chloride polymer is subjected in the supercooled condition to stretching and false twisting. A diagram of the apparatus is given. C.

Gin Saw Cleaner. James Delashaw and F. D. Gibson. U.S.P.2,332,783. The device consists of a set of discs on a shaft so spaced that the separate plates of the gin saw will fit between them when the saw is mounted for cleaning. The discs carry cleaning blades mounted at reverse angles to the rims of the discs so that the inner ends of blades on adjacent discs cross and override the saw teeth as the cleaner is rotated. C.

Flexible Corrugated Spool. Industrial Rayon Corporation. U.S.P.2,332,826. A radially compressible, flexible spool is made by forming into a cylinder a sheet that, in the illustration given, resembles deeply corrugated packing paper. C.

Endless Belt Yarn Collecting and Winding Apparatus. E. I. Du Pont de Nemours & Co. U.S.P.2,333,278/9. (1) Yarn (from a liquid treatment bath) is collected on a slowly moving endless belt from which it is removed (for winding into a bobbin) by means of a pair of tapered rollers so that the point at which the yarn is taken off the belt occurs at a pre-determined point from the forward part of the belt. (2) The arrangement is used for handling a crinkled yarn and the take-off mechanism is adjusted to apply tension so as to remove any desired amount of crinkle. C.

Glycinin-Viscose Mixture Filaments: Spinning. Tubize Chatillon Corporation. U.S.P.2,333,527. A homogeneous mixture of viscose and an alkaline solution of glycinin made with the help of a hydroxyalkyl sulphoxylate is spun into an acid bath. C.

2—CONVERSION OF FIBRES INTO FINISHED YARNS

(A)—Preparatory Processes

Electro-pneumatic Opening Machinery: Advantages. C. Consterdine (Messrs. Platt Bros. & Co. Ltd.). *Textile Weekly*, 1944, **33**, 512-8, 552-6, 594-600. A report of a lecture on the single-process system of cotton opening. Present difficulties in the production of good laps are ascribed to (1) high-density baling,

(2) the wide range of cotton grades due to the extension of cotton growing to new areas, (3) the demand for the reduction of dust in mills, and (4) the demand for better laps for the better functioning of the carding engine. Modern developments in machinery to meet these demands, especially the adoption of electric controls and pneumatic mixing and conveying systems, are reviewed in some detail and the following machines (by Platt Bros. & Co.) are mentioned. Hopper bale opener with electrically-controlled feeding lattice, Hopper feeder with creeper lattice and dust fan, Super-grid-area porcupine opener with feed lattice and Shirley cage and fan, Crighton opener cylinder fitted with by-pass valve, Hopper feeder with condenser and fan fitted with delivery regulator reserve box and wiper roller, Double opener consisting of one 24-inch cylinder and one pair of cages, one beater part with feed lattice, feed roller, cages and fan for down draught, and by-pass valve to miss the beater part if required, and Electro-pneumatic automatic distributor with one inlet and two outlet valves to distribute cotton to two scutchers. C.

Cotton Card: Evening Action. R. W. Vose and C. H. Plummer. *Textile Research,* 1944, 14, No. 1, 20-24. An experimental procedure was devised in which identifiable lap irregularities of known amounts were introduced and the resulting irregularity was traced in the card sliver. In order to produce the desired irregularities it was found more practical to alter the linear rate of feed of a uniform lap than to form a lap with definite irregularities in weight from point to point. A differential mechanism was used to control the irregularity in the feed of the lap to the card. Variations in the feed were created with wave lengths of 1, 2, 4, 8 and 16 in., each with amplitudes of 5 per cent., 10 per cent., 20 per cent. and 40 per cent. Records obtained on a sliver tester show the sinusoidal variation in sliver weight plus much smaller superimposed irregularities evidently originating in the card. To obtain an index of the card action in reducing the sinusoidal irregularity of the lap as fed, the irregularity of the sliver was compared with that introduced in the feed. The percentage standard deviation of the sliver was divided into the percentage standard deviation of the lap feed to obtain a decimal fraction indicating that part of the feed irregularity which passed through the card and appeared in the sliver. A chart is given showing the variation of this fraction with the wave length of the lap irregularity. Irregularities of wave length shorter than ½ in. in the lap were largely absorbed by the card and did not appear in the sliver. Irregularities of wave length longer than 8 in. were reproduced essentially completely, without any modifications by the card. In the range between these two wavelengths the card exerted a partial evening action. C.

Speed-frame Products: Effect of Doubling on Yarn Strength. *Cotton (U.S.),* 1944, **107**, No. 12, 122-123. Further evidence is given on the question whether it is possible to reach the Draper standards for yarn strength with few doublings. The writer regards these standards as " rather ancient " and prefers the strength graphs issued by F. P. Sheldon & Son (1926), which give slightly higher values than the latest Draper figures for counts up to 10s and rather lower values for finer counts. Particulars of the speed-frame processes used are recorded and the average strength results obtained in 1942 and 1943 are tabulated. In 1942 the results were above the highest Draper figures in all of the 16 counts spun (4s to 20s) except in 17½s and 20s. In 1943 the results were not up to standard except in counts below 10s. The writer ascribes this rather to the poor quality of the crop than the processing. C.

Faults in Woollens: Defects in Raw Wool and Yarn. *Wool Rec.,* 1944, **65**, 464, 466. If mechanical removal of burrs is not possible in carding, the piece good are either carbonised or burl dyed. The formation of neps in carding may be prevented by reversing the direction of revolution for one of the workers working over the intermediate swift. This reversal is also applied successfully for the prevention of slubs in the carded sliver by applying it to the last worker on the woollen carder. W.

(B)—SPINNING AND DOUBLING

Hank Clock Production Factor Table. C. McElroy and M. Gross. *Textile World,* 1943, **93**, No. 4, 131. The table gives the factor by which to multiply the weight of cotton yarn required in order to obtain the corresponding number of hanks for a 240-spindle frame. Thus, assume that 1000 lb. of 36s has to be spun; the factor for 36s is 0·15 and the hank clock reading for the 240-spindle frame should be 0·15 × 1000, or 150 hanks. C.

Modern Cotton Spinning Mill: Installation. J. Buckley (Messrs. Platt Bros. & Co. Ltd.). *Textile Manufacturer*, 1943, **69**, 65-68, 115-118, 161-164, 207-210, 253-255, 299-301, 341-344, 389-392, 398, 431-435, 479-481, 529-531; 1944, **70**, 19-22, 65-66, 87, 113-115, 159-161. This series of articles is an expanded version of a lecture (already noted) covering the equipment now in sight that would make the cotton mill of the future. The series is illustrated by 156 pictures of machines, mills and lay-outs, and the main chapter headings are: (I) Modern cotton spinning machines and methods; (II) Cotton opening and lap forming; (III) Do., dust extraction and waste recovery; (IV and V) Carding and combing; (VI) Ring spinning; (VII) Ring spinning and doubling; (VIII) Ring doubling; (IX) Large packages; (X) Packages and doubling rings; (XI and XII) Electric driving; (XIII) General mill conditions; (XIV) The complete modern cotton spinning mill; (XV) Future spinning mills. C.

Worsted Spinning Nomograph. M. C. Bishop. *Text. World*, 1944, **94**, No. 1, 74-75. A nomograph showing delivery rate and bobbin filling time is illustrated, and its working described. W.

(D)—YARNS AND CORDS

Glass Fibre Yarns: Uses. H. D. Keiser. *Amer. Inst. Min. Met. Eng., Tech. Publ.*, 1598, 14 pp.; *Min. Tech.*, 1943, **7**, No. 3 (through *Brit. Chem. Physiol. Abstr.*, 1944, B I, 23). Brief descriptions are given, with flow-sheet diagrams of the processes used in making various types of glass fibre. The products are used in military and naval electrical equipment for insulating purposes, as retainer mats in storage batteries, as light-weight thermal insulation for aircraft, as a material for sound insulation in factories, for making fireproof insulating board for covering steel plating of decks, bulkheads, or hull, for the tension core of field telephone cable, for parachute flare shields, and for insulating steam pipes and refrigerators. C.

PATENTS

Apparatus for Reclaiming Fibre from Wool, Wool Waste, etc. F. Kershaw and H. F. Raisbeck. B.P.558,675 of 14/1/1944. The material is fed into the upper end of a sloping, reticulated cylinder and removed from the lower end, grease and dirt being thrown through the reticulations and then through a hopper to a sack. The cylinder has a side to side shaking motion, the degree of movement being adjustable to suit the requirements of the material being treated. A beater assists the passage of the grease and dirt by striking the hopper when the cylinder is rocked. W.

Reclaiming Fibres from Wool, Wool Waste, etc. F. Kershaw and H. F. Raisbeck. B.P.559,307 of 14/2/1944. The fibres to be reclaimed are blended with a mixture of dust and sand, and passed through a willeying and then a shaking machine. The dust absorbs grease and dirt and the sand also acts as a scavenging agent by forcing the grease and dirt-laden dust through the apertures of the willeying machine. The reclaimed fibres are suitable for re-use in the textile industry, and the cleansing medium is used as manure, having the advantage of being free from long fibre. W.

Spindle Bearing Oil Extracting Device. Fine Cotton Spinners' & Doublers' Association Ltd. and E. A. Leigh. B.P.560,214 of 15/10/1942:24/3/1944. A device for the extraction of oil from the spindle bearings of spinning, doubling, winding and similar textile machines comprises a cylindrical oil receiver having a removable cover provided with three apertures, one carrying a junction having a bent pipe for insertion into a spindle bearing, the second carrying an inlet pipe connected to a source of compressed air for producing a vacuum in the receiver, and the third aperture provided with a drain plug or tap through which the contents of the receiver can be discharged. C.

Textile Disintegrating Machine Teasing Drum. F. A. and Sophie S. von Osten (South Orange, N.J.). U.S.P.2,331,943. The teasing drum of a disintegrating machine comprises a shaft and end discs connected by a number of rods that carry pivotally mounted, rigid pins projecting beyond the side discs. C.

Novelty Yarn Spinning Frame. Goodall Worsted Co. U.S.P.2,332,395. A frame for producing novelty yarns comprises front and back rollers for drafting roving at a uniform speed and thickness, means to impart twist, and a pair of feed rollers in front of the above front drafting rollers to deliver a novelty-producing strand under uniform tension, but at a different speed from that of the roving, to the point where twist is being inserted into the roving. C

Covered Chenille Strand. Duro Persian Manufacturing Co. Inc. U.S.P. 2,332,833. A strand of chenille is run through a constricting device to lay the outwardly-extending fibres at an angle and then wrapped in a covering of fibrous material (yarn). C.

Spindle Brake. Whitin Machine Works. U.S.P.2,333,047. The claim is for a brake that applies pressure at opposite points of the whorl of a spindle and consists of a pair of levers actuated by a toggle device. C.

Self-lubricating Spinning Ring. Herr Manufacturing Co. Inc. U.S.P.2,333,069. The claim is for a ring combined with a well from which a wick leads lubricant to the bearing surfaces of the ring, the special feature being the provision of an enclosure for the wick in the well. C.

Glass Fibre Yarns: Production. Owens-Corning Fiberglas Corporation. U.S.P.2,333,267. A mat of glass filaments collected on a spinning drum is cut by angularly displaced knives into strips parallel to the axis of the drum and these are then stretched into yarns and collected. C.

3—CONVERSION OF YARNS INTO FABRICS

(A)—PREPARATORY PROCESSES

Nylon Yarn: Preparation and Weaving. E. I. Du Pont de Nemours & Co. *Textile World*, 1944, **94**, No. 1, 67-68. Practical advice is given on the processing of nylon. In winding, it is best to use tension devices of the whorl or rotating drum types. The double weaver's knot is preferred. Sized and oiled yarns give much wider tension variations than sized but not oiled yarns, but oiled yarns have other advantages. Suitable dyes for tinting are listed; they have to be added to the size. Yarn is sized single end by means of an aqueous solution of polyvinyl alcohol, about 4·5 per cent. being added. Such yarn is sized again in warp form; the taping of unsized nylon yarn has not been widely developed. Satisfactory tension in pirn winding is 20-35 grams for sized 60-den. yarn; low-twist unsized yarn, requires lower tensions. Conditioning should take place first in a very moist atmosphere and then in a normal one. Steaming of pirns results in width changes at each weft change. Weaving is best at 50-70 per cent. R.H. Because of trouble due to static electricity all metal parts with which nylon makes running contact should be earthed. C.

(B)—SIZING

Cotton Warps: Sizing. Textile Operating Executives of Georgia. *Cotton (U.S.)*, 1943, **107**, No. 12, 91-95. A more complete record of answers to a questionary than one already abstracted. C.

Electronic Instruments: Application in the Textile Industry. S. T. Herr. *Instruments*, 1944, **17**, 30-32. Applications of the photo-tube, e.g. in the spectrophotometer which may be used for control purposes in dyeing, a photo-electric weft straightener, photo-electric switches for various purposes, and electronic circuits applied to pyrometers are mentioned. The control of moisture content in warp sizing is discussed and the Moist-o-graph is briefly described. When applied to a tape frame, a small metal contact roller rides on the warp at the delivery end of the machine. The grid element of the measuring circuit is connected to this control roller and is responsive to the current which can be passed through the warp from an independent low-voltage source. This current is a measure of the electrical resistance, and therefore the moisture content, of the warp. By providing the instrument with a set of control contacts, and the tape frame with a suitable variable-speed drive, it is possible to set the control point at any desired moisture content and the unit will automatically maintain this value by adjusting the speed as required. In order to obtain the maximum benefit from the Moist-o-graph the size preparation, size box temperature and level, and cylinder temperature or pressure should all be under automatic control. C.

Nylon Yarn: Dressing for Knitting. *Silk and Rayon,* 1944, **18**, 315-316. A brief review is given of patented methods for the dressing of nylon yarn for knitting by means of polyvinyl alcohol (prepared by the hydrolysis of polyvinyl acetate), sometimes partially etherified by acid condensation with formaldehyde, and blended with boric acid. C.

Gum: Use in Size. N. A. Mukoseev. *Tekstil. Prom.*, 1943, No. 1/2, 23-24 (through *Chem. Abstr.*, 1944, **38**, 647^6). A textile size, equal or superior to the usual starch size, was made by replacing half of a 90-kg. batch of rye flour (in 700 l. of water) by 24 kg. of gum arabic, heating nearly to boiling, adding 4 l. of a solution of castor oil 16·5, oleic acid 2·5, 20° Bé. caustic soda 7·5 in water 23·5 kg., and further adding 1 l. of oleic acid, boiling 20 min., and neutralising with acetic acid. C.

Lime: Use in Size. V. Korolev and V. M. Rybakova. *Tekstil. Prom.*, 1943, No. 4/5, 12 (through *Chem. Abstr.*, 1944, **38**, 647^5). A satisfactory textile size was prepared by mixing 100 kg. of rye flour with 700 l. of water at 20-25°, heating to 40°, adding gradually 8 kg. of lime in 100 l. of water, and, after 10-15 min., heating nearly to the boiling point. C.

(C)—Weaving

Picking Bowl: Fixing. *Cotton (U.S.)*, 1943, **107**, No. 12, 89, 96. The question is raised why different methods are used to fasten the picking bowl on some (American) looms. In reply two authorities say that on older looms it was usual to hold the bowl only by the cover that is used to prevent splashing of oil on the warp, that on more modern looms an extra cap screw is provided on the end of the picking bowl stud, and that on the latest models of Draper looms the cover is not used, but an Alemite fitting is carried by the cap screw to provide for the lubrication of the bowl. C.

Shuttle Accelerometer and Speedometer. I. H. Thomas and J. J. Vincent. *J. Sci. Instruments,* 1944, **21**, 45-48. Two instruments are described which measure the speeds and accelerations of moving bodies, e.g. shuttles. The accelerometer is a null instrument in which the force exerted by a weight freely supported in the moving body is balanced by a calibrated compression spring. The final result is given in units of **g**. The principle of the speedometer, of which the theory is given, is based on the fact that a helical spring, moving longitudinally with a mass attached to its leading end, will extend if the other end is suddenly stopped. The extension of the spring is directly proportional to the speed of the moving body immediately before it is brought to rest and is not appreciably affected by variations in some of the characteristics of the moving body. The instrument gives the speed directly in feet per second. C.

Loom Accessories: Storage. J. H. Morriston. *Cotton (U.S.)*, 1943, **107**, No. 12, 83-85. Practical hints are given on the storage and record-keeping of loom supplies with suggestions about the emergency supplies that the tackler should hold in order to save time. C.

Smallwares: Weaving. A. Thompson. *Textile Manufacturer,* 1944, **70**, 128-131. A report of a lecture on smallware weaving in the Derby district, with illustrations of Heywood, Hattersley twin-web, Matterson 12-web mock-space batten, and Clutsom and Kemp shuttleless looms. C.

Towel Fabric Warps: Preparation. O. Pomfret. *Textile Manufacturer,* 1944, **70**, 11-12, 29, 68-70. A practical account is given of the usual and special methods and machines for preparing ground and pile warps for towels. C

Weaving Shed: Management. Textile Operating Executives of Georgia. *Cotton (U.S.)*, 1944, **108**, No. 1, 79-82; *Textile World,* 1944, **94**, No. 1, 82-83. Replies from 17 mills to a set of ten questions on practical problems in weaving are analysed. On the question of suitable humidity, a table summarises the R.H. per cent. aimed at, with particulars of the range of cloths manufactured in each mill; the lowest R.H. is 65 per cent., and the highest 87½ per cent. Three records of temperature are 80-84, 85 and 90° F. C.

Weaving Shed: Management; Checking Defective Work. J. Middleton. *Cotton (U.S.)*, 1944, **108**, No. 1, 67-69. The writer discusses tactful methods of fixing the responsibility for bad work and stresses the importance of proper training for those operatives who do the cleaning. Too often, this is regarded as a suitable job for the newest operatives. C.

(D)—KNITTING

Flat Seam Looping Machine. J. W. Hughes. *Cotton (U.S.)*, 1944, **108**, No. 1, 123-126. The history of the looping machine for joining the edges of a knitted fabric with a flat seam is traced and detailed instructions are given for operating the "Sotco" machine. C.

(G)—FABRICS

Knitted Underwear: Production. N. Wonnacott. *Cotton (U.S.)*, 1942, **106**, No. 4, 157-8; No. 9, 243-6. A general discussion of modern production methods in an underwear factory with details of the arrangement of machines and work sheets for the manufacture of a standardized type of knitted shorts. C.

American Army Wind-resistant Sateen: Construction and Processing. *Textile World*, 1944, **94**, No. 1, 66. Suitable mill organization is suggested to meet the requirements of the wind-resistant 9-oz. sateen adopted by the American Army for field jackets, with or without pile-fabric lining. C.

Machine Gun Cartridge Belt: Production. J. A. Hendley. *Textile World*, **94**, No. 1, 69-71. The development of fabric belting for machine guns is briefly reviewed. Very large quantities are now being made in the United States from $1\frac{1}{32}$-$1\frac{1}{16}$ inch cotton. Two plain or duck fabrics are woven simultaneously with most of the warp threads passing through each other at intervals to form the cartridge pockets. On the loading edge of the belt the warps do not cross for a width of $\frac{1}{16}$ to $\frac{1}{8}$ inch, so that a continuous V-shaped entrance to the pockets is secured. On the bullet side the warps cross twice as often as in the main part so that secondary pockets are formed between the cartridges, the bullets are more rapidly aligned and the loaded belt lies perfectly straight. The main fabric is woven from 12/4s yarn, 8 turns per inch, dyed olive drab; there are 156 ends in belts for 0·50 cartridges and 106 for the 0·30 calibre. The belt is reinforced with 6-end lockstitch cord, wet twisted and treated under tension to remove stretch; 12 ends are used for the 0·50 calibre and 4 for the 0·30 belting. There are 38 or 36 picks per inch of the 12/4s yarn. Structure diagrams are given and also hints on weaving. The best results are obtained by using large section beams and weaving 4-8 pieces from each beam. The belts are finished water- and mildew-repellent. Inspection tests are described. There should be 29 pockets per yard for the 0·50 belt and 33 per 24 inches for the 0·30 belt. When cut to length, each 25th pocket is numbered for the gunner's guidance. C.

Nylon Monofilament: Application. T. G. Joslin. *Textile Manufacturer*, 1944, **70**, 136-137. A series of illustrations are given of recent developments in nylon yarn, "wire" and plastics. The monofilament or "wire" is used in a window screen material for the weaving of which a special loom is shown. C.

Terry Towelling: Construction. O. Pomfret. *Textile Manufacturer*, 1944, **70**, 104-106. Tables are given of length and weight per piece, width, numbers and counts of yarns used, weave, and ratio of pile length to ground for typical sorts of (1) terry robings and bib and feeder cloths, (2) nursery squares, (3) rollerings, (4) cotton hand towels, (5) condenser pile hand towels, (6) linen and cotton/linen hand towels, and (7) bath mats. C.

Inflatable Life Rafts: Design and Construction. J. G. Kreyer. *Mechanical Engineering*, 1944, **66**, 121-129. An account is given of the design and construction of inflatable life rafts and of the accessories and other equipment used with them. The laminated processed fabric used for the main tubes of the larger rafts comprises a rubber coating of 2½ oz. per square yard on the outside of a basket-weave fabric, a similar rubber coating on the underside of the fabric, followed by a light-weight plain-weave fabric placed on a bias, a rubber coating of 3½ oz. per square yard with another ply of plain-weave fabric, placed on straight, and an inside coating of 1 oz. per square yard. This combination has a thickness of 0·033 in. and a nominal weight of 19·3 oz. per square yard. The basket-weave fabric is constructed of plied yarns of long-staple combed cotton. The plain-weave fabric is woven from single yarns of long-staple combed cotton and has 120 × 120 yarns per inch. An alternative to the basket-weave fabric is a 5-shaft fabric constructed of plied yarns of long-staple combed cotton. Square-woven ducks are used for the bottoms, carrying cases and pockets of the rafts. When applying the rubber coating compound, not less than eight spreads or coats per ounce per square yard of surface covered are used. "Mae West" life vests are made of single-ply coated fabric. C.

What is Tweed? E. S. Harrison. *Wool Rec.*, 1944, **65**, 456, 458, 460. A survey of the development of tweeds, with particular reference to the implications of the word, and the question of dyeing. The cloth is described—not defined—as of medium weight, not very smooth in texture, tending towards Cheviot qualities and to broken colour effects, and definitely limited to woollen yarn. W.

Wool Cloth Measures and Weights. "A.A." *Wool Rec.*, 1944, **65**, 327. The present anomalies and discrepancies could be removed by generally adopting the standard measure of 36 in. to the yd. without allowance, and by quoting weight per sq. yd. W.

PATENTS

Fully-fashioned Hosiery: Knitting. A. T. May. B.P.559,926 of 13/10/1942: 10/3/1944. In the manufacture of hosiery, particularly fully-fashioned stockings, a running-on course comprising a series of spaced eyelet holes is provided at appropriate points in the fabric, e.g. at the edge of the foot portion. The holes are preferably formed by transferring a predetermined number of needle or sinker loops on to the adjacent needles. C.

