

Fig. 65. Skip Plain Weave. (a) General view (b) Cross section

The above describes the weaving of a very simple pattern with this technique. But depending on the course the wefts take through the back layer of the shed, a great range of complex designs is possible. One colour should always be the 'leader' in this technique. In the above description, it was A, the black weft. Whatever course A takes, dictated by the design required, B takes exactly the opposite course.

The limiting factor in designs is the length of float on the reverse of the rug, which should not exceed about $1\frac{1}{2}$ inches. This means that there should not be an area of one colour on the face wider than $1\frac{1}{2}$ inches. If a larger area is wanted, then spot it or stripe it with the other colour, so that the floats of the latter do not go right across the width of the area. It is this avoidance of long floats which gives some of the special character to designs in this technique. See Plates 14 and 15.

But the really special feature is the opportunity it gives the weaver of producing the finest possible lines, in both the vertical and diagonal directions. Even using conventional tapestry techniques, such lines are very difficult to produce. This is therefore the chief feature to exploit when using the technique.

Because of the floats on the reverse, it is not practical to use this technique all over a rug, unless of course it is to be used purely as a decorative textile. So it is best to alternate stripes of this technique with stripes of plain weave. A warp with 6 e.p.i. is suitable, threaded straight on four shafts, single in the heald. Then for the plain weave stripes, lift 12 and 34 and use a weft of three to four thicknesses of 2-ply carpet wool. For the stripes of skip plain weave, lift 13 and 24, and use wefts consisting of two thicknesses of 2-ply carpet wool. Woven thus, the floats will not give too much extra thickness in the skip plain weave sections.

Weaving a narrow sample, the shuttle itself can be made to dive in and out of the back layer of the shed, but for a full width rug it is simpler to use a pick-up stick. This should be flat and have a cross section of about 2 inches by $\frac{1}{4}$ inch and be pointed at both ends. The stick is threaded in and out of the back layer of the shed as required by the design, then turned on its edge, forming a shed for the shuttle to be thrown through. The stick is withdrawn and threaded through the same back layer, but taking an exactly opposite course, using the weft just thrown as a guide. It is then turned on its edge and the second shuttle thrown. The stick is removed and the two wefts beaten up together. Threads seldom need to be counted once the first few picks of the design are woven, and can act as a guide to what follows.

It could be argued that it would be much easier to weave the fabric the other way up, so that the shuttle goes in and out of the *upper* layer of the shed, and is therefore more convenient for the weaver to manipulate. But the drawback is that the floats (now on the face) obscure what is already woven. So unless the weaver knows his design by heart, which is probably the case with the Middle Eastern weavers, the advantage is illusory.

Three wefts can be used instead of two and are often found in Eastern examples of this technique. The introduction of the third weft makes the avoidance of long floats more difficult than usual. At any one point in the weaving, one of the three wefts is lying in the shed and the other two are floating on the reverse. Plate 16 shows an example using three colours.

If the weave is mentally turned through a right angle, so that what was the black and white weft becomes the warp, the structure is now warp-face and is identical with the 'saha' technique, described in Chapter 11. This is one of the many instances where a certain weave structure, in which one of the thread elements predominates, can be woven either as a warp-face or as a weft-face textile.

F. Technique for Weaving Letters and Figures

Occasionally the weaver may want to record his own initials on a rug or the date it was woven. Or a rug woven for presentation may have to include some reference to the donor. For these purposes, the following simple method is useful. It is satisfying because it is a real woven technique not an embroidered one.

The technique is basically a stripe of pick-and-pick weaving which is distorted to produce letters or figures by floating the wefts over or under three ends in appropriate places. So the rug has to have an end border of pick-and-pick weave in two contrasting colours. See Plate 17 and Fig. 66. The latter shows the details of producing the letter 'P':

Beginning just above the full-stop at the foot of the letter, it will be seen that the black weft has floated over three ends for four picks, labelled 1 to 4. The white weft floats correspondingly under three ends in this position. These floats are produced by

