

International Survey of Periodicals

RAW MATERIALS AND PREPARATION OF FIBRES

An Estimation of Artificial Silk.

Wilhelm Mang, Dipl.-Eng. (*Wollen- und Leinenindustrie* 1927, No. 2, pages 36—38). The writer describes briefly the technology of artificial silk for the benefit of textile experts and then shows that it is no longer to be regarded merely as a substitute, but that its present perfection and the properties of the better class types entitle it to be valued as an independent textile raw material. As criteria of a good artificial silk the author mentions the softness of the fibre, the uniformity of the filaments and of the denier in conjunction with strength and elasticity. Of particular value for the cotton mill man are the formulae for the conversion of cotton counts into deniers and a tabulation of the principal artificial silk deniers met with in the trade, together with the corresponding cotton yarn counts. In conclusion the author takes up the question of a change of name and invites discussion of a number of suggestions, such as chemical spinning fibre, industrial silk, celluline. Hgl.

The Action of Ammonia on Wool.

H. E. Farrar and *P. E. King* (*Journ. Text. Inst.*, 1926, 588). This article deals with the action of aqueous and alcoholic solutions of ammonia upon wool at different temperatures and concentrations, while varying the time of reaction, with special reference to the amount of sulphur lost by the wool. Further a new process for determining the sulphur content is described, which is based upon the use of sodium peroxide in a closed tube. Figures are given which show the gradual reduction of the sulphur content of the wool when continuously exposed for a long time to the action of lime water. Hgl.

The Sulphur Content of Wool.

J. Barrit and *A. T. King* (*Journ. Text. Inst.*, 1926, 386). The sulphur content of a number of classes of wool was determined. The various methods used for this purpose were critically examined and that put forward by Carius was found to be the most suitable. An altered process for ascertaining the humidity is described, and it was found that the amount of moisture taken up by combing wools of different fineness is practically the same in all

cases. The sulphur content varies and is in general not constant even in wools of the same origin. Fine wool contains on an average more sulphur than coarse wool. The sulphur content varies also with the part of the fleece from which the wool is taken. The lowest sulphur content was found in a sample of coarse Turkish mohair. The values varied between three and four per cent. Hgl.

A new Method for Stapling Cotton.

(*Textile World*, 1926, Vol. 70, No. 24, page 51.) Several methods of measuring the length of cotton fibres are first described, such as hand stapling, the sorting method developed by Henry Baer, of Zurich, estimating the length by successive pulls from a sliver, and the measurement of fibres projected with a lantern on a screen. The new method consists in fastening the cotton under a bar about one centimetre wide on a block of wood and cutting off the projecting ends by a wall-paper cutter. The average length of the fibre is then calculated as follows: weight of the ends (E) divided by the weight of the middle (M), multiplied by the constant length of the middle gives the length of the ends, and the sum of these two ends gives the average length. Schr.

The Differentiation of Flax and Hemp Fibre.

Fr. Tobler (*Dtsch. Leinen-Ind.*, 1927, pages 141—142). A short review of the contents of a work by Professor Alois Herzog, of Dresden, under the above title, recently published by Julius Springer, Berlin, 1926. The method hitherto employed, using as a basis the form of the tips of the fibres and their size, is not workable. The physical and chemical properties lend themselves better to this purpose, e. g. by testing the lignification and the property of swelling, as well as the impurities attached. In the case of bleached fibres, the solution test and the moisture test must be used and the sample examined in the polarisation microscope. Schr.

Brazilian Fibrous Plants.

F. Tobler and *R. Schwede* (*Faserforschung*, 1927, No. 1, pages 18—37). A descriptive list of the Brazilian fibrous plants is given which Ludwig Scholz collected during a journey through Brazil for the Botanical Institute of the Technical High School in Dresden. The following are described: Gnachuma, Gualima,

Rosea, Carapicho, Malvaisco, Aramina, Paka, Embira Branca, Imbirussa, Gravata, Agua Pé, palm leaf fibres, Aninga, Bananeira rosea, Tabua, Uba, Canna Prava, kinds of bamboo, Cipo, Timbo, Guaimbé, Barriguda, Musgo, Barba. Schr.

The Action of Ultraviolet Rays upon the Strength of Fibres.

(Sp. u. W., 1926, No. 103, pages 1 and 3.) A report is given of the experiments with rays carried out by P. Heermann and H. Sommer, and described in the Reports of the Material Testing Office in Berlin-Dahlem. Natural silk is most sensitive to the U₂ rays, and can be protected by weighting with minerals and dyeing with Monopole Black, which also protects the elasticity. Among vegetable fibres, jute is very sensitive and cotton is much weakened. Other effects of the U₂ rays and means of protection against them are discussed. Schr.

Rough Flax.

Fr. Tobler (Faserforsch., 1927, No. 1, pages 1—6). It has been found that flax, if not sown closely enough, tends to become rough and less suitable for use. Experiments by the author confirm this. If not sown closely enough, the woody matter develops at the expense of the fibrous matter. Cross-sections of fibres accompany the description of the experiments. Schr.

Kendir.

A. G. Jaeger (Faserforsch., 1927, No. 1, pages 6—12). Kendir is a shrub of the family Apocynum, upon the use of which instead of cotton great hopes were recently laid in Russia. The report of the commissions sent into the districts where this perennial plant grows wild were at first highly exaggerated and had to be greatly modified later on. The fibre is used chiefly for nets, cords, and ropes. (See the next article.) Schr.

Kenaf and Kendir.

R. Schwede (Faserforsch., 1927, No. 1, pages 13—18). These are two families of plants which occupy at present the foreground of interest in textile investigations and in the industry in Russia. Kenaf is a malvaceous plant and Kendir is a shrub which grows wild. The anatomy of the fibres and the distinctive reactions of both are described. Schr.

Silk Cultivation.

(Silk Journal, 1926, Oct., page 43 et seqq.) The chief foodstuffs of the silk worms are the various kinds of mulberry, as tree or bush. These should not be planted in valleys or on

the banks of rivers, as otherwise the leaves contain too much water and are deleterious for the worms. Among the main constituents of the leaf, the most important for the growth of the worms and their excretion of silk are sugar and resinous products. The chemical composition of the leaf is given. Then follow directions for gathering the leaves and the precautions to be observed in feeding them to the worms. A short tabular survey is given of the development of the silk worms in respect of increase in weight and consumption of fodder during the month following their birth. Gl.

Investigation of the Technical Process of Ginning and Cleaning Cotton.

W. S. Federoff (Bibliotheka Chlopkowogo Djela, 1927, No. 6, pages 134—190). At the instance of the Experimental Scientific Office of the General Cotton Committee investigations were undertaken in ginning establishments in Central Asia to study the influence of the various methods of ginning upon the cotton. Output and power consumption are directly dependent upon the density of the material fed in, when the rate of revolution of the saw is constant. If the material is very dense, the output is raised at the expense of quality, as is shown by diagrams, but there is no great difference to be found in the quality of the cotton when the density of the material fed in is low or medium. The impurities present in cotton consist of:

1. Foreign bodies, such as leaves, dust, sand.
2. Unripe and diseased cotton, small knots.
3. Seeds, and fragments and shells of seeds, motes.
4. Nepps, torn fibres, fly, etc.

In working with modern gins, impurities of the first and third classes are much reduced, but the nepps (group 4) increase many times when the material is very dense.

Tearing tests showed that the strength of the fibre is not affected by the nature of the ginning.

Modern ginning allows a loss of from 1.5% to 3%, but since this is mainly due to the removal of the shorter fibres, it is compensated for by the higher quality of the cotton. The prejudice in the trade against a high speed of the saws is unfounded, for cotton is less damaged by a speed of from 500 to 700 r. p. m. when the material is loose than by 250—300 r. p. m. with dense material. Dr. K.

Comparison of the Apparatus of Balls and Johannsen for Measuring the Staple of Cotton.

W. E. Sotikoff (Bibliotheka Chlopkowogo Djela, 1927, No. 6, pages 64—81). The results obtained by both apparatus are practically identical, when the work is carefully done.

Balls' apparatus is more exact, while Johannsen's shows the results more vividly, so that the former is more suitable for scientific investigations and the latter for demonstration purposes. Balls' apparatus is indispensable for giving the results of exact measurements in figures, for instance, for determining whether a sample of cotton belongs to a certain grade or how far it varies from that type. Dr. R.

Defects in Cotton.

Tschapkowsky (Bibliotheka Chlopkowogo Djela, 1927, No. 6, pages 112—133). While setting up a new classification for Russian cotton the defects found in cotton were minutely investigated both quantitatively and qualitatively and arranged in groups. The cotton was examined at all stages of manufacture beginning with the loose cotton up to the finished roving and the waste and the impurities found were tabulated in detail. Nepps and unripe seeds are the most harmful for the spinning process, for they are the only impurities which reach the lap in the card and get into the sliver. Dr. R.

More Care is Needed in Working with Artificial Silk.

H. Vollprecht (Leipz. Monatsschr. Text. Ind., 1927, pages 133—136). This is a continuation of the article on page 32 of the same journal and brings and explains a number of diagrams which show a regular periodical appearance of shiners in artificial silk. This leads to the conclusion that the shiners are not due to the weaving, but have their origin on the bobbin. Schr.

A New Flax Combing Machine.

R. Carter (Text. Rec., 1927, pages 42 et seqq.). The author discusses in a series of articles the action of the new flax combing machine which acts on the principle of Schlumberg's combing machine and has been used with success in flax spinning mills in the North of Ireland. Details of the machine are shown in numerous figures. Schr.

The Earliest Record of Spider Silk.

M. W. Neufeld (Kunstseide, 1927, page 138). The article contains an account of a book published in 1711 in Leipzig which describes a method of working up the silk with which the spider covers its eggs. The inventor was François Xavier Bon de St. Hilaire, of Montpelier. Schr.

The Latest about Silkworm Silk.

A. Herzog (Kunstseide, 1927, pages 139 and 140). The so-called Anaphe silk, the product of the family spiders which spin a common nest was examined. A silk of this nature is known on the market as Setalana. The silk is

finer than the silk of the *Bombyx mori* and resembles wild silks in shape and structure. It is very strong, but the breaking elongation is low. It withstands well the action of chemical reagents, especially alkaline carbonates and caustic alkalies. Schr.

Kenaf, a Substitute for Jute.

B. Schmidt (Leipz. Monatsschr. Text. Ind., 1927, pages 136—138). Endeavours are being made to find a substitute for jute and the old cultivation of the Kenaf plant has been taken up again with the assistance of the Russian government, principally in the north of the Caucasus. The former and the present attempts at cultivation are described. Schr.

The Effect of Heat upon Wool.

W. E. Emley (Textile World, 1927, Vol. 71, pages 27—28). The investigation aimed at finding the temperature to which wool can be heated without decomposition. A piece of wool was wound round a thermometer, after the dry weight had been found, and heated in an air bath at 40° C for half an hour, then weighed again after having cooled, after which it was exposed to the air for 12 hours to acquire its normal regain. This test was repeated, raising the temperature by 10° each time till a maximum of 300° C was reached. The results are shown in the form of curves and indicate that there is no sharp line of demarcation between complete dryness and commencing decomposition, which take place between about from 90° to 180° C. At a high temperature both the dry sample as well as that with its regain show a noticeable loss of weight which indicates commencing decomposition. In spite of this, wool which has been so strongly dried still retains its capability of taking up water, but it becomes more sensitive to moisture. Schr.

The Action of Atmospheric Influences on Fibres.

H. Sommer (Leipz. Monatsschr. Text. Ind., 1927, pages 158—162, continuation from page 100). After woollen material had been exposed to the weather for a considerable time, a destruction of the woollen substance was found to have occurred, as shown by the disappearance of wool, loss of weight and strength, and the appearance of products of decomposition, which was fairly proportional to the hours of sunshine and was hastened by the presence of moisture. A previous treatment with acid tended to delay the destruction, while treatment with alkali hastened it. Fat afforded a slight protection against the action of light, which protection was also noticed more or less markedly according to the nature of the dyestuff used to colour the wool and the depth of the shade. Schr.

Testing Cotton.

(Text. Rec., 1927, No. 526, page 87). In several countries which grow cotton there are state testing mills for investigating the quality of the different kinds of cotton. One such mill, for instance, exists in the United States and another in India. The latter has 550 spindles and a combing plant, as well as a weaving and a knitting mill, but there is no finishing. Schr.

A Rapid and Exact Method of Measuring Wool.

(Text. Rec., 1927, No. 526, pages 57 and 77.) An article by Professor Henseler, head of the Institute for Animal Breeding at the Technical High School in Munich, in the Journal of the Institute of Agriculture is reprinted. Professor Henseler treats of a new method for accurately and easily examining wool. Manual examination calls for much experience and the result is very subjective, while microscopic examination tires the eye and permits of the examination of small samples only. For these reasons a projection apparatus constructed on lines suggested by Dr. Doehmer, of Munich, is used. A small clump of wool is cleaned with ether, lightly brushed and laid between two glass slides in cedar oil. The picture is projected on a screen and permits of the examination of a large number of woollen hairs at the same time from the root to the tip. A scale is projected simultaneously with the object, so that the thickness of the hairs can be read off on the screen. Schr.

The Unprofitableness of Raising Silk in Germany.

F. Grauthoff (Kunstseide, 1927, pages 146 bis 148). The cultivation of silk in Germany will always be unprofitable owing to the climate and the cost of labour. The cultivation promoted by Frederick the Great was the object of large subsidies by the State and was often taken up by the country clergy and village schoolmasters beside their other duties. A witness for the unprofitableness of the cultivation is cited in the person of the zoologist Professor Adalbert Seitz, of Frankfurt, in his book "Die Seidenzucht in Deutschland" (The Cultivation of Silk in Germany). Schr.