Winding Machine. J. Mackie & Sons, Ltd. and J. P. Mackie. B.P.559,927 of 17/10/1942: 10/3/1944. A machine for winding yarn into cross-wound packages or cheeses is provided with a helically grooved roller which may either run in contact with the yarn package or cheese, or may be additional to the roller which drives the yarn package by contact, the said roller having two oppositely directed grooves in its surface leading toward the ends from near the middle of the roller, the grooves being entirely independent. One is a right-handed and the other a left-handed helix. A moving guide member gives a comparatively small lateral displacement to the yarn so as to offset, first toward one side and then toward the other, the point from which the yarn extends to the grooved roller, the displacement being sufficient to carry the yarn over the centre line of the grooved roller and to cause it to enter the groove leading to the opposite end of the roller, thus ensuring that the yarn shall engage with the starting end, first of the right-hand helix and then of the left-hand helix, with a view to effecting the traverse toward the end of the roller and back again under the central displacement or biassing action. It is convenient to effect the biassing movement by means of a continuously rotating roller with a single continuous groove in it extending diagonally first in one direction and then back again so that the whole motion may be communicated by rotating elements without the necessity for any reciprocating parts. The rotating guide may, however, be replaced by any suitable form of laterally moving guide eye if preferred. C.

Knitting Machine Yarn-control Device. B. Toone (Nottingham) Ltd. and R. N. Toone. B.P.559,952 of 25/8/1942: 13/3/1944. A knitting machine having a yarn feeder displaceable between feeding and non-feeding positions, is provided with a yarn-control device located at the plain side of the needles to receive a withdrawn yarn on movement of the feeder to non-feeding position and to place the yarn for re-introduction to the needles on movement of the feeder to feeding position. The device may be applied to splicing and other mechanisms whereby a yarn is introduced into the fabric at intervals. C.

Winding Machine Bobbin-identifying Apparatus. Universal Winding Co. B.P.559,958 of 9/9/1942: 13/3/1944 (Conv. 11/9/1941). A winding machine is provided with a bobbin-identifying apparatus designed to apply an identification ticket automatically to a bobbin in such a position that the ticket is held in place by the yarn wound on the bobbin. The operating means are preferably arranged to actuate the ticket-supplying mechanism in timed relation to the winding operation of the bobbin. An electromagnet may be provided for operating the ticket-supplying mechanism and automatically controlled means may be arranged to control the energisation of the electromagnet. The identifying ticket may be applied to the bobbin from a continuous strip of tickets and the ticket-supplying mechanism is then preferably situated adjacent to the bobbin and is arranged to advance the ticket-strip to place a ticket between turns of the winding yarn to cause it to be gripped thereby with an end projecting from the bobbin. C.

Snag-resistant Polyamide Knitted Fabrics: Production. E. I. Du Pont de Nemours & Co. B.P.560,084 of 26/5/1942: 20/3/1944 (Conv. 14/2/1941). A method for the production of sheer knit goods, substantially free from snags and pulled threads, from water-insensitive, continuous-filament, synthetic linear polyamide yarns, comprises applying an aqueous dispersion of a film-forming material which is tacky in the air-dried state, e.g. an alkyd resin, vinyl interpolymer, natural resin or a carbohydrate. With acidic resinous materials that are insoluble in water, dilute alkalis may be used to effect solution. In some cases it may be desirable to add a certain proportion of a water-miscible organic solvent to aid solubility and accelerate drying. C.

Knitting Machine. H. N. Smith and Elizabeth E. Smith (Daventry). B.P. 560,192 of 11/8/1942:23/3/1944. A knitting machine comprises looping means, a series of loop guard members and a series of new loop accepting members, the looping means being operable to form new loops through first one and then another of a course-wise series of previously formed loops on the guard members, each looping movement taking place relatively to a guard member which holds open the loop being penetrated, the accepting members being arranged to receive the new loops and the machine being so constructed and arranged to operate that the old loops are released from the looping means and transferred by relative movement between the co-operating guard and accepting members from the accepting members to the guard members in turn to be held open for new loops to be formed through them by the looping means. The guard members may be arranged to receive the new loops from the same side as such loops were accepted by the accepting members. This construction lends itself to a modification whereby two pieces of fabric may be knitted in the machine which may be joined at either or each end, in the first case to produce a single double width piece and in the second case a tubular fabric. The transfer of loops by the relative movement between the guard and accepting members may be aided by means co-operating therewith to keep the loops squarely related to the guard members during the transfer operation. The part of the guard member holding the loops is preferably a channel open at each end and the accepting member is received in the channel while the transfer occurs. C.

Cop Winding Machine. J. Mackie & Sons Ltd. and J. P. Mackie. B.P. 560,267 of 30/10/1942:28/3/1944. In mechanism for forming cops with tapered nose ends, a grooved roller is used for traversing the yarn over the nose of the cop, the roller is driven by the drag of the yarn in its groove, and is mounted so as to be retracted when required to facilitate starting of the winding, or piecing-up any broken ends of yarn, and to be returned to its correct position for winding purposes. The roller is constructed in two parts suitably fitted together and providing the guiding groove for the yarn between their opposing faces. C.

Mock-fashioned Stocking: Production. C. J. Toon and J. Toon & Sons Ltd. B.P.560,312 of 20/1/1943:29/3/1944. A method of making a mock-fashioned stocking comprises the steps of knitting on a seamless knitting machine a length of tubular material comprising leg, ankle and foot parts, flattening the tube, cutting the foot part so as to provide a heel part and a strip of the material which is narrower than the tube and extends below the heel part, folding the strip back upon itself inwardly towards the heel part, attaching the then adjacent longitudinal edges of the strip to each other, and attaching the bottom edge of the strip to the then adjacent edges of the heel part so as to provide the instep, the toe and the sole of the stocking. In a preferred method, a seamless tube equal to the length of two stockings is knitted upon a tubular knitting machine and, during the knitting operation, the central part of the length of the tube of knitted material is automatically tightened in order to form the ankle and foot parts of the two stockings. After removal from the machine the knitted tube is flattened and cut so that it is separated into two lengths, each forming one stocking length and each comprising a narrow strip adapted to form the instep, toe and sole of the foot. Preferably the stocking is provided with an imitation seam at the back of the leg and with imitation fashion marks on opposite sides of the seam. It is also preferred to form a welt at the end of the stocking length of material during the knitting operation. C.

Picker Stop. Draper Corporation. U.S.P.2,332,366. The claim is for an adjustable element that bears against the top surface of the slay when engaged by the picker at a predetermined point of its travel. C.

Reinforced Flexible Transparent Sheeting. E. I. Du Pont de Nemours & Co. U.S.P.2,332,373. An open-mesh material made of nylon monofil is coated with a film of ethylene polymer, heated to the fusion point of the polymer, and rapidly cooled by quenching in a cooling liquid. C.

Resilient Yarn Stockings: Knitting. Paramount Textile Machinery Co. U.S.P.2,332,738. Stockings are knitted under low tension from a resilient yarn that resists the formation and retention of loops by feeding the yarn to the machine in intimate contact with a controlling yarn and afterwards removing this yarn. C.

Rayon Winding Machine Thread Guides. American Viscose Corporation. U.S.P.2,332,889. The claim is for a device for guiding the thread in the unwinding of a sequence of yarn packages so that when the trailing end of one package is united to the leading end of another the loop of joined thread may be kept out of the region of ballooning. C.

Knitting Machine Fabric Draw-off Mechanism. Textile Machine Works. U.S.P.2,333,074. The claim is for self-locking mechanism that engages by a downward movement with the fabric-engaging element without interference with the knitting frame. C.

Moulded Plastic Bobbin. Kilgore Manufacturing Co. U.S.P.2,333,340. The claim is for a bobbin moulded from a coloured plastic with stout ratchet teeth at either end. C.

Textile Machine Batten: Reinforcing. C. L. Huffman (Greenville, S.C.). U.S.P.2,333,377. A wood element for textile machinery that acts as a lever about a pivot is reinforced on either side of the hole in it by cutting diagonal bolt holes and filling them with dowel pins. C.

Shuttle Weft Guard. J. B. Daudelin and R. J. Messier. U.S.P.2,333,413. The claim is for a device located in the throat of the shuttle to stop an outwardly running balloon as the weft runs through the threading slot to the delivery eye. C.

Circular Knitting Machine Adjustable Combination Stand. Tompkins Bros. Co. U.S.P.2,333,572. A number of stands are mounted on a support that extends about the axis of the needle cylinder and are adjustable as a unit both radially and circumferentially. Slide means interconnecting the stands make some of them independently adjustable. C.

Knitted Vulcanized Composite Fabric: Production. Vanity Fair Mills, Inc. U.S.P.2,333,630. A base sheet containing latex is knitted through and then vulcanized. C.

4—CHEMICAL AND FINISHING PROCESSES

(B)—Boiling, Scouring, Degumming and Washing

Cottonin: Effect of Processing on Structure. K. C. Menzel. *Klepzig's Textil-Z.*, 1943, **46**, 4-9 (through *Chem. Zentr.*, 1943, i, 2257 and *Chem. Abstr.*, 1944, **38**, 873[1]). The surface structure of the cottonin obtained from green tow by chemical disintegration is related closely to the degree of disintegration and greatly affects the spinning properties. It is affected appreciably by the presence of residues of the material that originally surrounded the fibre bundles and also by the condition of the middle lamella. The impurities of the tow from flax are attacked readily by alkali; those of tow from hemp, less easily. The cottonin can be improved greatly by thorough washing after the alkali treatment. The spinning properties of cottonin are damaged by bleaching. Acid pre-hydrolysis attacks the materials accompanying the cellulose, and occasionally causes the green tow to stick together. Acidification after the alkali boiling lightens the goods and improves the feel. Correct brightening makes the cottonin soft and flexible. Good cottonin can be produced even from raw material which is not very clean if the pre-cleaning, alkali disintegration, washing, brightening and mechanical after-treatment are well co-ordinated. C.

Saponins as Detergents. W. Kind. *Fette u. Seifen*, 1942, **49**, 708-711 (through *Chem. Abs.*, 1943, **37**, 6371). Saponins of various origin used in washing experiments on woollens and coloured goods failed to show any cleaning effects. W.

Saponin as Textile Assistant. H. J. Henk. *Zellwolle, Kunstseide, Seide,* 1942, **47**, 131 (through *Chem. Abs.*, 1943, **37**, 5870). The cleaning properties of saponin are due to negative electrostatic charges that peptize the dirt particles. The addition of 0·5-1·0 per cent. saponin to benzine prevents auto-ignition. W.

(G)—Bleaching

Continuous Peroxide Bleaching Range: Advantages. W. W. Chase. *Textile World,* 1944, **94**, No. 1, 76-78. A description is given of a new plant for continuous peroxide bleaching in open width, installed at the Riverside and Dan River Cotton Mills, Virginia. The units are (1) the cloth trolley, (2) a mangle for saturating the cloth with caustic soda, (3) a vertical heating tube, (4) a J-box, (5) a vertical washer, (6) an acid tank and mangle, (7) a vertical washer, (8) a travelling lattice, (9) a peroxide tank and mangles, (10) and (11) duplicates of (3) and (4), (12) and (13) two vertical washers, (14) drying cans, and (15) a winder. The treatment for an 8½-oz. herringbone twill and similar fabrics is outlined. The cloth travels at 50-60 yards per minute and the whole passage (including the piling in the J-boxes, which hold about 5400 yards) occupies about 2 hours 40 minutes. Costs for chemicals used are about 1·50 to 2 dollars, and the steam consumption is less than 750 lb. per 1000 lb. of cloth. C.

Cellulose Fibres: Acid Bleaching. P. P. Viktorov. *Tekstil. Prom.*, 1943, No. 1/2, 18-22; No. 3, 12-15 (through *Chem. Abstr.*, 1944, **38**, 646^9). Steep the material in water at 50-60°, after 36 hours wash with water at 50-60°, steep in a solution of sulphuric acid (5 g. per l.) at 60° for 12 hours, wash with water until neutral to Congo red, steep in a soap solution at 110-120° for 8 hours, drain and wash with circulating hot water for 30 min., wash twice with cold water, and treat with hypochlorite as usual. This process is particularly applicable to gauze. To prepare absorbent (hospital) cotton, heat for 4 hours in a sulphuric acid solution (0·5 g. per l.) with or without a wetting agent, wash with water, treat for one hour at ordinary temperature with an acid hypochlorite solution containing 1 g. per l. of active chlorine, rinse in water, bleach for one hour in an alkaline hypochlorite solution containing active chlorine 2 and silicate 2 g. per l., total alkalinity 0·5-0·8 g. per l., heating gradually from 30° to 60°, rinse with water, acidify with sulphuric acid (3-5 g. per l.), wash and dry at 50-60°. Some modifications of this procedure are discussed. C.

Fur Bleaching. W. E. Austin. *Text. Col.*, 1943, **65**, 407-411, 429-430, 472, 519-521. A special technique is required on account of the diverse properties of skin and hair, and because an intense natural colour often has to be removed. Sulphites are used to bleach light-coloured furs by reduction, while pigmented furs are usually bleached by oxidation with peroxides. Solutions are applied by the brush or dip methods, ageing, drum bleaching (using an absorbent) or solvent bleaching. Deeply pigmented furs are best bleached catalytically with peroxides. The principles and mechanism of catalytic fur bleaching are discussed, and the methods of application described, the essential steps being "killing" (to remove grease and swell the fibres), application of the catalyst, bleaching and after-treatments. W.

(I)—Dyeing

Cotton Pile Fabrics: Dyeing. *Textile Weekly,* 1944, **33**, 407-9, 563-566. A general, practical account is given of the dyeing of cotton pile fabrics with direct, sulphur, vat, and basic dyes. C.

Nylon Yarns and Fabrics: Dyeing. E. B. Abbott. *J. Soc. Dyers & Col.*, 1944, **60**, 55-59. The principal dyeing and fastness properties of dispersed dyes when applied to nylon are reviewed and compared with the properties of the dyes when applied to cellulose acetate rayon. The selection of dyes to be used in mixtures is discussed. The use of Solacet dyes for nylon is also discussed and differences in the behaviour of these dyes towards nylon and cellulose acetate rayon are described. The effects of certain physical properties of nylon on its behaviour in large scale dyeing are pointed out. C.

Nylon Yarns and Fabrics: Dyeing and Printing. *Silk and Rayon,* 1944, **18**, 318. Brief particulars are given of new methods for dyeing nylon, including the use of formaldehyde sulphoxylate in vat dyeing (B.P.534,085; Imperial Chemical Industries Ltd.) and the reservation of nylon against direct dyes by means of sulphonic acid compounds (B.P.552,015; I.C.I. Ltd.). C.

Soap Solution: Dye Solubilization and Colloidal Micelle Content. J. W. McBain and K. E. Johnson. *J. Amer. Chem. Soc.*, 1944, **66**, 9-13. The solubilization of insoluble dye by four potassium soaps containing 8-14 C atoms has been measured for equilibrium conditions over a range of concentrations. The solubilization increases so rapidly with the higher soaps as to cast doubt upon the suggestion that it is solution in the hydrocarbon fraction of the molecule and to favour the view that it involves incorporation between the layers of lamellar micelles. Potassium chloride not only greatly increases the solubilizing power of fully-formed micelles, but it produces in dilute solution micelles of still higher solubilizing power. C.

Sodium Alkyl Sulphates: Adsorption by Fibres. R. G. Aickin. *J. Soc. Dyers & Col.*, 1944, **60**, 60-65. The adsorption of sodium alkyl sulphates by wool has been studied under a variety of conditions. The single long-chain alkyl sulphate ion reacts with the basic groups present in wool and behaves as a colourless dye, in that the adsorbed ions cannot be removed by a simple washing process. Quite large amounts of the sodium alkyl sulphates are adsorbed, viz., up to 2·5 per cent. on the weight of the fibre, under neutral conditions. The extent of the adsorption increases with increasing H-ion concentration, and the concentration of the sodium alkyl sulphate solution is reduced almost to zero if there is less present initially than corresponds to the acid-combining capacity of the wool. The retarding and levelling action of these compounds in dyebaths can be explained in terms of this adsorption, since the dye sulphonic acids and the alkyl sulphates are competing for the same basic groups in the wool fibre, or active centres in other fibres. The extent and rate of adsorption are increased by the addition of electrolytes, the ion of sign opposite to that of the long-chain ion being responsible. As with interfacial tensions, the univalent ions fall into a lyotropic series. Measurements have also been made of the adsorption of sodium alkyl sulphates by cotton, silk, deaminated wool and nylon. The extent of the adsorption depends largely upon the number of basic groups present in the fibre. The curve for the adsorption by cotton is of the same shape as that for the adsorption by wool, showing that it is the single long-chain ion which is involved in both cases. With wool the adsorption increases over quite a long period, but with cotton it is complete in less than 30 minutes. The mechanism of adsorption thus appears to be different in the two cases. C.

Luminescent Pigments: Characteristics. G. F. A. Stutz. *Paper Trade J.*, 1944, **118**, *TAPPI*, 78-80. Fluorescent and phosphorescent pigments and their uses, and exciting light sources for these pigments are discussed. The chemical properties, daylight colour, fluorescent colour and brightness, afterglow, and other characteristics of fluorescent zinc and cadmium sulphides, the luminescent pigments that have found most use in printing inks, coated papers and filled papers, are briefly described. C.

Peat, Brown Coal and Alder Bark Dyes: Application. S. A. Bensman and G. N. Proshkin. *Legkaya Prom.*, 1943, No. 1/2, 12 (through *Chem. Abstr.*, 1944, **38**, 645^6). Alkaline extracts of granulated peat gave dyeings on cotton that were not fast. Treatment of the dyed fabric for half an hour at 40-50° in a solution containing 1 per cent. of sodium dichromate and 2 per cent. of 30 per cent. acetic acid, and a 1 per cent. solution of copper sulphate removed part of the dye, but the remaining part was quite fast. Lignite extracted with boiling 40° Bé. caustic soda for 4-5 hours, filtered, and diluted with water, and applied to fabric which was then washed with acidified water and treated with dichromate solution, gave better results than did the peat extract. Caustic soda extract of alder bark was applied to cotton with a little ferrous sulphate, and to wool with ferrous sulphate and size. The cotton was dyed gray and the wool green-black. By using various metal salts there were obtained beige, brown, olive, black and other colours. Detailed experimental data are given. C.

Aniline Black Dyeings: Production. (1) B. V. Ponomarenko and A. A. Veliksel'skaya. (2) I. M. Khailov and E. A. Kondratenko. *Khlopchatobumazhnaya Prom.*, 1940, No. 11-12, 45-49 (through *Khim. Referat. Zhur.*, 1941, **4**, No. 7-8, 107-108 and *Chem. Abstr.*, 1944, **38**, 868^5). (1) It has been proposed to add an excess of aniline to increase the mechanical strength of the dyed fabric on the assumption that free aniline neutralizes mineral acid.

Another view is that all free aniline evaporates during the dyeing process and, therefore, does not affect the strength of the fabric. Fabrics were dyed with aniline black dyes and the colour effect, the mechanical strength of the fabric and the concentrations of aniline in the air and in the drier, depending on the percentage of free aniline, were determined. Increasing the amount of free aniline in the bath caused increased volatilization of aniline, but did not improve the fabric. The limiting permissible content of free aniline is 5 per cent. (2) In dyeing cotton, in order to avoid as much as possible weakening of the fabric, and to produce a better colour, it is recommended to use aniline salt 10, copper sulphate 1, potassium dichromate 10 per cent. and the theoretical amount of hydrochloric acid required to displace dichromic acid from K dichromate; the temperature should be 20-25° and time of dyeing 1 hour. A preliminary treatment of the yarn with 0·5 per cent. solution of *p*-phenylenediamine is recommended. C.

Dyed Silk: Treatment to Increase Fastness. K. M. Markuze. *Shelk*, 1940, No. 12, 20-1 (through *Khim. Referat. Zhur.*, 1941, 4, No. 7-8, 108 and *Chem. Abstr.*, 1944, 38, 871[3]). The substantive and some neutral-dyeing acid dyes produce on silk fast colours in light and medium shades, but less fast colours in dark shades. Fastness can be improved by treatment with a condensation product of formaldehyde and dicyanodiamide. The method increases fastness to washing, does not decrease the light fastness, and leaves the shade almost unchanged. Treating rayon fabrics with the condensation product decreases their light fastness. C.

Indanthrene Dyes: Application. K. Stierwaldt. *Deut. Färber-Ztg.*, 1943, **79**, 1-7 (through *Chem. Zentr.*, 1943, i, 1719 and *Chem. Abstr.*, 1944, **38**, 869[8]). A discussion of the classification of these dyes according to their absorption velocities, migration properties and levelling powers; newer dyeing methods, as the dyeing at 80-90°, dyeing in temperature stages with initial temperatures of 16-17° with the use of wetting agents, such as Igepon T or TS, Peregal OK, Humectol CX or Setamol WS; the pigment padding method with the use of an assistant, such as Eulysin A; acid vat dyeing methods, etc. C.

Substantive Dyeings: After-treatment with Chromium Salts. G. Nitschke. *Textilberichte*, 1943, **24**, 189-191 (through *Chem. Abstr.*, 1944, **38**, 646[4]). Certain substantive dyeings can be improved in fastness by an after-treatment with dichromate and formic acid. This improvement is due to the power of formic acid to reduce Cr^{vi} compounds partly to activated Cr^{iii} compounds. This after-treatment is applicable to substantive dyeings of staple fibre and cotton as well as to dyeings on semi-wool and wool-staple fibre mixtures; it can be employed in a two-bath or one-bath process. C.

Sulphur Dyes: Application; Determination of Optimum Quantities of Sodium Sulphide. N. N. Voznesenskiĭ and N. K. Sokolova. *Tekstil. Prom.*, 1943, No. 3, 8-11 (through *Chem. Abstr.*, 1944, **38**, 646[5]). For sulphide determination the plumbate and the potentiometric methods are preferred to the iodometric. The plumbate method used with sodium ferrocyanide as external indicator is simple and reliable. The sodium sulphide requirements are different for various sulphur dyes and also depend on whether the dye is a powder or a paste and on the way it was stored. C.

Dyes: Fading. A. N. Terenin. *Trudy Chetvertogo Soveshchaniya Voprosam Anilinokrasochnoĭ Khim. i Tekhniki* (through *Khim. Referat. Zhur.*, 1941, 4, No. 9, 16 and *Chem. Abstr.*, 1944, **38**, 871[4]). Precision physical methods are necessary for the complete explanation of the individual stages of the fading process. In a number of cases the application of the photochemical method explained the individual steps of the fading process. Fading is not a chain reaction; the retardation of fading by inhibitors is caused by the decomposition of the peroxide compound formed by the dye. C.

The Dyestuff and Chemical Industry of Germany. A. M. Ryde. *Dyer*, 1943, **89**, 85-87, 125-127, 165-166, 173, 201-202, 239-241, 277-278, 309-310, 347-348, 387-388, 423-425, 457-458. A review of the growth and development of the German chemical industry, with particular reference to the activities of the I.G. Farbenindustrie A.-G. W.

(J)—Printing

Chitin: Use in the Textile Industry. P. P. Viktorov and I. M. Maïofis. *Khlopchatobumazhnaya Prom.*, 1940, No. 11-12, 52-53 (through *Khim. Referat. Zhur.*, 1941, 4, No. 7-8, 108 and *Chem. Abstr.*, 1944, **38**, 874^{3}). Chitin obtained from crab shells was deacetylated by treating 200 g. with 1000 c.c. of caustic soda (50° Bé.) at 120°, decanting the caustic soda, pressing out, washing and drying at 60°. The yield of chitosan was 90 per cent. Its highly viscous, colourless solution in acetic acid can be used as a thickener for printing and for finishing various fabrics. Chitosan solution is not washed from the fabric by alkali solution. C.