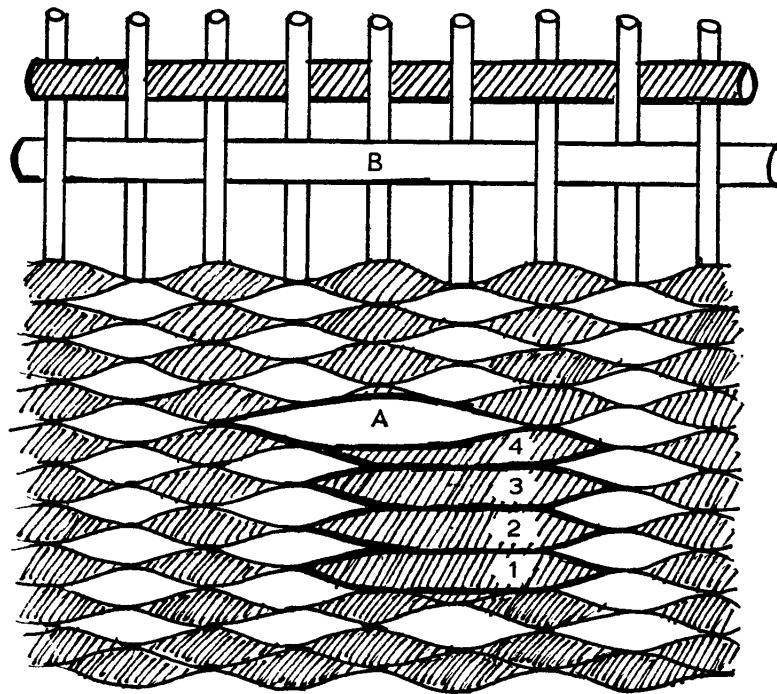


Fig. 66. Weaving letters and figures

bringing the shuttle out of the front (or the back) of the shed, and passing it over (or under) one end before returning it into the shed. The net result is a solid area of black on the face and of white on the reverse.

To produce the lower part of the loop of the 'P', the white weft has to float over three ends. This float is labelled A in Fig. 66; there is of course a corresponding black float on the reverse of the rug. The upper part of the loop is shown in the expanded section of the diagram and is labelled B. Note the float of black weft passing under three ends above it. When these are beaten down, the letter 'P' will be completed and should be followed with a few picks of black weft only.

In this technique it is best if one of the colours, e.g., white, always initiates the changes of outline by floating where necessary. Then the other colour always follows the white's lead, floating on the reverse where the white floats on the face and vice versa.

5 · Weft-face Rugs in Plain Weave

PART TWO: TECHNIQUES IN WHICH THE WEFT DOES NOT RUN FROM SELVAGE TO SELVAGE

INTRODUCTION

In all the techniques described so far the wefts have passed from selvage to selvage, even though this course may have been interrupted for some reason, e.g., twisting.

The characteristic of the techniques described in the present chapter is that the wefts never take a simple selvage to selvage course, they either weave within the confines of a small area, or if they do pass from selvage to selvage they take a complicated zigzag course. These methods lead to a far greater freedom in design.

1. MEET AND SEPARATE TECHNIQUE

Meet and Separate is the convenient name given to a technique which is basically only a special application of *hatching*, a method used in tapestry. In tapestry it is generally used to shade from one colour to another, i.e., to give an area of mixed colours, A and B, between areas of solid A and solid B. In this technique it is used with two contrasting colours so that the hatched area is not just a half-way stage, but becomes an important element in itself.

A. Normal Method

(i) USING TWO COLOURS

The normal method is shown in Fig. 67 and the sequence is as follows:

Lift even-numbered ends, insert the two wefts A and B, from opposite selvages (see arrows) and bring them both out of the shed between raised ends 6 and 8.

Lift odd-numbered ends, insert A and B down into the shed between raised ends 7 and 9 and let each return to its own selvage. So the wefts have met and then separated, leaving a small slit in the rug at the meeting point, X.

Lift even-numbered ends, insert wefts into this shed as before, but this time bring them out of the shed, between raised ends 2 and 4.

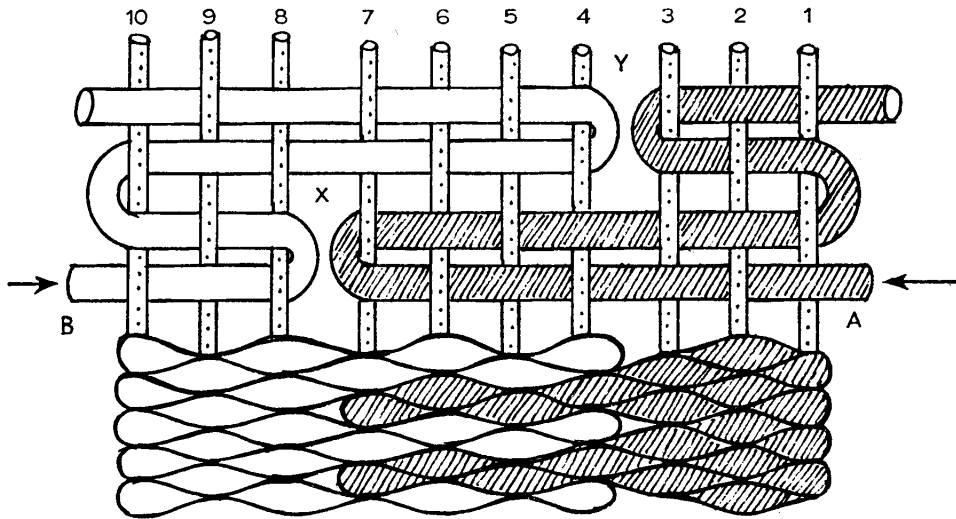


Fig. 67. Meet and Separate Weave, normal method. Using two wefts

Lift odd-numbered ends, insert wefts down between raised ends 3 and 5 into the shed, and let them return to their own selvages. There is now a small slit at this new meeting point, Y.

