

FABRIC ANALYSIS.

(Continued from October Issue.)

To Ascertain Texture Required in Loom.

To Ascertain Width of Fabric in Reed.

Of all the points required to be ascertained in the analysis of a fabric, the present one is the most difficult to master, and can only be satisfactorily accomplished by practical experience.

To simplify your work, make a collection of a variety of samples of finished fabrics in your line of goods, and of which you know the exact shrinkage from width in reed to finished width. Such a collection of samples will guide you in laying-out similar new fabric structures for the loom.

The setting of a fabric in the loom, *i. e.*, the width in the reed the warp must occupy in the loom, compared to its finished width, is regulated by the raw material used, the manner in which the yarn has been spun, turns of twist per inch, as well as the different processes the fabric has to be subjected to during finishing.

The setting of cotton and silk fabrics in the loom make little trouble, since then the width of the fabric from the loom is about equal to the width of the fabric when finished, *i. e.*, very little difference, if any. This however differs when dealing with woolens and worsteds, more particularly the first, and when the proper setting of the fabric in the reed becomes an art and can only be mastered by experience.

Some kinds of woolen fabrics require a considerable amount of fulling, hence must be set wider in the loom than others that may require only little, or possibly no fulling.

For example, the best grades of billiard-cloth are set nearly twice as wide in the loom as their finished width, while beavers, kerseys, and similar heavy-weight woolen fabrics need to be set but about one-half their finished width wider in the reed, while fancy cassimeres are set only from one-quarter to one-third wider in the reed than in their finished state. Worsteds require a less wide setting compared to woolens, about one sixth wider in the reed than their finished width.

The kind of yarns used in the construction of a fabric as well as the weave used also exert their influence in regulating the setting of certain fabrics in the loom.

A study of the following rules will greatly simplify the work of the designer when planning the construction of a new fabric, or duplicating given examples:

(1) The finer the quality of the stock used and the less twist inserted into the filling, the more in its width the cloth will shrink at the fulling process. If the filling is hard twisted, and of a coarse quality of stock, such cloth will have but little tendency to shrink.

(2) If the weave used presents a far apart interlacing in the fabric structure, this will have a tendency to produce a narrower fabric than when warp and filling are more closely interlaced.

(3) The less tension we put on the warp-threads during weaving the narrower the fabric will become.

(4) In comparing woolen and worsted yarn, the former produces fabrics which shrink more in width than fabrics made with worsted yarn. This result, when produced from the same raw material, is based upon the two different processes (carding or combing) the wool fibres are respectively subjected to in their manufacture into yarn.

By carding the wool, every fibre, through mixing up in every shape and direction, is twisted in itself, and such fibres always endeavor to resume their original position.

By worsted combing, the wool fibres are separately united in the formation of the yarn, *i. e.*, each fibre, as placed in position for forming the thread, remains more or less its own, for which reason such a thread remains undisturbed in the fabric, and when fabrics made out of such threads will keep wider than if using a wool-spun yarn of the same quality and count, under similar conditions.

Again, woolen yarns refer more particularly to fabrics that are felted (shrunk) in the wet finishing (fulling, scouring or both) processes, hence must be laid-out wider in the reed as compared to worsted cloth which, as we might say, has to be made on the loom, whereas the woolen fabric in many instances is made in its finishing process.

Take-up of Warp During Weaving, Shrinkage of Fabric in Length During Finishing.

We must also carefully consider the amount of take-up the warp is subjected to during weaving, and the amount of

shrinkage in its length the cloth undergoes during the finishing process. The latter point will not come into consideration in the case of fabrics which are ready for the market or require only a slight finishing after leaving the loom, some of which, by means of pressing or calendaring under tension, may actually become longer by this process.

The take-up of the warp during weaving varies from fabrics requiring two, three, four or more times the length in dressing than the length of the fabric woven, compared to fabrics in which the length of the warp dressed equals the length of the fabric finished, or if any difference found, the same to be very little; again in some special cases the warp may stretch sufficiently in weaving and finishing to produce more yards woven than was dressed.

Points previously given on the shrinkage in width of a fabric also apply to its shrinkage in length.