Stencil-printing Frames: Cleaning. A. Franken. *Deut. Textilwirt,* 1942, **9**, No. 17-18, 27 (through *Chem. Zentr.*, 1943, i, 1001 and *Chem. Abstr.*, 1944, **38**, 370^{9}). Frames fitted with phosphor bronze gauze are cleaned with a solution of 1 : 1 caustic soda of 40° Bé. For silk gauze a solution of 3 c.c. of the same caustic soda per l. is used first and then a bath is used containing 4 g. of Biolase N extra powder, 1 l. of water (70°) and 0·5 g. of Nekal BX dry or else the bath contains 4 g. of Viveral E conc., 1 l. of water (50°), 0·5 g. sodium chloride and 0·5 g. Nekal BX. The washing periods for these baths is 3 hours and the washing is repeated, if necessary. The chromium gelatin can be dissolved also with lactic acid. In all cases the frames must be rinsed thoroughly. C.

(K)—Finishing

Permanent Waving Preparations. C. H. Allen. *Soap, Perfumery and Cosmetics,* 1943, **16**, 392, 394, 397-8 (through *Chem. Abs.*, 1943, **37**, 6088). Formulae are given illustrating the use of ammonia, ammonium carbonate, potassium carbonate, sodium carbonate, borax, monoethanolamine, triethanolamine, morpholine, ammonium sulphite, sodium sulphite, potassium sulphite, ammonium acetate, calcium oxide, calcium carbonate, ammonium sulphate, oxalic acid, barium chloride, copper carbonate, aluminium powder, potassium chlorate, copper sulphate, sodium chlorate, and a heat indicator of the mercuric iodide and cuprous iodide type. W.

(L)—Proofing

Electronic " Sewing " Machine: Application. C. N. Hoyler. *Plastics Resins Ind.*, 1943, **1**, 8 (through Mark & Proskauer's, *Resins, Rubber, Plastics Abstr.*, 1943, Sheet 680). An experimental electronic sewing machine is shown in which thermoplastic material to be bonded is advanced by a pair of rotating electrodes and exposed to a strong field for a few hundredths of a second. Very little power is required, e.g. two sheets of Vinylite, 0·004 in. thick, may be bonded in a seam $\frac{1}{8}$ in. wide, at an inch per second with less than 10 watts. To accomplish the same result, two heated rollers would require a temperature of 180° C., and one roller operated over a platen would require a temperature of 370° C. In the electronic machine the heating is very uniform, and the heat conductivity of the electrodes keeps the outside of the material relatively cool so that the highest temperature is in the central part where bonding is supposed to take place. Devices for binding, hemming, or folding operations can be attached to the machine. For sealing packages, bar electrodes may be used. C.

Copper Soaps: Rot-proofing Action. P. B. Marsh, G. A. Greathouse, Katharina Bollenbacher and Mary L. Butler. *Ind. Eng. Chem.*, 1944, **36**, 176-181. The results of soil burial tests show that copper naphthenate prevents rotting of cotton fabrics at lower concentrations than do copper oleate, " tallate " or hydrogenated resinate. Of these four soaps, copper naphthenate alone is able to prevent the growth of the copper-tolerant fungus *Aspergillus niger.* Naphthenic acid is effective in preventing the growth of *Aspergillus niger, Penicillium* sp., *Chaetomium globosum,* and *Metarrhizium* sp., and in preventing fabric deterioration in soil. Tall oil, oleic acid and hydrogenated resin show no protective value in any of these cases. Fabric treated with copper naphthenate, which has been drastically leached with dilute nitric acid until essentially free from copper, still has enough residual protection to prevent growth of *Aspergillus niger;* it is likewise protected against deterioration in soil. These facts indicate that the high preservative power of copper naphthenate is due in part to naphthenic acid. Fabrics treated with copper oleate, naphthenate and tallate lose copper readily at the points where the fabric is in contact with soil. Each of these compounds is insoluble in water, but may be solubilised by acid hydrolysis or by reaction with materials which form soluble copper complexes. A neutralised sodium hydroxide extract of soils will dissolve copper from treated fabrics. Neutralised solutions of a variety of naturally occurring hydroxy and amino acids have a similar effect. Copper hydrogenated resinate is highly resistant to leaching. Its relatively poor protective power in contact with soils may be due in part to the low availability of ionic copper. C.

Ozokerite: Use for Waterproofing. N. P. Batsyn. *Tekstil. Prom.*, 1943, No. 4/5, 15 (through *Chem. Abstr.*, 1944, **38**, 647[9]). Stearin, paraffin and aluminium oxide usually used for waterproofing were successfully replaced by ozokerite, waste fat and ferrous sulphate. An emulsion was prepared from ozokerite 150, waste fat 100, 32·5 per cent. caustic soda 16-20, 25 per cent. ammonium hydroxide 15-20 and water 180 g. Details of the application of the emulsion and the subsequent ferrous sulphate treatment are given. C.

PATENTS

Wool: Chlorine Gas Treatment for Unshrinkability. J. Brandwood. B.P. 559,263 of 11/2/1944. Wool, or similar fibre, in the form, e.g. of rovings or yarns, is wound into packages which are mounted on perforated holders of metal, metal alloy or other chlorine-resistant material, and subjected to the action of chlorine gas; the packages are cleared of residual gas by compressed air, and then washed. The winding is done so that a thin, even and permeable layer is presented to the gas. The gas (1-3 per cent. of the weight of the material, according to the degree of unshrinkability required) is preferably mixed with a large proportion of air at 5 lb./in. pressure. The apparatus used is similar to a yarn dyeing apparatus. Initial drying of the fibres is unnecessary; they may contain about 40 per cent. moisture. W.

Wool Mixture Materials: Treatment to Reduce Shrinkage. J. B. Speakman, T. Barr and Imperial Chemical Industries Ltd. B.P.559,787 of 21/8/1942: 6/3/1944. A process for the treatment of loose fibre, yarn, or woven or knitted fabric consisting of or containing wool fibres to produce effects which include an increased stiffness, a reduced affinity for water vapour, and a reduced tendency to felt or, for woven or knitted fabrics, to shrink, comprises exposing the material at elevated temperature, but below 100° C., to the combined action of water vapour and the vapour of a volatile monomeric vinyl or vinylidene compound, e.g. an ester of acrylic or methacrylic acid, styrene or a vinyl ester, the temperature, time and other conditions of the treatment being such as to cause substantial polymerisation of the vinyl or vinylidene compound within the fibre. If the material is wetted out with water before exposure to the action of the mixed vapours, more even effects are obtained. If a polymerisation catalyst is required, the material may be impregnated with an aqueous solution of the catalyst. C.

Fabrics: Coating. Texproof Ltd. and R. H. Czeczowitzka. B.P.559,820 of 19/6/1942:9/3/1944. A process of surface coating fabrics with a composition containing a polymerised organic compound, comprises first impregnating the fabric with a volatile liquid to form an emulsified layer of the composition at the surface of the material, which minimises permeation of the material by the coating composition, coating the material with a composition containing a polymerised organic compound, and drying the coated material. The impregnating liquid may contain small quantities of substances that modify its viscosity and wetting power, and also a precipitant for the coating composition. C.

Transfer Marking Composition. British Kaumagraph Transfers Ltd. B.P. 559,859 and 559,878 of 31/8/1942:8/3/1944 (Conv. 17/9/1941). (1) A dye composition or transfer marking composition suitable for application to cotton, wool, silk or nylon fabrics comprises a dye, a non-resinous compound or compounds containing singly or collectively a phenolic group and a carboxylic group and capable of acting to fix the dye in the fibres of the fabric upon application of heat and in the absence of moisture or steam, together with a resin and/or a wax. The dye may be of the group Nigrosine base 2R, Methyl violet base, Rhodamine bases, Victoria blue base, Crystal violet. Salicylic acid is a satisfactory fixing or assisting agent. If desired a plasticiser, such as an alkyl phenol, may be added to the resinous material. (2) A heat transfer consists of a paper backing and a transfer marking composition printed thereon, the marking composition comprising a dye, an assisting agent or agents, namely, a compound or compounds containing singly or collectively a phenolic group and a carboxylic group, and resin or wax or both resin and wax, the composition being capable of being released from the backing and caused to adhere to a textile fabric upon application of pressure at an elevated temperature below 250° C., and the dye being capable of becoming fixed on the fibres of the fabric under the influence of the heat and pressure and of the assisting agent or agents, and while maintaining the composition in a dry state. C.

Nylon Fabrics: Dyeing and Printing. British Kaumagraph Transfers Ltd. B.P.559,879 of 31/8/1942:8/3/1944 (Conv. 17/9/1941). A method of dyeing fabrics and articles containing nylon or other fibres comprises applying by dry heat and pressure, at a temperature less than about 250° C., a composition containing a dye and a fixing agent. In order to facilitate printing it is preferable to include a resinous material and/or a wax as an ingredient of the composition. If the dye composition is to be used as a transfer composition, a wax is added. The fixing agent may be salicylic acid, or a phenol, together with a carboxylic acid. The dye may be of the group including Nigrosine base 2R, Methyl violet base, Rhodamine bases, Victoria blue base and Crystal violet. C.

Anti-gas Clothing. British Cellophane Ltd., G. S. Heaven and Zoe Heaven. B.P.559,966 of 9/9/1942:14/3/1944. An article of clothing resistant to the passage of toxic materials including liquids and mists, such as mustard gas, consists essentially of two outer layers of leather or one outer layer of leather and one of fabric showing relatively low resistance to penetration by toxic material and between them a continuous interlayer of impervious sheet cellulose. The outer layers are united together around their edges to form a pocket, but are not united to the interlayer, which can be removed and replaced as desired. C.

Rubber Bonded Cotton Fabrics: Production. United States Rubber Co. B.P. 559,986 of 2/11/1942:14/3/1944 (Conv. 8/11/1941). A process for bonding rubber to plies of fabric containing cotton for the production of tyre casings, hose pipes, belting, etc., comprises applying to the fabric a coating of an aqueous rubber dispersion containing a quaternary ammonium compound in which one valency of the nitrogen is satisfied by an anion and the remaining valencies are satisfied by hydrocarbon radicals, drying the coating, applying a vulcanisable rubber composition, and vulcanising the composite structure. The anion of the quaternary ammonium compound may be any common ion, such as that of the hydroxide, halide, formate, acetate or sulphate radical. Specified quaternary ammonium compounds include benzylpyridinium chloride, trimethylbenzylammonium hydroxide and tetraethylammonium chloride. Tests have shown that the use of small amounts of these compounds in the manner described leads to a substantial increase in the flexible resistance of the rubber-fabric product. C.

Cellulose Acetate Materials: Acid Dyeing. D. M. Clark (Atlantic Rayon Corporation, Providence, Rhode Island, U.S.A.). B.P.559,991 of 22/5/1941: 15/3/1944. Secondary cellulose acetate, in the form of yarn, fabrics, films, etc., is dyed by treatment with an acid dye in an aqueous solution of an organic solvent of the cellulose acetate, e.g. formic or acetic acid, having a *p*H value below 1·4. The solution has a concentration between, on the one hand, the threshold concentration at which wetting and penetrating capacity toward the cellulose acetate become markedly greater than that of water, and, on the other hand, either the critical delustring concentration or the critical swelling concentration for the particular time and temperature conditions employed, and, if necessary, an inorganic acid is added to depress the *p*H value below 1·4. C.

Printing Paste. Hercules' Powder Co. B.P.560,049 of 5/12/1940:17/3/1944 (Conv. 10/2/1940). A textile printing paste has a total solids content not much above 20 per cent. by weight comprising a water-insoluble colour pigment dispersed in an emulsion comprising a continuous phase consisting of a solution of an insoluble cellulose ether in a volatile organic solvent and a discontinuous aqueous phase, the content of solids derived from the emulsion not exceeding about 10 per cent. by weight of the paste. If desired, a plasticizer for the cellulose ether or a suitable synthetic resin, or both, may be included in the solution of the cellulose ether. The printing paste may be applied to fabric by means of printing rollers or screens and the printed material dried at a temperature in the range of 180° F. to 320° F. Development of the colour in the fabric and washing and soaping are not necessary. C.

Thermoplastic Organic Materials: Heating by High Frequency Electric Fields. E. I. Du Pont de Nemours & Co. B.P.560,101 of 14/9/1942:20/3/1944 (Conv. 13/9/1941). A process of inducing heat in thermoplastic organic materials comprises incorporating crystalline titanium dioxide (rutile or brookite) in the material and then placing it in an energized electrostatic field of radio frequency, e.g. between 100,000 cycles per sec. and 100 megacycles per sec. Suitable thermoplastic organic materials include polyvinylacetal resins, polyvinyl esters of organic and inorganic acids, polystyrene, polyacrylates, polymethacrylates, and cellulose derivatives. Applications of this method to the heating of adhesives in cementing operations are mentioned. C.

Cellulose Ether Compositions. British Industrial Plastics Ltd. B.P.560,115 of 25/8/1942:21/3/1944 (Conv. 26/8/1941). Water-soluble cellulose ethers are rendered relatively insoluble when heated in the presence of an acidic catalyst by incorporating in them a soluble methylated polymethylol melamine. The compositions may be used for the production of water-resistant films and coatings for the protection and decoration of paper, textiles, etc., and with suitable fillers for the preparation of moulding compositions. C.

Patterned Cellulose Derivative Fabrics: Production. British Celanese Ltd. B.P.560,116 of 1/9/1942:21/3/1944 (Conv. 3/9/1941). A process for the production of a patterned fabric comprises subjecting a fabric containing cellulose derivative filaments and carrying a resist in a pattern, to be action of a solution, of not more than 50 per cent. strength, of a non-volatile plasticizer for the organic derivative of cellulose in a volatile liquid which has some softening action on the organic derivative of cellulose, and then drying the fabric at an elevated temperature. The resist is preferably a water-soluble compound such as a soluble resin obtained from polyvinyl alcohol, a gum or protein material. The parts of the fabric exposed to the action of the plasticiser acquire a semi-stiff or organdie-like finish. The pattern effects are highly resistant to laundering. A similar process may be used for the production of pattern effects on films having a basis of cellulose acetate or other organic derivative of cellulose. C.

Cellulosic Fibres: Treatment to Improve Resistance to Wet Processing. Courtaulds Ltd., C. C. Wilcock and W. Armfield. B.P.560,121 of 17/9/1942:21/3/1944. To increase their resistance to wet processing cellulosic fibres are impregnated with an aqueous solution prepared from dicyandiamide or guanidine, resorcinol and formaldehyde and having a *p*H below 7, and then heated to convert the substances into a water-insoluble product. Cellulosic materials treated in this way do not suffer any substantial loss in affinity for wool dyes when they are subjected to crabbing, setting, scouring or milling operations. C.

Methine Dyes: Production. A. H. Cook and Imperial Chemical Industries Ltd. B.P.560,160 of 18/9/1942:22/3/1944. Di- and tri-methine dyes are made by condensing one molecular proportion of a quaternary salt of 3-methylquinoxalone, which may optionally be substituted in the 1-position by an alkyl, aryl or aralkyl group, with one molecular proportion of a cyclic aldehyde or, in one or more stages, with one molecular proportion of an arylformamidine or an ortho-formic ester which is capable of providing a methine group, and one molecular proportion of a heterocyclic nitrogen compound containing a reactive methyl or methylene group. The products dye acetate rayon and tannin-mordanted cotton in deep red, blue and violet fast shades. C.

Halogenated Anthraquinone Dyes: Production. Sandoz Ltd. B.P.560,164 of 8/12/1941:23/3/1944 (Conv. 13/12/1940). Halogenated dyes are prepared by treating derivatives of 1:4-diaminoanthraquinone of given general formula, which contain halogen in the 6- or 7- or 6- and 7-positions, with halogenating agents and, if desired, sulphonating the products so obtained. The treatment of 1:4-di-(2′:4′-dimethyl)-phenylamino-6-chloranthraquinone, 1:4-di-(2′:4′:5′-trimethyl)-phenylamino-6-chloranthraquinone, 1-amino-2-bromo-4-(2′:4′-dimethyl)-phenylamino-6(7)-chloranthraquinone and similar derivatives is described in examples. The dyes obtained dye wool in blue shades of good fastness properties which remain blue in artificial light. C.

Aeroplane Fabrics: Tautening. J. R. Myles, F. J. Siddle, D. Whittaker and Imperial Chemical Industries Ltd. B.P.560,168 of 8/11/1940:23/3/1944. Fabrics, particularly fabrics stretched over light structures such as aeroplane wings, are tautened by doping them with a solution of the material obtained by chlorinating solid polythenes at a temperature generally below 60° C. to a chlorine content of 60-70 per cent. by weight, and preferably also one or more substances that inhibit the liberation of free hydrogen chloride from chlorinated polythenes under the conditions of exposure to light and/or heat, and if desired, other film-forming materials and/or plasticisers. Preferably, the first coat of dope is brushed on to the fabric and subsequent coats are sprayed, brushed or otherwise applied as convenient. C.

Dyed Cellulose Fibres: Protective Treatment against Chlorination. Society of Chemical Industry in Basle. B.P.560,284 of 23/12/1941:29/3/1944 (Conv. 24/12/1940 and 25/11/1941). Cotton, linen or regenerated cellulose fibres which have been dyed with dyes sensitive to chlorine can be treated in baths containing chlorine without destroying the dyes, if water-insoluble condensation products of formaldehyde and urea compounds or similarly acting compounds are produced on the dyed material prior to chlorinating in such a manner that the condensation products are present in a coherent condition in or on the fibre. This treatment is especially valuable for the treatment of cellulose fibres which are to be mixed with wool and then subjected to chlorination to prevent the wool from felting and shrinking. Another suitable application of the process is in cases where undyed cellulose fibres have to be bleached by chlorination in association with dyed fibres. C.

Cemented Pile Fabrics: Production. R. S. Allen (Birmingham, Michigan, U.S.A.). B.P.560,290 of 16/7/1942:29/3/1944. In a process for the production of cemented pile fabric by the method involving pleating a fibrous web about several separator strips, cementing a base fabric to each face of the pleated structure and then splitting the resulting structure in a plane parallel to the base fabrics, a pleated structure comprising a warp and several separator strips is passed through a confining passage formed by a pair of spaced parallel plates which are provided with longitudinally extending ribs. The mechanism for depositing the strips, one by one, in the mouth of the passage includes a pleating mechanism and a strip holding magazine co-operating with a strip transfer device adapted to receive a strip from the magazine. The transfer device first receives a strip from the magazine and then, moving from its receiving to its delivery position, it deposits a strip in the mouth of the passage, the pleating mechanism then folding the warp about the strip so delivered. The pleating mechanism may include a bar having a strip-engaging surface provided with openings which communicate with a suction passage and the strip transfer device may also be provided with suction passages controlled as by a number of cam-operated valves so that the strip is held on the delivery mechanism by suction until it is engaged by the pleating bar. The suction is then cut off from the transfer device and applied to the pleating bar, means being provided for operating the pleating mechanism so as to move its bar from engagement with the transfer device to the mouth of the passage when the suction is cut off from the pleating bar. Two pleating bars may be provided and two similar strip-holding magazines may be arranged on each side of the passage mouth. As the pleated structure leaves the confining passage, cement is applied to the bights of the warp by means of rollers which travel in the same direction as the pleated structure. In addition, the structure makes contact with friction rollers rotating in the opposite direction and at a greater speed than the cement applying rollers, so that the cement is rubbed or pressed into the loops before the structure passes through a drier, with the result that the initial cohesion between the cemented pleats is employed to maintain the number of tuft loops per unit of length. C.

Cellulose Derivative Monoazo Dyes: Production. British Celanese Ltd. B.P. 560,298 of 25/9/1942:29/3/1944 (Conv. 1/10/1941). Monoazo dyes are obtained by coupling 1-di(β-hydroxyethyl)-amino-3-acetanilide with the diazo compound of an aminophenylsulphone or an aminophenylmethylketone in which the benzene nucleus is free from further substituents. The products dye cellulose acetate and other organic derivatives of cellulose in orange shades which are dischargeable to white and are of very good fastness to light, acid fading and dry bleeding. C.

Wool Fabric: Mothproofing. W. Colman and H. L. J. Haller (to the U.S. Secretary of Agriculture and his successors in office). U.S.P.2,318,201 of 4/5/1943 (through *Chem. Abs.*, 1943, **37**, 6142). *Iso*nitrosoacetanilide is used, preferably in acetone solution and with various other compounds. W.

Dry Carrotting Fur on the Pelt. J. D. Sartakoff (to No-Mercury Felt Corp.). U.S.P.2,321,775 of 15/6/1943 (through *Chem. Abs.*, 1943, **37**, 6909). Pelts, e.g. English rack pelts, are tumbled with a relatively large bulk of pieces of substantially acid-proof attrition material, e.g. paraffin particles, substantially free from abrasive properties and dust and carrying a substantially imperceptible coating of adsorbed highly active carrotting solution, e.g. one containing nitric acid or sulphuric acid and hydrogen peroxide, and the attrition material is then separated from the pelts. W.

Flexible Raincoat Coating Composition. Columbus Coated Fabrics Corporation. U.S.P.2,331,977. A flexible film-forming composition for raincoats, etc., comprises nitrocellulose, butyl acetyl ricinoleate as plasticizer, a reaction product of castor oil, maleic anhydride and glycol as " flexibilizer," diatomaceous earth as a filler, a pigment, and a solvent. C.

Nitrogenous Cellulose Derivative Materials: Production. Röhm & Haas Co. U.S.P.2,332,047. Cellulosic fibre, yarn or fabric is treated with a solution of a condensation product of amino-1:3:5-triazine, formaldehyde and dimethylamine, and heated at 90-140° C. C.

Starch Product: Preparation. Corn Products Refining Co. U.S.P.2,332,320. A suspension of starch at 95-105° F. is passed through a chlorinating tower into which chlorine gas is supplied at the rate of 0·165-0·55 per cent. on the dry starch. The chlorinated starch liquor is mixed in a tank and allowed to settle for 180-50 minutes, when an antichlor is added and the starch is filtered and dried. A small amount of Na_2H phosphate is added during the cooking of such starch (containing chloro-fatty acids) to minimize thinning. The product is described as a " thermophylic free starch." C.

Dyeing Machine. W. E. Rowlandson (Lowell, Mass.). U.S.P.2,332,346. The machine comprises a tank through which the fabric passes in festoon form and a mixing reservoir alongside the tank which has an upper part level with the top part of the tank, connected by a narrow channel to a lower part level with the bottom part of the tank. Perforated pipes within the tank feed the top and bottom parts with dye liquor from the top and bottom parts, respectively, of the reservoir. C.

Shoe Stiffening Fabric: Finishing. Celastic Corporation (Wilmington, Del.). U.S.P.2,332,501. A porous fabric is impregnated with 300-900 per cent. on its weight of a polyester-polyamide formed by the interaction of a C_6-C_{10} alkyl diamine, a C_4-C_8 alkyl dibasic acid, and ethylene or propylene glycol, the ester-forming ingredients comprising 80-100 per cent. of the composition. C.

Retarded-exhaustion Finishing Dispersion. E. I. Du Pont de Nemours & Co. U.S.P.2,332,817. The exhaustion of a positively-charged aqueous dispersion of a finishing agent is retarded by the addition of 0·02–0·5 per cent. of a cationic surface-active agent, based on the weight of the textile material. C.

Rubber-cored Yarn Laminated Fabric. J. A. Grabec (Czechoslovakia; vested in U.S. Alien Property Custodian). U.S.P.2,332,848. Elastic sheet material is formed by embedding a fabric made from rubber-cored, textile-covered yarn in rubber sheeting under heat and pressure sufficient to unite the two supplies of rubber, and then vulcanizing the assembly. C.

Polyvinyl Chloride Plasticizing Agent. W. Gruber and H. Machemer (Germany; vested in U.S. Alien Property Custodian). U.S.P.2,332,849. An aliphatic ester of diacetoxystearic acid is claimed as plasticizing and thermally-stabilizing agent for polyvinyl chloride. C.