If these four picks are repeated, with the meeting points alternating between positions X and Y, the result will be as at the bottom of Fig. 67, i.e., an area of solid black to the right, an area of solid white to the left, and, in between, a striped area made up of two picks of black alternating with two picks of white. Note that two shuttles are giving three areas.

It will be immediately apparent that the outline of this central striped area can be altered by changing the position of the meeting points, X and Y; for it is these points which establish its right and left boundary. Thus to enlarge the area X must move to the left and Y to the right.

Once this principle is learnt, a shape of any complexity can be woven. Fig 68 (a) shows the weft plan for weaving the triangle seen in Fig. 68 (b).

One obvious variation is to make the wefts meet twice at X and then twice at Y, so that the central area is made up of four picks of black alternating with four picks of white.

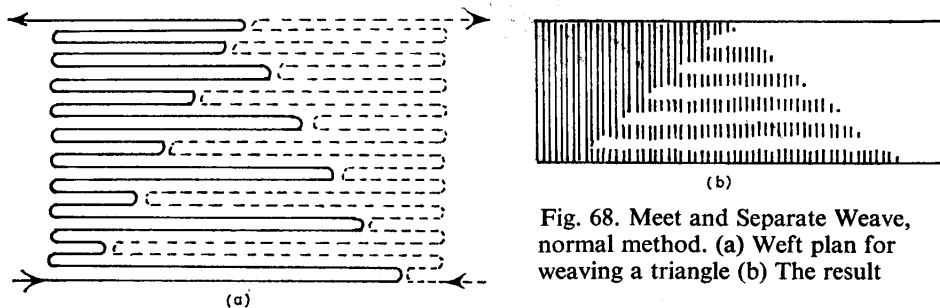


Fig. 68. Meet and Separate Weave, normal method. (a) Weft plan for weaving a triangle (b) The result

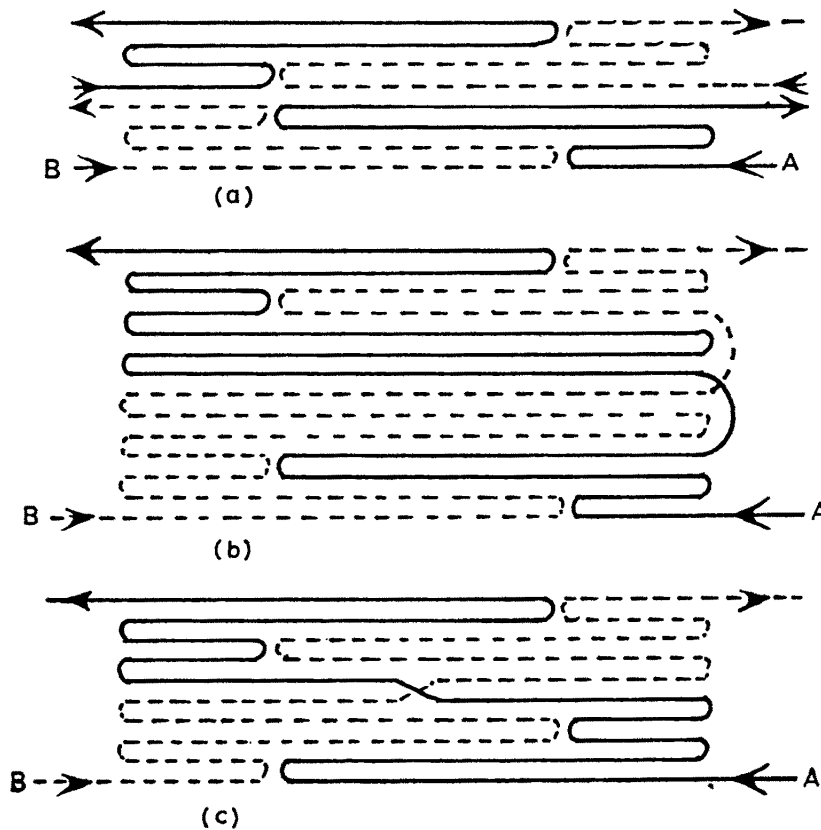


Fig. 69
Meet and Separate Weave,
normal method.
(a-c) three
methods of
crossing colours
over

Crossing Colours Over

The need will probably be felt to switch the two colours over, i.e., to bring the black over to the left and the white to the right, otherwise one side of the rug will be darker than the other. It is difficult to do this without destroying the continuity of the central area. In fact the only perfect way is to cut both wefts when they are at their selvages and then start them again at the opposite selvages. The next meeting place will then have to be at the same side as the one before the colour change, in order to preserve the striped sequence, see Fig. 69 (a).

