But the business expanded so that the new quarters were insufficient to accommodate their large stocks. The new building, therefore, was made necessary to give them more salesroom and increased facilities for promptly taking care of customers and correctly filling orders. This firm take a very optimistic view of the outlook for Spring business and base their confidence in the business situation on conditions which they interpret as significant of a satisfactory season. This is foreshadowed by the fact that prices for finished goods have already advanced indicating thereby a firmer market. The curtailed production of the mills during the past several months having left the market to distribute such goods as were on hand, resulted in a scarcity of silks, a scarcity, however, that does not affect the house of Samuel Eiseman & Co., who early foreseeing the trend of the trade, supplied themselves on a large scale in order to take care of their customers during the season. An inspection of their large stocks leaves no doubt as to their preparedness for any and all demands that the season may develop.

Analysis of Woolen and Worsted Cloths.

Distinguishing Cotton from Linen Yarn.

Cotton yarn is smoother, more even, and softer than linen yarn, which contains uneven bunches, and is comparatively harsh.

Testing Animal and Vegetable Fibres by Burning.

A quick and very largely used method of distinguishing between animal and vegetable fibres is by burning a sample of each with a lighted taper or match. Vegetable fibres, such as cotton, flax, and so on, will, when dry, burn up very rapidly with a flash, only a small amount of ash of a grey color will be left, the flame will be smokeless, and practically no smell will be produced. It will also be observed that if the match or taper is taken away before the whole of the fibre of yarn is burned, where the burning ceases it leaves a sharp but blackened edge. On the other hand, when a lighted match or taper is applied to animal fibres such as wool, a rapidly consuming flame is not produced, as animal fibres are burned with comparative difficulty even when dry and contain oil or fat, and the ash that is left is in the form of small black beads or knobs; also, when burning, a very disagreeable smell is given off that is similar to that produced when burning other animal matter, such as feathers. The smell is due to the 2 or 3% of sulphur which is present in addition to the carbon, hydrogen, and oxygen that are constituents of both animal and vegetable fibres; in addition to those named, nitrogen is also a constituent of animal fibres. If a single fibre is burned and the flame is allowed to go out before the fibre is completely burned, the burnt edge is not clear and sharp, but is in the form of a knob.

Silk when practically free from weighting material behaves in a similar manner to wool upon the application of a flame; but if heavily weighted silk is burned the residue retains somewhat the shape of the original. In this respect it is similar to artificial silk, which always leaves an ash similar in shape to the original fibre.

If silk, cotton, and wool yarns are compared it will be seen that silk is very much more lustrous, and also generally finer than wool yarns and frequently finer than cotton yarns. It is quite possible to confuse mercerized cotton yarns with silk, as both are very lustrous, but any doubts can be quickly resolved by applying the burning test, since the former is made from a vegetable fibre, while the latter is made from an animal fibre.

Distinguishing Flax from Jute.

To distinguish flax from jute, moisten the samples with an acidulated alcoholic solution of phloroglucine, when jute will be stained an intense reddish brown, and flax will remain practically unchanged apart from a slight yellowing.

To Remove Rubber from Rubbered Water-proofed Cloth.

To remove rubber from fabric, steep the sample for about 15 mins. in benzine, which causes the rubber to slightly swell and become soft, thus rendering it possible to clean the cloth sufficiently to enable it to be analyzed. This method does not give an absolutely clean cloth, owing to the rubber having penetrated into the interstices of the cloth, and also that vulcanized rubber will not dissolve.

Finding Width in Loom.

The finding of the width of the cloth in the reed from a sample of the finished cloth is not an easy matter in the case of a cloth which has been fairly heavily milled, but if very much milling has not been done it is fairly easy to determine. When a cloth has been milled considerably the extent of the shrinkage both in length and width must be estimated in the form of a percentage allowance based on previous experience, or upon reliable data. For example, very heavily milled woolen cloths, such as beavers, meltons, and pilots, will shrink as much as 30% in width, and for such cloths a fair average shrinkage is from 25 to 30%. Lighter milled cloths, such as woolen suitings, will shrink from 10 to 20% in width; an average shrinkage would be about 15%. If no milling has been done an average allowance of 12½% can be safely assumed.