Nylon Fabric Articles: Finishing. Paramount Textile Machinery Co. U.S.P. 2,333,160. Articles manufactured from synthetic linear polyamides are pre-set by treatment in the unconstrained state with an aqueous medium at a predetermined temperature, then given a hot liquid treatment at the same or a lower temperature, and finally re-set on a form by the action of an aqueous medium at a higher temperature. C.

Cellulosic Fibres: Enhancing Dye Affinity. General Aniline and Film Corporation. U.S.P.2,333,203. Cellulosic material is heated with pyridine or quinoline (if desired, in an indifferent diluent) and a compound of the formula R·O·CHY·Hal, where R is a radical with up to 6 C atoms, or benzyl, and Y is H or methyl. C.

Azo-dyed Cellulose Derivative Fabric: Discharge Printing. Celanese Corporation of America. U.S.P.2,333,204. The material is printed with a discharging composition, aged, and washed at 10-35° C. in an alkali hydroxide or carbonate solution that is not sufficiently concentrated to injure the material. C.

Singeing Machine Burner. M. R. Kelly and J. T. Melton. U.S.P.2,333,381. The burner consists of a gas pipe with a slot along one side and a compartment, spaced from the pipe and encircling all but the slot region, through which a cooling liquid is conducted. C.

Fabric Printing Drum. C. P. Kent (Lyndhurst, N.J.). U.S.P.2,333,382. A perforated, rotatable drum houses a series of paint or lacquer containers that can be fed with pigment under pressure. Each container has a top opening, normally closed by a plug, through which the pigment enters and a bottom opening that is regulated by a segment-shaped plate and is kept clear by an oblique doctor blade. C.

Arylaminoanthraquinone Dye for Cellulose Acetate. E. I. Du Pont de Nemours & Co. U.S.P.2,333,384. Compounds of the formula $RO \cdot C_6H_4 \cdot NH \cdot C_{14}H_6O_2 \cdot OH$, in which R is $-CH_2 \cdot CO_2H$, $-CH_2 \cdot CH_2 \cdot OH$, $-CH_2 \cdot CO_2Me$ or $-CH_2 \cdot CO_2Et$, and the NH and OH groups are attached to the anthraquinone system at positions 1 and 4, are claimed as violet dyes, fast to gas fumes, for cellulose acetate. C.

Finishing Agent. Montclair Research Corporation. U.S.P.2,333,623. The reaction product of formaldehyde, a nitrile (<9 C), an acid chloride (>9 C) and a tertiary amine is claimed. [The full specification says that agents of this type impart a soft, suede handle and that the impregnated cloth becomes water-repellent if baked at 140-170° C.]. C.

Textile Material: Recovery from Rubber Goods. R. E. Tefft (to Allied Chem. & Dye Corp.). Canadian P.407,228 of 8/9/1942 (through *Chem. Abs.*, 1942, **36**, 6816). The material is digested at 120-160° with sulphur, a vulcanizing accelerator, and rubber solvent, e.g. anhydrous aromatic hydrocarbons, and the textile material then separated from the solution. W.

Waterproofing Fabrics which Retain Air Permeability. Textilwerk Horn A.-G. D.R.P.725,120 of 30/7/1942 (through *Chem. Abs.*, 1943, **37**, 5874). The fabric is impregnated first with a paraffin solution, then with a dilute solution of a synthetic resin, e.g. polyvinyl acetate in benzene, and finally with a water-repelling solution, e.g. paraffin solution (for the second time). The fabric is then calendered at approx. 25°. W.

Felt and Straw Hats: Stiffening. I.G. Farbenind. A.-G. D.R.P.725,794 of 13/8/1942 (through *Chem. Abs.*, 1943, **37**, 6142). Hats are treated with mixed- or hetero-polymers of at least one polymerizable olefinic compound having no free carboxyl groups and at least one olefinic monocarboxylic acid. Salts of such polymers can also be used. The hats are then treated with a salt solution which renders the polymer insoluble. W.

Animal Fibres: Bleaching with Hydrogen Peroxide. R. Sarg (to Elchemie G.m.b.H.). D.R.P.727,153 of 24/9/1942 (through *Chem. Abs.*, 1943, **37**, 6470). Fibres, e.g. hair or bristles, are treated with reducing sulphur compounds and solutions of iron salts either simultaneously or consecutively. The bleaching is then finished as usual. W.

Textiles: Milling. J. Breuer (to L. Ph. Hemmer, G.m.b.H.). D.R.P.727,568 of 8/10/1942 (through *Chem. Abs.*, 1943, **37**, 6908). The heat required for milling is supplied by an alternating current passed through the fabric. W.

5—ANALYSIS, TESTING, GRADING AND DEFECTS

(A)—FIBRES

Balls Sledge Cotton Sorter: Description and Application. R. W. Vose. *A.S.T.M. Standards on Textile Materials*, 1943, 415-419. A brief description is given of the draw box and carriage of the Balls sledge sorter and their manipulation and use for plotting fibre length distributions. The accuracy of the instrument was checked by direct measurement of length on 25 fibres taken at each of a number of places on the plush spread. Except for one or two points the distribution of length of the 25 fibres was within the chosen limits and the averages for the 10, 15, 20, 25, 30 and 35 m.m. groups were, respectively, 9·7, 14·9, 19·4, 24·5, 29·2, and 33·0 m.m. This calibration is better than some reported by Balls; the improvement is ascribed to a superior quality of plush and to small mechanical modifications in the instrument. As typical of the use of the sorter, a set of frequency curves is given for a sample of cotton in the bale (12 bales) and in the scutcher lap, draw-frame sliver, card sliver, card strips and roving. C.

Fibre Projection Apparatus: Application. J. H. Graff and J. R. Feavel. *Paper Trade J.*, 1944, **118**, *TAPPI*, 53-57. A projection arrangement for use in measurements of fibre dimensions consists of a projection microscope from which the microscope tube has been removed; in place of an objective, the microscope is equipped with an F 12·5 mm. f 2·8 projection lens. The microscope and illuminant are placed in a box-like table equipped with a reflecting mirror. The inside of the box is painted a dull black. On the top of the table-box and above the reflecting mirror is a ground glass (finely ground) on which a series of lines are drawn at 7·5 mm. intervals, representing an actual space between the lines of 0·1 mm. at 75 diameters magnification. Above the ground glass is a hood (the interior of which is painted dull black), which makes it possible to observe and read the dimensions of the projected fibres without disturbance from the light in the laboratory room. For measurements on pulp fibres, the fibres are stained with Bright stain and the pulp diluted so that 1 drop (using a dropper with 5-mm. inside opening) will contain about 25 fibres. One drop of the suspension is placed on each of eight slides. The slides are dried and the fibres are then treated with a drop of standard calcium chloride solution, straightened out with a dissecting needle and arranged side by side parallel to the length of the slide. The slide is then put on the stage of the projection microscope and fibre lengths are determined to the nearest 0·1 mm. and fibre widths to the nearest 0·01 mm. At a magnification of 75 diameters ray cells, fibre fragments and broken and whole fibres can be distinguished. A minimum of 200 measurements should be made. The arithmetic and weighted average fibre lengths, the average width, the length/width ratios, and the average area of the fibres, and also the percentage frequencies of the length and area can be calculated from the measurements. Results obtained for various pulps are tabulated and the advantages of comparing different pulps, as regards their relative percentages by weight of short, medium long, and long fibres, by plotting these values on a triangular chart are demonstrated. The influence of the size of the mouth opening of the dropper and the probable errors in average lengths and widths based on measurements of 100 to 1000 fibres are discussed. C.

Cellulose-Water Adsorption Isotherm: Interpretation. A. G. Assaf, R. H. Haas and C. B. Purves. *J. Amer. Chem. Soc.*, 1944, **66**, 66-73. Three highly-swollen cellulose samples of cotton linters were studied by the thallous ethylate method. Extrapolation of the linear plots of methylation against molecular volume to volumes of 18 and 35 gave the respective percentages of cellulose theoretically accessible to water vapour and nitrogen gas. The moisture adsorption isotherms, at 20° or 25°, of the same swollen samples were determined. The moisture content at the second region of inflection in the sigmoid plots, occurring at R.H. about 50 per cent., was approximately that predicted from the results above by assuming the adsorption of one water molecule by each accessible alcoholic group. This region in the isotherm was considered to be approximately equivalent to a unimolecular water layer completely covering the accessible surface of the cellulose. The moisture content at the first region of inflection in the isotherm, occurring at R.H. about 10 per cent., was approximately one-third of the value at the second inflection. This fact, together with other considerations cited, suggested that the avid adsorption of water up to the first inflection was mainly a function of the strong hydrogen-bonding capacity of the accessible, primary alcoholic groups. The intermediate portion of the isotherm represented the water less strongly hydrogen-bonded to the secondary alcoholic groups, but its shape was influenced at the higher humidities by the effects of swelling and by capillary condensation. Some physical-chemical implications of these ideas are discussed, particularly the inference that the moisture sorption characteristics of cellulose and starch at 80° or more must be those of the primary alcoholic groups exclusively. Up to 98 per cent. of the surface of moist, swollen cellulose was obliterated by direct drying, but up to 75 per cent. was preserved during solvent-exchange with ethanol. The adsorption of 6 per cent. to 9 per cent. of water increased the colloidal surface of highly swollen cellulose by at least 20 per cent., but the increase for unswollen samples was perhaps thirtyfold. These data throw fresh light upon the significance of the mercerisation or reactivity ratio of cellulose, which is usually given as about 1·5. The surfaces of two of the swollen cellulose samples were estimated by the standard method involving the determination of the nitrogen adsorption isotherm at −195·8° but the correlation of this method with the thallous ethylate technique requires further study. C.

Cupri-ethylenediamine Cellulose Solutions: Viscosity; Rapid Determination. R. M. Levy, P. Muffat and W. D. Harrison. *Paper Trade J.*, 1944, **118**, *TAPPI*, 45-47. Details are given of a rapid method for the determination of the viscosity of cellulose in cupri-ethylenediamine solutions which is suitable for control purposes in pulp and paper mills. Moist pulp samples can be used without previous drying. The pulp is first subjected to a wet disintegration and then measured into a dissolving tube and mixed with an equal volume of double-strength cupri-ethylenediamine solution (1·0M. in copper). The pulp is stirred for 5 min. and the viscosity determined with a capillary viscometer. An aliquot part of the pulp suspension is also filtered on a Buchner funnel, dried on a steam cylinder, and finally weighed in a conventional type of heated pulp balance. The viscosity is then corrected to a standard weight from a set of simple tables. The entire test, including all operations in duplicate, can be carried out by unskilled workers in approximately 20 min., and results obtained which are reproducible within 1 per cent. or better. C.

Fibres: Specification and Testing. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials,* 1943, 457 pages. The following standard has been revised in 1943: D276, Tentative methods for identification of fibres in textiles (pp. 18-36). C.

Rayon Staple: Commercial Weight Testing. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials,* 1943, 257-259. "Tentative Method of Test for Commercial Weight of Rayon Staple," D540, lays down the conditions for sampling from the bale, preparing test specimens (about 300 gm.), "boiling off," and determining the moisture regain. C.

Casein Bristles: Production and Properties. T. L. McMeekin. *A.S.T.M. Bull.*, 1943, No. 125, 19-21. A general account is given of the production, properties and uses of casein bristles. Data showing the water absorption of untreated and formaldehyde-hardened fibres, lysine content, and flexibility of fibres prepared from various proteins are presented. Hardening agents for casein fibres are briefly discussed. C.

Clam Muscle Fibrils: Electron Microscope Observations. M. A. Jakus, C. E. Hall and F. O. Schmitt. *J. Amer. Chem. Soc.*, 1944, **66**, 313-314. Electron micrographs show the fibrils obtained from the adductor muscles of marine and fresh-water clams to be very long and evenly contoured, with widths usually between 200 and 1000 A. In fibrils treated with osmic acid the density along the axis is not uniform but shows a periodic variation producing a cross-striated appearance. From measurements of 100 fibrils a distribution curve of "spacings" of this fibre axis repeat pattern was constructed. All the values lay between 290 and 470 A. The most frequently occurring spacings were between 330 and 390 A., the average value of all spacings being 360 A. X-Ray diffraction data indicate that the fibre axis period in the intact dried muscle is 720 A. It is suggested that the larger X-ray period reflects density differences not yet resolved with the electron microscope but which may become apparent when special methods are applied. C.

Shirley Analyser: Application. G. W. Pfeiffenberger. *Textile Research,* 1944, **14**, 50-54. The Shirley Analyser is briefly described. It is pointed out that there is a good correlation between Shirley Analyser waste percentages and combined scutcher and card waste so that rapid determinations can be made of the waste loss that may be expected in the mill. The relation between waste and grade is discussed and it is shown that an examination of waste may serve to explain some apparent discrepancies. "Grade" entails three factors—colour, leaf, and preparation. If two samples of cleaned lint are difficult to distinguish from each other, the difference in grade designation can be attributed to factors other than colour. If the cleaned samples differ in appearance, fibre deterioration as reflected by colour is indicated. Another useful application of the Shirley Analyser is for the analysis of mill waste products. A table is given showing percentages of clean lint recovered from samples of raw stock, finisher laps, finisher motes, card motes, flat strips, and cylinder and doffer strips. Average values are 97, 98, 45, 56, 89 and 96 per cent., respectively, indicating that a large part of the material now considered as waste is composed of good, usable fibre. This statement is substantiated by the results of fibrograph length tests on the reclaimed fibre. Fibrograph or array measurements used in conjunction with the Shirley Analyser would be useful for determining proper settings on scutchers, cards, combers, etc. The possibility of using the principle of the Shirley Analyser in the commercial cleaning of cotton either at the gin or in mill opening processes is discussed. C.

Polyamide Fibres: Fine Structure. K. Hess and H. Kiessig. *Naturwissenschaften,* 1943, **31**, 171 (through *Chem. Abstr.,* 1944, **38**, 181^5). The condensation product of hexamethylenediamine and adipic acid or that of ϵ-aminocaproic acid gives new reflexes in the meridian of the X-ray pattern (diatropic interferences) of period 74A., for poly-ω-hydroxydecanoic acid 79A., and for poly-ω-hydroxyundecanoic acid 65·5A. The reflexes are weaker for the latter two. The periods have no relation to the usual fibre period. Heating of the fibre increases the period length irreversibly. The exact origin is not given. C.

Textile Fibres: Elastic Properties. H. J. Henk. *Spinner u. Weber,* 1942, **60**, No. 19, 14-15 (through *Chem. Zentr.,* 1943, i, 799 and *Chem. Abstr.,* 1944, **38**, 872^3). The elasticity of textile fibres is compared with that of rubber and is related to structure. Silk and cotton exhibit only slight true elasticity because of the stretched condition of their principal valence chains. Wool is highly elastic, owing to the possibilities of transformation of the α- and β-keratin during the stretching. The behaviour of the polypeptide chains during stretching, reversible and irreversible stretching, the significance of the amino groups in irreversible stretching, and the effect of *p*H on the extent of the stretching are discussed. C.

Wool Scale Cells: Electron-microscope Pictures. H. Zahn. *Textilberichte,* 1943, **24**, 137-160 (through *Chem. Abstr.,* 1944, **38**, 646^9). In the degradation of isolated scale cells with pancreatin, fibrils are set free which agree in their structure with those found in the spindle-shaped cells. The structures are very long, are arranged parallel and are 100-500 mμ wide. C.

Wool: Testing Resistance to Bacteria. B. Schulze and H. Sommer. *Textilber.,* 1943, **24**, 105-108 (through *Chem. Abs.,* 1943, **37**, 6465). Differently treated wool fabrics were subjected to the action of bacteria and of Burgess's trypsin solution, respectively. The wool damage was determined microscopically and titrimetrically. The microscopic method is more accurate and more sensitive. The attack by bacteria takes place more slowly than that by trypsin solution. Neither method can be substituted completely for the other. The use of *B. subtilis* alone or with wool-damaging bacteria made no difference in the results. Samples treated with Eulan N and chrome were fairly resistant to bacteria, but nearly all were attacked by trypsin solution. W.

(B)—YARNS

Cordage: Testing. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials,* 1943, 121-128. "Tentative Methods of Testing and Tolerances for Spun, Twisted, or Braided Products made from

Flax, Hemp, Ramie or Mixtures thereof," D739, lays down definitions, tolerances, and methods of sampling and determination of weight per unit length, breaking load, twist, diameter, alkali solubility, sizing and finishing material, regain, matter soluble in ethylene dichloride, and analytical values of the constituent waxes. C.

Rope: Testing. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials*, 1943, 117-120. "Tentative Methods of Testing and Tolerances for Rope (Leaf and Bast Fibres)," D738, lays down conditions for sampling and conditioning, and determination of weight per foot, circumference, length per turn, breaking load (dry and wet), extractable matter (solvent), and fungicides. C.

Vinyon Yarn: Properties. Carbide and Carbon Chemicals Corporation. *Silk and Rayon*, 1944, 18, 261. Vinyon yarn is spun from an acetone solution of a co-polymer of vinyl chloride (90) and vinyl acetate (10). The average molecular weight, according to the Staudinger viscosity rule, is 20,000. The freshly spun yarn is weak, but it is stretched by several hundred per cent. while hot and "set" under tension at 90-100° C. The filaments then have breaking loads of more than 4 gm. per den. They retain their dimensions at temperatures up to 65° C., but shrink at higher temperatures and become tacky at 135-140° C. Very fine filaments are spun, e.g. 10 fil. 8 den. yarns. The specific gravity is 1·34-1·36. Vinyon does not absorb moisture and is water-repellent, though it can be wetted if a wetting agent is used. It is resistant to acids, alkalis, salt solutions, cuprammonium, and organic solvents other than ketones, esters, amines and halogenated hydrocarbons. It is a non-conductor of electricity, is non-inflammable, and immune to mildew and bacteria. It has been used for filter cloths, for anode bags in electrolytic operations and for clothing in chemical work. C.

Yarns: Designation of Construction and Twist. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials*, 1943, 337-339. Examples are given of extensions of the S and Z system of designating yarn twist to include, in order, the direction of twist, the amount of twist and the type of fibre, the shilling stroke being used to indicate a folding operation. Thus, 100-60 Z 60 Viscose & 100-40 S 3 Acetate/2 S 12 designates a ply yarn made by twisting together one end of 100-den. 60-fil. viscose yarn having 60 t.p.i. of Z twist and one end of 100-den. 40-fil. acetate yarn having 3 t.p.i. of S twist, the ply yarn having 12 t.p.i. of S twist. C.

Yarns: Specification and Testing. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials*, 1943, 457 pages. The following standard has been revised in 1943: D508, Standard methods of testing and tolerances for yarns spun from mixed fibres. (pp. 47-51.) C

Yarn Calculation Tables. Ernest Whitworth. *Textile World*, 1944, **94**, No. 1, 64-65. The following "ready reckoners" are provided: (1) Table of yards per pound of various yarns in counts 1 to 9. (2) Conversion factors for seven count systems. (3) Table of equivalent counts of yarn in the same seven systems. C.

Grex Universal Count System: Application. A. G. Scroggie. *Textile Research*, 1944, 14, 36-39. Problems that would be met with in the adoption of the Grex count system are briefly discussed and suggestions are made for the conversion of testing instruments. Applications of the system to single and plied yarns are considered, its effects on yarn twist and fabric cost and conversion calculations and in the control of yarn manufacture and strength tests are indicated, and its advantages are pointed out. Extracts are given of letters from members of the American textile industry endorsing the system. C.

Rayon Yarns: Use for Insulation of Fine Wires. A. Brookes. *Engineering*, 1944, **157**, 263-264, 281-283. Properties required in insulating materials for fine wires, particularly those for use in electrical equipment which may be exposed to tropical conditions, are discussed. Possible substitutes for silk are reviewed. Where space factor is of secondary importance, silk may in many cases be replaced by fine cotton, acetylated cotton (Cotopa), varnish-impregnated lapped paper or pulped paper. Glass fibre yarn is suitable for heavier gauges. Cellulose acetate rayon has been used in large quantities on large-gauge wires, switchboard cables, cords, etc., and proved superior even to silk for such coverings. A light fusion of the surface of the covering after lapping by suitable heat treatment provides a covering of high abrasion resistance. "Fortisan" (regenerated cellulose) has great resistance to abrasion and excellent covering power. Durafil is also useful. Nylon is produced in filaments fine enough for wire covering, but is more expensive than the other types mentioned. Notes are given on the methods of production and properties of these various artificial filaments, yarn count systems are explained, and the results of tests of the different types of wire coverings are discussed. Average values of electric strength for silk coverings vary between 350 and 720 volts per mil, the most frequent value being of the order of 670 volts per mil. Fused cellulose acetate, single lapped, gives 730 volts per mil, as a median value, with 620 and 800 volts per mil as normal extremes. Nylon gives an average figure of 550 volts per mil. Figures for cuprammonium rayon and Fortisan coverings vary considerably with the humidity. Average breakdown temperatures of coverings are: cotton, 376° C.; Fortisan, 375° C.; cuprammonium and viscose rayons 365° C.; silk, 355° C.; nylon, 254° C.; and cellulose acetate, 220° C. In comparative abrasion tests, the highest resistance figures were obtained with a double-lapped cellulose acetate fused. Rayons do not permit minimum wire elongations of 20-30 per cent. as obtained with silk, but 15-17 per cent. is commonly attained with cellulose acetate. In general it can be said that where a textile covering is essential and the electrical properties and space factor demand a high standard, cellulose acetate, fused after lapping, and nylon are the most suitable substitutes for silk. Where electrical properties and moisture resistance are not so important, or if varnish impregnation is used, Fortisan may be used on good elongation wire and if, in addition, space factor is not important, the range may be expanded to include cuprammonium or viscose rayon strong yarns. C.

(C)—Fabrics

Circular Knit Underwear Fabrics: Defects. *Textile World,* 1944, **94**, No. 1, 86. Illustrations are given of (1) loose stitch, (2) cut hole, (3) pulled stitch, and (4) needle mark defects in underwear fabrics, and causes and remedies are suggested. C.

Fabrics: Air Permeability Test. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials,* 1943, 61-62. "Tentative Method of Test for Air Permeability of Textile Fabrics," D737, lays down the conditions under which conditioned air is drawn through a known area of fabric, after establishing a known pressure gradient across the fabric (usually half an inch of water), and the volume of air is measured in some suitable way. The "air permeability" is expressed in cubic feet of air per minute per square foot of fabric at the stated pressure gradient. Tests are made at 70 ± 2° F. and 65 ± 2 per cent. R.H. C.

Glass Fibre Fabrics: Testing. Committee D13, American Society for Testing Materials. *A.S.T.M. Standards on Textile Materials,* 1943, 226-233. Particulars are given of the following new "Standard Methods of Testing and Tolerances" for Woven Glass Fabrics (D579), Woven Glass Tubular Sleeving and Braids (D581) and Woven Glass Tapes (D580). C.

Quality Control Charts: Applications in Cloth Production. O. P. Beckwith. *Textile World,* 1944, **94**, No. 1, 79-81, 134-140. An explanation of "quality control" by means of charts marked with upper and lower permissible limits of a test value. The importance of the correct selection of these limits is emphasized by some charts for the finished weight of a fabric. The advantages of "quality control" are enumerated. C.

