

hypochlorite in solution, combinations of sodium hypochlorite and lime salt, etc.

Antiseptics:—During warm weather, or when the size is allowed to stand for any great length of time, there is a tendency for the same to putrefy.

Corn starch enjoys the distinction of retaining its freshness longer than any other starch, but for the purpose of preventing fungoid growths, without deteriorating the sizing properties of the ingredients, an antiseptic must be added.

These antiseptics often times serve a double purpose, such as the metal chlorides which serve as antiseptics as well as give weight to the yarn. The most frequently used are:—zinc chloride, magnesium chloride and calcium chloride.

Of these, zinc chloride possesses the greatest antiseptic property, while all are deliquescent.

Calcium chloride as well as *sodium chloride* are under certain conditions distinctly harmful, and it is ventured that the best results are obtained when both are entirely eliminated.

ZINC CHLORIDE being used to the greatest extent, it may be interesting to know that it is placed on the market in two forms, liquid and solid, and is prepared by dissolving zinc in muriatic acid, and as there is always some little free acid present, this is neutralized by means of soda ash; the slight trace of iron that may be present is precipitated out, the liquor allowed to settle, then run off into vats to age. It is a pale yellow liquid; its color should only show slightly by transmitted light. It should be perfectly free from iron and free acid. It is precipitated in the form on an oxychloride when water is added to it, and the white turbidity or milkiness is redissolved in excess of the chloride of zinc. It attacks iron with great rapidity, and should never be allowed to come in contact with that metal, as it at once begins to take it in solution. The liquid is often of 49° B., or of a specific gravity 1.51, or a gallon weighs 15 $\frac{1}{10}$ lbs. At this strength, it should contain from 44 to 45 per cent of pure zinc chloride. It is liable to adulteration, the chief adulterant being common salt. The solid form is simply the liquid form evaporated down until the solution attains a temperature at which the percentage of the zinc chloride is a constant, when it is then packed in lead lined casks and hermetically sealed. At the destination, the stuff is dissolved in water and made to a convenient strength.

As zinc chloride is seldom pure, it should be tested for the presence of:—salt or sodium chloride, which, if present, will, upon combination with equal parts of strong hydrochloric acid, be precipitated in small white crystals.

Iron salts may be detected by adding one drop of the zinc chloride to a solution of potassium sulphocyanide which has been boiled with a little pure nitric acid for a few minutes.

If the resulting solution assumes a blood red color, it is an indication that iron is present.

The amount of *free acid* is quickly determined by the use of litmus paper, the presence of the same turning the blue paper red immediately. This test

must be instantaneous, as zinc chloride itself would have the same action on the litmus paper, the only difference being that it would require a greater length of time than if free acids were present.

FORMALDEHYDE or formalin for all ordinary sizing of goods exposed to normal conditions, is entirely adaptable, and when used in dilute solution, forms an extremely good antiseptic. Care must be observed, however, to use precaution in preparing the solution, not to have the strength too strong, as there is a tendency to harden the fabric somewhat after the nature of tanning.

CARBOLIC ACID or phenol, while it has antiseptic properties, its use, from a financial standpoint, proves almost prohibitive in an extensive way in sizing. It being a coal tar product, it is suggested that a pure quality be used, and that it be as free as possible from certain coal tar products, or it may result in stains to the fabric. Crude carbolic, while it is a most efficient antiseptic, is almost prohibitive for use in size, due to the characteristic odor which is somewhat disagreeable.

(To be continued.)

CHRONOLOGICAL EVENTS IN THE TEXTILE INDUSTRY.

(Continued from page 46.)

1606. The manufacture of carpets started at Chaillot, France.
1608. The culture of the silk worm attempted for the first time in England.
1610. Fixed sinkers added to the stocking frame by Aston, thus doubling its capacity.
William Lee, the inventor of the stocking frame, died broken-hearted, in poverty, in France.
1614. Dyeing wool before spinning, first practiced in England.
1619. Tapestry weaving started in England, at Mortlake.
1620. The manufacture of broad silks started in England.
1621. This year is generally regarded as the birth-year of cotton culture in the United States. A tract called "A Declaration of the State of Virginia," published in London in 1620, mentions cotton wool as one of the commodities of that "collony." In 1621 cotton wool was 8d. per pound in Virginia.
1629. The Silk-Throwsters' Company of London, England, incorporated; a Mr. Burlamach, a London merchant, having a few years previously introduced silk-throwing on a considerable scale.
1630. The Saxony, or Leipsic wheel, with bobbin and flyer, invented.
1631. The Company of Silkmen incorporated in London, England.
The first shipment of calicoes brought to England, from Calicut, India.
1638. About twenty families from Yorkshire, England, settled at Rowley, Mass., and established the manufacture of cloth. Here they built the first fulling mill, said to have been erected by John Pearson, in 1643, and is claimed was in operation so late as 1809. It then contained a cedar tenter-

