

FABRIC ANALYSIS.

(Continued from page 153.)

III. Ascertaining the Weave.

This procedure, more frequently called *picking-out*, has for its object to ascertain and record on point paper, the plan (weave) by which warp and filling interlace with each other in a sample under consideration. In many instances, although wrong, this work is considered as the most important, if not the only work to be done, to obtain the analysis of a sample, *i. e.*, obtain the facts necessary to reproduce the latter. This picking-out of the weave, in connection with many a fabric structure, may require more work, patience and time, than all the other factors necessary to be known for a complete analysis, but at the same time, we must remember, that the construction of many a fabric depends less upon the interlacing of warp and filling, as compared to other points, like texture, twist, stock, coloring, finish, etc.

Ascertaining weave of a sample is based, first of all, upon a thorough comprehension of the theory of constructing the various weaves for single cloth, double cloth, etc. It also requires, in dealing with heavy fulled woolen fabrics, or fabrics having threads, more or less broken, during the process of finishing, a considerable amount of skill and patience.

An experienced designer will, in many cases, know the weave necessary for producing a given sample, by a mere glance at it, while in connection with cotton or silk fabrics, of high textures, the microscope will quickly assist him, without having to take up much of the details of picking-out. But, as such skill can only be arrived at after years of practice and experience, we will define our explanations, with reference to the picking-out process, more particularly for the benefit of the learner. For him, it will be advisable to begin his study with simple fabric structures, of a loose texture, where every thread is readily distinguished from its joining, or with its interlacing threads. The harder twisted these threads are, the better for him. Coarse textured, cheap, cotton fabrics will be the ones most suitable for him to start with, after which he then can take up low textured worsteds, to be followed by woolens, and when he then will master the subject by knowledge and experience gained to pick-out harder samples.

In order to record the weave, when picking-out a sample, a special kind of paper, known as textile design, or point paper, is made use of; it being a paper ruled horizontally and vertically with lines, 8 or more to the inch, each way, every eighth line being in turn, each way, either ruled heavier than the others, or ruled over in a different color, in order to simplify counting-off a certain number of spaces on the paper, when so required. Eight (8) is the number selected for over ruling, for the fact that it is the most suitable number for the purpose; not only on account of 8 in itself comprising the repeat of the most often employed weaves, it, besides claiming the four (4) harness weaves on account of covering two repeats of said weaves, at the same time, furnishes the multiple for most all other prominently used repeats of weaves,

like for example; $1\frac{1}{2}$ heavy squares cover 12 threads, 2 heavy squares cover 16 threads, $2\frac{1}{2}$ heavy squares cover 20 threads, and 3 heavy squares cover 24 threads. Again, should we call for 10 threads, instinct will teach the eye to grasp the one heavy ruled-off space (of 8 light lines) plus 2 light spaces, in preference to counting 10 spaces, provided the paper was not over ruled into heavy squares. Over-ruling of the point paper, besides simplifying matters, at the same time prevents mistakes in counting-off the repeat of a weave, a feature possible to occur otherwise, more particularly if dealing with a weave of a large repeat. It, at the same time, will guide the designer when picking-out samples of a large repeat, since certain fancy ends may come near one of these heavy ruled lines, which thus becomes a guide for him while picking-out other picks.

At the same time, however, we must mention here, that besides point paper ruled over in 8 each way, technically written 8 x 8 paper, we also find other kinds, for example, 4 x 4, 10 x 10, 12 x 12, etc.; however, 8 x 8 is the kind generally met with, when picking-out a weave from a sample.

In connection with any kind of point-paper, the distance between two lines, taken in a vertical direction, represents one warp thread, and each distance between two lines, taken in a horizontal direction, represents one filling thread. The different small squares formed, illustrate the place where a certain warp thread and filling thread meet, one of which must be up and the other down, a filled square, a cross, a dash or any other mark in said square indicating that the warp thread in this instance is up and the filling down. Provided the reverse should be required, we then had to indicate on the weave that said marks made stand for sinkers or warp down, and empty squares for risers or warp up; but if no memorandum to that effect on the weave, we always will consider filled, cross, or dash for risers (warp up).

Previously to beginning dissecting the sample, the first question for us to ascertain is whether the interlacing of warp and filling, in the sample, is clear and distinct. Provided this is not the case, and the face of the fabric is covered with a felt or nap, as is frequently met with in woolen goods, the sample in turn must be then prepared so that the interlacing of the ends and threads become well defined, and which can be done in two ways, *i. e.*, removing the felt or the nap either by shaving with a sharp knife, or it is singed-off over a flame. Either method requires care, since, if the surface of the structure is in any manner impaired thereby, the sample may become useless for dissecting, since then, in spite of all care, the threads will draw apart during picking-out. Even if the weave is clear, some designers singe such samples slightly, in order to remove all the little points of fibres standing in the hollows, and which it is not possible to remove by shaving, without at the same time injuring the thread. Shaving, again, is preferable with a smoothly interlacing weave.