Wire Mesh Screens: Hydraulic Properties. J. F. Halladay. *Paper Trade J.,* 1944, **118**, *TAPPI,* 48-52. In a study of the flow of water through woven wire mesh screens of the type used in the paper industry use was made of a device comprising a Lucite tube 3·75 in. in diameter and about 40 in. long with a thin metal plate at one end having a circular aperture over which the cloth to be tested was fixed. Measurements were made of the time (t) for a head of water in the tube to fall from an initial value H (in feet) to a value h. Tests were made with starting heads of 30 and 20 in., orifice diameters of 0·6875 and 0·91 in., and wire mesh screens of 40, 80, and 100 meshes per in. at water temperatures ranging from 44° to 122° F. It was found that the ordinary hydraulic laws governing discharge through orifices could be applied and t was given by the relation $t = 2A(\sqrt{H} - \sqrt{h})/ak\sqrt{2g}$, where A = area of horizontal cross-section of vessel in sq. in., a = area of discharge orifice in sq. in., g = acceleration due to gravity, and k = discharge coefficient of orifice. A direct and practically linear relation was observed between the hydraulic discharge coefficient and the calculated open area of the wire cloth. Increase of about 80° F. in water temperature caused increases of not more than 10 per cent. in discharge coefficients. C.

Quality Control Charts: Textile Applications. A. G. Ashcroft. *Text. World*, 1943, **93**, No. 12, 69-71. Statistical control does not by itself make quality or uniformity, but assists in judging the significance of variations in the quality record. The technique is based on statistical theory, details of the sources of which are given, but the actual operation involves only simple mathematics. Charts, as used by Alexander Smith & Sons Carpet Co., U.S.A., are illustrated for controlling the weight, strength and yarns per in. of Army blanket and duck, and for recording the porosity or leakage values of duck. W.

Friction Meter for Determining the Coefficient of Kinetic Friction of Fabrics. E. C. Dreby. *J. Res. Natl. Bur. Standards*, 1943, **31**, 237-246. A friction meter, designed at the instigation of the American Society for Testing Materials and the National Bureau of Standards, with the object of developing methods for the evaluation of textile finishes, is described. One piece of cloth is drawn over a second piece, whilst the two are pressed together by a standard load. One end of this second piece is fixed to a clamp on a torsion element and the frictional force measured by the deflection of this element, recorded by a dial gauge. The factors which affect this dial reading, e.g. relative speed of the two patterns, load applied to the contact surfaces, repeated testing of the same two pieces, etc., are enumerated and their various effects described. These investigations lead to the formulation of a standard testing technique. Various applications to the evaluation of smoothness are given. An investigation on the coefficient of friction of 18 samples which had been graded for smoothness by a number of experts, showed (by the application of the Kendall method of rank correlation) that factors other than the coefficient of friction enter into an expert's judgment of handle. The combined use of 3 measurable characteristics of cloth, friction, flexibility and compressibility is given as an example of how it may be possible to evaluate handle by physical tests. Examples are given of the use of the friction meter for determining the effect of finishing treatments, e.g. finishing agents, calendering, and laundering on the frictional properties of fabrics, as well as the properties of fabrics composed of different fibres and yarn and cloth construction. W.

(D)—OTHER MATERIALS

Gas Permeability Measuring Apparatus. A. C. Shuman. *Ind. Eng. Chem., Anal. Edn.*, 1944, **16**, 58-60. Apparatus for measuring the gas permeability of film materials of low permeability is described and details of its construction are shown in a diagram. The method involves measuring with a manometer changes in pressure inside a small evacuated space due to gas passing through the test specimen. Results are recorded as c.c. of gas at standard conditions of temperature and pressure transmitted per 100 sq. in. of surface per 24 hours. The calculations are explained and results obtained with samples of laminated glassine and polyvinyl alcohol coatings are discussed. The apparatus can be used for measuring the gas permeability of film materials having permeabilities as low as 0·001 c.c. per 100 sq. in. per 24 hours. C.

China Clay: Electron Microscopy. W. Eitel. *Ber. deut. keram. Ges.*, 1943, **24**, 27-53 (through *Chem. Abstr.*, 1944, **38**, 461^9). Photographs were made by utilizing the differences of penetrability of particles by electrons. Kaolin is characterised by individual crystals having hexagonal outlines. Montmorillonite has a strong tendency to form finely flaked, leafy aggregates, which appear as a cloud in the electron microscope. The absorption of electrons is increased by exchanging the lighter cations of the montmorillonite for heavier ones. Halloysite has crystals shaped like a shoe last. Layer-forming tablets are shown by mica and its decomposition products, as well as talc and soapstone. The electron diffraction diagrams of the above clay minerals correspond with the X-ray diagrams. A tabular summary of the electron-microscopic interference fringes and spots furnishes the basis for the quantitative analysis of clays. A potential of 70 kv. was used as a standard in preparing the summary. The electron-microscope picture of soapstone heated to 700° resembles that of unignited talc. Soapstone crystals heated to 800° become turbid and flake off. The interference diagram shows that at this temperature the talc crystals have completely disappeared and have been replaced by protoenstatite. Formation of the free oxides was not observed with talc. Recrystallisation of the protoenstatite begins at 900°. Soapstone heated to 900-1200° contains protoenstatite and cristobalite. Above 1200° protoenstatite passes irreversibly into stable clinoenstatite. The behaviour of talc on heating is similar to that of soapstone. Kaolin heated to 500° shows no change in electron-microscope picture or diffraction diagram. At 550-600° dehydration sets in and diffuse scattering halos appear in the diffraction diagram. Up to 800° these halos remain unchanged in position and sharpness, but increase in intensity with increasing temperature. These lines do not belong to mica, muscovite, or biotite. At 900° all of the kaolin lines have disappeared and the first lines of the mullite diagram are seen. Above 1100° these lines predominate. Finally typical lines of cristobalite appear. C.

7—LAUNDERING AND DRY-CLEANING

(A)—CLEANING

Detergents: Efficiency. J. C. Harris. *A.S.T.M. Bull.*, 1943, No. 125, 27-33. A report is given of studies of the efficiency of Santomerse products, with and without various additions, in hard water and sea water. Washing tests were carried out by the "multiple suds" method on Indian Head fabric soiled with a standard soil, and the degree of soil removal was measured by means of the Lange photo-electric photometer. In general increasing water hardness reduced detersive efficiency. A 0·8 per cent. concentration of Santomerse No. 1, and a 0·32 per cent. concentration of Santomerse No. 3 produced optimum results in extremely hard water. These percentage concentrations are of equivalent active ingredient content. Absence of sodium sulphate in the Santomerse No. 3 product results in increased detergency. Santomerse combined with trisodium phosphate, tetrasodium pyrophosphate, or a mixture of the latter with sodium acid pyrophosphate gave results superior to those obtained with Santomerse alone. Santomerse Nos. 1, 3, and 55 were found to be poor sea water detergents. Addition of soap increased detergent action. For optimum detergent results with 51-D-7 bar (tallow kettle soap + Santomerse No. 55) the *p*H should be as near to 10 as possible, and the concentration 2 per cent. Additions of tetrasodium pyrophosphate or sodium carbonate to Santomerse increased the detergent efficiency of Santomerse in sea water. A ternary combination of Santomerse, soap and tetrasodium pyrophosphate produced unusually low soil removal. C.

PATENTS

Improvements in or Relating to Laundry Washing Machines. Baker Perkins Ltd., F. Dewhurst and J. E. Pointon. B.P.558,456. App. 23/12/41. Acc. 6/1/44. It is stated that rotary washing machines either of the normal or end loading type suffer from constructional defects, including lack of rigidity, liability to leakage at the joints and bearings, undue wear and considerable maintenance costs. The new design aims at reducing these defects to a minimum and at the same time producing a neat machine in which excrescences such as pipes, pipe mountings, brackets and the like, are eliminated or reduced to a minimum. The use of an external trunnion drive and the penetration of the casing and end portions or heads by trunnions is avoided. The outer casing is in two parts which are connected by vertical flanges at the centre of the machine or other position, or by horizontal flanges. Each part consists of a head or end portion, having a hollow supporting base which can be bolted to the floor and a horizontal cylindrical or barrel portion. A dip gauge is provided by fitting a glass window to part of the casing at one end. The bearings are contained in the two head portions of the machine and the main driving pinion is integral with one end of the cage so that the driving mechanism or part of it actually rotates in the wash liquor. The drive is by an individual motor through reduction gearing housed in a suitable casing. Conduits are disposed within the casing so that water is supplied simultaneously through both hollow trunnions of the cage. A charging hopper is fitted for introducing the washing solutions, and it is connected to a longitudinal conduit in the barrel portion. Steam is admitted through steam inlets in the bottom of the casing. La.

Phosphatic Water Glass Detergents: Preparation. Diamond Alkali Co. U.S.P.2,333,443/4. (1) Alkali metasilicate with 2-9 mols. of water of hydration is melted and mixed with dry alkali pyrophosphate. The composition, containing 5-40 per cent. of the pyrophosphate, is cooled and ground to a dry powder. (2) A similar product contains 25-40 per cent. of Na tripolyphosphate. C.

8—BUILDING AND ENGINEERING

(A)—CONSTRUCTION AND MAINTENANCE OF BUILDINGS AND PLANT

Cotton Fabrics: Use in Laminated Plastics. *Textile Research*, 1944, **14**, No. 1, 11-14. A discussion of the use of cotton fabrics in the production of laminated plastics, the advantages and disadvantages of cotton fabrics compared with other materials, such as paper and fiberglas fabrics, for this purpose, and the need for the development of new fabric constructions especially suited to specific needs and for investigations of factors governing fabric strength and their relationship with the strength obtained from a fabric when used as a filler in a laminated plastic. C.

Ground Plastic Spools: Production. P. G. Weiller. *Machinist*, 1944, **88**, No. 1, 97-98. A method for the production of Bakelite spools by wet grinding is described. Laminated Bakelite is received in the form of round bars 1½ in. in diameter which are first ground to final diameter in a conventional centreless grinder. A 0·001 in. tolerance is easily kept. The bars are cut into short lengths, sufficient for five spools, and fed to a specially designed grinder. A steady stream of water flows through the machine and keeps the wheels and work covered during the grinding. As the work emerges there is no change in the outside diameter. Sloping heads of the spools are kept within 0·0005 in. tolerances. The grinding wheels also form a 0·015 in. high shoulder on the inside of each of the spools. The machine is fully automatic and produces approximately 30 bars of 5 spools per hour. Spool blanks come from the grinder joined by a quill, which is then broken, as from this point on the blanks are handled individually. Blanks are placed in a special collet on the turret lathe, where the centre hole is drilled and the wheel head hollowed out. For the final operation, the spools are placed in two fixtures, one for grinding slots across the head and another for grinding slots parallel to the spool's axis. The spools are always covered by water except during the lathe operation. Dimensions remain stable in storage. The spool increases in diameter about 0·001 in. during the entire operation. As this increase remains stable machine settings are adjusted to compensate. C.

Plastics: Use in Post-war Building. H. H. Lusty. *British Plastics*, 1944, **16**, 55-60, 116-118. Thermo-plastic and thermo-setting plastics and their physical characteristics are briefly described and the manufacture and uses of moulded plastics and sheet plastics are discussed. Possible developments in the use of plastics for windows and frames, wall and floor tiles, plumbing systems, and interior decoration are outlined. The development of synthetic resin-bonded plywood and its use in the manufacture of prefabricated houses are discussed. C.

Reinforced Laminates and Plastics Heater Panels. Reinforced Plastics Ltd. *British Plastics*, 1944, **16**, 97-102. Armoured reinforcing material comprising a fabric having cotton and 24 high-tensile steel wires to the inch in both warp and weft is being used as a core in laminated paper and fabric materials to which it imparts high strength, high resistance to impact and shattering, and dimensional stability. This reinforcing material has also been applied to resin-bonded plywood and moulded plywood construction, to give increased strength and dimensional stability. Possible post-war applications of such reinforced materials, e.g. in the construction of railway rolling stock, are briefly discussed. For the construction of "Yarworth" electric panel heaters resistance wire is woven into fabric to and fro in the form of loops, the ends being eyeleted to give good terminal connections. The whole is then impregnated with phenol-formaldehyde resin and pressed between a laminated paper material, resulting in a flat flexible sheet about 1/16 in. thick and weighing approximately 3 oz. per sq. foot, possessing a hard, glossy surface. The panels may be used as bed warmers and for other domestic and similar purposes. Panels can be fitted into ceilings, walls, etc. Similar panels can be used as electric heating mats for cars, 'buses and rail coaches. They are non-inflammable, waterproof and non-corrodible. C.

Wood: Glueing. W. Gallay and G. G. Graham. *British Plastics*, 1944, **16**, 50-54, 103-112; *Modern Plastics*, 1944, **21**, No. 6, 126-129, 168-172. Laminated wood and plywood, and adhesives used in their production are discussed. Present glueing procedures are reviewed and the application of high frequency heating is considered. Details are given of a new glueing process in which a synthetic resin adhesive is used in conjunction with acetylene black or other highly conductive black so that the glue line is rendered conductive. Electrodes are placed at the edges of the glue line and a low voltage current of ordinary characteristics, e.g. direct current or 60 cycle A.C., is passed through the glue line. Rapid heating is obtained directly in the adhesive, and the latter is thus conveniently and efficiently hardened. The preparation and application of glue-black dispersions, the use of a carrier such as mesh fabric for the black or for the black and resin glue, the use of unsupported resin-black films, types of resin glues used, current characteristics, the proportion of conductive black, the dimensions of assemblies, time of glueing, electrodes, pressure, temperature and moisture content of wood, equipment, power requirements and efficiency and the quality of the glue line are discussed. Promising results in large scale trials are reported, various applications are discussed, and the advantages of the new glueing process are pointed out. C.

Ethylcellulose Plastic: Extrusion. *Modern Plastics*, 1944, **21**, 132-134, 180. Ethylcellulose is one of the easiest plastics to extrude. Type ER is used for most applications, whilst type ELT is of exceptional value where extremely low temperatures are encountered. Type ELT also has somewhat better heat resistance than the ER type of material. Extruded tubing, strips and complicated shapes are very durable owing to the inherent mechanical strength and toughness of the plastic. Extruded products normally have a smooth, glossy surface, but it is possible to get matte finishes and retain good mechanical properties. Ethylcellulose plastic should be dried prior to extrusion since the absorption of even a small amount of moisture in storage or in transit is apt to result in a poor extruded section. Drying in a hot-air or infra-red oven at 80 to 90° C. for one hour immediately before extruding is ample for all grades. The temperature of the plastic mass as it comes from the die should be in the range 340-400° F. It is suggested that the plastic extrusion machine should have at least three, and preferably four, individually controlled temperature zones. The extruded plastic may be taken from the machine either by conveyor or by draw rolls. In the extrusion of ethylcellulose tubing, air is required to inflate the tubing during the cooling period. Ethylcellulose can be extruded to very close tolerances, the variation being of the order of ± 1 per cent. Dies should be 10 to 25 per cent. larger than the plastic section to be extruded and the piece drawn to the proper size by suitable adjustment of the speeds of the extruder and take-off mechanism. A list is given of some of the properties of representative extrusion grades of ethylcellulose (Ethocel) plastic. A wide variety of colours is available in transparent, translucent and opaque types. C.

Plastic Laminates and Plywoods: Use in Aeroplane Construction. Y. I. Zhibitskiĭ. *Aviapromyshlennost*, 1941, No. 4, 2-5 (through *Khim. Referat. Zhur.*, 1941, **4**, No. 7-8, 116 and *Chem. Abstr.*, 1944, **38**, 809^{6}). Plastic building materials are prepared by saturating fabrics (Textolite) or paper (Hetinax) with resin, drying and compressing at 120-150° and a pressure of 70-120 kg./sq. cm. The heat capacity of Textolite is one-third and its thermal conductivity $\frac{1}{40}$-$\frac{1}{80}$ of that of metal. Textolites with tensile strengths of 18 kg./sq. mm. and a Young's modulus of up to 1700 kg./sq. mm. have been obtained. A 1·5-3·0 mm. layer of Textolite is placed on steel parts. Bakelite plywood is used to cover the wings and fuselage of aeroplanes. Plastics from phenol resin and cellulose dust are used for the construction of sections of wings. Other substances used in the construction of aeroplanes are: a composition from asbestos fibres, kaolin and phenol resin (Absolite); a composition from asbestos ribbon, thin copper or brass net and phenol resin; a stratified plastic composed of asbestos fibres and phenol resins (Asbotextolite). Viamiz, a porous protein plastic of density 0·1 that of felt, is used as sound-insulating material. C.

(C)—STEAM RAISING AND POWER SUPPLY

Boiler Flue Gases: High Dew-point Temperatures. W. F. Harlow. *Engineering*, 1943, **156**, 497-500. Difficulties brought about by acid deposits in the air heaters and economisers of certain modern boiler plants fired by mechanical stokers are due to abnormally high dew-point temperatures of the flue gases caused by excessive sulphur trioxide content. The results of tests in which flue gases were passed over rusty mild-steel scrap show that iron oxide acts as a catalyst for the oxidation of the sulphur dioxide in flue gases, trioxide formation being greatest at temperatures of 1,100° F. "Parkerised" mild steel, nickel-plated mild steel and stainless steel also behaved as catalysts. With mild steel treated by the "Penetral" process (surface of steel converted to aluminium ferride) catalytic action was slight. Samples of external scales from superheater tubes of two boiler plants burning Durham and Yorkshire coals, respectively, exhibited catalytic properties at high temperatures. Spraying with milk of lime while hot inhibited the catalytic action of iron oxide and superheater scale. Observations in actual plants are discussed and it is suggested that catalysis due to scale is less important than that due to metal tube surfaces. The influences of temperature, sulphur content of fuel, and steam content of flue gases are discussed. It is suggested that the immunity of pulverised-fuel plants from the troubles studied is due to coating of the heating surfaces with fine dust. C.

High-pressure Power and Low-pressure Process Steam Plant. *Engineer*, 1944, **177**, 273-275, 292-294. A detailed description and diagrams are given of plant designed to supply all the power and steam requirements of a large mill operating 24 hours per day, seven days a week, and requiring an electrical output varying from 4000 to 6000 kW, and a process steam output up to 120,000 lb. per hour. The plant includes three mono-tube steam generating units of 65,000 lb. per hour normal full-load capacity, operating at a pressure of 1400 lb. per sq. in., two 3300 kW geared turbo-generators, operating at 1325 lb. per sq. in. and a 4000-kW turbine, heat exchanger plant, high-pressure feed pumps, coal-handling plant, and feed-water arrangements. Operational data relating to analyses of turbine blade deposits, feed-water control, the method of starting up and shutting down the plant, and boiler efficiency tests are presented and discussed. C.

Steam Storage Accumulators: Theory. C. A. Geneve. *Engineering*, 1944, **157**, 283-284. A theoretical study of the operation of the Ruth "pressure-drop" type of steam storage accumulator. Equations are deduced and an example is given of the calculation of the changes in the mass of water present with changes in pressure in individual steps of charging and discharging processes. C.

(D)—POWER TRANSMISSION

American Textile Mills: Electrification. W. W. Chase. *Textile World*, 1944, **94**, No. 1, 56-63. A review of 50 years' progress in mill electrification in the United States. The contrasts between the Columbia Mills in 1894 and 1944 are shown in a series of pictures. Recent developments in other mills are also shown, including electronic control devices. C.

Driving Belts: Maintenance. *Silk and Rayon*, 1944, **18**, 342, 442. Practical hints are given on measures to ensure minimum wear of belts, on mounting motors, and on testing the alignment of shafts. Suggested sizes of V-belts for various motor speeds and horse-powers are tabulated. C.

Fabric Bushings: Dimensional and Weight Changes in Oil and Water. R. Nitsche. *Kunststoffe*, 1943, **33**, 11-14 (through Mark & Proskauer's *Resins, Rubber, Plastics Abstr.*, 1943, Sheet C: 171.3/816). A report is given of a study of dimensional and weight changes of hard fabric bushings of cotton and cellulose fabric when subjected to prolonged treatment in oil and in water, with and without oil pre-treatment at 100° C. The bushings were made from hard tubing composed of fabric and cresol resin. Tests were made of bushings which had been pressed into a steel collar and of bushings not so mounted. The bushings were held at room temperature for about a year in water or in spindle oil, and the changes in dimensions and weight determined. The results show that the dimensional and weight changes may be two or three times greater for impregnated cotton fabric. The behaviour of bushings appears to depend to a greater degree upon the resin content than upon the degree of compression. Bushings from tubing which is coiled but not compressed behave better under the influence of oil and water than those from compressed tubing in so far as the resin content is actually higher. Pre-treatment in oil at 100° C. for 7 days effects only temporary improvement in the behaviour of bushings under the influence of oil and water. Conclusions as to the behaviour under oil and water of bushings pressed into a steel collar may be drawn from the results obtained from bushings not so pressed. Short-time tests at room temperature for the determination of the influence of oil and water are misleading, but tests at elevated temperature and pressure give excellent agreement with prolonged tests at room temperature. C.

V-Belt Drives: Selection. H. A. Wilson. *Machinist*, 1944, **87**, No. 51, Reference Book Sheet. An Econograph sheave selector chart is presented that enables designers to solve for six variables and determine an economical drive with the fewest V-belts. Advantages of using the largest sheave diameter permissible for a given belt cross-section, consistent with maximum space that can be allowed for the drive are pointed out. The chart gives five families of horse-power curves. Each family of curves gives horse-power at various velocities for a given cross-section of belt when running over stock sheaves ranging from the smallest that will not cause excessive heating to the largest at which no further gain can be realized in power transmitted. The curves show that horse-power capacity of a given cross-section of belt increases with sheave diameter and belt velocity. Totalizing lines for horse-power ratings of standard squirrel-cage motors are superimposed on the chart. In addition, motor-speed lines are drawn through velocity and sheave diameter points. The use of the chart is explained. C.

Asbestos Friction Materials: Characteristics. R. T. Halstead. *Paper Trade J.*, 1944, **118**, *TAPPI*, 74-77. The application of friction material to a rotating mechanism is discussed and it is pointed out that the chief result is a conversion of energy of motion into heat energy which in cases of severe service may result in operating temperatures of 1000° F. A suitable material must have a sufficiently high coefficient of friction to perform satisfactorily at all operating temperatures, must not wear too rapidly, and must not abrade the opposing metal surface too rapidly. Coefficients of friction and rate of wear data for standard types of friction materials against various metals are presented and discussed. Other necessary characteristics of friction materials are outlined. The advantages of asbestos for use in friction materials are pointed out and the functions of bonding media, such as rubber and resins, and friction modifiers, such as metals and carbonaceous materials, are discussed. C.

(G)—HEATING, VENTILATION AND HUMIDIFICATION

Electronic Heating Devices: Industrial Applications. G. C. Nonken. *Paper Trade J.*, 1944, **118**, *TAPPI*, 59-61. The electronic heating of electrical non-conductors is accomplished by placing the materials between plates to which voltages are applied at frequencies of up to 30,000,000 cycles per second. High-frequency electronic oscillators which draw power from any standard alternating-current power source are used. Fundamental equations which are used to predict the size and type of equipment needed are given, and various theoretical and practical considerations are discussed. High-frequency heating has been commercially applied to plywood bonding, the laminating of other thick wooden structures, the pre-heating of plastic preforms prior to moulding, and similar operations where the material to be heated is thick and the time to heat short. Electronic heating of thermo-setting resin-bonded paper plate stock during the curing process is discussed and power factor data are given. C.

Infra-red Radiation: Use for Evaporation and Distillation. J. A. Reavell. *Industrial Chemist*, 1944, **20**, 119-130. Types of infra-red generators are briefly described and wave length, temperature, energy and cost considerations are discussed. Applications of infra-red radiation for heating and drying are mentioned. The evaporation and distillation of liquids is studied and infra-red heating is contrasted with methods using steam, heated fluids or hot gases. Conditions of heat transfer in evaporators are examined. Infra-red evaporators designed for use in the laboratory are shown in photographs and diagrams. Satisfactory results obtained in the concentration of various sensitive solutions are reported. C.