Amongst other ways which upset the striped sequence, but seem a little less contrived, are the following.

(a) Start with both wefts at their own selvages and then weave three picks of B from selvage to selvage, followed by three picks of A from selvage to selvage. Then continue normally, the next meeting point being on the same side as the one before the colour change, see Fig. 69 (b). This gives a black and white stripe at the point of colour change.

(b) Bring both wefts out at the centre, not at either of the normal meeting points. Change shed and then instead of letting them return to their own selvage, cross them exactly as in the Crossed Weft technique. The next meeting point is on the opposite side to the one before the colour change. This method gives a row of spots in the central area, see Fig. 69 (c), but if it is used at the point of a striped triangle, there will be no spots. Plate 18 shows the two above methods.

So far the meeting points, X and Y, have been ordered in a precise way, but a rug of quite a different character can be woven if the meeting points are more or less haphazard. Fingers of colour from each side reach varying distances into the opposite colour, giving more movement and variation.

(ii) USING THREE COLOURS

Just as two wefts can give three areas, so three wefts can give five areas. Plate 19 shows a simple design using three wefts. Note that there are three areas of solid colour and two striped areas. The two outside wefts (black) move in relation to the striped area on their side exactly as in the method described above. But the central weft (white) takes a more complicated course, being involved in both the striped areas and in the central white area; it never reaches either selvage.

Fig. 70 will help to explain this. Note that in the first shed, each of the three wefts is moving in the opposite direction to its neighbour, see arrows. Weft A moves to the left, B to the right and C to the left. The sequence is thus:

Pick 1, B meets A at right boundary of right-hand striped area (point Q), and C passes to the selvage.

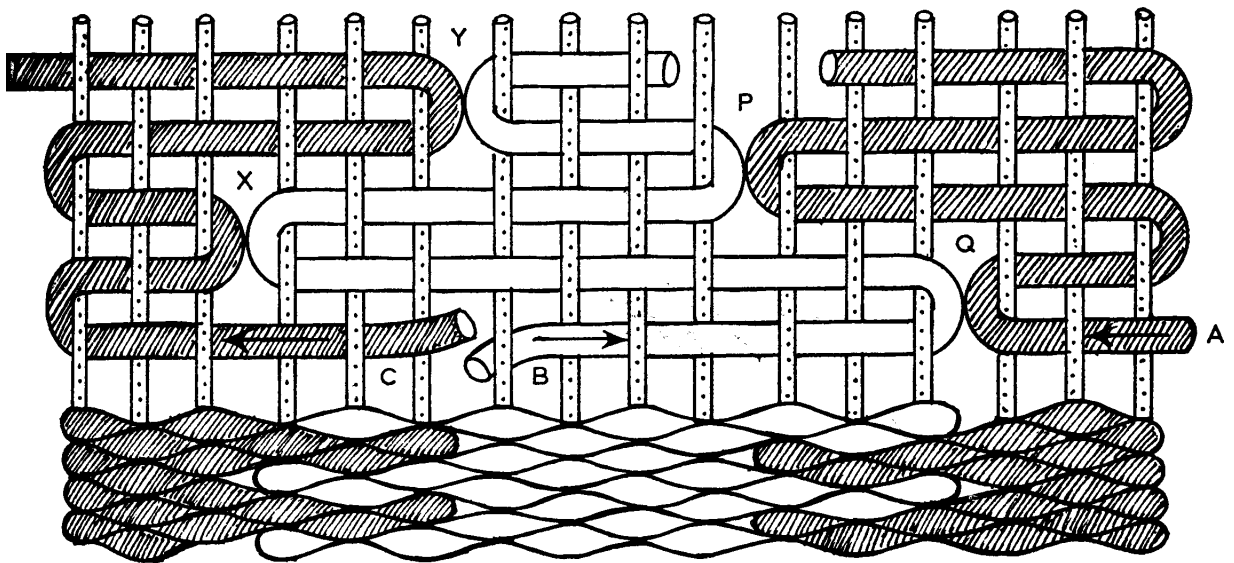


Fig. 70. Meet and Separate Weave, normal method. Using three wefts

Pick 2, B meets C at left boundary of left-hand striped area (point X), and A passes to the selvage.