The weave and the number of picks per inch used, are the chief features regulating the take-up of the warp during weaving; for example, a fabric interlaced with a far stitching satin (say 8 to 12-harness) will take up very little, if any, unless we use an extra high texture for warp and filling. Thus, the oftener a warp-thread intersects with its filling in a given distance, the greater the amount of take-up required for the warp. For this reason, fabrics which have two differently interlacing weaves combined, for example $\frac{1}{2}$ -inch plain weave to alternate with 1-inch 8-harness satin = $1\frac{1}{2}$ inches in repeat of pattern, require two beams; one to carry the warp for the plain weave and the other beam for carrying the warp for the satin weaving part of the fabric.

This feature also applies to worsted fabrics made with a woolen back-warp, as well as such where the face-warp interlaces different from that of the back-warp, like for example a 4-harness twill for the face and an 8-harness satin for the back, a combination which in most instances will call for two-beam work on account of the difference in the take-up of the two systems of warp-threads. Double cloth, wool or worsted face warp used in connection with a cotton back warp will also call for two-beam work.

The amount of shrinkage in warp pile fabrics, for its pile-warp is considerable. It is regulated by the height of pile required, the amount of wires or loops per inch, etc. Such fabrics may often require their pile-warp dressed four to eight times longer than the piece measures woven.

To ascertain the exact percentage of take-up for a fabric needs experience, and can only be mastered by a thorough study of the theory of constructing the different weaves, the nature of the various raw materials, their various methods of preparing the yarn for the loom and the different processes of finishing fabrics in question are subjected to.

If dealing with a cotton or silk fabric, or a loosely interlacing worsted fabric, using in either structure two, or more different interlacings for the warp-threads, for example, a certain number of warp-threads interlacing with a closely intersecting granite or crêpe weave to alternate with a certain number of warp-threads interlacing with a loosely interlacing (floating) 7 or 8-harness satin. The difference in the take-up of these two systems of weaves is readily seen by liberating one or two threads of each system and holding the same against a contrasting background. Their original length before woven may then be ascertained by stretching one thread after the other on a finely graded scale or ruler, holding each end of the thread, while stretching and measuring the same, by means of a delicate pair of pinchers so as to obtain a short but solid grip on the two ends of the thread during the stretching operation.

Arrangement of Colors, Counts and Twist.

In the reproduction of fancies, of any kind of textile fabrics, the proper arrangement of colors in warp and filling in combination with the weave used is of the greatest of importance; any mistake made is liable to make the fabric unsaleable. The same also holds good if dealing with two or more different counts or twists of yarn used in warp or filling, or in both systems of threads.

It must be remembered that different colors, counts or twists of yarn may have to interlace with certain warp-threads or picks of the weave and that any derivation of the proper arrangement of either warp or filling threads will spoil the pattern or effect in the fabric.

The proper placing of fancy ends in a pattern must be taken care of when preparing the sample for picking out the weave, and in order to simplify matters arrange wherever convenient to do so your warp fringe of the sample prepared for picking out, to start with a fancy thread. This will

simplify the picking out as well as keep the repeat of the weave and that of the arrangement or dressing of the warp under your control.

The repeat of the color arrangement may equal that of the weave, again one or the other may be a multiple of the other, etc.

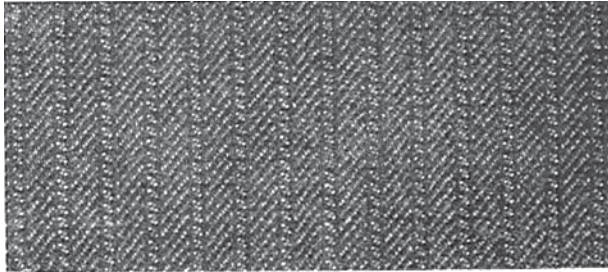


Fig. 51

HOW TO PROCEED WITH THE ANALYSIS.

In preparing the sample according to details given before when explaining the picking-out process, during the latter work indicate at the right hand side on your point paper next to the weave, for each pick as liberated from the sample, its color, or any other remarks as to count, twist, etc., as the case may require.

After you have ascertained the interlacing of the first pick, indicate on the top of the portion of the point paper that you have reserved for indicating the weave, in its proper position the color arrangement of the warp for one or two repeats of the pattern. Do the same if dealing with different counts of yarn.