The principal factors affecting the width, apart from milling, are as follows: The kind of raw material used in the manufacture of the yarn is a factor, since yarns made from animal fibres, and wool yarns in particular, tend to cause shrinkage in width, while cotton and other yarns made from vegetable fibres tend to restrict shrinkage to within very narrow limits. Different kinds of wools have comparatively widely varying effects as regards causing or facilitating shrinkage. The shrinkage in width will be less in the case of coarse than fine filling, and will also be less in the case of worsted than with woolen filling, as well as less in the case of hard than with soft or slackly twisted filling. In woolen yarns the fibres are mixed and crossed in all directions, which results in bulkier and looser yarns than worsted yarns produced from similar wool, because in the latter the fibres are arranged parallel to one another and lie smoothly in the direction of the thread. The disposition of the fibres and the looseness of woollen yarn cause it to contract and shrink more readily than the more solid and lean worsted yarn. Slackly twisted weft being looser is affected in a greater degree than hard twisted weft by any shrinking influence.

Dyeing also influences the shrinking properties of yarn appreciably, as a dyed yarn will resist any tendency to shrink, due to the shrinkage that takes place in dyeing, much more than an undyed yarn. Consequently, when getting out the weaving particulars for a cloth it is advisable to set the cloth in the loom 3 to 5% wider in the case of undyed yarns than when dyed yarns are to be used. The cloth also shrinks in width while undergoing certain operations in the finishing, such as scouring.

Perhaps the best method of ascertaining the width in the reed is to take out a few picks, say, 6 or 8, which it will be noticed are wavy. Then, after moistening them slightly, each of these picks may be placed in turn on a ruler, one end held tight, and a finger run along the thread so as to smooth it out. No more pulling should be done than is necessary to accomplish the straightening. In this way the length of each thread is obtained, and from the average length of the 6 or 8 threads the width in the loom can be calculated by employing the following rule:

Rule.—Multiply the required finished width by the average length of the picks straightened out, and divide the product by the width of the sample.

Example.—If the length of the filling threads straightened out is $3\frac{13}{32}$ in., the sample 3 in. wide, and the finished width is required to be 58 in.:

$$\frac{58 \times 3\frac{13}{32}}{3} = 65.85 \text{ in. width in the reed.}$$

The method just described can be verified by assuming a probable shrinkage, which for unmilled woolen cloths is taken to be $12\frac{1}{2}$%; for medium and light-weight worsted cloths 10%; for heavy-weight worsted cloths $13\frac{1}{2}$%; and for heavy weight milled worsted cloths $17\frac{1}{2}$%. Cloths made with cotton warps shrink very little in length, while the reverse is the case with cloth made from cotton filling. When either the warp or filling, or both, is made from a blend of wool and cotton, then the shrinkage decreases as the percentage of cotton in the blend increases.

Under ordinary conditions cloths do not shrink as much in length as width, because both in weaving and finishing there is less restriction to the shrinkage in width, the tension in both processes being more in the direction of the warp than the filling. Variations from the average shrinkages given above can only be determined by the capacity to judge that comes with experience of various cloths and their behavior in the finishing. Any departure from the average allowances should receive careful consideration, in spite of the fact that woolen and worsted cloths can be finished any width and weight within certain limits. The limits depend largely on the character of the raw material and other factors which have been dealt with previously.

Finding Length of Finished Piece.— The next item to be obtained is the length of the finished piece. The method is similar to that employed in obtaining the width of the cloth in the loom, but the warp threads are straightened out and the average length obtained instead of the picks. The length of the sample, multiplied by the length of warp on the beam, and the product divided by the length of the straightened threads = length of woven cloth.