When the sample has been prepared in this manner, the next point to ascertain is to find out in which direction the warp ends run. With napped goods, this is ascertained before shaving, since the nap shows the direction of the warp, the nap being raised, during gigging or napping on the face of the goods, warp-ways, while with woolen goods not gigged or napped, chevots, meltons, etc., it is more difficult to decide,

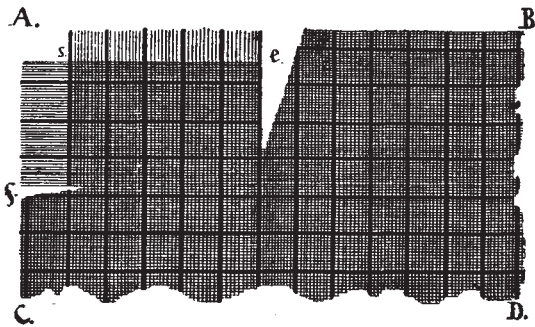


FIG. 1

provided there are no special characteristics, such as selvage and which runs warp-ways, to indicate direction of the warp. Provided such a sample reveals none of the characteristics, then its face must be closely examined, since interlacings protruding a little beyond the surface, most frequently show the warp ends.

If the threads in one system are harder twisted than in the other, the hard-twisted threads are generally the warp system.

The counts of yarn found used in each system, will often assist in ascertaining which is the warp and which is the filling, for in most instances, the yarn used for warp is of a finer count than the filling.

If the fabric has cotton yarn for one system of threads, and woolen for the other (union fabrics), the cotton yarn is generally the warp yarn.

If in the sample submitted for analysis, the one system of threads is found to have been sized or starched, the other not, the former is the warp.

If the sample contains reed marks (or imperfections known to the weaver as being caused only by warp system), such imperfections readily characterize the respective systems of threads.

Another guide, for distinguishing the warp from the filling, is found in the style of the respective fabrics submitted for picking-out. Fabrics having a striped character, or check effects in which the one direction of the lines is prominent, compared with the others, the direction of the stripes, or the prominent lines in the check, indicate the warp system. If the checks are somewhat longer one way than the other, the warp, as a rule, runs the longer way.

In fabrics composed of two systems of filling (face and back) and one system of warp, the heavy and soft-spun filling, known as the backing, indicates itself, and thus the system of threads.

If it should be found impossible to distinguish warp from filling, proceed with the picking-out, and when then the resultant weave, will in most cases explain to you, which is the warp and which the filling.

The instrument required for picking-out is a

strong needle, having a fairly sharp point, also a handle, which will permit a convenient grasping of it, like you would hold a pencil. In few instances, the microscope may be found to be of help; for woolens and the average worsted samples, it will be of no assistance, when picking-out over your hands. We will confine our explanations strictly to this procedure.

With silk fabrics and higher textured cotton goods, and where the microscope is a necessity, two pinchers secured to the table of a medium power microscope, and to which the previously trimmed sample is secured, take then the place of your left hand, and when you then proceed with the picking-out needle, in your right hand, in the usual manner.

The work of picking-out a sample with your hands is most readily accomplished by proceeding as follows:

Loosen with your picking-out needle, and take out with the help of the latter and your fingers, a number of filling threads, so that the warp ends are about 1-4 inch free of any filling. Provided you have a large sample given, you may pick-out a few more picks, since you will be then less liable to make mistakes in dissecting, more particularly if a beginner.

Should the sample contain a fancy thread, if possible, prepare it so this will be the initial thread for starting to pick-out.

Next, liberate, in the same way, on the left hand side of the sample, a few warp threads from the filling, so that the latter ends also protrude singly from the structure, the same as the warp threads do, in order to get a good start for the picking-out.

It will always be advisable, with complicated weaves, to have a sample sufficiently large to contain at least two repeats, so as to be able to verify your work; again a sample may be larger than needed for picking-out the weave, and when handling such a sample, pick for pick, throughout its entire width, would only retard the work for the designer, again a portion of the sample may be needed for reference, by the dyer, the finisher, the office, the commission house, etc., and when then, after ascertaining amount of space needed for the pick-out, cut then with your scissors, warp-ways and filling-ways into the sample, and thus protect portion of sample, not actually needed, from having warp or filling pulled out of the structure.

Fig. 1 is given to illustrate how to prepare sample. *A*, *B*, *C* and *D* size of sample submitted. *e*, cut made into the filling threads, to preserve right hand portion of sample. *f*, cut made into warp threads, to preserve lower portion of sample. *s*, the place where first warp thread and first pick meet, *i. e.*, the starting point for picking-out. Illustration shows how warp and filling ends have been liberated, to obtain its required condition for picking-out, showing also a fancy end as the initial warp thread to come under consideration when picking-out. The latter is not necessary with the filling.

The filling thread, lying first in the sample, is then carefully loosened with the point of the needle, from its hold in the woven structure and pushed slightly, say about $\frac{1}{8}$ part of an inch, forward, into the loosely protruding warp threads, after having previously drawn the cloth sample tightly over the point of the

left index finger, using the thumb and middle finger to assist in keeping the sample in place. Fig. 2 is given to illustrate the procedure.