Pick 3, B meets A at left boundary of right-hand striped area (point P), and C passes to the selvage.

Pick 4, B meets C, at right boundary of left-hand striped area (point Y), and A passes to the selvage.

These four picks constitute the repeat and if continued will produce the five areas seen at the bottom of Fig. 70. Note it is always best to move the central weft first in each shed, as it establishes where the meeting points are to be.

To alter the outline of the two striped areas all four meeting points may have to be shifted. To achieve the effect in Plate 19, points X and Y have gradually to separate, as do points P and Q. Then points X and Y must gradually approach each other as also do points P and Q. Some difficulties arise because the four meeting points are one pick ahead of each other. So the two striped areas cannot change outlines simultaneously, one must precede the other.

Interchanging Colours with Three Wefts

Any two adjacent colours can be interchanged using the Crossed Weft technique. For example, A and B could be crossed at P or Q, and B and C could be crossed at X or Y. So the two outside colours could be switched over, but it would have to be done in stages, needing four picks.

B. Method Using Clasped Wefts

(i) USING TWO COLOURS

The Clasped Weft method has an interesting application to the Meet and Separate technique, greatly increasing its range of possibilities.

For this, the two wefts involved must be half the normal thickness. If they consisted above of 2-ply carpet wool used fourfold, they must here be 2-ply carpet wool used twofold. One weft A (black) is wound on a shuttle and it will weave from the right selvage. The other colour B (white) is wound as a ball or on a cone and is placed to the left of the rug, perhaps on the floor, see Fig. 71. The sequence is as follows:

Throw the shuttle (carrying the black weft) to the left across the full width of the rug. At the left selvage take out the shuttle and catch it round the white weft. Do not change the shed, but throw the shuttle back to the right selvage. The returning black weft drags a loop of white weft into the shed, see pick 1 in Fig. 71. So there is now a doubled length of black and white in the shed, the two wefts being looped into each other (clasped) at some point, X in Fig. 71. By pulling on the two free ends of the weft, this point can be moved from side to side and its exact position adjusted before the weft is beaten.

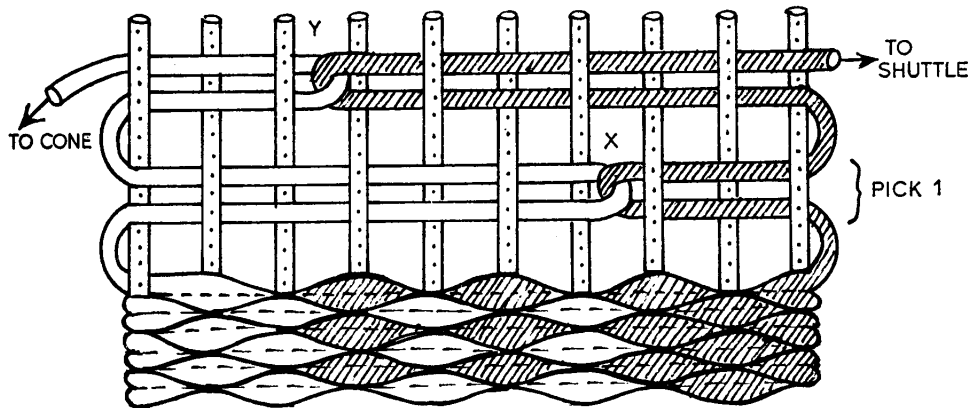


Fig. 71. Meet and Separate Weave, method using clasped wefts

Change the shed and repeat the above procedure.

Note—Tension is put on the wefts to move their meeting point to the required position, so remember to wave the wefts after this stage and before beating.

- The fact that there are always doubled wefts in the shed explains why these wefts must begin by being half the normal thickness.
- A simple way to catch one weft round the other at the left selvage is to suspend a loop of wire from the loom framework on the left so that it is to the side of, and a bit above, the level of the fell of the rug. Then lead the white weft up from the cone on the floor, through the loop and then to the rug, see Fig. 72. Catch the shuttle with the hand under the part marked X. Withdraw the shuttle, pass it over X and back into the shed. This can be done very quickly.