Example. — If the length of the warp threads in the pattern is 3 in., the average length of the threads when straightened out $3\frac{1}{3}$ in., and assuming that the length of the warp is 70 yds., then

$$\frac{70 \times 3}{3\frac{1}{3}} = 63 \text{ yds.} = \text{length of finished piece.}$$

Finding Ends and Picks per Inch Finished.— Before finding the ends and picks per inch in the loom, the ends and picks per inch in the finished cloth must first be found. The latter can be found by placing a piece-glass on the pattern and counting the number of times the weave or design repeats over as large a distance as the sample will allow, and then by calculation.

Example: Suppose the number of repeats of the warp pattern in 3 in. is 54, and the weave is 2-and-2 twill, the ends per inch will be:

$$\frac{54 \times 4}{3} = 72 \text{ ends.}$$

By measuring lengthwise of the cloth and employing the same rule the picks per inch can be obtained.

If the design is one in which the complete repeats of the weave cannot be readily seen in the cloth, as in the case of the weaves of a broken or crêpe character, then the best method to employ is that of counting the ends and picks, one by one, over as great a distance as the sample will allow. It will be clear that the greater the distance counted, the larger is the distance over which any error is spread, and hence the less serious does any error become. When employing this method of counting, the best plan is to make fringes at the left hand side and bottom of the pattern, and carefully count the number of ends and picks over a measured distance in inches or parts of an inch. If more than one inch is counted over, it is merely a question of dividing the total number of ends or picks by the number of inches measured, to obtain the ends and picks per inch.

Finding Ends per Inch in Loom.— From the ends per inch finished, the ends per inch in the loom are obtained as follows:

Example. — If a finished sample contains 72 ends per inch, and the finished width of the cloth is 58 in., while the width of the loom is 66 in., the ends per inch in the loom will be:

$$\frac{72 \times 58}{66} = 63.28.$$

Finding Picks per Inch in Cloth.— When obtaining the picks per inch in the cloth from the loom there are two shrinkages to consider. First, the shrinkage of the warp due to the take-up during weaving; and second, the shrinkage which takes place during finishing. With regard to the shrinkage due to take-up, this will be greatest in the case of the plain weave, since the warp is bent out of the straight line the maximum number of times, as it interlaces with each pick. If the plain cloth were made theoretically perfect, that is, with the same counts of warp and filling, and with the same number of ends and picks per inch; then by calculating according to the diameter and intersection theory, the shrinkage due to take-up would be about $12\frac{1}{2}$%. In the case of a 2-and-2 twill the shrinkage due to take-up is theoretically about 9%; and in the case of the 8-end satin it would be about 5%; and in the case of filling rib and filling corkscrew cloths, the take-up would be practically nil. The take-up in weaving in the case of warp-backed and double cloths may be calculated theoretically in a similar manner by treating each warp separately, according to the way in which in intersects, and making an allowance for the stitching or binding in the case of that warp, face or back, that does the stitching.

The allowance that is made in practice varies from 4 to 15%; but is generally from 4 to 7½%. Some of the affecting factors which contribute toward the prevalence of the allowance being generally nearer the lower than the higher figure are, the amount of tension on the warp beam during weaving, the elasticity of the yarn, the relation of the counts of the warp to the counts of the filling, and so on. Owing to the take-up during weaving, varying considerably with different kinds of cloths, and conditions the effect of which it is impossible to estimate except by experience, this shrinkage can only be accurately determined by observing the results obtained in actual practice, which should be carefully recorded for future reference. It might be remarked in this connection it has been found by experimenting that an ordinary Botany worsted coating with a clear-cut finish and not piece-dyed, shrinks about 40% of the total shrinkage, that is, the shrinkage from the warp length to the finished length during weaving, and the remaining 60% takes place during finishing.

Before obtaining the picks per inch in the cloth from the loom, it is necessary to get the length of the cloth from the loom, which is represented by the figure obtained by deducting $\frac{2}{5}$ of the difference between the length of the warp and the length of the finished cloth, from the warp length.