High-velocity Air Stream: Temperature Measurements. H. C. Hottel and A. Kalatinsky. *Instruments*, 1944, **17**, 40-42. In selecting a method for measuring temperatures in high-velocity streams, the choice has to be made between probes designed to record the true temperature, probes to record the stagnation temperature, and conventional probes accurately calibrated for recovery factor. Since any stationary probe retards the gas in its immediately vicinity, measurement of true temperatures with ordinary probes is not possible. Stagnation temperature measurements have the advantage of yielding more representative data with respect to energy conditions and, in many cases, with respect to heat transfer than intermediate readings obtained with a calibrated conventional probe. The principal advantage of a stagnation probe lies, however, in the considerably improved reproducibility of calibration results. Tests of various probes are reported. A diagram of the equipment is given. The Pratt & Whitney high-velocity stagnation temperature probe was found to be satisfactory for precision measurements. For measurements which do not justify the use of special stagnation probes, the recovery characteristics of commonly-used bare wire thermocouples were investigated. The results indicate that bare wire thermocouples can be used for the great majority of measurements at velocities below 300 ft./sec. C.

Spectroscopic Hygrometer. L. W. Foskett and N. B. Foster. *Bull. Amer. Meteorological Soc.*, 1943, **24**, 146-153 (through *Sci. Abstr.*, 1943, **46** A, 247). A simple grating spectrophotometer is used with a tungsten filament lamp and projector to measure the precipitable water in the atmosphere. Use is made of the 1·380μ water-vapour absorption band and the 1·250μ region for reference. Vacuum thermocouples and high-sensitivity galvanometer are used for energy measurement. Calibration tests were conducted over optical paths of 1·5-52 m. C.

(H)—WATER PURIFICATION

Water Treatment Plant: Maintenance. H. Nix. *Textile World*, 1943, **93**, No. 4, 134-135. Practical hints are given on the maintenance of the motors, pumps and equipment for feeding chemicals of a mill water treatment plant. C.

Lead: Attack by Water. E. A. G. Liddiard and P. E. Bankes. *J. Soc. Chem. Ind.*, 1944, **63**, 39-48. A critical survey is made of published information and an account is given of a study of the action of distilled water containing known quantities of carbon dioxide on lead, the effects of various additions to the water, electron diffraction examination of films formed on the lead, and the action of various natural waters on lead. The results obtained lead to the conclusion that oxygen plays an essential part in the dissolution of lead by water, the first stage being oxidation of the lead to lead oxide with subsequent formation of lead hydroxide in solution. In distilled or very soft water, containing only traces of carbon dioxide, the first effect on lead is a comparatively heavy attack with the formation of a white precipitate of basic lead carbonate in the water, probably formed by interaction of lead hydroxide with small amounts of carbon dioxide in solution. In time this reaction tends to be suppressed owing to the formation of an insoluble film of basic or normal lead carbonate on the surface of the lead. The formation of this protective film is accelerated by circulation of the water or by increase in the amount of carbon dioxide in the water. The amount of lead going into solution is, however, increased with increase in carbon dioxide content of the water, probably owing to the formation of lead bicarbonate. The presence of sodium or calcium bicarbonate in solution in the water favours the formation on the lead surface of a film which is completely protective even in the presence of carbon dioxide, provided the water is free from chlorides. As little as 40 parts of calcium bicarbonate per million is sufficient to inhibit attack by distilled water containing substantial quantities of dissolved carbon dioxide. The attack on lead by distilled water or bicarbonate solutions, both containing free carbon dioxide, is increased by the addition of sodium chloride. Addition of calcium sulphate to distilled water or solutions of bicarbonate has no effect, and chlorination of distilled water or public supply water has no marked effect on the action of the water on lead. The initial action of distilled water or soft water containing only traces of carbon dioxide can be suppressed by pre-exposure of the lead to solutions of calcium or sodium bicarbonate, but such films have no permanent protective action on waters containing appreciable quantities of carbon dioxide.

Protection against initial attack can also be obtained by pre-treatment with sodium silicate or sodium sulphide. Treatment with solutions of phosphates, sulphates and sulphites gives no initial protection. C.

PATENTS

Dust Removing Appliance. Dallow, Lambert & Co. Ltd. and J. E. Dallow. B.P.559,827 of 7/1/1943:7/3/1944. An appliance for removing dust and other impurities from manufacturing operations, comprises a nozzle applied to a tubular arm universally jointed with a pipe or duct and connected with a suction fan or blower, and a rigid support which serves to carry the pipe or duct and is fixed either directly or through an intermediate part upon a floor or the ground. In conjunction with this appliance there is used a suction fan which forms part of a unit including a separator or filter for separating the dust or other impurities from the air. The tubular arm is preferably telescopic and the nozzle is preferably jointed to the arm so that it can be adjusted to various angular positions. C.

Cation-exchange Materials: Preparation and Use. Permutit Co. Ltd. and E. L. Holmes. B.P.559,941 of 10/9/1941:13/3/1944. Cation-exchange materials consisting of sulphonated carbonaceous materials such as coal, peat, cellulosic substances, starch, sugar and related products, tar, fats, etc., or sulphonated synthetic resins of the phenol-aldehyde type are heated with an aqueous solution of a sulphiting agent to increase the cation-exchange capacity. The sulphiting agent may be a sulphite, bisulphite or metabisulphite. Resins are preferably treated at temperatures of 110 to 150° C. With sulphonated carbonaceous materials the best results are obtained by treatment with sodium metabisulphite at temperatures of 120-125° C. The products may be used for the treatment of water or other liquids. C.

Low-density Fibre Board: Production. Minnesota and Ontario Paper Co. U.S.P.2,332,369. A suspension of fibre is mixed with waste lignocellulose cooking liquor and the *p*H is adjusted to the iso-electric point. The mass is then agitated and aerated so that a stable foam is developed. The mass is made into a structural unit and dried. The material has a density of about 12 oz. to 5 lb. per cubic foot. C.

Ferrous Metals: Protection against Corrosion. E. I. Du Pont de Nemours & Co. U.S.P.2,333,206. The metal is coated with an alkylamine of at least 8 C atoms at the rate of 1 lb. per 10,000-80,000 sq. ft. of surface. The process may be applied to oxidised surfaces of ferrous metals after pre-treatment with phosphoric, chromic, molybdic or oxalic acid or one of their acid salts. C.

Waxed Glass Fabric Liner and Gasket Sealing Material: Production. Merck and Co. Inc. U.S.P.2,333,535. A tightly woven glass fabric having fibres of about 0·00025 inch diameter and weighing about 1·4 lb. per sq. yd. is impregnated with 40-75 per cent. by weight of wax. The unwaxed fabric is specified as having an air permeability of about 30 cub. ft. per min. per sq. ft. under 1 inch water pressure, and water permeability of about 286 gallons per minute sq. ft. under 10 lb. water pressure per sq. inch. The wax has a viscosity of 62·7 seconds at 210° F., melting point 170° F., and needle penetration of 0·12 cm. at 77° F., and is free from carbonizable matter, free fatty acids, esters, odour or taste. C.

9—PURE SCIENCE

Insect Pests: Control by Fumigation. E. A. Back and R. T. Cotton. *U.S. Dept. Agric. Circ.* No. 369, 1942, 63 pages. An illustrated review of general mill or warehouse fumigation; the use of vaults for fumigating products, e.g. clothing; vacuum plant for tobacco, sweets, etc.; and fumigation of specific products. The toxic agents used and their production are described. Respirators should be worn in most cases and first-aid measures in case of accidents with prussic acid are set out. C.

West Indian Dry-wood Termite: Control. G. N. Wolcott. *Caribbean Forester,* 1943, 4, 145-157 (through *Tropical Agriculture,* 1944, 21, 14). The West Indian dry-wood termite, *Cryptotermes brevis* (Walker) is able to live in dry wood within houses and does not construct exposed nests. West Indian mahogany is unpalatable to this termite. When small samples of the very susceptible wood of *Bursera simaruba* were dipped in solutions of various inorganic compounds and then made available to the termites, along with untreated mahogany and other woods of known susceptibility, samples dipped for 10 min. in a solution of approximately half an ounce of either copper sulphate, zinc chloride, barium chloride, or cadmium nitrate per gallon of water became more resistant to attack than mahogany. Treatment of new furniture with such solutions previous to painting or varnishing would provide cheap protection. Since arsenic is toxic but not repellent, the introduction of a 0·3 per cent. arsenic solution into the tunnels of infested wood might not only kill the present colony but prevent reinfestation. C.

Air Sampling Flowmeter. H. M. Lemon and H. Wise. *Science,* 1944, **99**, 43-44. A small flowmeter designed to be attached to the upstream end of any air sampling device is shown diagrammatically. A constricting orifice, 4 mm. inside diameter and 10 mm. long, in a tube 6 mm. x 48 mm. gives a satisfactory change in static pressures for air flows between 0·33 and 1·30 cu. ft. per min. This change in static pressure is measured by a glass manometer (4-5 mm. inside diameter and 120-150 mm. long) filled either with water or a 1 per cent. solution of a suitable detergent with a few drops of phenol red added for colouring; the detergent inhibits mould growth and improves the wetting of the glass. Graph paper ruled in millimetres backed by a wooden tongue depressor blade and bound to the manometer with transparent cellulose tape provides a simple scale. Any non-corroding metal or chemically inert plastic, such as Plexiglas, may be used in the construction of the flowmeter. For calibration, the flowmeter should be attached upstream to a standard wet-gas meter or a previously calibrated Venturi meter. C.

Automatic Acidity Recording Apparatus. *Silk and Rayon,* 1944, **18**, 331-332. An account is given of an automatic titration unit with the following main features. The sample to be titrated is arranged to discharge itself into a beaker, fitted with stirring apparatus and standing on a revolving table, at regular intervals (say, every 3 minutes). It then closes a circuit which releases a spring to open the burette tap. The standard solution flows in until a colour change occurs, whereupon a thalofide cell causes the tap to be turned off. A beam of light is then momentarily operated by means of a shutter to project the image of a float in the burette on a calibrated film. The film is run through a developer, actuated by a time-lag, and gives burette readings in white on a dark background. The burette then fills again and the contact of the float at the top shuts off the feed. A pump empties the beaker. C.

Glass Electrode Valve Amplifier. Chun-yu Lin. *J. Sci. Instruments,* 1944, **21**, 48-49. A simple valve amplifier for measuring glass electrode potentials is described and shown diagrammatically. The system is characterised by high gain of voltage amplification, great flexibility and economy of power supply. C.

Titrimetric Analysis Solutions: Standardisation; Volume Measurements. W. M. Thornton, Jr. *Ind. Eng. Chem., Anal. Edn.,* 1944, **16**, 50-53. Factors influencing the accuracy of measurements of volume, particularly the effects of the thermal expansion of liquids are discussed. Burettes designed for accurate measurements are described and calibration data are given. Procedures for the standardisation of potassium permanganate, borax, and sodium hydroxide solutions are outlined and experimental data showing the high degree of accuracy obtainable are presented. C.

Iron: Determination. J. L. Henry and R. W. Gelbach. *Ind. Eng. Chem. Anal. Edn.,* 1944, **16**, 49. Potassium dichromate, with diphenylamine sulphonic acid as indicator, can be used in place of ceric sulphate in the determination of iron by the Walden silver reductor method. Hydrochloric acid (1N.) is used instead of sulphuric acid. Details of the procedure and results showing the effects of added impurities are given. Mn, Cr and Ti do not interfere and V does not interfere in concentrations of 100 mg. or less in 200 ml. of titrating solution. C.

Mahogany Soaps: Adsorption Analysis. J. M. Koch. *Ind. Eng. Chem., Anal. Edn.,* 1944, **16**, 25-28. For the analysis of mixtures of petroleum oil and oil-soluble sodium sulphonates (mahogany soaps) produced in the manufacture of medicinal white oil, a sample is dissolved in petroleum naphtha and the solution passed through a column of Attapulgus clay. The oil is carried through by the naphtha and can be weighed after evaporation of the solvent. The sulphonate adsorbed by the clay is removed by washing with methyl alcohol and weighed after evaporation of the latter. Any resinous material in the sample is also adsorbed by the clay from which it can be removed by the use of ethyl acetate or diethyl ether before the treatment with methyl alcohol. Alternatively, if it is only necessary to determine the sodium sulphonate content and the total amount of oily or inactive matter in the sample, a suitable resin eluant may be used as solvent in place of the petroleum naphtha and the oil and resin determined together in the first percolate. The results of analyses of mixtures of known composition show that the method gives accurate results. C.

Pectin: Determination. E. F. Bryant, G. H. Palmer and G. H. Joseph. *Ind. Eng. Chem., Anal. Edn.*, 1944, **16**, 74-76. Details are given of an improved pentose-furfuraldehyde method for the determination of pectin in biological materials which involves steam distillation from 85 per cent. phosphoric acid and determination of the furfuraldehyde in the distillate by the aniline acetate reaction. Colour measurements are made with the photo-electric colorimeter or the Duboscq-type colorimeter. C.

Pectin and Pectic Acid: Determination by Electrodeposition. K. T. Williams and C. M. Johnson. *Ind. Eng. Chem., Anal. Edn.*, 1944, **16**, 23-25. Details are given of a procedure and apparatus for the determination of soluble pectin in which the solution is freed from electrolytes by the use of ion-exchange resins and is then subjected to electrolysis so that the pectin is deposited at a platinum anode in a weighable form. Results obtained in the analysis of fruit extracts are presented. The results obtained are higher than those obtained by the calcium pectate method. Pectic acid in fruit extracts can be determined by electrodeposition after subjecting the extracts to acetone purification and hydrolysis and removing the electrolytes. C.

Phenol and Cresols: Identification. W. B. Deichmann. *Ind. Eng. Chem., Anal. Edn.*, 1944, **16**, 37-38. Qualitative tests employing ferric chloride, hypochlorite, and the reagents of Melzer, Millon, Liebermann, Guareschi, and Cotton are described. A single test or a combination of several of these colour tests can be used for the identification of phenol or *o*-, *m*-, or *p*-cresol, if the unknown solution contains only one of these compounds. C.

Amorphous Cellulose: Determination by Thallous Ethylate Method. A. G. Assaf, R. H. Haas and C. B. Purves. *J. Amer. Chem. Soc.*, 1944, **66**, 59-65. Cotton linters, highly swollen in caustic soda and dried through methanol and benzene, were immersed in a large excess of 0·1N. thallous ethylate solution. The thallium cellulosate so formed was methylated with excess methyl iodide in benzene. The methoxyl content of the product was accepted as proportional to the percentage of the cellulose wetted by the particular liquid in which the thallous ethylate was dissolved. The extent of the methylation did not depend upon the molecular volume of normal hydrocarbon solvents for the thallous ethylate, but the relationship was inverse and linear for the normal ethers from diethyl to di-*n*-amyl. Branched chain or cyclic ethers and hydrocarbons penetrated the cellulose less efficiently than their normal anologues and thallations in alcohols, although reproducible, were thought to be incomplete. Amorphous cellulose was defined as the percentage wetted by an ether of zero molecular volume and was estimated by extrapolating the linear methylation-molecular volume plots of three or more straight-chain ethers. An extrapolation of the similar plot for the normal alcohols from ethyl to hexyl tended to confirm the result, which was probably within ± 10 per cent. The amorphous fractions of swollen linter samples were as high as 27 ± 2 per cent., but the amount present in unswollen fibres was of the order of 0·25 to 0·5 per cent. The corresponding colloidal surfaces, ranging from 520×10^1 to 5 or 10×10^4 sq. cm. per g., were not inconsistent with published estimates based upon other experimental methods. C.

Cuprammonium Cellulose and Glucoside Solutions: Optical Rotation. R. E. Reeves. *Science*, 1944, **99**, 148-149. The high (lævo) optical rotation of cellulose in cuprammonium hydroxide solution is believed to be a property of a complex formed by a copper-containing radical and free hydroxyl groups of cellulose. β-Methyl glucoside dissolved in cuprammonium hydroxide solution is not lævo-rotatory but β-methyl-4-methyl glucoside, which possesses the same free and substituted positions as cellulose, shows optical activity remarkably like that of cellulose. Observations with other methylglucosides substituted in various positions indicate that free hydroxyl groups in positions 2 and 3 and substitution in position 4 are essential for complex formation. The lævo-rotatory complex appears to be a cyclic structure involving hydroxyl groups on glucose carbon atoms 2 and 3. C.

Corn Stalks: Oxidation with Alkaline Nitrobenzene. R. H. J. Creighton and H. Hibbert. *J. Amer. Chem. Soc.*, 1944, **66**, 37-38. Oxidation of corn stalks by nitrobenzene and alkali gives, as actual pure products, vanillin, syringaldehyde and *p*-hydroxybenzaldehyde in yields of 4·5, 2·6 and 1·4 per cent., respectively, based on the Klason lignin content of the corn stalks, the crude yields being 5·3, 3·2 and 1·8 per cent. This represents the first isolation of free *p*-hydroxybenzaldehyde from lignin. Its presence may serve as a distinguishing characteristic between the mono- and di-cotyledons. C.

Lignin-type Substances: Oxidation with Chromic Acid. W. S. MacGregor, T. H. Evans and H. Hibbert. *J. Amer. Chem. Soc.*, 1944, **66**, 41-44. Chromic acid oxidation of oxygenated side-chain phenylpropane derivatives related to lignin yielded 80 to 95 per cent. of the theoretical amount of acetic acid thereby providing a method for the determination of $-$CMe groupings in such products. Oxidation of spruce and maple woods showed that the native lignin present in each wood does not contain an appreciable quantity of end methyl groups. A difference between extracted, amorphous spruce and maple ethanol lignins was observed, in that the former was found to contain an appreciable quantity of $-$CMe groupings (one for each four or five C_6-C_3 units) whereas the latter contained few or no such groups. Repeated ethanolysis of spruce ethanol lignin effected an increase in the proportion of terminal methyl groups. Strong experimental support is thus found for the theory that native lignin is characterized by the absence of terminal methyl groups and that their presence in extracted lignins is the result of intramolecular changes undergone by very reactive side chains such as are present in hydroxyconiferyl alcohol. C.

Plant Materials: Taxonomic Classification by Oxidation with Alkaline Nitrobenzene. R. H. J. Creighton, R. D. Gibbs and H. Hibbert. *J. Amer. Chem. Soc.*, 1944, **66**, 32-37. Alkaline nitrobenzene oxidation of 47 widely varying accepted forms of gymnosperms and angiosperms (including various types of wood, jute fibre, bamboo, rye straw and corn stalks) has shown that in practically all cases the former yield only vanillin, whilst the latter give both vanillin and syringaldehyde. The yields of vanillin, in the gymnosperms, vary between 15 and 24 per cent., based on the Klason lignin. With the angiosperms the combined yield of vanillin and syringaldehyde amounts to 35-51 per cent., the ratio of the former to the latter being approximately 1 : 3. Considering the highest combined aldehyde yield (silver maple 51 per cent.) obtained, this amounts to 61 per cent. of the Klason lignin based on the assumption that the native maple lignin is derived essentially from a mixture of anhydro polymeric forms of coniferyl and syringyl alcohols. Exceptions to the above ratio (1 : 3) of mixed aldehydes were found in the case of certain primitive angiosperms characterised by the absence of vessels, the ratio in this case being 1 : 1. All genera of the *Gnetales* (a group of uncertain position) gave both vanillin and syringaldehyde on oxidation, a result in harmony with their high lignin and methoxyl values and behaviour with the Mäule reagent. Their relationship to the angiosperms rather than to the gymnosperms is thus indicated. Only a very few members of the *Coniferales* were found to yield, on oxidation, an aldehyde mixture containing both vanillin and syringaldehyde and to give a definite Mäule reaction. The behaviour on oxidation of all the plants investigated is in complete agreement with their colour reaction (or its absence) when tested with the Mäule reagent, and thus offers a new chemical procedure for taxomic classification. C.

Starch Modification B: Structure. R. E. Rundle, L. Daasch and D. French. *J. Amer. Chem. Soc.*, 1944, **66**, 130-134. Methods of preparing films and fibres of the " B " modification of starch are outlined and X-ray diffraction data are discussed. A unit cell with $a_0 = 16{\cdot}0$, $b_0 = 10{\cdot}6$, $c_0 = 9{\cdot}2$ A. is found for the " B " modification. The structure is probably orthorhombic. A rough structure is proposed. It is pointed out that, in contrast to cellulose, the configuration of the starch chain depends upon how the starch is treated and that plasticizers generally alter the starch structure considerably. C.

Pyrodextrins: Structure. B. Brimhall. *Ind. Eng. Chem.*, 1944, 36 72-75. Pyrodextrins are degradation products of starch obtained by roasting, either alone or in the presence of small amounts of catalytic agents. The properties of a commercial water-soluble pyrodextrin (a British gum) are described and shown to be in harmony with a molecule containing approximately 66 glucose residues arranged so that there are four or five short branches of approximately five glucose units each. The branched (amylopectin) and unbranched (amylose) components of corn-starch, as well as amylodextrin, retrograded starch, and ordinary granular starch, have been dextrinized and the course of conversion has been followed by water solubility, reducing power, and digestibility with β-amylase. The results indicate that the linear portions of starch become branched during the heating process, as demonstrated by loss of ability to retrograde, increased resistance toward β-amylase, and percentage of tetramethylglucose upon hydrolysis of the methylated product. A possible mechanism for heat dextrinization is discussed. C.

Amino Acids: Colour Reactions. H. Tauber. *J. Amer. Chem. Soc.*, 1944, **66**, 310. Certain amino acids are converted to chromogens when heated. Alcoholic extracts containing these chromogens become more deeply coloured when alkali is added, but on subsequent acidification become colourless or much paler. *l*-Tyrosine, *l*-tryptophan, and *dl*-threonine turn reddish brown on heating, exhibit a light brown or reddish brown in alcoholic solution, become more deeply coloured on the addition of alkali and turn a light brown, or, with *l*-tyrosine, a yellow colour on acidification. *l*-Histidine mono-hydrochloride becomes light brown on heating, light yellow in alcoholic solution, deep yellow on the addition of alkali and almost colourless on acidification. *dl*-β or *l*-β-Phenylalanine and *l*-leucine on heating partially sublime, turn yellow and give a yellow or light yellow colour in alcoholic solution. This turns to a deep yellow on addition of alkali and becomes almost colourless on subsequent acidification. With the β-phenylalanines, the alkaline alcoholic solution exhibits a greenish-yellow fluorescence, which is particularly strong in ultra-violet light, without the addition of alkali. On heating, *l*-cystine, *l*-cysteine, glycine, *l*-hydroxyproline, *dl*-methionine, glutamic acid, *dl*-aspartic acid, *dl*-serine, *l*-proline, *d*-arginine monohydrochloride, *dl*-lysine and *d*-lysine change to yellow, brown or black decomposition products without chromogenic properties. *dl*-Alanine, *dl*-valine and *dl*-iso-leucine sublime completely leaving no pigment or residue. C.

Antioxidants: Properties. F. Bergel. *Chemistry and Industry*, 1944, 127-128. A discussion of the preparation, antioxygenic activity and other properties and uses of antioxidants of the quinol and pyrogallol groups, dienols, ω-hydroxyhydroxyacetophenones, and nitrogen-containing inhibitors. It is pointed out that quinols, pyrogallol and dienol derivatives have so far proved to be the most effective and practical stabilizers. C.