The warp threads are then examined singly, with the needle, from left to right, as to whether they lie over or under the thus loosened pick.

Such of the threads as lie over the filling, are indicated by a cross or any other mark, upon the design paper (which you had placed conveniently on the table or desk near you) in the space (squares) intended. Push the warp threads, as they are examined by you, slightly to the left and carefully under the point of the thumb, where they must be retained. Proceed in this way with a sufficient number of warp threads, until two repeats of the interlacing of the filling thread (pick) are obtained. In order to avoid errors, it is advisable to mark, by a dot, in its respective square on the point paper, such warp threads as are lying under the filling. For example: suppose that in taking out a pick, we found the position of the warp ends to be as follows:

4 down 2 up, 2 down 3 up, 1 down 1 up, etc., then the recording on the point paper must be performed every time when the number of up-lying threads have been pushed under the point of the thumb, and as indicated herewith by comas:

...xx, .xxx, .x, etc.; in other words, note on your point paper each and every change as you pick-out. Do not try and keep several changes in your mind, since it is apt to mislead you—do not trust your memory—it will prevent mistakes. The work may progress somewhat slower in this manner, but the result will be more reliable, and to keep any possible errors out of your weave record is what you are after. It will save you the trouble of having to go all over your work again, and what will be the case provided you slight your work.

When all the warp ends lying above and below the first pick, have been carefully recorded on the point paper, before removing said pick, examine pick-out carefully and see where the repeat of the weave will come in. If theory tells you that there is a chance for an error, go over your work again. Starting your first pick right will go a long way towards simplifying the rest of the pick-out to you. It is not improbable, that in connection with complicated weaves, the repeat is larger than it appears at a first glance, and that mistakes are prevented in this manner.

When the repeat of the weave has been finally established, in connection with fancy colorings in the warp, indicate then on top of your record on your point paper, up to the end of the first repeat, and see that the coloring of the warp in the 2d, etc., repeat corresponds to that of the first repeat, otherwise, mark it down also.

Repeat of weave and repeat of the warp pattern (dressing) do not correspond always, sometimes one repeat of the warp pattern covers 2 or more repeats of the weave, again, vice versa, and when then the complete design, *i. e.*, effect does not come in until both (warp pattern and weave) repeat simultaneously.

Now liberate carefully the first pick from the warp threads and repeat procedure with the next pick in the

same manner, and continue in this way until you find the pick which will correspond, with reference to its interlacing, to the first pick. Here, however, is where the novice, not versed in weave formation, may come in trouble, for the fact that in connection with derivative weaves, duplicate picks, either single, or in sets of 2 or more picks, often occur, previously to obtaining the complete repeat of your weave. This will make no trouble to the experienced designer, he will know

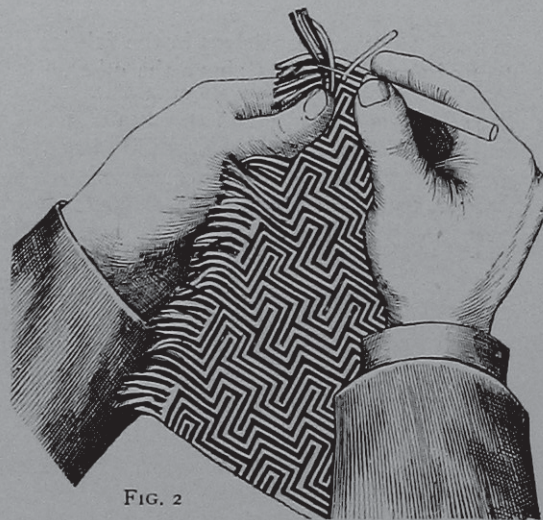


FIG. 2

from theory at once the number of picks when the final repeat will occur, thus clearly demonstrating the advantage of theory and practice going hand in hand. Alone, either is grasping its way in the dark, combined, they simplify work, and make the latter a pleasure.

If dealing with a soft-spun filling yarn, be careful in raising it, to avoid breaking the thread; also be careful that after the interlacing of the pick has been ascertained, it is entirely removed, so that no small pieces of the thread remain in the fringed part of the warp; for if such should be the case, it might lead to mistakes in examining the next adjoining pick.

Cases will occur in practical work, where the sample submitted does not contain one complete repeat of the weave. In this instance, pick-out the interlacing of amount of sample furnished and construct the remaining part from theory; easy to say—often lots of trouble to the designer.

As will be readily understood, when dealing with our foundation weaves, as twills and satins, or our standard derivative weaves, like broken twills, skip twills, diagonals, rib weaves, basket weaves, etc., a little experience in picking-out will be sufficient, 2 or 3 ends picked-out and recorded, will be all that is needed, the balance of the repeat of the weave, being then readily marked out by theory.

In connection with any kind of pick-out which refers to the use of 2 or more colors, or counts of yarns, in warp or filling, or both, always be sure to note on the pick-out plan the particular color or count of the thread under consideration—it will save you trouble afterwards, and prevent any chances of mistakes in the weave-room.

(To be continued.)