

Reeding and False Twill

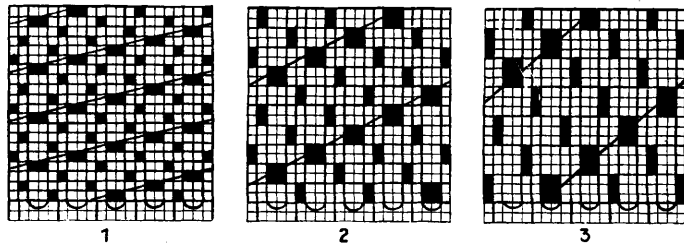
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It is well known that the formation of false twill in fabrics of real silk, or artificial silk, or mixtures of artificial silk and cotton, etc., is in some way due to the selection of an unsuitable pitch of the reed. The object of this article is to find a method that is easy of application and permits of predicting from the point paper, *without having to make a practical trial*, before reeding, what pitch is suitable or is liable to form of a false twill with a given weave and sett.

Each wire of the reed occupies a certain space, albeit quite small, among the total of the warp threads, and naturally also forms a lane in the finished fabric, that is, in the intersection of warp and weft according to some system or another. Those branches of manufacture which have to do with fabrics that undergo no further treatment generally try to obliterate these reed marks, but it cannot be done properly with goods that have been dyed in the hank, and similar loom cloths. During weaving the dent presses slightly together the intersection of warp and weft (interlacing point) which I will assume to be ordinary square (Figure 2), so that it is forced into a rectangular shape. All the interlacing points close to the dent on the right or the left assume a rectangular form instead of the hypothetical square shape, and may produce a twill line in the weave under certain unfavourable conditions, and therefore also

in the finished cloth (Figs. 1—3). For the sake of clarity I have there chosen only one thread line for the threads affected by the reed, and for the unaffected threads in the middle of the space between two dents I took two threads for one.

The line of the false twill can run in any direction, and it would be difficult to predict without a point paper design, but it can also run

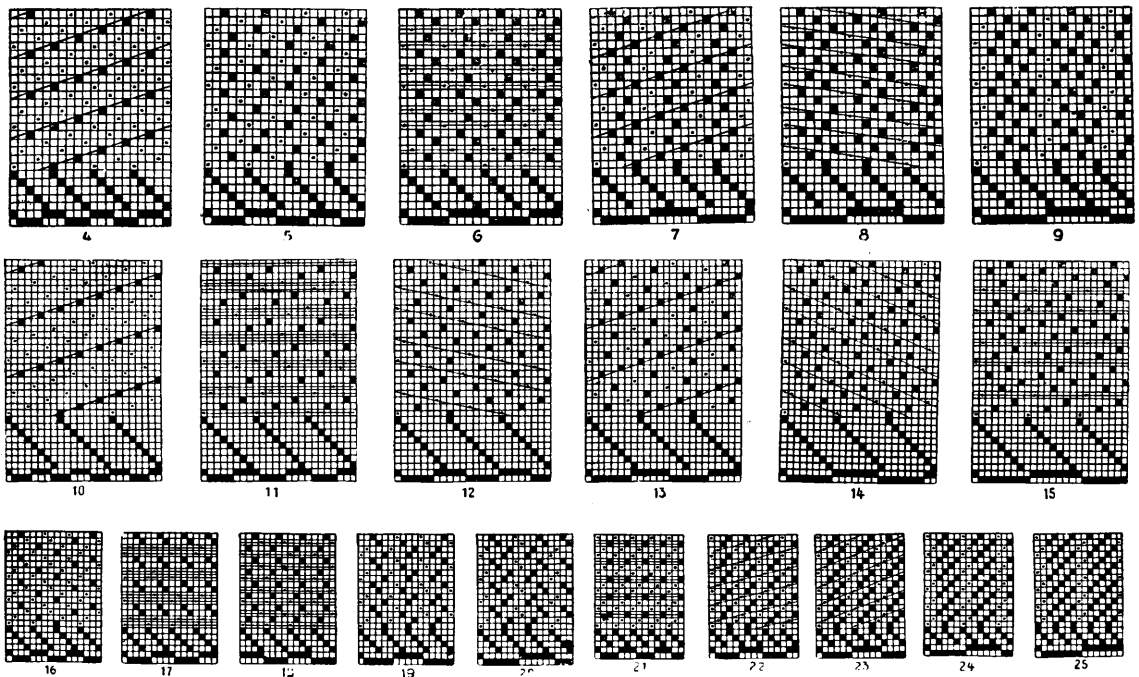


parallel to the direction of the weft and thus cause reediness. This favours the production of weft-streaked goods, in particular when working with only one shuttle (Figs. 6, 11, 15, 17, 18 and 21).

To simplify matters I have represented in the design the various interlacing points which lie some distance apart as being only symbolically different, that is to say, I have only lightly dotted the interlacing points of the threads touched by the dent to the left or to the right, but have shown as full squares those that are isolated from the dents by threads to the right or left. A false twill or a technically perfect cloth is produced accord-

ing as it is possible or not to draw somehow or other a straight line in any direction *through the interlacing points of the one set without being interrupted by the interlacing points of the other set*. To complete the picture, the draft and reeding are added to each weave design from Figure 4 on. The drawing investigation was first carried out on the 5-shaft weft sateen shown in Figures 4—9 (weft sateen was chosen merely for reasons of convenience), then on the 8-shaft weft sateen

appears so prominent because relatively few threads show abnormal interlacing points in the repeat; that is, in the twill line. The fewer the number of threads in the split, the greater is the number of the abnormal intersecting points and the more the twill loses itself, as experience also teaches, the more sharply it runs in the design and finally disappears with three threads (although theoretically still present), and two threads. A consideration of Figures 4—25 leads me to the following results:



shown in Figures 10—15, further on the four-shaft weft cross twill shown in Figures 16—20, and finally on the three-shaft weft twill shown in Figures 21—25, that is to say, in the commonest weaves (apart from plain weave) that are used for real and artificial silk. Of course the remarks here made and the theoretical explanation and the sketches of the origin of false twill apply for all other weaves also. If twill, e. g. eight-shaft fine weft twill 1/7, is examined, it will be found, however, that every sett of the reed, naturally except with one or two threads, causes a reverse twill. Eight-threads produce reed marks, that is, twill in weft direction, as is always the case when the number of the threads drawn into one split is equal to the weave repeat number or to the half of it, Seven threads cause a very prominent reverse twill in the fabric which slopes very flat and

1. 5-thread sateen
 - Figure 4 3 threads marked twill line
 - " 5 4 " good
 - " 6 5 " reedy; favours cracks
 - " 7 6 " marked twill line
 - " 8 7 " less strongly marked twill line
 - " 9 8 " good
2. 8-thread sateen
 - Figure 10 3 threads marked twill line
 - " 11 4 " reedy, favours cracks, but in spite of this preferable to all other setts unless 7 threads
 - " 12 5 " slight twill line
 - " 13 6 " very marked twill line
 - " 14 7 " very slight twill line
 - " 15 8 " inclined to be reedy

3. 4-thread weft cross twill

Figure 16	3 threads	good
„	17 4	„ very reedy, not to be recommended
„	18 4	„ more regular reediness (dents displaced by one thread)
„	19 5	„ good
„	20 6	„ good

4. 3-thread weft twill

Figure 21	3 threads	not to be recommended;
		very reedy
„	22 4	„ slight twill line
„	23 5	„ slighter twill line
„	24 6	„ good
„	25 7	„ good

Now it will be found that a false twill produced by unsuitable reeding is enormously increased if a comparatively coarse weft thread is taken instead of one of about the same count as the warp. The reason for this is evident if it is borne in mind that, when a fine weft is used, a thread lying close to the dent and influenced by it forms an interlacing point which, although abnormal, is still in practice almost a square. The deformation only becomes evident when it is made prominent and is pulled out by a coarse weft, say, of stout cotton. Figures 1—3 show this quite clearly, the weft in Figure 3 being thrice as thick as in Figure 1, and in Figure 2 twice as strong as in Figure 1. Otherwise the false twill runs more steeply here too, which means that it is more unpleasant for the eye and all the more prominent.

One other factor appears and that is the connections between the twist angle of the warp and weft threads on the one hand and the direction of the ridge on the other hand (which is partly in evidence in suits with herring bone patterns). It is well known that a ridge gives a closed effect when the spirals of the yarn run in the contrary direction to it. Twist means conservation of energy. The moment that the shed changes when weaving with open shed, the thread raised in the weave repeat becomes slack, which means that the force stored up in the twist has an opportunity to exert itself. This follows somewhat in the direction of the spirals shown in Figure 26, that is to say, towards the left with left-handed twist, and therefore in the case of two-thread reeded fabrics supports in one case the pushing off action of the dent, and in the other case opposes it. In this way

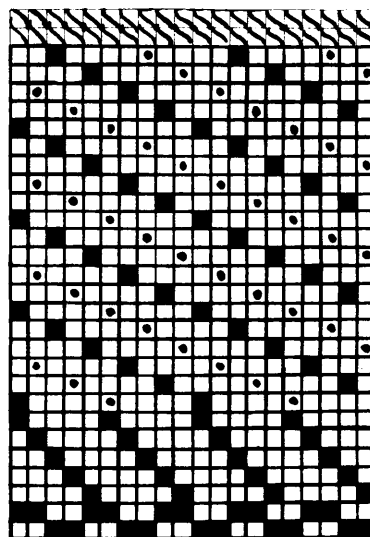
Figure 26 arises. It is thus possible to produce a twill even with two warps per dent.

This twill is further heightened by a left twisted weft (the twist angle runs contrary to the ridge of the false twill) so that even in a mixed silk fabric with two warps per dent

warp: 19/21 den. organzine RL and

weft: 120 den. viscose, weft twist L about 130 twist as described above, a false twill can be produced, which would seem to contradict the theory just set out. If the twisted viscose weft is replaced by an untwisted cuprammonium weft, the effect is diminished very much.

I may sum up as follows. When a false twill is produced, the initial action is set up by the dent pushing the warp aside, which effect is secondarily heightened by the negative action of the twisted warp and weft yarn.



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The false twill which is formed in the manufacture of cloth, covers, and overcoatings and is the most feared of all must be distinguished from that described above and has quite a different origin. This false twill is caused by unskilful tying of the under weft or the under cloth to the upper weft or the upper fabric. It can be explained on *purely technical weaving grounds* and does not fall within the scope of this article. A false twill in such fabrics, in particular in fabrics with a coarse warp and a rough surface, although theoretically present also in the raw fabric, can be completely obliterated, as mentioned at the outset, by suitable aftertreatment, especially by fulling, washing, raising, or by felting.

The author is well aware that a reference will be found here and there in technical literature to the unpleasant fault of the formation of false twill, but he hopes that he has here indicated a way which permits after due consideration of rapidly finding the most suitable reeding for any given sett. Of course the

density and the nature of the warp set limits which may occasionally prevent the selection of the most suitable reeding practically adapted for a given weave. In such a case the attempt can only be made carefully to weigh already on the design paper the advantages and disadvantages of the reeding in view.