SPINNING, WINDING, DOUBLING, ROPE MAKING

The Spinning Value of Cotton.

Otto Johannsen (Leipz. Monatschr. Text.-Ind., 1927, pages 138—140). The spinning value of a textile fibre depends upon its staple, the surface structure of the fibres, the strength and elasticity of the fibre substance, and the pliability with which the fibres take up the twist. These conceptions serve to define the

narrower or physical spinning value, besides which there is a more general spinning value in the shape of the technical and economical properties. Particularly important for the spinning value are the staple and the strength of the fibres. It is shown in the article that a hand sample which indicates a strong staple may be the cause of much deception in respect of the expected strength, because a strong coarse fibre lessens the friction surface within the thread. Schr.

Production and Piecework Wage in Worsted Spinning.

J. Zehetner (Wollen- und Leinen-Ind., 1926, 22, 559). The wage paid depends upon the lowest weekly wage for piece work plus a percentage bonus calculated in relation to the local conditions and the highest output which can actually be reached. By means of calculations, sketches of motions, and tabulations of the action of each machine, the author then explains the calculation of this highest output value for each machine in the worsted spinning mill. Gl.

Efficiency Values in Jute Spinning and Weaving.

H. Rudolph (Leipz. Monatschr. Text.-Ind., 1926, 11, 419 et seq.). The article explains by means of curves and calculations the value of the efficiency figures for the control of the own mill and for comparison with the figures for other mills. Gl.

Device for High Drafting.

(Leipz. Monatschr. Text.-Ind., 1926, 11, 408.) The writer gives first of all a short survey of the means hitherto adopted to produce high drafts and then describes by means of a sketch a new device which is said to give them. It consists in the main of a middle pressure roller, the cover of which is unusually elastic so that it clings by its own weight to a larger surface of the lower roller in such a way that one end of the nip line is brought closer to the nip of the pair of rollers in front. Owing to the peculiar form of the cover of the upper roller, the pressure on the sliver is also much lessened. Gl.

Twist in Jute Yarns.

Woodhouse and Brand (Text. Manfr., 1926, 617, 158). Although jute is not a strong fibre and hence does not make a strong yarn, a fair amount of it is regularly made into twist for the cheaper classes of shop twines. There is as yet no general agreement in the preparation of compound twist yarns as to the number of threads, the number of the yarn, and the twist constant. Two tables give a summary of the results found in examining a number of different twist yarns. The authors

then explain by means of examples the present-day practice in the trade of finding out the number of turns per inch. Finally a formula is given by means of which the average twist of from two-ply to five-ply jute yarns can be calculated from a given yarn number and a table is given to serve as a basis for determining the number of turns per inch.

Gl.

The Quadrant and its Influence on Cop Building.

Engelmann and Baumann (Leipz. Monatschr. Text.-Ind., 1926, 11, 409). After a few short introductory remarks upon the origin of the quadrant and its present-day development, the article gives hints for the proper adjustment of the quadrant and the signs which indicate that it is not properly adjusted. Finally the measures are discussed which must be taken to put matters right.

Gl.

The Transport of Woollen Roving Reels.

(Textile World, 1927, March, page 89.) This article contains two photos and describes a gravity conveyor for the automatic transport of woollen roving reels from the carding room in the second storey of a spinning mill to the spinning room below. The full reels are hung into an endless chain conveyor. When the transport arrangement is freed, it is set in motion by the greater weight of the reels just hung in and moves so far that a fresh section for loading is made available; at the same time an empty beam is brought up from the floor below and thrown into a frame for holding it.

Gl.

The Spinning Regulator of Brown, Boveri & Co.

J. Mänhardt (Leipz. Monatschr. Text.-Ind., 1926, 6, 231). After a short introduction upon the aim of the spinning regulator and its use in the ring spinner, the construction of the brush adjustment cam in dependence on the form of the ring rail cam is described by means of sketches and explained.

Gl.

Werning's System of Drafting.

Chr. Ros (Leipz. Monatschr. Text.-Ind., 1926, 6, 218). The author gives a short sketch of the nature and development of Werning's system. It proved itself of great value already during the war for drafting inferior material and has now been improved e. g. by replacing the second smooth pressure roller by a roller with fishscale fluting. It is now quite as good as any of the other systems.

Gl.

The Best Drafting Rollers for High Draft.

Professor *M. Lehmann* (Leipz. Monatschr. Text.-Ind., 1926, 8, 299). The author points out the special advantages of von Trümbach's

system is superior to yarns drafted on other against it. To prove its value he gives the results of a large number of trials which show that yarn which has been drafted by this system and contradicts the allegations made machines in uniformity, strength, and twist.

Gl.

Ascertaining the Fineness of the Wool in Combed Sliver.

J. Rouffin (Text.-Ind., 1926, 481, 235). The fineness of the combed sliver, i. e. the average number of fibres in a cross-section of fibre, is inversely proportional to the square of the average fibre diameter. The diameter of the fibre can be found in several ways, but the most exact is actual measurement by the aid of the microscope. Contrarily the diameter can be calculated from the number of fibres in the cross-section of a fibre bundle, the count of which is known. The number of fibres must be found by counting. A special method for finding the number of fibres consists in thoroughly mixing together a definite weight of white sliver with a definite percentage of dark coloured fibres. By counting the dark fibres under the microscope, which is very easy owing to the different colouration, the number of the white fibres can readily be calculated. If the requisite care is taken in the measurements and a sufficient number of tests are made, results can be obtained which are 95 per cent. accurate or even more.

Gl.

New Process for Spinning on the Bare Spindle.

W. Scott-Taggart (Text. Record, 1926, April, 47). In order to spin perfectly on the bare spindle, it is necessary to regulate the speed according to the diameter of the cop. This can be done on the usual ring spinner by using the motor drive to effect the change. The present suggestion is to do this in a novel way by employing a traveller driven at a uniform speed. This winds the yarn on the bare spindle much in the same way as in a flyer spinning frame in which the flyer serves simultaneously as yarn giving and winding agent. In this machine the bobbin is braked mechanically so as to provide for a differential speed between flyer and bobbin which permits of the yarn being wound, but in the new ring spinner the spindle is braked and is revolved only by the yarn itself. The brake is hydraulic and can be actuated very simply in the following way. The spindle is mounted so as to revolve lightly in a tubular bearing which completely encloses the lower part and communicates with an oil reservoir. By raising or lowering the level of the oil, the height of the oil in the spindle tube and consequently the surface of contact between the stem of the spindle and the liquid, i. e. the action of

the brake, can be altered. The level of the oil in the spindle tube is altered by means of a lowering body in the oil reservoir which is connected with the lifting motion for the traveller and dips more or less deeply into the oil. This causes a displacement of the oil and thus changes the level of the oil in the reservoir and in the spindle tube. The yarn spun on this machine is said to be the equal of that spun on the mule. Gl.

Band Drafting for Spinning Long Staple.

R. E. Naumburg (Text. World, 1926, No. 11, page 49). The article, which is illustrated, describes briefly the use of band drafting for spinning long staple. The chief points of discussion are the oldest patents in this field, an English Patent of 1868 which provides for a band in conjunction with a counterpressure roller, and an American Patent dated 1870, according to which the fibres are led between two parallel bands which work together. Gl.

The Causes of Irregularities at the Flyer Frame.

(Rev. Text., 1926, page 1209.) The various causes of the formation of uneven bobbins are discussed and the means of avoiding them. Special attention should be paid to the alignment of the flyer frame and its light and even running. The spindles also must be set accurately. The drawing frame must be examined to see whether the various parts are working evenly and exactly together. The uneven and irregular formation of bobbins is also very often due to the band cones not working together properly, or to belt slip, when everything else on the machine is in order. Finally a number of sources of bad work are pointed out caused by improper treatment of the bobbins, the use of bobbins which have not been quite emptied, or of bobbins of different thickness. Gl.

The Arrangement of the Delivery Rollers for Doubling Frames.

H. Eigenbertz (Text. Record, 1926, April, 45). The author describes with the aid of a number of sketches the various methods of arranging and mounting the delivery rollers for doubling frames. Besides the ordinary arrangement, commonly in use, in which the lower roller is driven and the upper roller presses by its own weight upon it, there is described among others an arrangement which has been much adopted in America, in which two lower driven rollers are used with a pressure roller which presses upon them both. Special arrangements which aim at enlarging the angle of twist either at the delivery roller or at the pressure roller are also explained by means of various sketches. Gl.

One Hundredth of a Millimetre Guaranteed.

J. Wallich (Die Umschau, 1927, 8, page 148). After a few short introductory remarks upon artificial silk spinning, the article deals with the manufacture of the spinnerettes used, more particularly with the manufacture and properties of spinnerettes of porcelain. Gl.

The Electric Drive of Spinning Centrifuges in Artificial Silk Spinning Mills.

H. Wilbert (Kunstseide, 1926, 12, 435). The article deals with the special construction of the spinning cans of artificial silk spinning machines with individual electric drive. The arrangements for transforming the normal alternating current of 50 periods into a current of lower tension and a variable periodicity according to the speed of the can required is gone into particularly fully and explained by means of diagrams of various wiring schemes. Gl.

Planning the Lifting Cam for Winding Machines.

J. Desrumaux (Rev. Text., 1926, 9, 1415). First of all the author explains the mathematical relations between the form of the bobbin and that of the lifting cam for the movement of the flyer frame by means of a number of diagrams. He then explains by several examples practical methods of constructing the form of the cam for given dimensions of the bare bobbin and a given form of the chase. Gl.

Sketch of the Technical Development of Cotton Spinning and Weaving.

Dr. F. Gemmert (Sp. u. W., 1926, 81, 5). The author surveys briefly the development of spinning and weaving from the oldest times to the present, without going into details of construction. Gl.

WEAVING, SIZING, AND PREPARATION

Trials with Warp Beam Brakes on Narrow Looms.

Jos. Sponar (Leipz. Monatsschr. Text.-Ind., 1927, page 13). The writer starts from the idea that the spinning of coloured cotton goods must also adapt itself to changes in fashion, and describes a number of trials which were made to weave two different cotton articles with alterations of various warp beam brakes (band and friction block brake, chain brake, rope brake). The observations made are described and explained by means of sketches, and may be summarized by stating that any uniform tension which tends to improve the appearance of the goods is of advantage if correctly applied. Hae.

Regulating the Speed of Textile Machinery.

P. Beckers (Leipz. Monatsschr. Text.-Ind., 1927, page 25). Two types of arrangements for speed regulation must be distinguished. Firstly, those in which it suffices to change the speed in wide graduations (belt step pulleys, gear change motion and so on). Secondly, those which permit of fine graduations (belt cone and friction drives). The drive proposed by Dr. Schatz (here illustrated) with a conical wedge belt pulley for looms and the speed regulating mechanism on the section warping machine of the Sächsische Webstuhlfabrik vorm. Louis Schönherr for keeping the tension of the warp always constant belong to group No. 2. Of interest for calico printing machines are also the continuous current motors, the d. c. five-conductor system, the regulatable a. c. collector motors, and the so-called auxiliary motor drive. Regulatable oil drives, for instance the Huwiler drive of the Berliner Maschinenbau A.-G. vorm L. Schwartzkopff, have recently also been much used for this purpose. Hae.

Cloth for Aeroplanes.

El. (Sp. u. W., 1926, No. 75, page 8). The nature of the fabric used for the wings of aeroplanes has assumed special importance owing to the progress made by aviation. Exact regulations have been worked out in England for such fabrics, because, in the first place, the surface must always be in uniform tension even under different atmospheric moisture conditions. Secondly, it must be very strong to avoid tearing, and finally it must be unaffected by any of the atmospheric influences. Besides this, several conditions, which are fully described, must be complied with as to density, elasticity, nature of the fibre, effect of sun and rain, and in connection therewith the colour and the acetyl cellulose dope.

Manufacture of Woven Felts.

(Woll- u. Leinen-Ind., 1926, page 563.) The thickness of woven felts for technical purposes in place of ordinary felts can be regulated as desired by using weft which is pretty coarse or composed of cabled yarn. There are generally used two warp thread systems with different weaves and three systems of picks (for under and over cloth and filling). A cloth of this type is shown in cross-section with a weave plan. Woollen yarn double cloths or strengthened fabrics of this class are felted in the hammer fulling mill. Hae.

The Flying off of Weft Cops.

(Sp. u. W., 1926, No. 45, page 5.) The flying off of weft cops during weaving is due to a number of causes. Either they have been wound too steeply, or the surface of the tube

is too smooth, or the shuttle spindle does not fit properly, or the weaver has not set the cops on accurately. The pick, in particular the buffing of the shuttle on the picker must not be too hard. Trouble can be obviated by braking the shuttle and seeing that the check strap works properly. In overpick looms the pick must quickly come to rest after the stroke or the blow is too hard and the cops fly off. For this purpose a thicker buffer or a check strap should be employed which must be fastened at the outer end of the picking spindle outside the wall of the shuttle box, at the spot where the check strap is also fastened. The picker then cannot strike the tip of the spindle at all, so that it is treated very gently. Recently also shuttles with spring tips have been constructed to reduce the tendency to fly off. A description of such shuttles is given. Hae.

Weaving Figured Repps without Change Box.