For example: Assuming that the length of the warp in the loom is 70 yds., and the length of the finished cloth is 63 yds., the length of the cloth from the loom should be

$$70 - (\tfrac{2}{5} \text{ of } 70 - 63) = 70 - 2\tfrac{4}{5} = 67\tfrac{1}{5} \text{ yds.}$$

To obtain the picks per inch in the cloth from the loom the rule is to multiply the length of the finished piece (63 yds.) by the picks per inch in the finished cloth (72), and divide the product by the length of the cloth from the loom (67⅕ yds.).

$$\frac{63 \times 72}{67.2} = 67.5$$ picks per inch in the cloth from the loom.

It should be explained that in basing on a warp length of 70 yds. no allowance has been made for the extra length that is required to start the warp in the loom, and which must be left in the heddles at the end. An allowance of 1½ to 2 yds. is ample.

A reference to the picks per inch inserted by the loom will not be out of place at this point. As there is a slight shrinkage of the cloth when taken from the loom due to the removal of the considerable tension the cloth and the warp are submitted to while in the loom, the picks inserted by the loom should be fewer than those in the cloth from the loom by about 2% to allow for the contraction increasing the picks per inch. Slight differences from the 2% allowance will be found in practice due to the contraction in question being affected by cloths woven with different weaves not contracting the same amount.

Norwegian Prohibition on Importation of Luxuries.

Consul General Letcher has cabled from Christiania, Norway, under date of August 19, 1920, that the Norwegian Government has announced the prohibition of the importation of articles of luxury, including automobiles, except under license. A list of prohibited articles grouped under 26 headings has been issued and will be published in Commerce Reports as soon as received.

Bleaching Silk.

When silk is boiled off and rinsed it can be dyed in medium shades, but it is necessary to bleach it for light shades. Silk when it comes from the boiling-off bath, even when called white in the raw stage, retains a fairly dark cream shade. If it is colored a very light sky blue the result is a greenish and dirty color. If dyed mauve, the result is even worse, as violet is complementary to yellow. If used without dyeing, the silk has a pearl shade instead of white.

It is therefore necessary to remove the cream shade of the boiled-off silk so far as possible. The bleaching of silk in its essential features is similar to bleaching wool, two different processes being used, the results being practically the same.

Sulphurous Acid.

The first process is based on the decoloring action of sulphurous acid gas. In spite of its age this process is extensively used and possesses real value. With a suitable installation the results are very satisfactory, very reliable, and very regular, as well as economical. It requires, however, a special installation and some time for its manipulation. During the last two years of the war the silk bleachers of France were deprived of peroxide of hydrogen and were very glad to avail themselves of the old sulphur process.

The second method of bleaching is of comparatively recent origin, having been introduced about thirty years ago, and is based on the oxidizing action of peroxides, particularly peroxide of hydrogen. In dyeing and bleaching establishments where special care is taken with the work, both processes are used in combination, the results being much better than when the processes are used separately.

The Sulphur Process.

The silk is placed in a hermetically sealed chamber, in which the sulphur is burned. The oxygen in the air in the chamber is converted into sulphurous gas, and when this transformation is nearly complete the sulphur disappears. At this moment the chamber contains a mixture of SO_2 and nitrogen which acts on the fibre.

We will now examine the conditions under which this reaction takes place and the accidents that may result during its progress. This brings us to the construction of the sulphur bleach house and the practical precautions to be taken in carrying on the operations.

Precautions.

1. In the first place it is indispensable that the silk be kept uniformly wet. When the silk is in this condition the sulphurous gas, which is soluble in water, comes in regular contact with the fibre by being dissolved in the water that is carried by the silk. It will be readily understood that this action of the gas cannot be uniform on all parts of the silk if the silk is not perfectly and uniformly moistened. Furthermore, when sulphur is burned even in the closed chamber there are always traces of sulphuric vapor, which have an injurious effect even on the wet silk. If parts of the silk are dry, pronounced alteration of the fibre often results from contact with the acid. It consequently is necessary to prevent the silk from becoming dry in the chamber and for this reason the air in the chamber must be kept saturated with moisture.