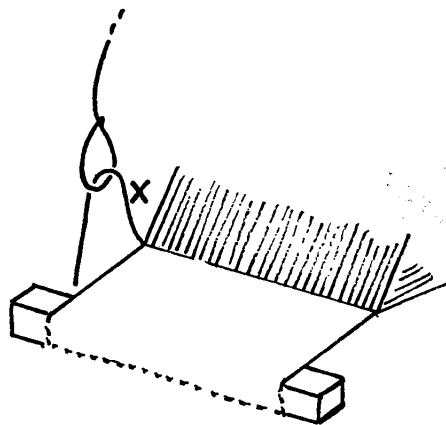


Fig. 72
Meet and Separate Weave, method using clasped wefts. View of loom

Now if the meeting points (labelled X and Y as before) are alternated from side to side as in the normal Meet and Separate technique, the central area, instead of consisting of 2-and-2 stripes, will consist of pick-and-pick stripes, as at the bottom of Fig. 71. If this is not understood, compare the top parts of Fig. 67 and Fig. 71. The former shows four picks, the latter only two.

If the meeting point is twice at X and then twice at Y, the central area will consist of 2-and-2 stripes as before. If it is twice at X then once at Y, and the sequence repeated, the central area will have black spots on a white ground. So the great advantage given by the Claspéd Weft method is the possibility of varying the striping of the central area. In fact it will be discovered that by varying the meeting points appropriately any two-weft pattern can be produced in the central area.

Another variation specially suited to the Claspéd Weft method is to use two colours for one of the side areas. In other words, have two cones holding different colours on the floor to the left of the rug. When the shuttle comes across, it can catch either one or other of them. If it catches them alternately, then the left hand area instead of being a solid colour will show pick-and-pick stripes. Any other sort of striping can be produced in this area. See Plate 20.

The above variations show there is an endless field for exploration here.

(ii) USING THREE COLOURS

Three colours can be used to give five areas as with the normal method for Meet and Separate technique. There are two possible methods.

(a) The two outer colours are on cones at their respective sides, and the central colour is on a shuttle which lies at the centre of the warp. This shuttle passes down into the shed and to the left selvage, picks up a loop of that colour and then goes straight across to the right selvage. Here it picks up a loop of the other colour and returns to the centre where it leaves the shed. All this takes place in one shed. The procedure is repeated in the next shed.

(b) The two outer colours are on shuttles and the central colour is in a ball or in some convenient form. The right-hand shuttle is thrown across to the left selvage, a loop of the central weft is pushed down into the shed so that on the return of the right-hand shuttle its weft picks up a loop of the central weft. In the same shed, the left-hand shuttle is thrown across to the right selvage, a loop of central weft pushed down as before and picked up by the weft of the returning shuttle. The shed is changed and the sequence repeated.

A simple implement, made from stiff wire, with a loop at one end, and another about 6 inches away, will help with this method, see Fig. 73. Yarn from the central ball is threaded through the two loops in the order shown and then goes to the fell of the rug.

Throw the right shuttle to the left selvage. Now introduce this implement down

through the centre of the warp, passing over the pick just thrown (marked A in Fig. 73), and as close to the reed as possible. Throw the right shuttle back and draw out the implement. The weft from the right shuttle will now be looped around the central weft. Repeat this manoeuvre with the left shuttle. Note that the implement remains threaded all the time, yarn being paid out from the ball, through the wire loops and into the weaving area.

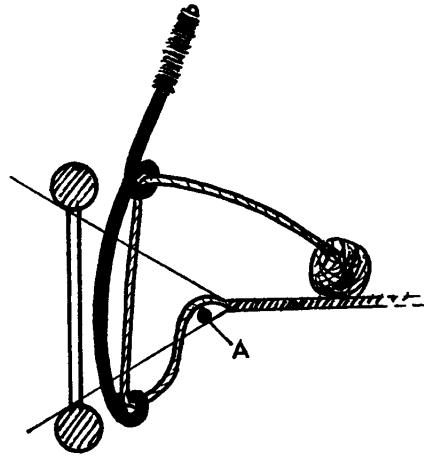


Fig. 73
Meet and Separate
Weave, method using
clasped wefts.
Technique for using
three colours

An alternative method is to have the central weft in a ball or cone underneath the warp and pull a loop up instead of pushing one down. Either way needs some development to make it more practical.

However it is carried out, this is a slow process and necessitates a small float of the central float between each pick, but it has more design possibilities than when using three colours in the normal Meet and Separate technique.

2. COMPENSATED INLAY

In the various inlay methods used in fine weaving, the inlay weft is an extra element added to certain parts of the cloth. So in these parts there is an increased thickness of weft. But in a weft-face technique, there has to be equal thickness of weft throughout, so it is only possible to inlay a weft, if some method is found of compensating for its added thickness.

A. Basic Method

Fig 74 (a) shows the basic idea.

Weave two picks of the white weft (the inlay weft), where required in the centre of the warp.