E. Gienger (Leipz. Monatsschr. Text.-Ind., 1926, pages 411—12). These fabrics are chiefly used for men's white shirts and are woven in two ways. Either by warp and weft being alternately on the face of the cloth, the figuring being also done by warp and weft. Or by using one stout and one thin thread both in weft and warp alternately, but this requires the use of a change box. Eight figures of patterns serve to show how figured repps can be made. Hae.

Soft and Smooth Qualities of Artificial Silk Fabrics.

(Z. f. d. g. Text.-Ind., 1926, page 644.) Artificial silk fabrics of this type with cotton weft are generally woven in plain weave, less often in crepp or sateen. Single coloured goods are generally dyed in the piece. The use of artificial silk in pale shades as filling produces shot effects with a crepp weave. Hae.

The Taking up Motion.

W. Bertram (Sp. u. W., 1926, No. 81, pages 1 and 3). A taking up motion used in domestic ribbon weaving is described. It has an eccentric driving shaft for the ratchet wheel of the taking up motion, one complete revolution of which lasts for four picks, because the small driving eccentric sheave is in the relation of 1:4 to the revolution of the main shaft of the loom. The arrangement is illustrated. By means of two diagrams the irregularities are demonstrated which occur in taking up the goods owing to wrong mounting or otherwise. Hae.

The Bergmann-Nullau Loom Drive.

E. Möller (Sp. u. W., 1926, No. 75, page 1). This type of drive with an improved picking mechanism and regulatable motor for slow

starting and stopping power looms together with partial regulation of the speed is described by means of two sketches showing the arrangement for high and low speeds. Particular attention is paid also to the construction of the picking spring as an extension to the picking motion set together on a tappetpicking loom with overpick. The drive is further explained by means of figures after having removed the picking mechanism from the loom, both with individual motor drive and with a crankshaft drive, as well as with twin motor drive. The latter arrangement has the advantage that the strength of the pick can be varied to suit the material and the width of the loom quite independently of the revolving crankshaft. Hae.

Nicolet's Weaving Process.

W. N. (Rev. Text., 1926, pages 1585—1595). A new method of weaving is described in detail by means of ten figures. It consists chiefly in forming two warps which lie one behind the other, into which the wefts can be inserted either simultaneously or rapidly after one another, the foremost pick being first beaten up and the other after the change of shed. Shedding is done by means of a comb with thread guide holes in the prongs and a carriage comb with an up and down motion for the yarn of the second warp. The picks run off from fixed bobbins and are carried in loop form into the shed. They are beaten up by combs which swing alternately backward and forward. A longitudinal groove on the shed-forming comb serves as a guide for the shuttle or pick carrier. To secure a good selvage, the weft which runs at the commencement of each motion from and along one edge of the fabric to the weft guide for the back shed is gripped by a clip passed through the cross shed from the other side of the fabric and drawn into the cross shed after the yarn between the clip and the edge of the fabric has been severed. Hae.

The Manufacture of Gauze.

G. Strobino (Ind. Text., 1926, pages 509 et seqq.). The article, which is a continuation of an earlier one, deals with the manufacture of single and double thread gauze fabrics. Many illustrations are given of the different types together with weave plans, and the various thread groupings are explained. Hae.

The Movement of the Shafts with Double Lift Dobbies on the Hattersley System.

V. Hildebrand (Ind. Text., 1926, pages 410 to 412, 459—463). The author describes minutely by means of 18 figures the arrangement and method of work of the Hattersley double-lift dobby. Particular attention is

given to an explanation by means of diagrams of the various motions of the lifting blades, wires, etc., using different drives. Hae.

Methods of Producing Twist Effects in Smooth Fabrics.

Ass. (Sp. u. W., 1927, page 7). Only a limited number of doubled threads are used in the warp in the preparation, for instance, of ze-phyrus, blouse fabrics, etc., so that they must be warped on a special beam. These effect threads need not be sized. Instructions are given for warping and beaming them. They can also be run from a special creel, but when sizing they must not be allowed to run through the sizing box under the dipping roller. These threads are evenly distributed throughout the whole width of the warp by means of an expanding reed. Hae.

One-sided and Two-sided Weft Tapestries.

Professor Gräbner (Leipz. Monatsschr. Text.-Ind., 1926, page 169). The manufacture of this type of fabric is explained by means of figures and cross-sections of fabric, together with design plans and the arrangements of the harness. The design of a double-sided fabric can be the same on both sides or different. Two photograms show both sides of a sofa cover with four identical pick colours on each side in different patterns. Hae.

The Finishing of Women's Woollen Dress-goods.

Rich. Hünlich (Leipz. Monatsschr. Text.-Ind., 1926, page 204). The article describes the treatment of this class of woollen goods by burling, scouring, fulling, singeing, crabbing, steaming, dyeing, finishing, drying, cropping, and pressing. Hae.

Shuttle Truing Machine.

Gebrüder Stäubli, Horgen, Switzerland (Text. Manuf., 1926, pages 128—129). In order to preserve shuttles in good condition for use, a special machine has been built the description of which is accompanied by two figures, in one of which a shuttle is being trued and trimmed, and in the other is being sharpened, rounded off and polished. Hae.

Loom for Picking from Stationary Weft Bobbins.

(Text. Mercury, 1926, page 557.) The Gansworth self-weaving attachment and its action are described and a view of the loom is given. A photo illustrates the finishing off of the selvage by the weft in loop form. Hae.

Cockayne-Dyson Central Selvage Motion.

Cockayne & Clay, Huddersfield, (Text. Manuf., 1926, page 381). When two or more

widths of cloth are woven side by side in one loom from the same shuttle a centre selvage motion is used to make the inner selvages. A diagram and a photo serve to illustrate the construction and action of the motion, which comprises two needles like sewing-machine needles which guide the warp threads at the edge. Hae.

The Manufacture of Madras Muslin Curtains.

Prof. Gräbner (Sp. u.W., 1927, No. 9, page 1 et seqq.). Madras muslin curtains are fabrics for curtains or hangings which are woven in colours and in which one or more coloured design picks follow each ground pick; the coloured picks float freely outside the figure and must afterwards be clipped, so that bits of yarn show themselves on the left side of the fabric. The foundation is a gauze weave and is different from Madras curtains which are a light plain weave and in which the figure pick floats on the face of the fabric. The manufacture of different Madras and other curtain designs is explained by means of 14 figures which illustrate weave plans, harness tie-up, and the jacquard machine. Hae.

The Gabler Loom.

Prof. E. Mauz (Leipz. Monatsschr. Text.-Ind., 1927, page 143). The weft can be positively led only by the use of a gripping shuttle with a gripper or of a gripper alone. In the latter case the weft can be wound off bobbins of any size, whereby the stoppages due to the pirns having run off which occur in a positive picking motion are avoided. J. Gabler has perfected picking by means of grippers and has at the same time improved the construction of the loom. A number of diagrams and figures serve to explain the ingenious, but simple arrangement and action of the new picking motion. The yarn is fed from stationary cheeses, which are arranged at both sides of the loom, upwards through a thread guide funnel and an external thread brake to the thread holder with a brake. A thread tensioner regulates the length of the pick in such a way that the end of the thread always remains within the selvage and always ends as far as possible at the same place. The yarn then passes to the inner thread brake which tensions the yarn to the selvage and makes sure of its being easily brought by the thread carrier to the gripper. Each gripper has an exchangeable device for taking in the yarn in the shape of a loop up to the middle of the fabric and for pulling through the end of the yarn which is cut off within the selvage by a thread cutter whereby the shed for the selvage threads is slightly closed by means of a selvage pusher. The new loom is being built at present with a reed width of about 100 centimetres and makes 170—200 revolutions

per minute. The large cheeses contain about 850 grams of 20's (English) yarn, or 29,600 metres. The height of the shed can be very low. Hae.

Gansworth's Loom with Stationary Shuttles.

(Text. Manuf., 1926, page 379 et seq.) The loom, which works with an endless supply of weft, is explained by means of a diagram and a photo. The weft is carried in loop form by specially constructed weft carriers provided with horns, two carriers working alternately from each side. The length of the thread in the fabric is shown by a diagram. The loom runs at 200 picks per minute, warp breaks are seldom, and one weaver can tend twenty looms. Hae.

Grounds for Complaint about Woven Fabrics, their Origin and Prevention.

K. Liebsch (Z. ges. Text.-Ind., 1927, page 109). The use of perfect warp yarn of first-class quality is of prime importance for a good cloth. The author deals with the chief faults that occur in fabrics and their prevention. They can be enumerated as follows: the cloth shows ribs, or the weft is bent, inferior selvages, reed marks, irregular set of the weft, beetling, alternate thick and thin stripes, tension, double picks, dirty streaks, rust and other stains, knots, curling of the warp yarn, warp that has not been woven in, loops of weft at the lists, upper weft threads and back picks, holes and tangles, the pick is squeezed out and looks wavy, drawing in faults, the weft breaks halfway across, picking faults, design faults, thread breaks and double thread breaks. Hae.

KNITTING, EMBROIDERING, LACE etc.

The Lubrication of Knitting Yarns.

W. Davis (Text. Manuf., 1926, No. 623, pages 364—365). Yarn for knitted goods must often be damped and lubricated to improve its curving property. Lather is generally preferred for this purpose, prepared from white curd soap with the addition of neatsfoot oil in the proportions given. Damping and lubricating are done on the winding machine, to which the yarn is led over a roller revolving in the liquor. The author has made tests to examine the action of the liquor on the strength and elasticity of the yarn. In one series of tests unimpregnated yarn was used, in a second series yarn impregnated in the usual way, and in a third series liquors were used with more oil and less soap. The second series showed increased elasticity, but lessened strength. The oil used in the third series was an oil largely employed in worsted spinning which emulsifies well. This treatment was found to be of great advantage for the yarn.

Too much oil tended to lower the strength of the yarn and increased its elongation. The results of the tests are plotted in curves. Schr.

Artificial Silk Tricot.

R. Hünlich (Kunstseide 1926, pages 303 to 307). The article describes the use of artificial silk on the various knitting machines for different articles of clothing, together with the method of working on these machines and their differences. The properties of artificial silk and its preparation to make it soft and pliable are also discussed. Schr.

Normal Lengths for Stockings.

M. Schenke and W. Schoeffstall (Text. Rev., 1927, No. 525, pages 81—82). It is a drawback that different mills have different lengths for their stockings. The American Bureau of Standards in conjunction with the National Association of Hosiery and Underwear Manufacturers has accordingly measured about 1200 dozen pairs of stockings and socks for women, men, and children and fixed a normal length for each class of stocking based on the average length found together with the permissible deviations from this standard. The measurements are given in tabular form. Schr.

Principles of Knit Fabric Production.

M. C. Miller (Text. World, 1926, 23rd Jan., 27th March, 15th May; Vol. 70, No. 4, pages 53—55, No. 12, pages 41—42, No. 15, pages 48—50, No. 21, pages 33—34). Short articles have appeared under the above title dealing with the basic processes of knitting and the mechanism of the frames. The articles discuss the formation of loops by spring and latch needles, pressing off the needles, the influence of the course of the thread on the quality of the goods, the various kinds of sinkers and their action, knitting on the circular frame, the form of its needles and webholders, and also knitting on Lamb's type of machine. It is proposed to publish the articles in book form. Schr.

New Methods of Raising the Output of Circular Knitting Machines.

C. Aberle (Dtsch. Wirkerztg., 1927, No. 14, page 9—10). The article discusses the endeavours made to develop the circular knitting machine as a rapid knitter, for instance, by mounting movable parts lightly in ball bearings, immediate stopping and braking. Three improvements by Messrs. C. Terrot Söhne are described. They comprise a loop wheel which shortens the time that the sinkers are in contact with the needles, a stop motion when the yarn breaks while looping and when the bobbin is empty, and an instantaneous brake. Schr.

The Manufacture of Knitted Linings.

T. Zwirn (Kunstseide, 1927, pages 170—172). The article describes by means of diagrammatic figures the preparation of various kinds of linings on the circular knitting frame, such as ordinary lining, ordinary double lining, and single and double binding thread lining. Schr.

Mounting the Carriages of Knitting Machines.

(Monit. Maille, 1926, page 83.) These carriages generally run in right-angled grooves which are soon worn away and allow the carriage too much play. It is proposed to mount the carriage between two bars of rectangular, preferably square, cross-section, one edge of each of which lies against one side of the carriage. By adjusting the two rods to one another, the carriage can always be run without play. Schr.

Plating Device for Circular Knitting Frames.

(Monit. Maille, 1926, page 81.) In order to work plated stripes on a circular frame, one of the two threads is more strongly tensioned so that both threads turn and the one under greater tension is laid on the back of the fabric. Both threads run at the side of a brake block which is pulled to one side by an electromagnet and to the other side by a spring against braking surfaces and in this way arrests one thread or the other. The current in the electromagnet is closed by a pattern drum with pegs which sets a lever on a contact ribbon running round the needle cylinder. Schr.

Comparison of the French and the German Circular Frames.

U. D. (Rev. text., 1926, pages 869—873 and 1017 to 1021). The article deals with the French circular frame built by Messrs. Lebocey Frères, Troyes, on the Berthelot system. It has a ring of jack sinkers which are arranged radially in a horizontal plane and pass between the needles, at the same time swinging up and down. (It is thus different from the so-called French circular frame with a loop wheel.) The Lebocey frame is compared with the so-called German frame built by Schubert & Salzer with a ring of suspended sinkers which are moved up and down for looping and forward for knocking off. The sinkers of the Lebocey frame lie in a circular comb which guides them to the needles at the looping place, and they are guided at the front end so that they lower their heads when looping. This method demands very precise execution, because sinkers and needles, which lie on different parts, must have a speed which completely harmonizes in both cases. The speed is therefore limited and does not exceed 16 to 17 revolutions per

minute, as against 24 r. p. m. of the German frame. In the French frame too only a yarn can be used which is rather above the average, but this has the compensation that the loops formed are very uniform. The author is convinced that the Lebocey frame will yet be further improved. He then discusses the construction of the German frame and compares details, cams, pressers, etc., with the French frame to find points which tend to show up the advantage of the French frame. The German frame is based on the Falaise system, the invention of the Belgian Jouve in Falaise. The advantages are claimed to be the guiding and mounting of the looping sinkers which are also knocking off jacks, the arrangement of the cams, and the easily regulated thread guide. The great free length of the sinkers is said to be a disadvantage.