Benzoquinone and Anisole Derivatives: Resonance Effects. H. H. Hodgson. *J. Soc. Dyers & Col.*, 1944, **60**, 65-67. The melting point order and variation of colour of the 2-halogenobenzoquinones are interpreted on resonance theory, which also satisfactorily accounts for melting point regularity among the 3-halogenobenzoquinone-4-oximes. Benzoquinone-monoximes and their ethers always melt at higher temperatures than the tautomeric nitrosophenols and ethers, due to predominance of a more highly polarised resonance structure. The effect of fluorine in controlling the nitration of 3-fluoroanisole and of its mononitro-derivatives may be readily explained by resonance structures, and the argument thus developed is applied satisfactorily to the order of replacement of all three chlorine atoms by nitro-groups when 3-fluoro-2:4:6-trichloroanisole is treated with fuming nitric acid at 0° C. C.

Dilinoleic Linear Superpolyesters: Preparation. J. C. Cowan and D. H. Wheeler. *J. Amer. Chem. Soc.*, 1944, **66**, 84-88. Superpolyesters were prepared from the unsaturated dibasic acid, dilinoleic acid, with ethylene, decamethylene and hydrogenated dilinoleyl glycols. Loss and decomposition of ethylene glycol occurred at reaction temperatures and therefore superpolyesters from ethylene glycol were only obtained when excess of glycol was used and the final stages of the reaction were effected by glycolysis. Superpolyesters having molecular weights of 20,000 or more were obtained by direct esterification when decamethylene and hydrogenated dilinoleyl glycols were used. A study of the variation of viscosity with molecular weight showed a straight-line relationship between log. viscosity and square root of molecular weight up to molecular weights of 10,000 on certain polyesters. Direct comparison of superpolyesters from dilinoleic acid and from hydrogenated dilinoleic acid demonstrated that reaction conditions can be controlled so that non-conjugated unsaturation does not cause cross-linking of chains. C.

Unsaturated Fatty Acid Chlorides: Preparation. T. R. Wood, F. L. Jackson, A. R. Baldwin and H. E. Longenecker. *J. Amer. Chem. Soc.*, 1944, **66**, 287-289. Oleyl, elaidyl, linoleyl and linolenyl chlorides were prepared by the action of oxalyl chloride on the corresponding pure acids. Linoleic and linolenic acids and the corresponding chlorides were examined spectrophotometrically. The results demonstrate that the reaction of the acids with oxalyl chloride was not accompanied by rearrangements of the double bonds to produce conjugated systems. C.

Cellulose: Electrokinetic Properties and Surface Conductivity. Gertrude Rabinov and E. Heymann. *J. Phys. Chem.*, 1943, 47, 655-668. Experimental conditions and theoretical considerations affecting streaming-potential measurements with cellulose are discussed and a report is given of investigations of the electrokinetic properties and surface conductivity of purified cotton, cotton wool, oxycellulose, mercerized cellulose, and regenerated cellulose. The results show that in distilled water the ζ-potential decreases and the surface conductivity increases with increasing carboxyl-group content of cellulose. Substitution of carboxyl H by Ca and Na lowers the surface conductivity, but affects the ζ-potential little. A theoretical interpretation of these results is given. It is shown that a maximum observed in the ζ-potential/concentration curve for alkali chlorides is not due to a dispersion of the surface conductivity. For uni-univalent and bi-univalent electrolytes the surface conductivity shows a marked increase with concentration whilst the ζ-potential decreases. The difficulty of reconciling the increase of surface conductivity with a simultaneous decrease of ζ-potential is pointed out, and two tentative explanations are suggested. C.

Polyamide Solutions: Viscosity-Chain Length Relationship. A. Matthes. *J. prakt. Chem.*, 1943, **162**, 245 (through Mark & Proskauer's *Resins, Rubber, Plastics Abstr.*, 1943, Sheet C2: 163). Polymers of ϵ-aminocaproic acid with degree of polymerization below 50 were prepared by lactam polymerization in the presence of from 10 to 300 per cent. (on lactam) of water. For end group determination amino nitrogen was determined by the van Slyke method. Viscosities of 1 per cent. (by vol.) solutions in pure sulphuric acid and in 40 per cent. sulphuric acid were determined with the Ubbelohde viscometer. Solutions (1 per cent. by vol.) of technical fibres of ϵ-aminocaproic acid polymers (Perlon L) in 40 per cent. sulphuric acid were heated to 50° C. for periods from 5½ to 184¾ hours. The viscosity was measured at 20° C., and the degree of polymerization calculated by means of formulae obtained by correlating viscosity data with results of end-group determinations. The degrees of polymerization thus calculated were correlated with those to be expected from kinetic considerations. The results indicate the applicability of the parabolic relationship $[\eta]=K.P^{\alpha}$ for the viscometric molecular weight determination of ϵ-aminocaproic acid polymers, including the higher polymerized technical products. According to this equation, the degree of polymerization of Perlon L exceeds 200. The values found for the exponent α indicate that the polyamide molecules in solution are unbranched but highly curled. C.

Starch-Iodine Complexes: Absorption Spectra. R. R. Baldwin, R. S. Bear and R. E. Rundle. *J. Amer. Chem. Soc.*, 1944, **66**, 111-115. Differences in the transmission curves of the iodine complexes of amylose and amylopectin materials and the possibilities of colorimetric analysis of starch for amylose and amylopectin are discussed. The amount of iodine bound in complex formation with amylose increases as the concentration of iodide decreases, becoming one iodine molecule for six glucose residues for infinitely dilute iodide solutions. The wave length of maximum absorption of an amylose-iodine solution shifts toward the red as the chain length of the amylose is increased. The shift is in the same direction when the lengths of the unbranched portions of amylopectin are increased. An increase in the molecular extinction coefficient accompanies an increase in the length of amylose or an increase in the lengths of unbranched portions of amylopectin. Both these properties permit the relative evaluation of molecular weight of an amylose or degree of branching of an amylopectin, the change in molecular extinction coefficient being the more sensitive. Data and curves are given for iodine complexes of amyloses and amylopectins of different origins. **C.**

Photo-electric Photometer. J. McG. Sowerby. *J. Sci. Instruments,* 1944, **21**, 42-45. Diagrams and a detailed description are given of a photo-electric photometer for measuring the light scattered at about 45° from the surface of a transparent plastic which has suffered abrasion. The abraded portion of the plastic is illuminated by a low-voltage lamp via a lens system, and the scattered light falls on a sensitive vacuum photo-cell coupled to an amplifier. The amplifier drives a tuning-eye whose shadow is always returned to a given mark, and the adjustable element is a scaled potentiometer. C.

Colour Harmony: Geometric Formulation. P. Moon and Domina E. Spencer. *J. Optical Soc. America,* 1944, **34**, 46-59. A scientific development of the classical theories of colour harmony is presented. The qualitative ideas of artists and colour specialists are incorporated into a quantitative system depending on the C.I.E. colour specification and its transformation into a metric colour space. The entire theory is based on two postulates: pleasing intervals and ambiguous intervals exist between colours, and an orderly geometric arrangement of colour-points leads to harmony. On this foundation is built a classification of harmonies and these harmonies are tabulated in some detail. The combinations are by no means equally pleasing, but elements of order can be discerned in all of them. Divisions into regions of similarity, ambiguity, contrast and glare are made which are in accordance with classical colour harmony, but the numerical designations of these regions are new and are based on preliminary experiments. The advantage of the method is that it gives the designer a wealth of new harmonies from which he can select the particular one best fitted to his needs. Classical colour harmony is confined to relations among colours, irrespective of area. In the present paper conditions are simplified to agree with classical theory. Areas are kept equal, adaptation is fixed at a neutral gray of Munsell value 5, and no attempt is made to compare the various harmonies æsthetically. C.

Solids: Orthogonal Projection; Photographic Method. P. Lake. *British J. Photography,* 1944, **91**, 129-132. In examining fossils which have been distorted by pressure it has sometimes been possible to determine the amount and kind of distortion with considerable accuracy and to prove that an orthogonal projection of the distorted specimen would have the same proportions as the specimen had before distortion. The preparation by the ordinary methods of a drawing which will show the original form is laborious, and it has been found possible, without exceptional cameras or lenses, to obtain a photograph which would have the same proportions as the orthogonal projection. A detailed explanation of the method is given. C.

Fine Particle Measuring Instrument. Fisher Scientific Co. *Laboratory,* 1943, **14**, 63-65. The determination of the size of particles of sub-sieve range in the Fisher " Sub-Sieve Sizer " is based on measurements of resistance to air flow by packed particles. A motor-driven air pump builds up pressure in a pressure regulator to a constant head so that a uniform flow of dry air passes through the packed powder sample. The flow of air is measured by means of a double range flow meter. The average particle size corresponding to the observed liquid level in the manometer is read directly from a chart. The range of measurements is from 0·2 to 50μ. C.

Elastomers: Young's Modulus; Effect of Low Temperatures. J. W. Liska. *Ind. Eng. Chem.,* 1944, **36**, 40-46. Methods and apparatus are described for bending and brittleness tests at low temperatures. Data showing the variation with temperature in the range 0° to −60° C. of Young's modulus for natural and synthetic rubbers are presented and discussed and the effects of freezing time are considered. The results indicate that extremely long test periods are required for the investigation of physical changes resulting from low-temperature crystallization. The rubber stocks having relatively high moduli at a given low temperature sometimes have very low brittle-point temperatures. The latter are therefore inadequate for use as indices of low-temperature serviceability. It is pointed out that although natural rubber is basically more cold resistant than some of the synthetic elastomers it is possible to compound synthetic elastomer stocks having better low-temperature properties than natural rubber stocks. C.

Cellulose Bacteria: Activity. W. H. Fuller and A. G. Norman. *J. Bacteriology*, 1943, **46**, 273-289, 291-297 (through *Chem. Abstr.*, 1944, **38**, 201[7]). Five new species of aerobic cellulose-decomposing organisms are described: *Pseudomonas ephemerocyanea, P. lasia, P. erythra, Achromobacter picrum* and *Bacillus aporrhoeus*. With the exception of *P. erythra* all are capable of growing well on many carbohydrates. *A. picrum* alone produces acid from cellulose and sugars. The more active of the organisms used about one-third of the filter paper supplied in 14 days. Cornstalk cellulose was far more extensively used by all of the organisms in an equal time. The presence of xylan in the cellulosan component of the cornstalk cellulose exerted a favourable influence on decomposition. About 75 per cent. of the xylan was more readily available than the remaining fourth. Cornstalk cellulose with the major part of the xylan removed resembled filter paper in availability. There is some evidence that a portion of the xylan may be present in imperfect cellulose chains. A series of preparations with decreasing lignin content was obtained from jute fibre by treatments with monoethanolamine. The extent of cellulose decomposition produced by the vigorous organisms, *Ps. ephemerocyanea* and *Sporocytophaga myxococoides*, increased as the lignin content decreased. Less vigorous organisms were little affected by the lignin content of the substrate. Both used the xylan component of the cellulose disproportionately. Both lignin and cellulose in the cell wall form interpenetrating systems; the effects of lignin in reducing the availability of cellulose are probably physical. C.

Termite Protozoa: Digestion of Cellulose. R. E. Hungate. *Ann. Entomol. Soc. America*, 1943, **36**, 730-739 (through *Chem. Abstr.*, 1944, **38**, 794[9]). Cellulose-digesting protozoa (the hypermastigote flagellates *Trichonympha collaris, T. campanula, T. sphaerica* and the polymastigote flagellate *Trichomonas termopsidis*) were removed from the alimentary tracts of termites (*Zoötermopsis nevadensis, Z. angusticollis*), suspended in an inorganic salt solution and allowed to act on powdered cellulose for periods up to 108 hours at 25·5°. The digestion products, which were recovered to 70-75 per cent. of the initial cellulose, consisted of carbon dioxide, hydrogen and acids, principally acetic acid (85 per cent. of total acid). No glucose was demonstrated as a product of cellulose digestion by the protozoa. Apparently, the principal carbonaceous materials used by *Zoötermopsis* are fermentation products produced by protozoa from the glucose which they obtain by cellulose digestion. Gas and acid (acetic acid, etc.) were identified as products of cellulose digestion by protozoa taken from the digestive tracts of another termite (*Reticulitermes claripennis*). Probably an anaerobic fermentation process is characteristic of most of the wood-digesting protozoa found in termites. Tests showed that acetic acid and probably also the non-volatile acids produced by the protozoa are absorbed from the mid-intestine of the termites. These acids are oxidised by the termites to obtain energy; carbon, carbon dioxide and hydrogen are eliminated. C.

Proteolytic Enzymes: Activity Measurement; Gelatin Viscosity Reduction Method. F. G. Lennox. *J. Council Sci. Ind. Res. (Australia)*, 1943, **16**, 155-166 (through *Chem. Abstr.*, 1944, **38**, 758[5]). The gelatinase activities of trypsin, papain, euphorbain and a mould protease were measured by means of the digestion flask viscometer. The time for a given change in viscosity bears no constant relation of concentration over a wide range of enzyme concentrations. Although the relation between viscosity after 10 min. at 40° and enzyme concentration always approximates to a hyperbolic form, the shapes of the curves for different enzymes and for different samples of the same enzyme diverge appreciably at high concentrations. Thus the activity cannot be expressed in terms of equivalent enzyme concentration by reference to a simple equation or calibration curve, and it is reported as reduction in viscosity of the enzyme-gelatin mixture after 10 min. at 40°, expressed as a fraction of the initial viscosity. Determination of the amino and carboxyl groups in enzyme-gelatin mixtures shows that chemical splitting can be detected within 1-2 min. of adding the enzyme. After 8 min. at 40° certain highly active enzyme solutions have reduced the viscosity almost to a minimum value, and at this point approximately three peptide bonds are split per 10,000 g. of gelatin. If a molecular weight of 35,000 is assumed for gelatin, the average molecular weight of the resultant polypeptides would be approximately 2,800, which corresponds to chains of about 28 amino acid residues. C.

Cellulose: Heterogeneous Degradation. O. Eisenhut and E. Schwartz. *Die Chemie*, 1942, **55**, 380-387 (through *Chem. Abstr.*, 1944, **38**, 249^7). Measurements of the changes in the degree of polymerisation show that the heterogeneous hydrolytic degradation does not proceed according to a zero-order reaction, as a slowing down with time occurs. The initial velocity of hydrolysis of various fibre types in ascending order is: native untreated fibre, native mercerised fibre and regenerated cellulose fibre. For all regenerated cellulose fibres the *k*-values of the zero-order reaction equation became equal after relatively short time of hydrolysis. Even with prolonged periods of hydrolysis, the *k*-values of the untreated cotton remained appreciably lower and those of mercerised cotton definitely lower than the values for the fibres from regenerated cellulose. The velocity of the hydrolytic degradation as a function of temperature and concentration was determined. The effect of caustic soda pretreatment upon the velocity of hydrolytic degradation and the solubility at various alkali concentrations was observed. The behaviour of sulphite pulp was also observed and an explanation presented for the initial deviation compared with the behaviour of cotton. Observations of the changes of the *k*-values and the X-ray structures of crude and alkali-treated cotton fibres are discussed. The slowing down of the degradation reaction in the course of hydrolysis is explained on the basis of localised attack areas where the acid attack leads to the rapid formation of very short cellulose chains which then greatly limit the further acid attack. Intermittent alkali treatments remove these chains and permit renewed acid attack. The relationship between breaking strength and degree of degradation was investigated; the decrease of the breaking strength is proportional to the time of exposure to the degrading substances and is independent of the alkali pretreatment of the fibre. The decrease of the degree of polymerisation, however, is accelerated by alkali pretreatment. The relationship between degradation velocity and alkali solubility of hydrolytically as well as alkali degraded cotton fibre was determined. C.

Cellulose Molecules: Form and Mobility. P. H. Hermans, J. de Booys and C. J. Maan. *Kolloid Z.*, 1943, **102**, 169-180 (through *Chem. Abstr.*, 1944, **38**, 248^9). A new model of the cellulose molecule is developed on stereochemical considerations with the aid of known atomic distances, valence angles and effective radii of atoms. A space-angled position of the chain is required and rings of adjacent glucose groups cannot be quite parallel. The polarity of the chains must alternate and the chains in adjacent layers must be moved along the fibre axis by 3-4A. in relationship to each other. Rotation about the O bridge is assumed and there is a possibility of transition from the "chair" to the "trough" form. C.

Methyl Linoleate: Chromatographic Purification. C. E. Swift, W. G. Rose and G. S. Jamieson. *Oil & Soap*, 1943, **20**, 249-250 (through *Chem. Abstr.*, 1944, **38**, 655^4). A column of alumina for chromatographic adsorption is prepared by alternately pouring alumina and light petroleum (36-60°) in small portions into a chromatograph tube (400 g. alumina adjusted to activity of IV in a tube 1¾ in. diameter) with a glass rod for stirring. A portion, 4 g. methyl esters of cottonseed oil in 150 ml. of petroleum ether, is introduced and the chromatogram developed with 1400 ml. of light petroleum. By this procedure a fraction of iodine number 74·6 was obtained consisting of a mixture of methyl esters. The methyl linoleate was eluted by rapidly forcing 2·5 l. more of light petroleum through with pressure. From a total of 16 g. of methyl esters, iodine number 108, 5·2 g. of methyl linoleate having an iodine number of 159·5 were obtained. After further purification, this had the following constants: iodine number 170·4, thiocyanogen number 87·3, n_D^{25} 1·4594. The product was 97·7 per cent. pure. C.

Polyhydric Alcohol Fatty Acid Esters: Preparation, Properties and Uses. H. A. Goldsmith. *Chemical Reviews*, 1943, **33**, 257-349. The methods of preparation, physical and chemical properties, and industrial applications of the higher fatty acid esters of polyhydric alcohols and of polyhydroxy ethers are reviewed. The bibliography has 572 entries. C.

Proteins: Reaction with Formaldehyde. R. L. Wormell and M. A. G. Kaye. *Nature*, 1944, **153**, 525. Animal and plant caseins can be deamided by treatment with a solution of 1 per cent. caustic soda for 40 hours at 45° C. The desamido-casein, when hardened with formaldehyde under neutral conditions, combines with the same amount of formaldehyde as does the untreated casein. In the presence of salts, acids and formaldehyde, the neutral hardened deamided material combines with no additional formaldehyde, whereas the untreated neutral hardened casein may increase its formaldehyde content by about 100 per cent. Partial deamination is also possible without the removal of amide nitrogen. The partially deaminated product combines with a reduced quantity of formaldehyde under neutral conditions. In contrast to this, the same partially deaminated product combines with a normal quantity of additional formaldehyde when treated with formaldehyde, salt and acid. When zein is hardened in a neutral solution it combines with only 0·4 per cent. of formaldehyde, but in the presence of salt and acid, the combined formaldehyde increases to 4·1 per cent. These figures are in keeping with the low amino and high amide contents of zein. The conclusion is drawn that, at or near the isoelectric point of the protein, formaldehyde combines with the amino groups mainly derived from lysine residues whereas under more acid conditions it combines with the amide groups attached to residues of glutamic and related acids. C.

Osmotic Balance. I. Jullander and T. Svedberg. *Nature*, 1944, **153**, 523-524. An osmometer in which the liquid passing through the membrane is weighed can be used for osmotic pressures from a few cm. of water pressure to some hundredths of a cm. In an undamped analytical balance one of the scales is removed, and on the floor of the balance case is fixed a stand with an adjustable platform carrying a glass cylinder filled with solvent. The osmotic cell is constructed of aluminium and glass, the necessary cementings being made with litharge/glycerin. The lower part of the cell is conical with a basal diameter of 5 cm. At the apex is fixed a glass tube a few cm. long and 0·9 cm. inner diameter. The upper part of the glass tube has an aluminium collar, carrying a wire so that the cell can be hung on the balance arm. A semi-permeable membrane is attached to the base of the conical recipient by means of a threaded ring and a perforated membrane-support. The membrane itself acts as packing material against leakage. The osmotic cell and part of the glass tube are filled with solution and suspended on the balance in such a way that the cell dips into the solvent in the glass cylinder. By means of the adjustable platform the difference in level between the solution in the cell and the solvent in the glass cylinder can be varied. The balance is adjusted to neutral equilibrium. When the weight of the cell increases, the cell sinks until the buoyancy compensates the increased weight. Because of the minuteness of the displacements, the reading of the balance is magnified by means of a doubly reflected beam of light. Arrangements are provided for reducing evaporation losses and for eliminating electrostatic effects. The use of this device for measurements on nitrocellulose in butyl acetate is described. For a nitrocellulose made from American linters and having a nitrogen content of 12·28 per cent., the molecular weight (number-average) corresponding to the osmotic data is 148,000. C.

Indian Green Earth: Base-exchanging Properties. N. R. Damle, R. B. Forster and K. G. Kudva. *J. Indian Chem. Soc., Ind. Ed.*, 1943, **6**, 30-39 (through *Brit. Chem. Physiol. Abstr.*, 1944, B II, 9). Green earth (Caledon earth: SiO_2 66·1, Fe_2O_3 6·3, Al_2O_3 15·9 per cent.) adsorbs the cations of basic dyes and organic bases (aniline and *p*-phenylenediamine) irreversibly in proportion to their equivalent weight, all sorption curves being similar and not obeying Freundlich's law. The degree of sorption is decreased by pre-treatment of green earth with acids, but is increased by treatment with calcium, zinc or sodium chloride or sodium hydroxide, and is independent of the *p*H of the sorbate. Acid dyes and lakes are not sorbed. Ignition of green earth at 400° reduces, and at 800° abolishes, its sorptive power. Replacement of calcium by sodium ions in green earth occurs on treatment with excess of sodium chloride. With fuller's earth, the degree of sorption is increased on treatment with acids. C.

Hydrogen Bond: Occurrence. L. Hunter. *Chemistry and Industry,* 1944, 155-157. A discussion of the nature of the hydrogen bond and essentials for its operation, the prevalence of the hydrogen bond in common substances, the influence of the hydrogen bond on the physical behaviour of water, hydrogen-bond association and tautomerism, hydrogen bonds involving atoms of fluorine, oxygen, nitrogen and sulphur, and evidence pointing to hydrogen bonds involving carbon. C.

Bauxite: Use as Drying Adsorbent. W. A. La Lande, Jr., W. S. W. McCarter and J. B. Sanborn. *Ind. Eng. Chem.,* 1944, **36**, 99-109. The activation of tri-hydrate bauxites at temperatures up to 1600° F. has been studied with particular reference to the production of a highly efficient drying adsorbent. Data are presented to show the relationship between activation temperature, residual volatile matter content, surface area, dry gas capacity (a measure of the amount of water vapour held by the adsorbent up to the point where it just permits water to appear in the gas passing from it), and equilibrium capacity (a measure of the total amount of water vapour which can be removed by an adsorbent from a fluid stream under constant conditions of relative humidity, temperature and pressure). The mechanism of the thermal decomposition of bauxite is discussed with reference to the results of differential thermal and X-ray diffraction analyses. The maximum dry gas capacity is attained by activation at 700-750° F. This treatment reduces the volatile matter content of the mineral from about 28-30 to 6-8 per cent. Under optimum activating and operating conditions bauxite will adsorb 11-16 per cent. by weight of water before any moisture is detectable in the effluent. Activated bauxite may be regenerated repeatedly by heating at 300-500° F. Various other factors which influence drying efficiency, such as mesh size, moisture content of gas, velocity through adsorbent, adsorbent temperature, shape of adsorbent bed, and presence of impurities, are discussed. Some results obtained in the drying of gases at atmospheric and high pressures and in the drying of liquids are briefly discussed. C.