Weave the black weft (the background weft) from the right selvage up to the right edge of the inlay.

Change shed, take the black weft to the right selvage.

Change shed, take it right across to the left selvage.

Change shed, take it up to the left edge of the inlay area.

Change shed, take it back to the left selvage.

This characteristic zigzag course of the black weft is the means of compensating for the added thickness of the inlay weft. It will be seen from Fig. 74 (a) that there are now three picks of weft all the way across.

There are now two main possibilities.

(i) Return the black weft to the right selvage in the next shed and repeat the process over again. That is, take the white weft up over the two black picks and behind end 5 into the next shed, see Fig. 74 (b). Weave two picks of white as before, followed by the black as before. This will give a central inlay block consisting of alternate stripes of inlay weft and ground weft. It will be seen from the way the inlay weft jumps up that it naturally gives a vertical right edge to the inlay block. See Plate 21.

(ii) Leaving the black weft at the left selvage, weave two more picks of inlay weft. It can be inserted into the shed, either by carrying it over two warp ends (5 and 4 in Fig. 74 (c)), or by carrying it vertically upwards as in Fig. 74 (d). In either case it naturally gives an inclined right edge to the inlay block, sloping up to the right in Figs. 74 (c) and (d). After these two inlay picks, bring the ground weft back to the right selvage following the same zigzag course as before, see Fig. 74 (d). Here the weft sequence in the inlay block is two picks of inlay weft followed by one of ground weft. In other words it will be spotted as seen in Plate 22.

Thus the block can consist of either stripes or spots, depending upon which of the above two methods is used. Naturally, the two types can be combined in one block, e.g., by alternating repeats of the two methods.

It will be seen from Plates 21 and 22 that the successive jump-ups of the inlay weft, where it floats over some warp and weft, build up into a ridge. This is vertical in the case of a striped block and angled in the case of a spotted block. But there is no ridge when the jump-up is made as in Fig. 74 (d), and obviously there is no such ridge on the reverse of the rug. Note that the angled ridge can slant either way.

So far attention has been focused on the right-hand edge of the inlay block and the manner in which the jump-up of the inlay weft controls its outline. But the left-hand edge of the block is under no such control for the two inlay picks can weave as far as

desired to the left. So the left outline can be exactly as the weaver wishes. This leads to many design possibilities such as alternating long and short inlays to the left in an ordered way, see Fig. 75 (a). There are then two areas suggested, one of which has only half the normal quota of inlay picks.

It will be understood that the inlay weft jumps up on the right of the block simply because its first pick began on this side, see Fig. 74 (a). It could equally well have begun on the left. So it is simple to control on which side of the block the jump-up ridges

