# SATINS & SATEENS.

I do not know whether the story is true, but this is the way
it is told. You may believe it or not.

Regardless of what the historians say, one of the main fac-
tors which caused the decline of the Roman Empire was the price of
silk. Silk, recently introduced from the Orient, became so fashionable
that the citizens were buying it at any price. And the price was
more than "any": it was the price of gold pound for pound. One pound
of silk = one pound of gold. By our present standards it would amount
to $ 500 for one pound of silk, or about 150 times more than what
we are paying now.

Not only that the price was high but the silk yarn was not
availbale at all. Thus the silk merchant had a choice of either re-
selling the fabrics imported from the Orient, or of unravelling the
imported cloth thread by thread and use such "reclaimed" yarn for
weaving.

Under such circumstances it is no wonder that the weavers
tried to invent fabrics which would show all the silk that was in
them on one side of the cloth. It meant for them a neat profit of
250 dollars on each pound of a finished fabric. Not bad, even by
our standards!

And according to the legend this is how the Satin Weave
has been invented.

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Satin is a weave which throws most of the warp to one side,
and most of the weft to the other side of the fabric in the same way
as it happens in all twills of the type 1:N (1:2, 1:3 etc.). However
the length of floats in satins is of a much higher order than in
twills used for tweeds and similar purposes. Long floats mean of
course poor wearing qualitites, but the fabrics made for the appea-
rance were not supposed to be practical. Evidently the old Romans
were as keen on "keeping up with the Joneses" as we are. Incidental-
ly - long floats make the fabric very soft, and glossy.

When there is as much weft on one side as warp on the other
we call such Satin "a true satin". When it is mostly warp on one
side, but not so much weft on the other we have plain Satin. Ob-

viously here the silk or other expensive yarn will be in warp, when the weft may be slightly heavier and cheaper. Finally when we have very closely woven weft and comparatively open warp, the fabric is Sateen. This is the kind very often woven by hobbyists because it is faster in warping and threading, although more difficult in weaving.

In Satin the points where the weft crosses the warp (ties) should not lie on a diagonal. They must be staggered in a special way which we shall describe later. All Satins are Broken Twills of the type 1:N, where N is 4 or more

### SATINET.

With four frames we have several broken twills. They all are of the 1:3 type (over one under three). None of them is a real Satin, but they are the nearest thing, and therefore called Satinet (or Satinette) = imitation Satin. Here are three examples:
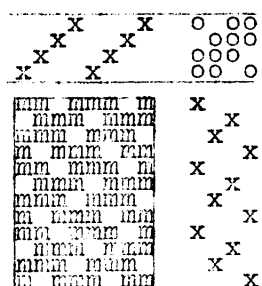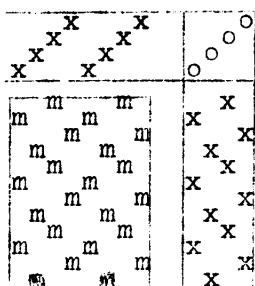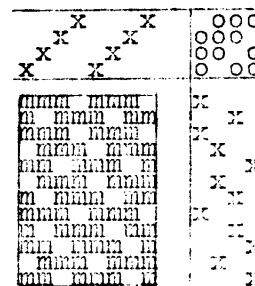


Fig.1          Fig.2          Fig.3

Fig.1 and 2 show the same fabric from both sides, and fig.3 - a variation in treadling. The easiest imitation of satin on 4 frames is the Sateen, i.e. satin with weft effect. We set the warp more open than usual, and use a soft, glossy, and comparatively heavy weft. It is important to use the same colour for both: warp and weft.

### SATIN

A real satin must be woven on 5 frames at least. When making the project of a satin we start with the draw-down of one repeat of the fabric. Since the threading of a satin is always straight (1,2, 3,4,5 etc.) the draw-down of one repeat gives us also one repeat of treadling (compare figs.1,2, and 3). Or, if we use straight treadling (which is rather unlikely), then the draw-down is identical with the tie-up.

To find the draw-down we proceed as follows: we draw first a square with as many divisions in both vertical and horizontal direction as the number of harness-frames. For instance 5 by 5 for five frames (fig.4). Next we find out or figure out so called "move". This is the distance in the horizontal direction between two "ties" or black marks on our draw-down. The move for 5 frame satin is either 2 or 3. Only one of them in the same piece of weaving. Let us say that we decided to take 2 as our "move". We place the first "tie", or a black square, or a cross in the first column and the first row (fig.4). To find the next tie we add 2 (move) to the number of column (1) which makes 3. Therefore we place the second tie in the third column of the second row. Then we add 2 again and get 5 as the proper

column for the next tie. But to find the fourth tie we must add 2
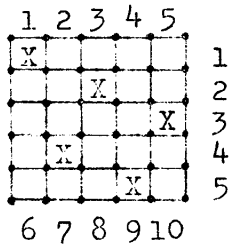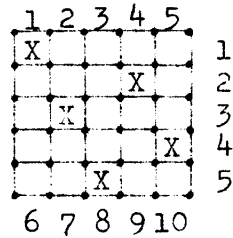to 5 which makes 7, and we have no 7th column. Therefore we count
the first column as 6, and
the second as 7. Thus the
fourth tie comes in the 2-nd
column. The last tie is
then 2 + 2, or the 4-th
column.