In most fabric structures the weave and the color arrangement for warp and filling repeat on a corresponding number of threads; in some instances, as mentioned before, one may be a multiple of the other. If the fancy arrangement of the warp is the smaller number, indicate it once, or repeat it over the entire repeat of the weave. If the weave is the smaller number, carry on the indicating of the color effect up to its repeat on the point paper, or if dealing with a large

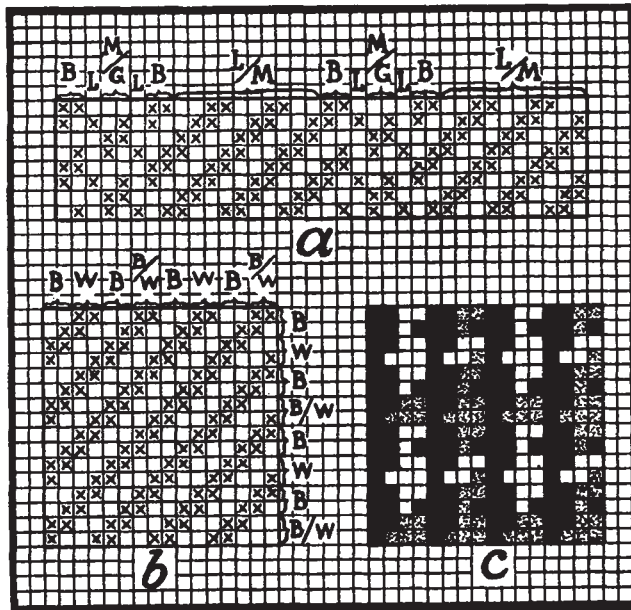


Fig. 52

repeat of a dressing, write out the respective color, count or twist arrangement of warp and filling on note paper, beginning each list (warp or filling or both) with its start as you are marking it on the point paper.

We will now explain subject with two samples, both referring to a fancy color arrangement of the warp-threads; the first has one kind of filling (stripe) the other deals with three different kinds of yarn used for warp and filling.

Worsted Trousering.

Fig. 51 is a photographic reproduction of the fabric to be analyzed, a worsted trousering previously referred to in connection with the chapter on "Obtaining Texture by Calculations."

Fig. 52^a shows the weave for this fabric on point paper, also showing the color arrangement of the warp indicated on top of the weave; the filling is all black, hence no notice was taken of it on the weave plan when picking-out the sample.

The arrangement of the warp, technically known as the *dressing*, as indicated on top of the weave, reads thus:

- 2 ends (B) 2/42's worsted, Black
- 1 end (L) 2/48's worsted, Light gray
- 2 ends (M/G) 2/48's worsted, Medium Gray
- 1 end (L) 2/48's worsted, Light gray
- 2 ends (B) 2/48's worsted, Black
- 10 ends (L/M) 2/48's worsted, Light and Medium Gray twist

18 ends, repeat of pattern; two repeats are given.

This analysis of the color arrangement of the warp, placed on the point paper in its proper position to the weave, will readily explain the wisdom of the procedure when we take into consideration that any misunderstanding in the weave



Fig. 53

room might be the cause of a mistake in the woven cloth on the loom, until discovered, and when possibly too late to correct.

L means one end Light gray interlacing 1 up 3 down, for its repeat.

M/G means two ends Medium gray interlacing 2 up 2 down, for its repeat.

B and L/M are fourteen warp-threads interlacing with the 2 up 2 down 4-harness twill, and of which the first and last two ends (B) are Black, the others (L and M) referring to Light and Medium gray twist threads.

Letters of reference for colors have been and are used to simplify matters to the reader, indications (fancy crayons) can be substituted.

Worsted Suiting.

Fig. 53 is a photographic reproduction of a worsted suiting, being given to illustrate a fancy arrangement of warp and filling.

Fig. 52^b shows the weave (or pickout as we technically call it) also the color arrangement in warp and filling, both being the same, viz:

- 2 ends (B) 2/60's worsted Black
- 2 " (W) " " White
- 2 " (B) " " Black
- 2 " (B/W) " " Black and White twist.

8 ends in repeat of pattern for warp and filling.

Fig. 52^c shows the color effect for fabric sample Fig. 53, executed on point paper thus:

- Black worsted is indicated by full type,
- White worsted by empty type, and
- Black and White twist by shaded type.

From color scheme Fig. 52^c it will be readily understood that the proper placing of the different colors in warp and filling is a most important item in planning the design and that any mistake (even if only one thread out the way) would spoil the effect aimed at by the designer, and in turn make the fabric second, hence the importance of indicating, if dealing with a fancy fabric, the proper warp-threads and picks in connection with the weave on the point paper while you are picking out the weave.

(To be continued.)