Schr.

Jacquard Devices for Knitting Frames.

J. Chamberlain (Text. Rec., 1927, No. 527, pages 73 and 76). Under the term jacquard device are often understood all kinds of pattern arrangements, such as peg chains, pattern wheels, and so on, although, strictly speaking, only jacquard card motions fall under this head. The so-called Manchester Jacquard machine with wire hooks and knife frame for Cotton's patent frame is much used. The effectiveness of the jacquard is much enhanced by the use of droppers. There follows a description of a number of jacquard devices for flat and circular knitting frames. Among these is a jacquard with perforated cylinder over which the card runs, pegs in rocking levers and catch levers of different lengths in the style of a dobbie for the adjustment of the thread guides in circular frames, as well as other constructions for the adjustment of these thread guides and the needles in circular frames.

Schr.

FINISHING

The Iron Content of Raw Cotton.

Prof. P. Kraus (Leipz. Monatsschr. Text. Ind., 1927, page 34). Defects which occurred when bleaching cotton yarn led to the investigation of the iron content of a number of different kinds of cotton. It was found to be very low in general, amounting on an average to 0.007 per cent. The yellow tufts show an average content of 0.083% iron, and the seed husks as much as 0.152 per cent. A total of 63 different types of cotton were examined.

Hgl.

Further Investigations upon the Chlorination of Wool.

S. R. Trotmann and E. R. Trotmann (translated by Prof. Kraus in Leipz. Monatsschr. Text. Ind., 1927, page 38). The authors have

found that the injury caused to the wool fibre by treatment with chlorine is principally due to the fact that the protective scales on the surface of the fibre are destroyed. After this the wool cannot felt. But wool can be made unshrinkable without much injury to the scales by chlorinating it with hypochlorous acid free of chlorine. Wool cannot, however, be made completely unshrinkable by treatment with chlorine alone. The capability of the fibre to absorb dyestuff is strongly affected by the chlorination process used, being enhanced by chlorine and diminished by the use of hypochlorous acid. Hypochlorous acid, with no free chlorine, is particularly well adapted for chlorinating wool without injury.

Hgl.

Setting Bleaching Liquors.

Prof. Hugo Kauffmann (Leipz. Monatsschr. Text. Ind., 1927, page 40). Bleaching liquors are set according to the changing proportions of chloride and hypochlorite by chemical determination of the active chlorine content with the aid of the titration method given by Theis, using an indigo carmine solution. According to the experience of the author, however, the result of the titration is largely dependent upon the way the indigo solution is allowed to run in and he therefore proposes to reverse the usual order and to titrate the indigo solution with the bleaching bath. Much more uniform results were obtained by this method when the bleaching liquor was at the same time suitably diluted.

Hae.

Bleaching Agents and their Determination.

E. S. (Sp. u. W., 1927, page 12). The article is confined to those bleaching agents which owe their activity to their content of chlorine. First of all the preparation and composition of chloride of lime, the best known bleaching agent of all, is given and explained, and its behaviour discussed when it is allowed to lie for some time exposed to air and the way it is affected by carbonic acid. All these bleaching agents belong to the class of hypochlorites and their action is not due to the direct activity of the chlorine content, but to the splitting off of nascent oxygen by way of the hypochlorous acid. The determination of the effect of bleaching agents containing chlorine by titration with arsenious acid, indigo solution, and iodine in potassium iodide are explained. The conversion with soda, sodium bicarbonate with Glauber's salt and caustic soda, and the reactions which take place when chlorine gas is led into a solution of soda, producing Eau de Javelle, are discussed, and mention is made of the concentrated bleaching lye prepared by the Chemische Fabrik Griesheim-Elektron. In conclusion the electrolytic preparation of bleaching lyes is also discussed and the reaction to hydrogen peroxide.

Hgl.

Producing a Scroop on Cotton and Artificial Silk Goods.

(Leipz. Monatsschr. Text.-Ind., 1927, page 122.) This is generally done by treating the cloth first with a good curd soap and then giving it a weak acid bath. The grating sound is considered to be due to the free fatty acid precipitated on the fibre. The author explains the mechanical and acoustic phenomena by the theory that the adsorptive compound (cellulose plus fatty acid) arises from the adsorption compound (cellulose plus fatty acid alkali). The most suitable acid for the purpose has been found to be lactic acid.

Hgl.

Sizing and Desizing Artificial Silk.

Justin Hauser (Leipz. Monatsschr. Text.-Ind., 1927, page 119). Artificial silk is usually sized in hank form by passing it through a lukewarm solution of broken up starch in a tub, less often in the machine. Aktivin is particularly suitable for breaking up the starch and a number of recipes are given. Desizing can be done in the usual way by laying the goods in a solution of Diastafor, Dégomma, Biolase, and the like. The use of neutral aqueous Aktivin solutions is new. By this means the strength of the fibre and the lustre do not suffer.

Hgl.

The Formation of Insoluble Colours upon Acetate Silk.

Josef Pokorny (Leipz. Monatsschr. Text.-Ind., 1927, page 113). The author gives first a short historical survey of the development of the use of ice colours, and refers to several earlier publications of his own and a number of sealed communications deposited with the Société Industrielle of Mulhouse, proving that he had already in 1923 dyed para red on acetate silk. It appears from these communications that the author also dyed Meldola Blue on acetate silk in 1923 and was also able to produce aniline black on acetate silk according to a sealed communication dated June 13th, 1923.

Hgl.

The Appearance of Streaks in Dyeing Woven and Knitted Fabrics of Artificial Silk.

Dr. H. Sommer (Leipz. Monatsschr. Text.-Ind., 1927, page 116). Two main kinds of uneven dyeing on artificial silk can be distinguished. In the one case large patches of dark and light colours alternate, and in the other case differences in the depth of shade occur regularly. The dyer is quite helpless here, but it is possible to say beforehand whether a dyeing will turn out well or not by the use of the silver reagent proposed by Goetze.

Hgl.

Preparing Woollen Yarn for Printing.

(Text. Col., 1927, page 252.) Woollen yarn is generally prepared for printing by the

following treatments: 1. cleaning; 2. bleaching; 3. chlorinating; 4. mordanting with tin. Each of these treatments is described in detail and worked out recipes are given. Cleaning is done in order to remove all fatty and oily substances; Marseilles soap is used as a rule. Hydrogen peroxide and sodium bisulphite are taken for the bleach. The use of chlorine is intended to raise the affinity of the wool for dyestuffs; the treatment is with chloride of lime and hydrochloric acid. A solution of stannate of soda treated with sulphuric acid or hydrochloric acid is used as mordant.

Hgl.

Sulphonated Oil and the Preparations Made from Them.

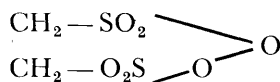
H. Pomeranz (Seifensiederzeitung, 1926). Turkey red oil, i. e. castor oil treated with concentrated sulphuric acid, is one of those dyeing assistants which have been used in the art before their chemical nature had been explained. The reaction product of the fatty body with sulphuric acid could not be obtained in a pure form for analysis, so that its chemical composition could only be deduced from its action in the dyeing process and its method of preparation. In view of the complicated construction of the natural fats as mixed acid glycerine esters and the complicated course of the reaction of sulphuric acid upon these bodies, this could not but lead to a tangle of baseless theories upon the sulphonation products of the solid oils. The author was faced with the problem of producing a soap soluble in concentrated caustic lye, a property which, as is well known, none of the known soaps of the higher fatty acids possess and endeavoured to solve it by finding a fatty acid which was soluble in water. This led him logically to the idea of adding a sulpho group to an insoluble fatty acid and thus make it soluble in water; the sodium salts of this body should then also be soluble to a certain extent in electrolytes, such as lye, common salt, and the like. Now Turkey red oil is generally looked upon as a sulphofatty acid or an acid salt of a sulphofatty acid, but it shows the correct solubility neither in water nor in electrolytes. Scheurer-Kestner succeeded in splitting Turkey red oil into two bodies, the one soluble in water and the other insoluble in water, the first of which possesses properties which the author endeavoured to give to a soap.

As already mentioned, it cannot be determined how far this part actually is a sulphofatty acid, but there can be no doubt that it is some compound of a fatty acid with sulphuric acid which arises only in small quantity during the sulphonation with concentrated sulphuric acid.

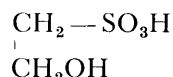
Scheurer isolated this compound by treating an aqueous solution of Turkey red oil

with ether which took up the insoluble constituent. The author asked himself whether the whole of the castor oil concerned in the reaction could not be converted into this compound by some technically feasible sulphonating method and worked up the process first used by Ad. Grün of sulphonating with chlorsulphonic acid to such a method. The sulphonation product obtained behaves exactly like the soluble constituent of Turkey red oil isolated by Scheurer-Kestner. The author having thus arrived at a more perfect product by the use of chlorsulphonic acid was brought closer to a reply to the question as to the chemical composition of Turkey red oil.

The active SO_3 in the chlorsulphonic acid reacts with unsaturated organic compounds of the fatty series differently from the hydrate H_2SO_4 , that is to say, in place of the double bond two molecules SO_3 attach themselves forming a complex body similar to carbyl sulphate.



This compound is probably split up merely by the action of water into a body with the configuration



and free sulphuric acid.

Such an explanation of the reaction between unsaturated fatty acids or oxyfatty acids and sulphuric acid (in this case after having split off H_2O) completely meets all experiences hitherto made with Turkey red oil and other sulphonated oils, with one exception, and that is the action of concentrated sulphuric acid of which, according to the theory of the author, there should be no trace.

But this sulphonating action is actually quite slight and can be readily explained as a superficial attack; somewhat like that of dilute caustic lyes in the cold. Pz.

Making Crêpe Fabrics.

(Rev. Gén. Teint. Blanch, 1926, page 263 et seq.) Fabrics of this type can be woven, or produced mechanically by gauffering with engraved rollers, or chemically by suitable treatment. These three methods are dealt with in profuse detail, especially the creping of cotton cloth by mercerizing and the creping of silk and woollen fabrics by chemical means (Process according to Depouilly Garnier & Cie., Zitter, Siefert, Siefert and Schwab). Hae.

Dyeing Cotton Warps by the Chain Method.

Leon W. Sidebottom (Amer. Dyest. Rep., 1926, pages 667 et seq.). Cotton warps for

light cotton cloths are first warped according to the chain method and rolled up in ball warp form, boiled, bleached, and dyed by passing the ball warps over guide rollers through a dye vat and then squeezing. The ball warp is then dried and beamed. The article is illustrated and explained by five figures. Hae.

Difficulties in the Dyeing of Viscose Silk.

L. L. (Text. Ind., 1926, 527). After referring generally to the sensitiveness of viscose silk when wet and the consequent necessity of treating it as tenderly as possible in all manipulations of preparation and dyeing, bleaching, etc., the article discusses the application of the various groups of dyestuffs. The direct dyes come chiefly into question which can be understood in view of the close connection of viscose silk with cellulose. Dyeing should not be done in the machine, if at all possible, but manually, taking great care in the work. The basic dyes are comparatively little used and they require a preliminary mordanting with tannic acid and tartar emetic. The vat dyestuffs are used on a large scale for specially fast dyeings. Sulphur dyes are not much employed. On the other hand, viscose is much dyed by the method of the ice colours, in particular with Griesheim Red. Loss of lustre in dyeing is generally due to the artificial silk having been soaped or steamed at too high a temperature. Viscose silk is printed in exactly the same way as cotton. Although, as can be seen, the dyeing of viscose silk offers no particular difficulties, it still requires experience and care in the treatment of the goods. Hgl.

The Finishing of Inlets.

(Sp. u. W., 1927, No. 6, page 16.) Inlets are generally made in coloured yarn with good penetration and fast to crocking. The desizing is of importance for giving a soft, leathery feel, and is generally done in the jigger. Recipes for a thorough desizing with Degomma DL are given. The goods are washed in open-width washing machines with 2 to 3 tubs with rinsing liquor, the last tub containing a brightening bath of soap and monopol brilliant oil. The stenter is often used for drying. After drying the goods are cooled, sprinkled and mangled hydraulically with 20,000 kilos pressure. Finally a size for cheap inlets is given. Hae.

Degumming Natural Silk with Hard Water.

O. H. Loberg. Degumming, that is, the removal of the sericin, is effected by boiling the silk in soap baths in open tubs, or in special apparatus. If soft water is not available, a good soap must be added, (for instance, Avirol KM extra) which is a thick clear

weakly acid oil, dissolves in water with a clear solution, and is not affected by lime. The author describes degumming tests of this kind and the dyeings afterwards produced. Avirol extra can also be added to the degumming bath for China silk, halfboiled silk, schappe silk, and tussah silk. Hae.

Guild's Trichromatic Colorimeter.

Text. Rec., 1927, page 88.) This apparatus, which gets its name from the inventor J. Guild of the optical department of the National Physical Laboratory, is illustrated by a figure and generally described. It is based upon the observation that some shade or other is formed by mixing three colours. Hae.