Fibre Molecules: Coiling in Flowing Solutions. W. and H. Kuhn. *Helv. Chim. Acta,* 1943, **26**, 1394-1465 (through *Chem. Abstr.,* 1944, **38**, 673[9]). Equations are derived that relate the amount of streaming birefringence or the direction of maximum refraction in flowing solutions of linear polymers to the degree of polymerisation (DP). The amount of streaming birefringence at limiting conditions is directly proportional to the DP and the direction at limiting conditions is proportional to $(DP)^2$. Values for the DP calculated from these optical measurements agree excellently with values obtained from viscosity measurements (Staudinger). Data for DP determined with the ultracentrifuge are used for comparison. The agreement with data from viscosity or optical measurements is excellent, except when the DP is very high. It is suggested that this discrepancy exists because at high values the coiled molecules form a strongly felted structure which immobilizes solvent between parts of the network. The theoretical treatment used in deriving the equations referred to above is valid only when the surrounding liquid flows freely between the fibre molecules, as is the case when the DP is relatively low. C.

Potato Starch Pastes: Viscosity. P. E. Meiss, R. H. Treadway and L. T. Smith. *Ind. Eng. Chem.,* 1944, **36**, 159-163. The influence of the conditions of preparation and measurement on the apparent viscosity or consistency of starch paste is discussed. The Brabender Viscograph is briefly described and an account is given of investigations made with this instrument. Although drying starch to nearly zero moisture content causes considerable lowering of paste consistency, the oven drying of wet starch to the air-dry moisture range, at temperatures below 90° C., does not result in such an effect. Consistency/temperature curves are given for two pastes made from the same starch, one using distilled water and the other using tap water. The lower consistency of the latter is attributed to soluble material in the tap water. The removal of soluble impurities from starch by washing is discussed and it is shown that the change in the consistency/temperature curve produced by washing gives indications of the causes of low consistency. The results of examinations of 24 samples of potato starch produced in factories in the United States during the 1941-42 season are reported. It is pointed out that a sample of average-quality potato starch should have an ash content of about 0·35 per cent., low acidity, a *p*H near the neutrality point, high reflectance, and a paste consistency/temperature curve in which a peak occurs below the boiling point and which remains substantially unchanged when the sample is washed with distilled water. The influence of manufacturing methods and of the water used on the quality of starch is considered. Experiments indicated that the method of purification had no bearing on particle-size distribution. C.

Starch and Bentonite Suspensions: Viscosity; Effect of Electrolytes. A. v. Buzágh. *Kolloid Z.*, 1943, **103**, 119-126 (through *Chem. Abstr.*, 1944, **38**, 289^9). The viscosities were measured at different concentrations and in the presence of various amounts of electrolytes such as Na, K, Ba, Cu, Al and Th chlorides, K and Mg sulphates, and K phosphate, ferricyanide and ferrocyanide. The results were compared with results obtained on quartz suspensions. In general, starch and quartz suspensions have similar properties, except that in starch both ions affect the viscosity, whereas in quartz only the cations have a pronounced effect. Bentonite suspensions, being hydrophilic, behave differently. C.

Colour Harmony: Effect of Area. P. Moon and Domina E. Spencer. *J. Optical Soc. America*, 1944, **34**, 93-103. The scientific formulation of colour harmony is extended by taking into account the effect of area. It is found that a pleasing balance among colour patches is obtained when the scalar moments about the adaptation point in ω-space are equal for all the patches. Other pleasing balances are obtained when the scalar moments of the various colour patches are simple multiples of each other. The balance point in x-space of a system of colour patches gives a measure of the over-all colour effect of the design and, by choice of a proper balance point, the artist can emphasize a desired psychological effect. Moments in colour space are treated most simply by means of weighted points. The mathematics of this subject is developed, and the calculated areas for harmonious effects are tabulated for a large number of examples. Practical application of this system by the designer is briefly explained. C.

Dyes and Pigments: Spectrophotometric Formulation. R. H. Park and E. I. Stearns. *J. Optical Soc. America*, 1944, **34**, 112-113. Methods are presented whereby the formulation of colorants needed to effect a visual colour match of a given standard may be computed from spectrophotometric measurements of the colorants and standard. C.

Machinery Testing Devices. Institution of Mechanical Engineers. *Engineer*, 1944, **177**, 237-238, 257-258. Abstracts are given of papers presented at a symposium on modern aids in the investigation of materials, mechanisms and structures, including (1) electrical resistance wire strain gauges, (2) measurement of displacement and strain by capacity methods, (3) measurement of strain in components of complicated form by brittle lacquer coatings ("Stresscoat"), (4) high-speed cinematography, (5) temperature-indicating paints, and (6) study of internal stress in a metal by X-ray diffraction. C.

Wool Wax Alcohols: Properties, Composition and Utilisation in Medicine. E. S. Lower. *Mfg. Chem.*, Aug. and Sept., 1943. W.

Thermally-shortened Keratin Fibres. H. Zahn. *Naturwissenschaften*, 1943, **31**, 137-139 (through *Chem. Abs.*, 1943, **37**, 6285). Pure white horse hairs were heated by a Bunsen flame, shrunk 32 per cent., increased in thickness 58 per cent. and studied by X-ray. The diagram has 3 isotropic rings, 3·78, 4·60 and 10·1 A, similar to that of the keratin decomposition product (*these Abs.* 1941, A601), *d*-keratin. Both materials are β-keratins. Measurement of swelling anisotropy shows the same change, only 2·9 for the heated hair, 16·4 for the original. During the heating process the weight loss is 2·6 per cent., the cystine content decreases 10 per cent., the isoelectric point changes little and the alkali solubility increases. The process is a "super-contraction" (Astbury and Woods, *these Abs.*, 1943, A60). Hairs will shrink in their own sorption moisture by rapid heating. The same effect is not found if water is absent. Heating in water at 130° for 2 hr. gives a 25 per cent. shrinking with formation of β-keratin, likewise heating at 150° in moist glycerol. W.

Stretched and Super-contracted Human Hair: Microscopic and Hygroscopic Investigations. T. Lochte and H. Brauckhoff. *Biochem. Z.*, 1942, **312**, 41-59 (through *Chem. Abs.*, 1943, **37**, 6290). The observations of Astbury and Woods (*these Abs.*, 1934, A60) on the extensibility of human hair were confirmed. It has been stated that red hair contains an unusual keratin, but no differences were observed between red and other hair, when subjected to humidity changes, under tension. Super-contracted hair is not as extensible in a normal atmosphere as the original hair. W.

Sheep Maggots: Field Experiments on Control. W. R. Angus, I. Thomas and O. G. Williams. *Ann. Appl. Biol.*, 1943, **30**, 164-169 (through *Exp. Sta. Rec.*, 1944, **90**, 233). In field experiments on about 4,700 sheep at about 40 different farms in N. Wales, crutching was the most effective control measure for lambs. Regular dipping with commercial arsenic-sulphur dips gave reasonable control except during adverse weather conditions. Dipping with zinc arsenite or with calomel proved, on the whole, less effective than dipping with commercial dip. An addition of calomel to commercial dip was more effective than commercial dip alone. Preliminary observations are given on the variation of the surface tension and viscosity of the dipping fluid as the number of sheep passing through the dip increased. W.

British Sheep Blowflies: A Survey. J. MacLeod. *Bull. Entomological Res.*, 1943, **34**, 65-88, 95-111. W.

PATENTS

Powder Specific Surface Determining Apparatus. H. Heywood. B.P.560,037 of 10/9/1942: 16/3/1944. Apparatus for examining suspensions comprises reflectors, mirrors, lenses and/or prisms operative for constraining separate beams of light from a common source to pass through respective test cells or spaces or through standard and test cells or spaces, respectively, and light-reflecting means for causing the beams issuing from the cells or spaces to be projected for comparison on to separate regions of an eyepiece, a graded light filter being movable in one of the beams to cause the intensities of the beams of light directed on to the eyepiece to be made equal to each other, and provision being made by which the amount of movement of the graded light filter may be used as a measure of the intensity of the light passing the cell or space under test. For the determination of the total specific surface or the particle size distribution, a suspension of the powder is placed in a test cell and a standard or comparison cell contains clear liquid of the same kind as that in which the powder is suspended. The graded light filter is suitably coupled with a pointer movable over a scale indicating optical densities. C.

Carboxyethyl Cellulose Ether: Preparation. Röhm & Haas Co. U.S.P. 2,332,048. A carboxyethyl ether of cellulose, soluble in water, is obtained by the treatment of cellulose at 5-35° C. with 10-40 per cent. alkali hydroxide and acrylonitrile in roughly equivalent proportions (based on the glucose unit). C.

Cyanoethyl Cellulose Ether: Preparation. Röhm & Haas Co. U.S.P. 2,332,049. A cyanoethyl cellulose ether, soluble in organic solvents, is obtained by treating cellulose at 0-30° C. with 10-30 per cent. alkali and 2-3 mol. proportions of acrylonitrile, based on the glucose unit. C.

Alkali Metal Chlorites: Preparation. Mathieson Alkali Works, Inc. U.S.P. 2,332,180, 2,332,181. (1) Chlorine dioxide is absorbed in an aqueous solution of an alkali metal bicarbonate containing hydrogen peroxide. (2) Chlorine dioxide is prepared by the reaction of a chlorate with mineral acid (*p*H not much above 1) and hydrogen peroxide at a temperature not much above 70° C. C.

10—ECONOMICS

Textile Wholesale Prices, March, 1944. *Bd. Trade J.*, 1944, **150**, 141. The wholesale price index numbers for March are Cotton 139·5, Wool 183·6, Other textiles 134·2 (1930=100). C.

American Textile Industry: Future Prospects. D. G. Woolf. *Textile Research*, 1944, **14**, No. 1, 2-7. A discussion of the outlook in the textile industry, the certainty of a growth in research in the near future, research in connection with the war effort and its influence on the type of textiles available after the war, problems of the textile industry in the immediate post-war period, new technical developments, textile raw materials of the future, the emergence of new finishes, the development of new equipment, and the economic outlook. C.

Cotton, Yarn and Cloth: Controlled Prices, April, 1944. W. H. Slater. *Textile Weekly,* 1944, 33, 584. New tables are provided with which to correct the author's previous lists so as to allow for the change in the Cotton Control basis from 7·80 to 12·75 d. per lb. for the price of American cotton. C.

Indian Cotton Cloth: Production and Consumption. M. Masani. *Indian Textile J.,* 1943, 54, 4-7. A popular account is given of the growth of the cotton industry in India with special emphasis on " clothing 400 millions." The following charts are noteworthy. (1) A map showing the concentration of the industry. (2) Graphs of numbers of operatives, mills, spindles and looms from 1879 to 1941. (3) Histograms of cloth consumption per head in India from 1915 to 1941. (4) Histograms of cloth consumption per head in 1936 for India and some other countries, Europe being represented only by Sweden and Ireland, and North America by Canada. C.

Raw Cotton: Prices. *Cotton (M/cr.),* 1944, 49, No. 2403, 4; 50, No. 2404, 5. (1) Tables are given showing the controlled prices of American, Brazilian, African, Egyptian, Sudan and Peruvian raw cottons as from April 17th, 1944. (2) Official prices for various marks of Egyptian cotton are tabulated. C.

Rayon: World Production and Consumption, 1942. *Silk and Rayon,* 1944, 18, 263-264. The best available estimates of continuous filament and rayon staple production in 1942 are tabulated for 25 countries. The annual *per capitum* consumption of rayon, based on figures for 1937/9, is given as Germany 6·49 lb., Japan 5·30, Italy 3·82, Australia 3·08, United States 2·83, United Kingdom 2·44, New Zealand 2·43, Switzerland 1·97, Sweden 1·91, Canada 1·76, Czecho-Slovakia 1·73, Netherlands 1·36, Belgium 1·30, France 1·24, Denmark 1·14, Trinidad 1·04 and Eire 0·80 lb. The state of trade and post-war expansion are discussed. C.

British Cotton Industry: Planning. *"Times" Trade & Engineering,* 1944, 54, April, p. 42. The special committee appointed by the Cotton Board for dealing with post-war problems has asked the Government for an assurance that the appointment of a post-war Cotton Board will be made before the present Cotton Control is abolished. The certainty of a serious shortage of operatives in the industry after the war has directed special attention to the urgency of carrying out reforms which will make work in the mills more attractive. A committee of recruitment and training has already been appointed and a special department of the Cotton Board set up to administer the plans and policy of the committee. The intention is not only to ensure regular and interesting work at good wages, but also to offer good prospects of promotion to ambitious juveniles. The most recent development is the institution of a training scheme for foremanship and other mill executive positions and over 1,300 enrolments have been made for a course of 12 lectures. The total general wage advances for workers in the manufacturing section since the outbreak of war amount to 35 per cent. for cost of living, plus 9/- a week flat increase. It is expected that joint meetings will be held in the near future to discuss a starting-point system of wages for weavers. The sub-committee appointed by the Cotton Spinners' and Manufacturers' Association to investigate methods of wage payments and conditions of work in the weaving section has suggested a number of improvements which are likely to lead to higher efficiency and better relationships between employers and workpeople. A good response has recently been made to the request of the Cotton Controller for a resumption of overtime working in spinning mills. C.

International Trade: Changing Outlook. *Planning,* 1944, No. 219, 24 pp. A survey is made of pre-war trends in international trade and the economic effects of the war are discussed. The following conclusions are drawn:—(1) Exports are essentially a means of obtaining necessary or desirable imports, and should not be used primarily as a means of creating home employment. Both export and import policy should be deliberately related to a nation's Balance of Payments and its long-term foreign lending and borrowing. (2) Trade restrictions and bilateralism were a symptom, more than a cause, of the decline in world trade after 1929. Post-war policy should aim at a continuing expansion of effective world demand, making full use of the world's man-power and resources. (3) Multilateral trade, whilst creating the necessary conditions for obtaining the greatest possible advantages from international trade, also heightens the economic interdependence of nations. A restoration of multilateral trade requires (*a*) an efficient international monetary exchange clearing system in which all nations have complete confidence, (*b*) the maintenance of full employment within national economies, and (*c*) the maximum attainable measure of political security. (4) Failing the establishment of a universal multilateral system of trade, the "low-tariff club" represents a means by which nations most dependent on international trade can secure the benefits of multilateralism on a limited scale. (5) "Lend-Lease" is essentially a war-time method of international exchange, and is unlikely to continue after the immediate post-war period of scarcities. International trade, however, must have a monetary exchange clearing system that is at once more flexible than the Gold Standard and more stable than freely fluctuating exchanges. (6) World prosperity, like peace, is indivisible. (7) Great Britain's major problem in the field of foreign trade after the war is to increase its visible exports very considerably in order to repair the inroads which the war has made into its invisible exports and overseas investment income and to maintain the volume of imports vital to its standard of living. The form of policy appropriate will inevitably be affected by the economic policies adopted by the rest of the world, and in particular by those countries with the largest share in international trade. C.

Spanish Textile Industry: Development. *"Times" Trade & Engineering*, 1944, **54**, April, p. 18. According to statistics published by the Spanish Textile Syndicate, production of fabrics in 1943 amounted to 392,500,000 metres, an increase of 75,000,000 m., compared with 1942. This total consisted of 300,000,000 m. cotton fabric, 48,000,000 m. silk and 44,500,000 m. woollen fabric. About 11,430 enterprises, employing about 450,000 people, are engaged in the textile industry. In 1940 production of cotton amounted to over 10,000 bales, and in 1942 to 19,666 bales, and it is hoped that the figure for 1943 will be similar to that of 1942. The production possibilities of Spain have been estimated at 120,000 bales. In the provinces of Cordoba and Seville, the cotton growing areas, numerous mills have been erected in the last few years. Others are being built at Utera, Cordoba, Badajos, Careres and Malaga with a capacity of 80,000 bales a year. Breeding of silkworms in Spain has increased considerably in the course of the last few years. This year's yield is estimated at 500 tons of cocoons, compared with 407 tons in 1943. About 80 per cent. of the entire production comes from the province of Murcia. The production of the silk industry has increased from 46,000,000 m. in 1942 to 48,000,000 m. in 1943, a figure which is 50 per cent. higher than in 1935. It is expected that once all measures taken by the authorities to improve silkworm cultivation in Spain have been completed Spain will be able to meet home requirements. C.

Wool Products: Labelling; Australian Legislation. *"Times" Trade & Engineering*, 1944, **54**, April, p. 14. At the instance of the Commonwealth Government, the Australian States have agreed to introduce legislation providing for the uniform labelling of textiles to ensure that fabrics shall not be offered to the public as woollens unless they contain at least 92 per cent. of wool. The United States Wool Products Labelling Act, 1939, has been suggested as a model for uniform Australian legislation. A difficult problem is to ensure that imported piece-goods containing synthetic fibres carry into made-up garments the labels which Customs regulations require to be affixed to them on entry into Australia. One of the post-war objectives of the Commonwealth Government is the establishment of a textile college with research facilities to enable wool to hold its place against synthetic fibres produced from pulp, cotton or other cellulose base. C.

Wool: Post-war Marketing. G. E. Scott. *Wool Rec.*, 1944, **65**, 172, 174, 176. Three principles are discussed: market stability by maintaining constant relationship between supply and demand with the resultant economic price; a system which permits and encourages continuous adaptation of standards and sources of supply; enterprise to experiment and pioneer. With the exception of the indefinite contract, the pre-war system of wool marketing has proved its value, and should be reconstituted as soon as possible after the war. W.

Wool Marketing Experiment: A Record of the Operations of the British Australian Wool Realisation Association. G. J. Blau. *Wool Rec.*, 1944, **65**, 333, 335, 337-8. **W.**

" Wool in the World of To-morrow! " F. Hopkinson. *Wool Rec.*, 1944, **65**, 341, 343, 345. Future possibilities are discussed in regard to raw materials, machinery, and the production of yarns and fabrics. W.

" The Truth About Wool." H. F. Tomalin. *Wool Rec.*, 1944, **65**, 171. It is suggested that the Board of Trade ruling on the term " wool yarn " should be changed, and that all members of the wool trade should contribute towards advertising wool and its basic value for clothing. W.

Wool: Advertising Valuable Properties. D. R. Christie. *Wool Rec.*, 1944, **65**, 171. A plea for the more extensive advertising of the more valuable properties of wool fabrics, for the development of processing for water-proofing fabrics for post-war trade, and for the fixing of standards of manufacture to prevent misdescriptions. W.

The Wool Industry and the Post-war World. I. C. Ross. *Pastoral Rev.*, 1943, **53**, 802-3, 1944, **54**, 14-15. The possibilities of increasing the efficiency of wool production are discussed. Responsibility for textile research in Australia must be accepted, the prestige of wool maintained, and new markets developed. The scale of present-day research activities is hopelessly inadequate in relation to the gravity of the problems and the importance of the industry, and the immediate setting up is advocated of a central authority in Australia, to administer funds for biological, textile and economic research and for promotion and publicity. W.

Pure Wool or Not? W. R. Lang. *Pastoral Rev.*, 1944, **54**, 18-19. The confusion arising from present-day descriptions of wool goods can only be removed by honest labelling, which should cover general serviceability of the fabric as well as fibre content. Simple tests are described by means of which the average customer can supplement the information given by handle and appearance of the fabric. W.

What is Wool? N. G. Baguley. *Text. Merc.*, 1944, **110**, 239. The Retail Trading Standards Association is in favour of restricting the use of the word " wool " to the description of a substantially all-wool article, and of declaring the constitution of goods sold as " woollen." W.

11—INDUSTRIAL WELFARE, INDUSTRIAL PSYCHOLOGY AND EDUCATION

Cardroom Workers: Training. *Cotton (U.S.)*, 1944, **108**, No. 1, 109-112. The writer explains his method of starting learners at work and provides copies of (1) a daily work progress record and (2) a learner's work progress sheet. The latter sets out clearly how the learner will be paid and provides tables in which the manager enters week by week the number of frames run (drawframes and fly frames) and the percentage efficiency reached. It is explained that the minimum rate of pay—a time rate—will be changed to a piece rate as soon as the efficiency reaches the requisite high level. The learner signs a declaration of understanding of the progress sheet. C.

Industrial Workers: Fatigue. P. S. Florence. *Nature*, 1944, **153**, 363-364. Experience in the study of industrial fatigue is discussed and it is suggested that " social medicine " can be regarded as an extension of such work and can be defined as the study of variations in human health and efficiency with variations in social living and working conditions. Such a study, aiming at the scientific observation of social norms of behaviour, can and (where laboratory experiment is impossible) must be based on statistical measurement and summarization. Full exploration must be made of the possibilities of vital statistics as a measure of health and efficiency as well as statistics of social conditions. Conditions relating to psychological social and family relationships have proved particularly difficult to observe and measure in fatigue studies and are likely to do so in social medicine. Further, different classes of persons will react differently to similar conditions according to their heredity, sex, age, education and past experience. A chair of social medicine should, therefore, in a fully developed school, be supported by a staff that includes experts in demography and social statistics, in social psychology and anthropology, and in social biology. A general scheme of study for social medicine is outlined, and classical and recent research in social medicine is briefly reviewed. C.

Knitting Operatives: Training. H. E. Reed. *Textile World,* 1943, **93**, No. 4, 108-109. The problem of training new employees in American knitting mills is discussed and the schemes adopted by some representative hosiery and underwear firms are described. C.

Factory Noise: Reduction. H. J. Sabine and R. A. Wilson. *J. Acoust. Soc. America,* 1943, **15**, July, 27-31 (through *Sci. Abstr.,* 1943, **46** A, 232). Noise-level measurements in 33 plants of diverse nature varied between 65 and 130 decibels, and in the majority from 85 to 105 db. Factors other than noise-level contribute to the discomfort of the worker, namely, reverberation and the spreading-effect of sound or the tendency of sound in a non-absorbent room to decrease at a slow rate with increasing distance from the source. Further, a machine operator is affected less by the sound of his own machine than by others near him. Conditions favourable to improvement are: wide spacing of machines, differing qualities of noise from various units, and intermittent operation of the machines. In rooms where the smallest floor dimension is at least several times the ceiling height, and having a sound-absorbent ceiling (coefficient at least 0·7), the intensity level due to one or more sources decreases at a constant rate over the entire area of the room. This rate varies inversely with the ceiling height and may be 0·2 to 0·4 db./ft. C.

Philadelphia Textile Institute: Research Work. H. W. Rose. *Textile Research,* 1944, **14**, 42-46. The dual objectives of research, knowledge and education, and the value of applied research in textile schools are discussed, and a brief account is given of the research work being carried out in the Philadelphia Textile Institute. Industrial problems are brought to this Institute by manufacturers, mills, factors in the trade, and by the Government. The research projects are arranged through the dean, who determines whether and when the work can be undertaken. Since it is difficult to estimate the exact cost of a project, the contract usually provides for periodic payments for a definite time. The research work is conducted by the faculty in its spare time. If appropriate, students may assist, and in some exceptional cases a project becomes part of the work of an entire class. Some subjects of research are undertaken by the Institute without sponsorship in the course of its regular work. C.

Research Associations: Expenditure. *Chemistry and Industry,* 1944, 168. Figures are given showing (1) the approximate expenditure of the 18 grant-aided research associations for the year 1942-43, (2) the net output of the industries concerned according to the Census of Production, 1935, and (3) the amount expended by the research associations per £100 of output. Research Association expenditure in 1942-43 varied from £7,200 for the boot and shoe industry to £115,200 for the cotton, silk and rayon industry, the expenditures per £100 net output being £0·04 and £0·17, respectively. The lowest expenditure per £100 output was £0·01 in the Printing and Allied Trades, and the highest £0·63 in the Refractories industry. C.