We mentionned that the
"move" for a 5-frame satin
is either 2 or 3. How then
the draw-down would look if
we adopted the number 3
instead of 2? Fig 5 shows
this second possibility. We start as before in the left hand upper
corner. Then we add 3 to 1 and get 4. This is the tie in the second
row. Then we add 3 to 4 and get 7, or the same as 2. Then 2 plus 3
is 5 and this is the fourth tie. The last tie is 5 + 3 = 8, and the
8-th column is the same as the third.



Fig.4



Fig.5

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How do we figure out the move? The rule is as follows.
Find two numbers which give a sum equal to the number of frames.
None of these numbers can be 1; the two numbers cannot be divided
one by another, or by any other number at the same time.

Thus for 5 frames we have only 2 and 3. Either 2 or 3 can be
the Move. We could decompose 5 into 4 and 1, but 1 is not allowed by
the rule.

For 6 frames we have: 1+5=6; 2+4=6; 3+3=6; 4+2=6; 5+1=6.
The first and the last combination will not do, because they include
number 1. Four and two are no good either because 4 can be divided
by 2. Finally 3 and 3 are also out of the question since 3 can be
divided by 3. Therefore there is no satin on 6 frames.

With 7 frames we have the following possibilities: 1-6, 2-5,
3-4, 4-3, 5-2, 6-1. The first and the last are out. But the remaining
numbers: 2,3,4, and 5 are all good for the Move. Does it really mean
that we have four different Satins with 7 frames? Not quite. If we
make the four draw-downs each based on a different number, we shall
see that they are all very similar and that the only difference is
in the sequence in which the ties follow each other. To get two
really different satins we have to go beyond 10 frames!

The case of the 8-frame satin is rather unexpected. Of all
the combinations: 1-7, 2-6, 3-5, 4-4, 5-3, 6-2, and 7-1, only the
pair: 3 and 5 gives a Satin. On the other hand it is a very good
satin. Fig.6 shows the comparison of the 8-frame satin with a 7
and a 9-frame ones. It is much superior to both because the distance
between the ties is about the same in all direction, and there is
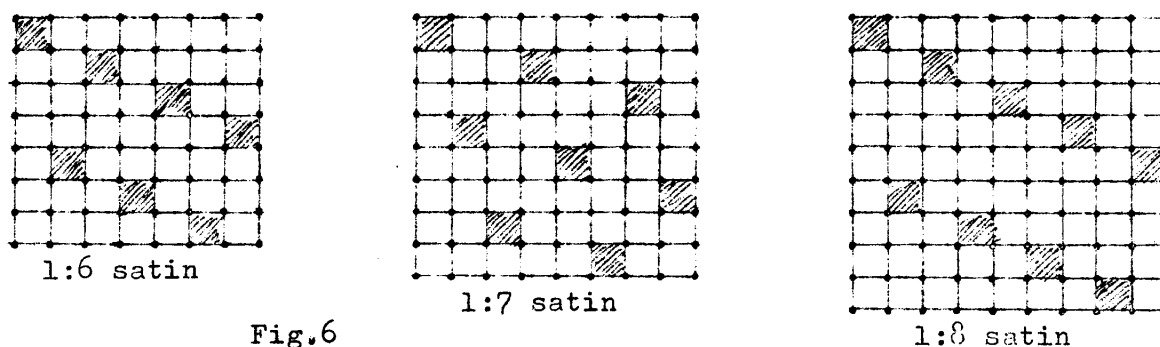hardly any trace of a diagonal.

1:6 satin

Fig.6

1:7 satin

1:8 satin

Higher satins are of course getting better and better, inasmuch as less and less of the wrong side shows on the right side of the fabric, but at the same time the floats are getting longer, and the fabric softer, and weaker. Therefore the higher satins must be woven in very fine yarns with a very close sett of warp. For the "coarse" satins (up to and including 8 frames) we can use standard yarns easily available, but for the "fine" satins we must first look for a supply of yarns which are rather out of the way, such as silk of at least 25,000 yds/lb. To find the proper sett of warp compare the article in MW 28. In the second table the factors are given only for 1:4 and 1:7 satins. For higher satins this factor will be closer to 1.

In the table which follows we give all satins which can be woven with 5 to 16 frames. The numbers opposite the satin number are the "moves", and the reader should be able to figure out the draw-down on the same principle as in the example given for 5 frames.

| No.of frames: | Satin: | Moves: | The best move: |
|---|---|---|---|
| 5 | 1:4 | 2,3 | 2,3 |
| 6 | 1:5 | none | |
| 7 | 1:6 | 2,3,4,5 | |
| 8 | 1:7 | 3,5 | 3,5 |
| 9 | 1:8 | 2,4,5,7 | |
| 10 | 1:9 | 3,7 | 3,7 |
| 11 | 1:10 | 2,3,4,5,6,7,8,9 | 3,8 |
| 12 | 1:11 | 5,7 | |
| 13 | 1:12 | 2,3,4,5,6,7,8,9,10,11 | 5,8 |
| 14 | 1:13 | 3,5,9,11 | |
| 15 | 1:14 | 2,4,7,8,11,13 | 4,11 |
| 16 | 1:15 | 3,5,7,9,11,13 | |

Of all these satins the best are: 1:4 and 1:7 for an 8-frame loom, and 1:14 for a 16-frame one. The second best are: 1:9, 1:10, and 1:12. The best moves are given in the above table.

In the next issue of the Master Weaver we shall describe practical applications of the Satin Weave to both traditional and modern weaving.

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