Finishing Artificial Silk.

Dr. Schams (Leipz. Monatsschr. Text.-Ind., 1927, page 120). Starting from the difficulties experienced in working with artificial silk owing to its low strength and elasticity, the author describes the various methods of sizing artificial silk which is done advantageously with boiled glue and gelatine, adding starch and Marseilles soap (German Patent No. 365,668). The silk must be dried slowly. Artificial silk which has been twisted, but not doubled can be strengthened by sizing with a mixture of soap, cocoanut oil, mineral oil, and salts which make the silk noninflammable (German Patent No. 417,775). Union cloths of artificial silk with wool, cotton, real silk, and linen have a great future before them owing to their smoothness and cheapness. Mixed fabrics composed of artificial silk and metals, especially gold and silver, are of interest and their finishing is described, as well as that of fabrics of wool and artificial silk, dealing in particular with their bleaching and dyeing, and the after-finish by cropping, steaming, and pressing. Hae.

Desizing Cotton Fabrics.

E. S. (Leipz. Monatsschr. Text.-Ind., 1926, page 430). The action and cost of the enzymatic desizing agents known as Diastafor, Degomma, and Novofermasol, much used in the trade, are discussed on the basis of comparative tests. Hgl.

The Addition of Antiseptics to Size.

(Sp. u. W., 1927, No. 4, page 16.) An antiseptic must be added to size to prevent the occurrence of mildew caused by the action of several bacteria. These antiseptics must be readily soluble in water and mix well with the sizing agents; they must not affect the colour, they must not have a strong odour or be poisonous, and they must not alter the properties of the starch and flour paste. Products which are generally used are zinc chloride, salicylic acid, and boric acid. Clean-

liness in the sizing room is of prime importance for aseptic work. Hae.

Jaeggli's Hank Mercerizing Machine.

Paul E. Fontaine (Rev. Gén. Teint. Blanch. 1926, pages 1321—1333). The arrangement and action of this hank mercerizing machine built by the firm Gebrüder Sulzer is described with the aid of ten figures, curves, and sections. Detailed figures are given upon its efficiency, the consumption and recovery of the caustic compared with other mercerizing machines. Hae.

Apparatus for Dyeing Worsted Bobbins.

J. Bosio (Text.-Ind., 1926, page 530). A vessel provided with openings in the bottom for letting in and removing the dye liquor has a peg tube for the bobbins which is situated in the centre on the entry pipe and can be set upon a disc-shaped bottom socket. A lid is provided, the height and pressure of which can be adjusted, and which can be laid over the topmost bobbin. The peg tube is pressed onto the bottom socket by means of a special central screw. The outflow pipe is arranged laterally on the bottom. Hae.

Bleaching Wool.

Dr. G. (Sp. u. W., 1927, page 12 et seq.). Wool is usually bleached as yarn or in the piece with sulphurous acid or with agents which release oxygen. Details are given about bleaching with gaseous sulphurous acid in the sulphur chamber and the progressive desulphuration which then follows, and about bleaching with liquid sulphurous acid or with sodium bisulphite. The bleaching agents for this purpose which release oxygen are potassium permanganate and hydrogen peroxide, and wooden or earthenware vessels are used. After bleaching, the wool is washed and soaped. Hae.

Methods of Determining the Capacity of Wetting-out.

Heinz Kafka (Leipz. Monatsschr. Text.-Ind., 1926, 426). The author first refers to the necessity of a numerical method of evaluating the different wetting-out agents on the market and then deals with their chemical nature. These agents are either simple or compound soaps, organic solvents, and naphthalin sulphonic acids. Testing methods must differentiate between those which act directly and those which act indirectly. The methods proposed by Herbig, Bernardy, K. Volz, and Lindner and Zickermann are described and criticized. H.

Selected Colour Standards on Cotton.

Karl Volz (Z. ges. Text.-Ind., 1927, 9). The author explains the "Selected Colour Stan-

dards on Cotton" issued by the Deutsche Werkstelle für Farbkunde, Dresden, at the instance of the Verband der Deutschen Veredelungsanstalten für baumwollene Gewebe E. V., Leipzig, in the form of a bulky pattern card, in which the coloured patterns are mounted on movable strips of pasteboard. The colours of these strips are arranged according to their shade in the order shown in the triangle of similar shades. Hgl.

The Properties of the New Acetate Silk (Celanese, Milanese, Aceta, etc.).

Professor *Alois Herzog* (Kunstseide 1927, 73). Continuing his researches upon the properties of acetate silk, the author deals in his present article with the following points: the specific weight of air-dry acetate silk, its electrical conductivity, the action of chemical reagents and of water, its behaviour when heated, its average diffraction of light, double diffraction, the character of the interference colours, pleochroism, its longitudinal uniformity, its appearance under the ultra-microscope. The observations recorded are profusely illustrated. Hgl.

Bleaching Wool with Sulphurous Acid.

John. L. Raynes (Journ. Text.-Ind., 1926, 379). It is shown that wool contains at least two substances which can combine with sulphur dioxide. The one yields a lemon yellow product, while the other is produced only in the presence of a considerable quantity of moisture and is colourless. The author further believes that the presence of a carbonyl group in the molecule of the woollen fibre must be assumed on account of its behaviour to hydroxylamine and semicarbazide. He concludes from the fact that wool which has been bleached with hydrogen peroxide still reacts with hydroxylamine that both coloured and colourless carbonyl compounds are present in the fibre. Hgl.

Bleaching Wool with Sulphurous Acid.

(Text. Col., 1927, 179.) Experiences hitherto gained in bleaching wool have led to the following rules: 1. The bleaching action is heightened when the wool contains free alkali or soap. 2. The best results are obtained by using the sulphurous acid as far as possible in concentrated vapour form. 3. Previous treatment of the wool with sulphuric acid makes the bleaching action worse. 4. Neutral salts have no effect. 5. The bleaching action can be accelerated, but not improved, by raising the temperature. Hgl.

Treating Bleached Linen Yarn with Lye.

Geja (Z. ges. Text.-Ind., 1927, 55). Besides the quality of the linen, the following points are of special importance for the treatment

with caustic lye, namely, the way in which the bleaching is done, the quality of the water, and the drying. The old dipping process should not be used for bleaching. This should be done in apparatus which treats the yarn with the utmost tenderness, all other methods tending to roughen it. The water used must of course be soft or softened. The worst mistakes occur in the drying and only graduated drying apparatus should be used. Soap and soda should be used in the last rinsing baths, adding a preliminary treatment with antichlor, if necessary. The addition of Perpentol when sizing has been found to be of advantage. Hgl.

Preventing the Shrinking of Wool.

A. J. Hall (Text. Col., 1927, 161). The commonest and most efficacious agent for preventing the shrinking of wool is chlorine, which combines with the wool, probably forming a chloramide. The course of the reaction varies according to the conditions of working and the concentration, i. e. the chlorine content of the solutions used. If the action of the chlorine is too energetic, the wool suffers; it swells up and the scales on the surface of the fibre are destroyed. The course of the chlorination is accurately described by means of curves showing the results of numerous experiments and the author gives directions how to avoid injury to the wool and arrive at a satisfactory result. Hgl.

Studies on the Action of Chlorine on Wool.

L. Lussiez (Rev. Gén. Teint Impr. Blanch. Appret, 1926, 1299). The author describes in detail the observations which he made in the course of three years while engaged in chlorinating wool. He had no chance to observe the action of dry chlorine on wool and confines himself accordingly to describing the reactions which take place when using chlorine in the presence of water, the action of the hypochlorous acid, and the effect of the various experimental conditions. Besides the normal action of chlorine, the effect of adding too much chlorine is also recorded. The question as to how far purely chemical processes are concerned, and whether the process is a mere oxidation or an oxidation with a simultaneous chlorination, is gone into. It has been found that the action of chlorine is different according to the experimental conditions, so that these must be varied according to the result desired, so as to reach it as accurately and as economically as possible. A special section describes the preparation and application of the chlorinating agents generally employed, the chlorine and the hypochlorous acid; the method of treating loose wool, woollen yarn, and woollen piece goods is described together with the requisite apparatus.

The chlorine content of the solutions employed can only be reliably tested, according to the author, by the chemical analytical method, and he entirely rejects the use of the areometer. Hgl.

The Sizing of Unions.

R. (Rev. Gén. Teint. Impr. Blanch. Appr., 1926, 1341). The property of cotton which permits it to take up metallic salts and starchy compounds with ease plays a large part in sizing and is naturally important not only for the finishing of pure cotton goods, but also for goods which are partly composed of cotton. A number of recipes are given and explained for preparing sizes containing magnesium sulphate, magnesium chloride, calcium chloride, sodium sulphate, barium sulphate, lead acetate, zinc sulphate, in admixture with dextrine, glycerine, and so on. If desired, the goods can be coloured simultaneously with the sizing by bringing, for instance, logwood and tannin extracts on the fibre beside the metallic salts of iron and copper. It has been found to be particularly advisable to use crystallized magnesium sulphate in conjunction with direct colours so as to load the fabric at the same time. Hgl.

Blueing and Bleaching wool.

(Text. Merc., 1926, page 72.) Blueing wool is an unpleasant necessity that must be reckoned with, because it is hardly possible to produce wool of such perfect whiteness by bleaching alone, as by kier-boiling cotton. Up to quite recently, wool was generally bleached with sulphur, but the effect is incomplete and transient. Hydrogen peroxide and sodium superoxide, both of which are now readily obtainable, give much better results, but they must be used in wooden tubs. Hgl.

Dyeing Mixed Fabrics.

Hiliador (Rex. Teint. Impr. Blanch Appr., 1926, 341). The first part treats of dyeing unions composed of cotton and wool. The leading method is to use direct colours which have the property of going onto both cotton and wool according to the conditions of working. By dyeing at the boil in the presence of Glauber's salt the wool is more strongly dyed, whilst cotton is more strongly coloured at moderate temperatures, especially with the addition of salt, soda, or the like. Conditions vary, according as more cotton or wool is present in the fabric. Under certain circumstances it may be necessary to dye the two fibres separately in different baths, or suitable mordants and dyeing agents must be used, such as Katanol W, supplied by the I. G. Farbenindustrie Aktiengesellschaft, which is prepared from orthochlorphenol and sulphur. By the aid of this product unions can be dyed evenly

with direct dyestuffs from one bath by using acetic acid and salt. The dyeing of unions containing real and artificial silk will be dealt with in a later article. Hgl.

The Influence of the Preliminary Treatment of a Fabric upon its Capacity of Absorbing Dyestuff.

(Am. Dyest. Rep., 1926, 700.) When dyeing unions, it is necessary to influence the affinity of the cotton or of the wool both to obtain level dyeings and to produce coloured contrast effects. Suitable agents for this purpose are chlorinating agents, alkalis, sulphocyanides, ammonium salts, bisulphite, and formaldehyde. All these tend to heighten the affinity of wool for dyestuffs in general, while the contrary effect is produced by treating it with concentrated sulphuric acid, or with an acidified solution of thiosulphate, or with tannic acid and formaldehyde. The same effects are produced on cotton by mercerizing it, or by treating it with tannic acid and tin crystals, or with cerium chloride. Bisulphite is recommended for stripping. Hgl.

The Nature of Stains and their Removal.

(Text. Rec., 1926, April, 69.) The article is a detailed report upon a paper by W. Nanson in the "Textile American". The nature of the stain must be settled in order to find a proper agent for its removal. There are two kinds of stains, external or mechanical stains, and internal stains. The first group comprises, for instance, fat stains of all kinds, stains due to tar, dyestuff, rust, mildew, and so on, whilst the second group is due to improper treatment. The article deals only with the origin of stains of the first group. Details are given about the various possibilities of origin of such stains and their chief characteristics so as to be able to tell where they have arisen in the course of spinning, weaving, or finishing operations. A number of agents are discussed which can be used for the removal of the various kinds of stains. Gl.

The Hydrolysis of Starch by Hydrogen Peroxide.

(Ind. Text., 1926, 529.) It is important that a size must be transparent, that is to say, it must contain a minimum of solid particles. This is a quality of the various kinds of glue and gum, of gelatines and albumens, but not of starch, the granules of which must be broken up. It is thereby split into dextrin and dextrose, but, as a rule, a partial conversion is sufficient, in which no dextrose is formed. The granules can be broken up by prolonged heating with steam, but it succeeds best with hydrogen peroxide or sodium peroxide, while neutralizing with acetic acid. Size prepared in this way is uniform and of superior

clearness and transparence. It excels the other agents commonly used in its yield and in its insolubility in water after having dried on the fibre. Hgl.

Improvement in the Process of Bleaching Cotton with Permanganate.

(Text. Rec., 1926, No. 524, 63.) The improvement consists chiefly in adding denatured alcohol and in using hydrochloric acid. The goods are treated in a permanganate solution which has been acidified with 10% hydrochloric acid and then freed from manganese dioxide by an acidified solution of bisulphite. Then follows a second treatment with permanganate with the addition of alcohol and a second bisulphite bath. The goods are finally thoroughly washed in acidified water. Hgl.

Dyeing Stockings.

(Text. Rec., 1926, No. 524, 65.) The difficulties are discussed which attend the level dyeing of stockings. These are due partly to the fact that the toes and heels are usually twice as strong as the rest of the fabric and partly to the modern seamless stockings' being often knitted with three different fibres, chiefly a mixture of artificial silk and natural silk with mercerized cotton at the parts which need strengthening. The addition of a little Turkey red oil and similar preparations assists uniform penetration by the dye liquor. Owing to the different nature of the fibres, however, dyeing cannot often be done in a single bath and it is consequently advisable to use a number of baths one after the other, first dyeing, say, the artificial silk and the mercerized cotton, and then bringing the silk up to shade. Sulphur colours can only be used with goods that contain bast silk, which alone is sufficiently protected against attack by the strongly alkaline dyebath. Hgl.