- 11. Cotton Piece Goods.—Berkeley Co., Providence, R. I.
- 12. Cotton Cloth in the Piece, Cotton and Woolen

REUNION
1

Elmaco
2

G
6

9

CATAWBA
3

Empire
4

CORORA
5

SNOWDROP
7

B&O
8

SIEGFRIED
10

BERKELEY COMPANY
11

REIGNSKIN
12

Calma
13

Classic
14

Cloth in the Piece.—Peters Mfg. Co., Boston, Mass.

13. Ladies' Underwear.—The Crown Corset Co., New York City.

14. Knit Underwear.—Carson, Pirie, Scott & Co., Chicago, Ill.

Points in the Shrinkage of Woolens in Dyeing and Finishing.

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Goods will shrink and felt more prominently provided the scouring process is carried on in the fulling mill, as occasionally may be done. Scouring the goods in the fulling mill is not advisable, since by means of it, cockles are fixed in the goods more obstinately; besides this it will be readily seen that the scouring cannot be done as thoroughly as in a cloth washer, both defects quoted being the result of the small amount of room afforded to the goods for scouring in the bowl of the fulling mill. Washing cloth in the fulling mill will not draw it out to such an extent in its length as washing it in a cloth washer will do, for the fact that as long as the cloth runs in the soap, it will generally crimp in the channels of the fulling mill, even though the crimping box is opened, for which reason goods possessing any inclination to felt will thereby continue to shrink in their length.

In connection with the cloth scouring machine, it is only necessary to take into account the entrance of the cloth through the guide board, and next, its stretching produced by the drawing up from the bowl

—a stretching which is caused by its own weight. Nevertheless, the cloth invariably stretches to a certain extent in this machine, and contracts in width, especially when the apertures of the guide board (guide rings) are not larger than absolutely necessary for the proper entrance of the rope.

In connection with open width cloth washers as are used extensively abroad, the claim is made that these washers stretch the cloth excessively and thus have a tendency to make it narrower than it should come from the washer. It is evident that the cloth, when running in its full width between the rollers, must be spread out to its full width, which can only be done by a corresponding tension, since otherwise one of the principal purposes of the machine, the smoothing of the cloth, would not be accomplished. That loose textured fabrics, by passing over the different spreaders and guide slats of the washer should be stretched and consequently made narrower, is unavoidable, and which feature must be duly taken into account when calculating the amount of the shrinkage required to be given to the fabric at the fulling process. By thus referring to the open width scouring machine, the same must not be considered as inferior to the rope scouring machine; quite the reverse, since the open width scouring machine possesses merits which outweigh this stretching of the fabric in its length.

Carbonizing, and which generally precedes fulling, under certain circumstances may also be the cause of stretching and shrinkage of the fabric, which by the treatment with acid, at high temperature, has its texture so loosened, that, when neutralized in the cloth washer, it stretches to a considerable degree.

The Gigging is another operation which will influence the shrinkage of the fabric in its length and width. The cloth must be held at a certain tension when passing the gigging cylinder. This tension, of course, can be regulated, *i. e.*, is at the command of the operator, so that when treating light and loose textured fabrics any undue stretching is prevented by the manipulation of the operator. Stretching of the fabric under operation is particularly favored when loosening the felt of the fabric under operation, at least on one side; the fabric in turn becoming softer and more elastic, and consequently more inclined to stretch. This feature in turn is offset by the fact that cloth inclined to stretch (for example loose textured goods) as a rule, requires only a moderate gigging.

When the gigged cloth is afterwards submitted to a wet lustering (boiling) or to the decatizing process, a slight stretching, in length of the fabric, may be expected, due to the rolling up of the cloth, which is generally accomplished under tension.

In connection with piece dyes, the process of dyeing often is the cause of a change in the length and width of the fabric, a feature which increases with the degree of the felting capacity of the wool as used in the construction of the fabric. The greatest change is produced by dyeing in the kettle, depending also upon the color which is dyed, some colors requiring a longer boiling than others do. In boiling, the cloth is apt to after-felt, provided the staple has any inclination to felting left, and when it then will shrink