Unshrinkable Process for Wool.

E. R. Trotman (Text. Manufact., 1926, No. 621, 310). All the processes used to prevent wool from shrinking when washed go back to a chance observation made by Mercer, who was the first to investigate the action of an aqueous solution of chlorine on wool. This prevents the wool from shrinking and at the same time increases the affinity for colouring matters, heightens the lustre, and raises the wetting power. The treatment however, strongly affects the surface of the wool because the scales are removed to a greater or lesser extent. If more than the half of the woollen fibre is injured in this way, the strength of the wool is greatly diminished. Bleaching with hydrogen peroxide is, by itself, quite harmless, but would have a very injurious action if applied after chlorinating. Wool which has been chlorinated has a hard

feel, but this can be removed by aftertreatment with aluminium sulphate. In conclusion the chemical reactions which take place in chlorinating wool are dealt with in detail. Hgl.

Improvements in the Artificial Silk Industry.

H. Jentgen (Kunstseide, 1926, 295). The various processes for the manufacture of artificial silk are described. The nitro process has practically disappeared. Most of the improvements relate to all phases of the manufacture of viscose beginning with the preparation of the cellulose, the mercerization, the preparation and recovery of the caustic soda from the black liquor. Besides these, there are described the shredders, the spinnerettes and spinning cans, and improvements. Spinning cans of artificial resin in place of aluminium have recently been introduced. The spinning can process is replacing the bobbin process more and more. Finally the ventilation arrangements and the deep spinning process are mentioned. The article will be continued. Hgl.

Dyeing Fabrics of Wool, Viscose, or Cuprammonium Silk.

Georg Rudolph (Kunstseide, 1926, 307). The dyeing of unions of wool and artificial silk at first presented some difficulties, but these have now been overcome in the opinion of the author. Perfect dyeings can be produced, if the dyestuffs are suitably chosen. Dyeing is done either in a single bath, or the different fibres are dyed successively in different baths. The wool can be left undyed, merely dyeing the silk with special dyestuffs, or the wool alone can be dyed, which can very readily be done by using acid dyes in an acid bath. Besides this, quite a number of dyestuffs are known which dye only one fibre and do not go onto the other at all, whereby the most diverse effects can be obtained at will. Hgl.

Red and Red-white Discharges on Cotton Dyed with Indigo.

Jos. Pokorny (Leipz. Monatsschr. Text. Ind., 1926, page 393). The article first deals with the fifteen methods for producing fast red and red-white discharges hitherto known and then describes a process deposited by the author in April 1914 with the Société Industrielle of Mulhouse. According to this process, mercerized cotton dyed dark blue with indigo is prepared with beta-naphthol and printed with a paste containing about 1 molecule manganese dioxide, 1 molecule chromate of lead, and 1 molecule sodium chlorate for white or with para-nitraniline-diazo for red. The goods are steamed, passed through hydrochloric acid, and steamed at once, the manganese is removed with hydrochloric acid, and the fabric is washed and soaped. Earlier

attempts by others to use manganese dioxide and chlorate were failures, which the author explains by showing that a short steaming is imperative, that a fine red can be produced without chlorate, that even the presence of manganese dioxide may under certain conditions be dispensed with, and that lead chromate alone is enough to produce a very good red. Corresponding recipes are given. In a second sealed communication deposited on June 22, 1924, the author shows how to obtain a satisfactory white with a printing paste that contains no chlorate and only a comparatively small amount of manganese dioxide. Traces of oxycellulose were found at the spots discharged. A discharging device is exactly described by means of a number of figures. The quantity of lead chromate in the printing paste must be varied by taking more, the smaller the design is. The author in conclusion points out that he has observed that alpha-naphthylamine-beta-naphthol-bordeaux can be discharged clear white with chlorate-ferroprussiate by adding only a little Leukotrope O to the discharge. The action of the mixture of hydrosulphite-sulphoxylate reduction discharge can be much increased by adding a little Leukotrope O. Hgl.

Washing Viscose Artificial Silk after Leaving the Precipitating Bath.

By an artificial silk expert (Leipz. Monatschr. Text.-Ind., 1927, page 103). After pointing out how necessary it is to wash the viscose coming from the spinning bath most thoroughly, the various methods are discussed. Firstly, the glass roller process, in which the thread is wound on glass rollers of 190 millimetres diameter. A second process consists in winding the thread as it comes from the spinnerettes on aluminium bobbins of 70—90 millimetres in diameter. The layers are thus closer together and washing takes longer accordingly. In a third process the bobbins are piled in a pyramid and washed with a fine spray of water. Viscose is washed to remove not merely the salts contained in the spinning bath, but also sulphur, so that the washing must be followed by a treatment with sodium sulphide. The most advantageous method of doing this is described in detail. Hgl.

Warp Dyeing.

(Dyer and Cal. Printer, 1926, page 38.) A machine for dyeing warps as invented by Dean of Bradford is described with three figures. The warp runs from a beam through a raddle and over a steam chest into a jigger-like dyeing machine with guide rollers, thence through a pair of squeezing rollers and once more over a steam chest to a second beam. The guide rollers in the jigger can be raised

or lowered, and the machine can run in either direction according to the position of the warp beam. Hae.

The Sizing of Artificial Silk Yarn Compared with the Sizing of Cotton Yarn.

(Wollen, Leinen-Ind., 1927, page 196.) The article describes the requirements which a modern machine for sizing artificial silk must meet. Artificial silk yarn must be sized in order to increase its strength by making the fibres which lie parallel to one another adhere together. Starting from the former sizing processes for artificial silk in the form of hanks or as thread from bobbin to bobbin a new machine of this kind consists of warp beam, size box with sizing roller and pressure roller, and a dryer constructed of flat cells heated by steam which rise like a roof and then fall away, the cells being highly polished. The thread is lightly twisted between the sizing roller and the first drying cell, which tends to favour the penetration of the size, in particular with artificial silk. Then the sizing of artificial silk and of cotton are compared. The lustre of the former must be preserved as far as possible, while the strength of cotton yarn must be raised as much as possible with the use of a minimum of size. Thin-boiling starch is most suitable for artificial silk and recipes are given. Viscose yarn must be warped about eight per cent. longer than cotton yarn. The temperature of the size for artificial silk should be fairly low (16—27° C), while cotton yarn can be sized at the boil. Hae.

Benninger's Chainless Mercerizing Machine.

H. Weiss (Leipz. Monatschr. Text.-Ind., 1927, page 216 et seq.). The chief advantages of machines of this type are good quality and high output, with a saving in labour, power, and space. The machine is illustrated and described by three figures showing it with one and two pads and curved scutching rollers. In order to impregnate successfully piece goods of different quality, the speed must be regulated and must be easily read off; the scutcher must avoid tearing, and only open out, which can be done by using scutching rollers with progressive screw thread. Hae.

A few practical applications of the Indigosols in printing.

H. Rittner and Dr. Gmelin (Melliand Textilberichte Vol. VIII, No. 6). Calico printers were the first to take an active interest in this novel class of dyestuffs in consequence of the method of their fixation and development, employing them both for direct printing and for resist printing. The chief representatives of this range of colours, Indigosol O and O4B attracted most attention, but the

other shades at present on the market are also of great interest in direct printing, especially for hand and yarn printing, owing to the great durability of the unsteamed prints. A number of the possibilities of use offered specially by the Indigosols are described. These refer

1. to the combination of the Indigosols with the Rapid Fast colours,
2. to their use as resists under aniline black, and
3. to their use on artificial silk (viscose silk) with or without resists.

1. Combination of the Indigosols with Rapid Fast colours.

Bearing in mind that the Indigosols can only be combined with the Rapid Fast colours by the nitrite process, we have to do with two printing colours, one of which consists in the simplest case of the Rapid Fast colour and the thickening, and the other of the Indigosol, the sodium nitrite necessary for development, and the thickening. In both cases a neutral starch-tragacanth thickening can be employed with good results. The nitrite cannot be omitted, but it does not affect the Rapid Fast colours; its salting out action, as an electrolyte, on the nitrosamine or the naphtholate of the Rapid Fast colour is so slight with the quantities used that it could not be determined.

Care must also be taken in adding chromate. Betanaphthol sodium affects the shade of the Rapid Fast print and must be omitted from the printing colour. Tests have proved that the Rapid Fast colours and the Indigosols have no effect upon one another. The combined printing paste contains besides the two dyestuff groups and the thickening only sodium nitrite, a little Turkey Red oil and neutral potassium or sodium chromate. The Rapid Fast colours are fixed either by hanging for several hours in slightly heated rooms or by steaming for a short time in the rapid ager. Either treatment hardly affects the Indigosol prints, in fact the steaming may be considered as advantageous. The Indigosols are developed in the nitrite process by a short passage through a dilute, lukewarm sulphuric acid bath, but the dyestuff formation of the Rapid Fast colours is only incompletely effected by means of mineral acids. It is very seldom indeed that the Rapid Fast colours can be completely developed by hanging, so that variations in shade cannot entirely be avoided. Among the organic acids both oxalic acid and formic acid have proved to be suitable for the development of the combinations of Indigosol and Rapid Fast colours. These developing baths, however, must be used at a fairly high temperature and do not give the same yield as the development with sulphuric acid. As the Rapid Fast colours are

strongly alkaline, the development of the Indigosols in combined prints must be done rather differently. It has been found that a rapid, uniform development can only be secured in actual practice when small quantities of chromate are added to the printing paste. Then follow a number of recipes for printing colours.

2. Application of the Indigosols as resists under aniline black.

A whole scale of indigosols, as shown by examples, is at disposal for coloured resists.

The goods are slop-padded in the usual way with the solution of aniline black, dried (not too much) on the hot flue, printed with the colour resists, dried, steamed for from 4 to 5 minutes in the Mather-Platt rapid ager at about 98° C (208° F), chromed in the usual way, washed, soaped at the boil, and rinsed. Care must be taken that the aniline black padding solution contains not less than 30 grams sodium chlorate. By means of the resist process, which closely follows the usual method of Prud'homme, the printer is enabled to produce bright colours in an unobjectionable and simple way on aniline black which are as fast as the ground colour.

3. Use of the Indigosols for padding artificial silk (viscose silk) or textures of artificial silk and cotton.

Difficulty is often met with in dyeing fabrics containing artificial silk (viscose silk) uniformly. This difficulty can be avoided in a very simple manner by the use of the Indigosols for padding artificial silk fabrics, for these colours have no direct affinity for the material and can be quite uniformly distributed throughout the fabric by impregnation, that is, by padding. Besides level dyeings, this process offers other advantages. As padding is done at ordinary temperature, the lustre of the artificial silk is unimpaired. Of course the usual resist process for Indigosols can be combined with this padding process.

The nitrite process as well as the steaming process can be used with equal success for fixing the padded Indigosols colours. Instructions for the nitrite process are given. The fabric is padded with the Indigosol padding solution N, dried, printed with the white or coloured resist, it desired, dried, if resist-printed, steamed at 101° C (214° F) for five minutes in the Mather-Platt rapid ager with moist steam, and then passed for 15 seconds at from 55 to 60° C (131 to 140° F) on the open width washing machine in open width through a bath containing 30 ccm sulphuric acid of 66° Bé per litre, then thoroughly rinsed cold, treated for a short time in boiling water, and dried. Instructions are given for the steaming process.

Colour resists can be prepared in the usual way with vat colours or basic colours with the

aid of Katanol, and with Nitrosamine Red. The goods are padded with the padding solution, dried, printed with the resists, steamed for 2×5 minutes in the Mather-Platt, thoroughly washed cold, treated for a short time in boiling water, and dried. As the Indigosol colours combine well with one another in padded goods also, there is here the possibility of dyeing any combined or mode shades desired on artificial silk fabrics.

The identification of vat dyestuffs on cotton fibre.

Mirko Vajs, Engineer, Technical communication by the Intern. Verein der Chemiker-Coloristen (Melliand Textilberichte, Vol. VIII, No. 7). Vat dyestuffs are finding increased application in dyeing and printing and new products are constantly being brought out. It is often important to be able to determine with what dyestuffs a fabric has been dyed or printed, or at least to what group of dyestuffs the colouring matter belongs.

R. Bude¹⁾ has published a tabular list for the examination of vat dyes on cotton fibre which served as the basis for my work.

The four reactions given in this article were taken, namely, boiling with $\text{Na}_2\text{S}_2\text{O}_4$, vatting with $\text{Na}_2\text{S}_2\text{O}_4$ and NaOH, boiling with NaOH, and the reaction with H_2SO_4 . Besides these the following reactions were also made use of: the change of colour upon spotting with concentrated HNO_3 , the solubility in benzene²⁾, the solubility in pyridine, and the change of colour of this solution with NaOH. It was found in many cases to be useful to increase the number of the reactions, especially when testing dyestuffs the reactions of which are similar to one another.

The investigation should be conducted in the following way.

The dyed or printed material is divided up into a number of parts corresponding to the number of reactions to be tested for.

1. The first part is boiled with sodium hydrosulphite or sodium formaldehyde sulphonylate and the change of colour noted.
2. The fibre boiled in this way and the solution are treated with NaOH 40° Bé.
3. The second piece of material is boiled with NaOH of 40° Bé.
4. A third piece is treated in a test-tube with concentrated H_2SO_4 and the colouration of the solution and the fibre observed.
5. The fourth piece is laid in a watch glass and spotted with concentrated HNO_3 .

1) Melliand Textilberichte 1924, S. 602.

2) Suggested by a tabulation upon the investigation of vat dyestuffs upon the fibre (Ratgeber der Farbwerke vorm. Meister Lucius & Brüning, 1925).

6. The fifth piece is boiled with benzene and the colour of the solution noted.
7. The sixth piece is boiled with pyridine base and the colour of the solution observed.
8. The solution obtained in this way is treated with NaOH of 40° Bé and the change of colour of the coloured pyridine solution and perhaps that of the not quite boiled off fibre are noted.

The following reagents were employed for the above reactions.

1. $\text{Na}_2\text{S}_2\text{O}_4$ conc. powder (BASF).
2. NaOH of 40° Bé about 35%.
3. conc. H_2SO_4 about 96%.
4. conc. HNO_3 about 65%.
5. Chemically pure benzene.
6. Pyridine base techn. (MLB).

The reactions found are compared with those given in the list and the dyestuff in question can be accurately determined.

Many dyestuffs are chemically so closely related that all their reactions resemble each other very much. It is then advisable to examine the colouration of the dyestuffs in question in a similar way also and settle the brand dyestuff by a direct comparison of the reactions.

The determination of lustre by the graduated photometer.

Dr. *A. Klughardt* (Melliand Textilberichte, Vol. VIII, No. 7). A new method of measuring lustre by means of the graduated photometer is described which intentionally refrains from all theoretical speculations upon the origin of the phenomenon and is intended for practical use only. In contrast to the methods hitherto followed the new method endeavours approximately to eliminate the purely photometric brightening of the object being examined by turning it towards the source of light. The lustre figures obtained can be very easily evaluated and give a reliable conception of the phenomenon even when measurements are confined to merely a few points.

Proof of the presence of oxidized cellulose and the determination of the quantity by means of the silver indicator.

Dr. *Kurt Götze* (Melliand Textilberichte, Vol. VIII, No. 7). The proof of the presence of oxidized cellulose and its determination is extremely difficult owing to the substance being nonhomogeneous. Oxidized cellulose is never uniform in nature and alpha, beta, and gamma oxycellulose can be recognized by their different solubility in alkalis. The body termed oxycellulose consists for the most part of unchanged cellulose and contains only

a few components which can be called oxidation products. These are retained mechanically on the fibre. Colour reactions are used for proof of the presence of oxidized cellulose and Methylene Blue colours oxidized cellulose more strongly than unchanged cellulose. According to the investigations of Kauffmann and Knecht, however, this reaction is capable of interpretation in more ways than one. Other reactions are based upon the reducing action of oxidized cellulose as shown by Nessler's reagent, vat dyestuff and a solution of silver nitrate in ammonium and caustic alkali undergoing reduction. Oxidized cellulose forms with phenylhydrazin a yellowish brown osazon. All these reactions apply also for hydrolyzed cellulose. There are a number of quantitative methods, such as Ristenpart's Methylene Blue figure, Schwalbe's copper figure, and Kauffmann's permanganate indicator figure. The first two determine hydrolyzed cellulose as well, while the last-named covers in general all components soluble in alkali.

It has now been found that a solution of silver nitrate in ammonia (prepared without caustic alkali) reacts only very weakly upon hydrocellulose, but very strongly upon oxidized cellulose. A one per cent. solution is sufficient which contains just enough ammonia to permit the precipitate formed to dissolve again. Finer differences can be shown by a stronger solution, say, 10%. If the ammonia in this solution is replaced by sodium acetate, the reagent is also suited for the quantitative analysis. For this purpose 7 grams of sodium acetate are dissolved in a 1% solution of silver nitrate and the silver acetate precipitated is filtered off. To carry out the determination 0.5 gram of finely cut fibres are laid in a Jena round flask of 500 ccm and 20.0 ccm distilled water are added, whereupon the whole is boiled for a few minutes so that the fibres are uniformly moistened. Then 50.0 ccm of the silver reagent are added, the flask is placed on a boiling water-bath and warmed for half an hour, while stirring mechanically. The brown coloured fibres are then filtered on the suction pump, washed, dissolved in 25% nitric acid and the acid solution is titrated with $n/100$ rhodanammium after having added ferric ammonia alum as an indicator. The value found is expressed as a percentage of the fibrous material and is called the "silver number". If the material treated in this way is again brought into reaction with the silver reagent, silver is again precipitated. In this way a constant basic value is reached. If this basic value is subtracted from the values found each time the reaction is carried out and the remainders are added, the "corrected silver number" is found.

Cuprammonium silk as a rule has a low silver number which lies only slightly above the basic value; the silver number is about 1. Viscose and nitro silks have a higher silver number (about 2 to 7). This can be used qualitatively to differentiate the two silks, since nitro silk is recognized by the diphenylamine reaction.

Comparative examinations of the copper number, the silver number, and the permanganate number of various types of cotton material showed that all three numbers rise as the degree of bleaching is raised. The permanganate number and the silver number are high for raw cotton before kier-boiling. Merely boiling with soda causes the permanganate number to sink, but the silver number still remains high, and both numbers only sink after the kier-boil. The copper number is low for raw cotton, rises slightly upon boiling off, and sinks again after the kier-boil. From this must be concluded that high silver and permanganate numbers indicate that the cotton has not been sufficiently kier-boiled. By boiling the fibre with hydrochloric acid 1:1 in the presence of a little phloroglucine it can be settled whether oxidized cellulose is present or merely insufficiently kier-boiled cellulose, the first-named giving a red colouration. Mercerizing the yarn raises the permanganate number so that this method is not suited for determining oxidized cellulose in mercerized yarn. That part of viscose silk which is soluble in alkali gives an enormously high permanganate number (390), while the silver number is very low. The copper number of hydrolyzed cellulose is also high, while the silver number remains low. This leads to the conclusion that the silver number is best suited for the unambiguous recognition of oxidized constituents.

Artificial and natural dyestuffs and methods of dyeing them. A study upon the nature of dyes and dyeings.

H. Pomeranz (Melliand Textilberichte, Vol. VIII, Nr. 8). The author had an opportunity in 1894 of visiting the aviatic laboratory of Otto Lilienthal and seeing his work upon the construction of a flying machine. The late Professor O. N. Witt, who led this excursion to Lilienthal's workshop, described the visit in "Prometheus" in the same year. Since that date aviation has progressed to a degree which Lilienthal, who was killed in an accident towards the end of last century, would never have dared to prophesy. Present-day aeroplanes have in general nothing in common with the ideas which guided Lilienthal, but in spite of this aeronautics look upon him as a pioneer and regard him as the father of aviation.

Lilienthal occupies this place in the history of aviation because he was the first to whom the idea occurred to learn aerial flight from nature which has provided birds with a build of body adapted for this purpose, an idea which he attempted to put into practice.

He proposed to provide the human body with appendages which would make it like a bird's. As a matter of fact aeronautics pursued quite a different course, but the possibility of human beings being able to fly by motions in the air as a bird does (*avis-bird*) was first appreciated by Lilienthal and that is his merit.

The author of the present article is of the opinion that the dyer of textile fibres should go to nature to teach him his art. Just as nature colours the glorious flowers, the hair of animals, the feathers of birds, and butterflies' wings, man must also colour his clothing.

Since man has learnt from nature to make dyestuffs such as indigo and alizarine, he can also learn how to dye objects certain colours, and the question is merely, can we make ourselves acquainted with the dyeing processes of nature itself?

Herr Pomeranz explains that he cannot give a definite answer to this question. He considers, however, that the dyeing methods with which we are acquainted have been created on the model of natural processes and resemble these to certain extent, although they are carried out in a quite different manner. The superiority of natural colourations is evidenced by their brightness and splendour, by their extreme fastness to light, by their fastness to washing, and their resistance to atmospheric influences, and so on. The author endeavours to show that this superiority is not to be appraised too highly, that the fastness to light is actually more apparent than real, and that the fastness to washing is simply due to nature's being able to produce a more intimate deposit of colouring matter in the micellae of vegetable and animal textures. And the very transience of natural colouration is the cause of their brilliant splendour and (paradoxical as it may sound) their resistance to the destructive action of light, water, and atmospheric influences.

The dyer is no more in a position to imitate a natural dyeing, i. e. to imitate the dyeing of a living cell, than Otto Lilienthal was able to turn human beings into birds.

A flyer at the present moment is a man who controls a certain machine, but nature served as model for the construction of this machine by its creation of the bird. The same principle applies to the dyeing of textile fibres which has its prototype in the operations of natural dyeing and still has much to learn from these processes. Just like aviation, however, it goes its own way.

The use of ferrous hydroxide as a reducing agent for vat dyes.

Paper read before the Eleventh Congress of the International Society of Chemists and Colourists at Dresden, 13th to 17th May, 1926. *H. Pommeranz.*

In 1912 the author took out German Patent No. 253 155 for a new process for discharging vat blue by reduction, which consisted in printing the cloth which had been dyed with indigo blue with a solution of ferrous sulphate and then passing it through a bath of warm concentrated caustic lye, by which means the dyestuff was simultaneously reduced and stripped off on the places printed. The discharged places appeared of a rusty yellow colour (*chamois*) and turned white after the iron oxide had been removed by dilute acid. The instructive history of the origin of this discharging process is briefly as follows.

Herr Karl Sünder, then Manager of the blue printing establishment of Moritz Ribbert in Hohenlimburg, Westphalia, instructed the author to find a process for producing colour discharges on indigo and other vat dyestuffs. At that date the white discharge according to the Leukotrope process of the BASF. had already been successfully introduced into calico printing everywhere. When the author applied himself to the solution of the problem, printing with vat dyestuffs had already made such progress that it could be called technically practicable. The problem in general was to alter the method of fixing the vat dyestuffs in printing in such a way that this fixation should take place while simultaneously destroying the indigo ground. It is well known that there are two processes of printing vat dyestuffs. That most generally used consists in printing the dyestuff together with the reducing agent and the requisite quantity of caustic lye on the fabric which has been dyed blue with a vat colour. The goods are then steamed and oxidized by washing in the presence of air or are treated with an oxidizing agent. According to the other less customary method, the dyestuff and the reducing agent are printed on the fabric which is then passed at once without any further treatment through a hot concentrated lye bath. By this means the dyestuff is vatted, dissolved, and fixed.

The first attempts made by the BASF. to discharge indigo blue with vat dyestuffs were also the first with the aid of the printing method and were not successful. The presence of caustic lye in the discharge printing colour naturally prevented the excellent operation of the Leukotrope white discharge process, that is to say, the familiar orange compound of indigo white, Leukotrope base and zinc oxide cannot then be formed. Con-

sequently pure coloured discharge effects could not be secured.

Karl Sünder suggested that it might be possible to attain success by the second method of printing vat dyes, known as Jeanmaire's process, and instructed the author to make investigations along these lines.

Jeanmaire used tin crystals as the reducing agent with a slight addition of ferrous sulphate. It was already known that stannous hydrate and caustic lye could destroy indigo blue without, however, yielding a serviceable discharge (German Patent No. 213 474 belonging to the BASF.). A mixture of ferrous hydroxide and caustic lye had never been tried because the ferrous hydroxide is unstable and oxidizes at once in the presence of air to ferric oxide. But when an attempt was made to print a reducing agent and secure a discharge effect by a passage through caustic lye, then ferrous oxide also came into question as reducing agent. The author made the attempt and it was then found that ferrous hydroxide is fixed firmly on the fibre, vating the indigo, and that it is completely removed by the caustic lye, but it was further found that the requisite quantity of $\text{Fe}(\text{OH})_2$ must have the reducing action of at least two hydrogen atoms in order to give reliable results. If ferrous sulphate was to be taken as the oxidulating salt, at least 556 grams per litre discharge printing paste would have to be taken, which cannot be done.

All the salts of ferrous oxide hitherto known are unstable in the presence of air and therefore cannot be used for discharging indigo. The author concluded from the fact that several double salts of ferrous oxide and other metals are more stable, or even perfectly stable, that a ferrous oxide salt could be found which would deposit enough $\text{Fe}(\text{OH})_2$ on the fibre to discharge indigo blue. Such double salts are $\text{FeSO}_4(\text{NH}_4)\text{SO}_4 \cdot 6\text{H}_2\text{O}$, $(\text{KCy})_2\text{FeCy}_2$, and so on. The present state of the problem of discharging with $\text{Fe}(\text{OH})_2$ appears to the author to be much the same as that of the hydrosulphite discharge before the discovery of the stable formaldehyde compound. Chemical research directed towards the preparation of ferrous oxide salts which are stable in air would seem in the author's opinion to offer the greatest likelihood of finding a suitable lower oxide compound.

The further remarks of the author refer to the so-called vitriol vat for dyeing indigo which is carried out in such a way that the scum of ferric hydrate is reduced to about one-third of the quantity usually met with. For this purpose a mixture of dyestuff and ferrous sulphate is added to the hot lime water when setting the vat. This simplifies the operation enormously and less lime and ferrous sulphate are required.

The shade of the indigo dyeing in the vitriol vat approximates more to that obtained by a previous preparation of the material to be dyed with ferrous sulphate. This admits of a simple explanation. The heavy loss of dyestuff which can be observed in the vitriol vat and is doubtless caused by the formation of the indigo white ferrous hydrate salt could be avoided if we were better acquainted with the metallic salts of indigo white. Unfortunately even the sodium and calcium salts have not been closely studied.

Studies in Rag Sorting.

Roßmann, Dipl.-Eng., *Melliand Textilberichte*, Vol. VIII. No. 1. The sorting of the raw material plays an important part in the manufacture of recovered wool. The initial materials are of the most diverse nature according to the final product to be manufactured and must be blended from very different points of view. The raw material is generally rags of very mixed quality which are sold either ready sorted or loosely classified, and the manufacturer has the task of making a selection from these for his purpose. Theoretically of course the possible varieties are countless, but work is confined practically to a few groups. Still about 2000 sorts or groups are in general use. Under such circumstances it is hardly possible to keep even one of the more important sorts in stock for sale as raw material in general, and it is advisable to make the sorting dependent upon the manipulation of the yarn. For this reason most of the plants which go in for fine sorting are affiliated to or form a part of the spinning mills using their rags.

In view of the importance of shoddy for the textile industry the author has carefully investigated the technics of rag sorting and describes tests and studies which he made in the rag sorting plants of a number of large cloth weaving mills. Although these studies thus cover only a definite special field, still they afford a good insight into the nature of rag sorting. The chief object was to find ways and means of simplifying the sorting and making it more economical. Further to reduce the dust which is such a nuisance in many plants and finally to make the work of the sorters less irksome.

The author devotes the first part of his article to a description of the working methods hitherto used. In the second part he gives the results of a careful investigation of the more important details observed, and in the third part works out the conclusions to be drawn from his studies.

The use of the Hydrosan process in soaping prints with Alizarine Red.

M. Apfelbaum, Engineer, *Melliand Textilberichte*, Vol. VIII, No. 3. The production of

a fine print with Alizarine Red on cotton depends upon several circumstances. In the first place, the proper composition of the printing colour is of importance and here in turn the nature and quantity of the fatty acids used and the mordants play a part. Aluminium and lime salts are indispensable components of the mordant for the formation of the lake.

The fatty mordants can be added in two ways. Either the goods are prepared beforehand with the requisite Turkey Red oil, or a certain quantity of a fatty preparation is added to the printing colour, such as Lizarol, for instance, that prevents a premature formation of the lake.

The amount of aluminium, lime, and tin salts required depends naturally upon the shade desired, as well as upon the hardness of the water used and the salts contained in it. Dissolved or soluble iron impurities are destructive; lime, magnesium, and aluminium compounds are necessary, so that the water must first be carefully examined. Water of 8° hardness (German scale) acts favourably. If only hard water is at disposal, it is advisable to use water of condensation for preparing the thickening and the printing colour, and to regulate the necessary mordants accordingly (e. g. aluminium in the form of the stable aluminium sulphoacetate, the lime as calcium acetate, the tin as oxalate or tartrate of tin).

The appearance of the print is further dependent upon the treatment of the goods after steaming, when they are soaped once or oftener. Hard water is here not merely injurious, but may even make it impossible to finish the printed fabric. The lakes, as is well known, are formed during the steaming, but in spite of this there always remains an excess of dyestuff on the fabric. The following treatment with chalk aims at combining any sulphuric acid present (resulting from the dissociation of the aluminium sulphate) or acetic acid (aluminium acetate) with lime, thus completing the fixation. In spite of rinsing quite a considerable amount of chalk clings to the fibre and then reacts with the hardness formers of the water used in the soaping process.

In April 1926 Dr. Ullmann, Vienna, in the course of a meeting of the Vienna section of the Society of Chemists and Colourists and later on at the Congress of the Society in Dresden, drew attention to a fatty preparation, called Hydrosan, placed on the market and prepared by Messrs. R. Bernheim, Augsburg-Pfersee, according to a process for which he had applied for patent protection. This product prevents the bad effects of hard water in the soaping processes mentioned above. It does not so much prevent the formation of lime soaps (under this general designation are included soaps of lime, magnesia, aluminium, and other salts), but rather induces

their formation in a form which has no injurious effects and, in particular, can be washed out. Details are given in Nos. 11 and 12 of this Journal (1926) and the reaction which takes place is described from the colloidal chemical point of view. The most important points may here be briefly recapitulated.

A solution of soap is a colloid electrolyte, the solution being isomolecular. On coming into contact with salts (the hardness formers of the water) the suspensoid solution partly coagulates, the system becomes more labile, the degree of dispersity being influenced by the concentration and the temperature of the bath. Lime soaps which have been formed, macroscopic, microscopic and ultramicroscopic particles, remain partly in suspension and partly coagulate upon the surface of the liquid. The apparent non-separation of lime soaps at certain concentrations and temperatures is due to the reversible change of condition of the colloids, but an excess of salts of alkali earths makes the system irreversible. When the lime soap comes into contact with fibrous material it clings to it as an insoluble body, fills the pores of the fabric and can then be removed only with difficulty. The addition of Hydrosan makes the lime soap more disperse, the number of the particles visible under the ultramicroscope is greatly increased and the system appears to be more homogeneous throughout, which is confirmed by diffusion and dialysis tests. Hydrosan, however, has no influence upon the peptisation of lime soaps which have already been formed, so that it must be added either beforehand or together with the soap.

The excellent effects of the process described above permit of the conclusion that its use in other textile soaping processes would also be found to be valuable.

The examination of aniline black.

Prof. M. M. Tschilikin, Melliland Textilberichte, Vol. VIII, No. 3. It was found that this process is extremely injurious to health owing to the formation of aniline vapours which fill the workrooms and poison the workers, spreading through the buildings and their neighbourhood. The spread of the vapours makes itself very noticeable, even newspapers and boarding in the courtyard being tinged yellow.

The writer had long been acquainted with these facts, but the results of the investigation of the workers' protection induced him to take up the scientific examination of the question. These investigations showed that the matter is extremely interesting and important even from a purely economic standpoint. It was found that from 21 to 25% of the aniline used with potassium chlorate and potassium ferrocyanide for the aniline black bath are lost when drying the fabric. The

higher the temperature of the drying apparatus is, the more aniline evaporates. The free base is extremely volatile, as are also the nitric and lactic acid salts. When we consider the large quantities of aniline oil that volatilize in the great consumption of aniline black, it is disquieting to think that so much material is wasted, quite apart from the pollution of the surrounding atmosphere.

Most of the recipes resemble Prud'homme's process and the present investigation also follows these lines. In all recipes it is the general custom to add about from 5 to 10 % more of aniline than is theoretically necessary to form the aniline salt. In Russia the addition was quite recently doubled to improve the bath and strengthen the fabric. The investigation showed, however, that the addition completely volatilizes when the fabric is being dried, without protecting it in the least. A loss of strength also occurs in steaming. This investigation showed where the cause of the poisoning of the atmosphere must be looked for. The textile chemist is confronted by the necessity of carefully examining the recipes in regard to a rational utilization of the aniline.

A) Practical conclusions.

In the usual process of Prud'homme the following points must be observed:

1. The proportion of aniline and hydrochloric acid must be altered or, still better, ready prepared aniline salt must be used.
2. The quantity of aniline must be correspondingly reduced from 80 grams to 60 grams in 1.000 ccm dye bath.
3. A colloid body, such as 40 grams tragacanth dissolved in 1.000 ccm, must be added.
4. The action of the additions of the various bodies upon the reduction of the weakening must be studied.

B) In the drying apparatus.

The effect of the temperature must be carefully observed. The thermometers should be inserted above and below and provided if possible, with a signal which indicates an abnormal rise of temperature.

1. The temperature must not rise above 50° C (120° F).
2. After interruptions the drying apparatus must be cooled with cold air, for which purpose the flow of warm and cold air must be capable of regulation.
3. The goods must come out of the dryers into the working rooms quite cooled down, the last compartment of the drying apparatus being provided with a counter-stream of cold air.

C) In the agers.

1. The temperature in steaming must not exceed 95° C (200° F).

2. The steam must be sufficiently moist.

3. After steaming, the goods must be cooled in a special room separated from the working rooms and must be cold when placed on the truck (below 50° C).

RAW MATERIALS AND PREPARATION OF THE FIBRE

Substitutes for Wool.

(Text. Mercury, 1926, page 375.) The article discusses the various proposals and processes for replacing wool by other fibrous materials, which as a rule are of vegetable origin. Although many of these substitutes, such for instance, as stable fibre, or some special kinds of cotton, like Peru cotton, bear some resemblance to wool fibres, and although it may be admitted that valuable fabrics can be made from mixtures of wool and artificial silk, yet there seems to be no likelihood that a completely satisfactory substitute for wool will ever be found.

Our Sheep-breeding since 1870.

W. Kolbe (Leipz. Wochenschr. Text. Ind., 1926, page 950 and 970). The author gives a detailed statistical survey of sheepfarming in Australia from 1861 to 1912 and the German continental sheep stocks since 1873, which have declined by 78 per cent. between 1873 and 1914. A tabular survey of movements in the German sheep stocks from 1873 to 1915 is given arranged according to states and provinces.

The Properties and Use of Artificial Silk Waste.

W. Cox (Text. World, 1926, pp. 24, 63). The article contains a survey of the present state of the working up of artificial silk waste and gives a hint of possibilities in the future. Although some attempts were made long ago to work up artificial silk waste, the work was only systematically taken up during the war when Germany was compelled to make the best use of its own spinning materials. The result is that Germany leads in this branch of industry. A discussion follows of the various processes for working up artificial silk waste and the uses to which it is put. The article concludes with a summary of the advantages and disadvantages of the goods made with artificial silk waste.

The Structure of the Cotton Fibre and the Resulting Properties.

F. P. Slater (Journ. Soc. Dyers Col., 1927, p. 181). The botanical structure of the cotton fibre is explained by means of a large number of microphotograph and special attention is paid to the spiral form. The cotton fibre is not a solid body, but sponge-like, so that it is not surprising that cotton can absorb large

quantities of moisture. Cotton becomes electrified when worked in metallic machines, but this never becomes dangerous owing to the moisture content. The relations between structure, strength, extensibility, and elasticity are discussed and the capacity of absorbing dyestuffs, which varies according to the structure.

South Africa as a Wool and Sheep Country.

(Text. Rec., 1927, No. 525, pp. 55—57.) A survey is given of the world's wool production and South Africa's share, together with the historical development of South African sheep-breeding and its future prospects. At present South Africa has about 35 million sheep, 30 million of which are pure merinos. These sheep supply 208 million pounds of wool annually, that is to say, each sheep yields about 6 pounds of wool. South African wool was formerly rather decried because it contained much dirt, but this state of affairs has been improved by careful packing.

Yarn Testing Machine.

Text. World, 1927, Vol. 71, p. 35.) The new tearing machine for cord, thread, and twine made by Messrs. C. Scott & Co., providence, is described and illustrated. By turning over a weight like a letter balance with two scales, the machine can work with from zero to 25 pounds, and from zero to 50 pounds. The clip are handy for use. It is driven by an electromotor of one-eighth HP which can be plugged on to the lighting.

The Relation between the Hygroscopicity of Cotton and the Moisture Absorption of Cotton Mercerized under Tension and without.

A. R. Urquhart (Journ. Text. Inst., 1927, S. T. 55—72). The investigation confirmed the result previously found that the curves which represent the relations between the hygroscopicity of cotton and the concentration of the mercerizing lye run much like the curves of the swelling of cotton in baths of various concentrations. This was found to be the case for cotton mercerized under tension and without, and different kinds of cotton behaved alike. The tension exerted in mercerizing acts against the swelling force, so that cotton mercerized under tension takes up very much less moisture than cotton that is mercerized loose.

South American Wool.

H. Kenningham (Journ. Text. Inst., 1927, S. T. 81—98). South America occupies the second place after Australia in the production of wool, but the present production is less than

it was twenty years ago. The geographical and climatic conditions are favourable for the production of wool of the finest grade. The various governments are taking steps to promote sheep breeding. The chief wool producing countries are Argentina, Chili, and Uruguay, as well as Brazil. These countries together with their sheep-breeding and the types of wool produced are described in detail by means of tables and illustrations.

Capillary Hygrometers for the Measurement of Atmospheric Humidity.

W. Weltzien (Seide, 1927, pp. 175—177). The suggestions often made to control the moisture content of the air in textile works have led to a search for the most suitable hygrometer and a simple method of adjusting it, for which purpose the capillary hygrometer has been found to be most reliable. The author has constructed in the Textile Research Institute in Crefeld a simple aspiration psychrometer for testing and adjusting it which he describes.

The Development of the Cultivation of Bast Fibre in the British Empire.

Dr. Goulding (Journ. Text. Ind., 1927, pp. 83—98). The distribution and cultivation of bast fibres, such as flax, hemp, jute, ramie, Manilla hemp, Sisal hemp, Mauritius hemp, New Zealand hemp, and others are described. The history of their cultivation, the acreage, and the crop are fully gone into.

The Examination of Artificial Silk.

K. Götze (Seide, 1927, pp. 97—100). The numerous types of artificial silk on the market make their differentiation more and more difficult. Three methods are explained. 1. Purely chemical reactions based upon the colouration of the fibre, or upon characteristic impurities originating in the process of manufacture. 2. Colloid-chemical reactions based upon the fine structure of the various fibres. 3. Examinations of the cross-section. Two plates of microphotographs of 24 different kinds of artificial silk show the results of the latter method. These illustrations are intended to make it possible to distinguish even fine shades of difference between artificial silks of the same kind. The collection of microphotographs will be continued.

A New Method of Distinguishing Viscose Silk from Cuprammonium Silk.

E. Ristenpart (Seide, 1927, p. 104). Viscose soaked with acetic acid retains the acid even after lying for weeks in contradistinction to the other kinds of artificial silk. The author has found that small quantities of sulphuric acid are formed.