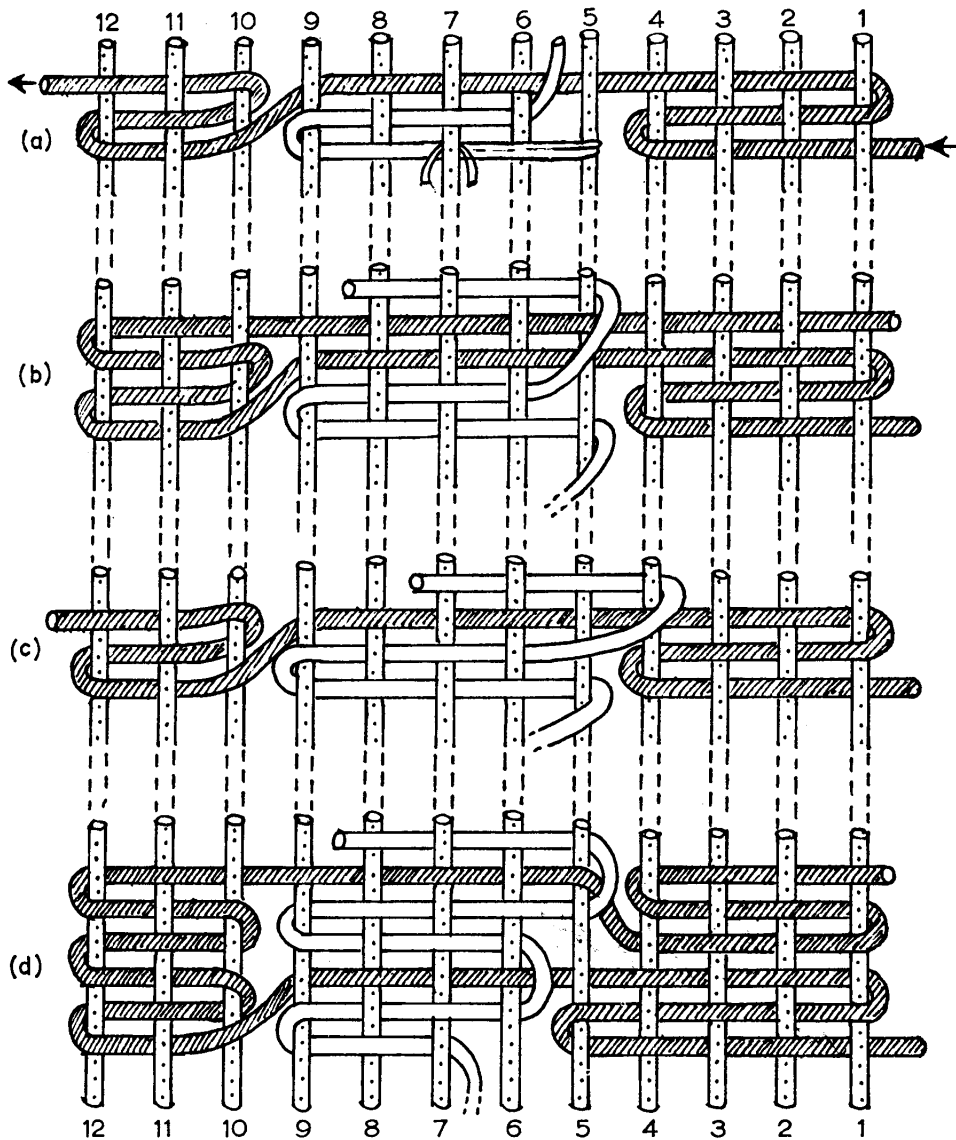


Fig. 74. Compensated Inlay. (a)-(d) Methods of jumping from one inlay to the next

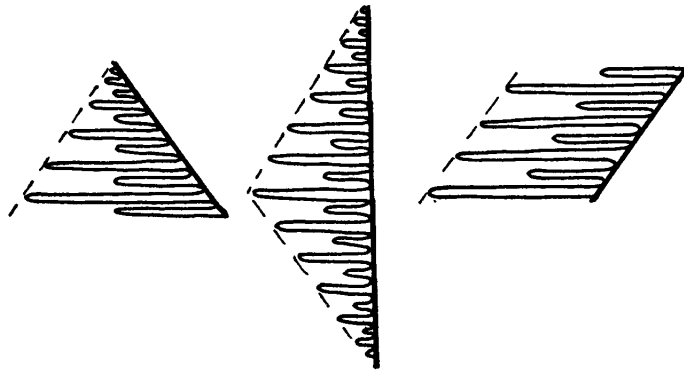
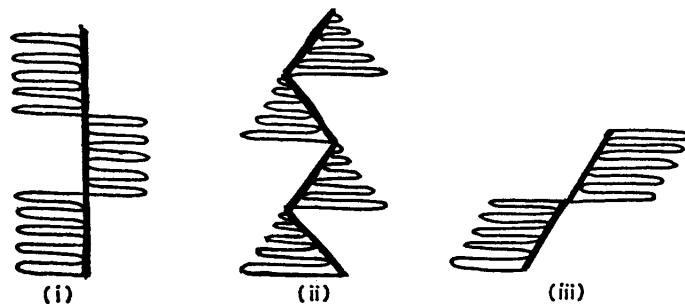


Fig. 75
Compensated
Inlay.
(a) Varying
lengths of inlay



(b) Inlaying to
right and left
of the jump-up
ridge

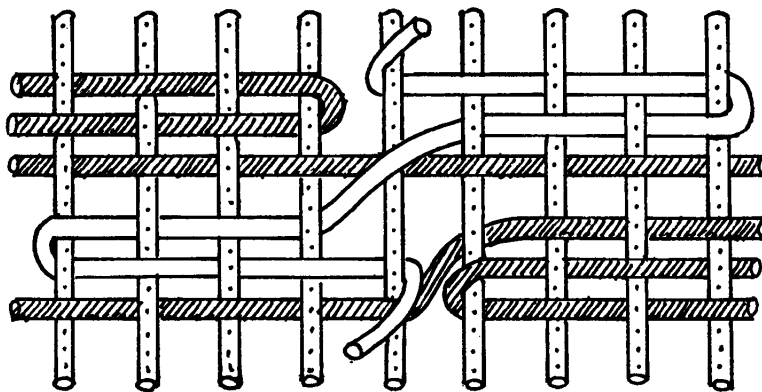


Fig. 76
Compensated
Inlay. Switching
from left-ward to
right-ward inlay

are to appear. This is important as they form a quite marked feature of the resulting design. In a certain type of design, due to the placing of successive blocks the ridge appears alternately to right and left, see Fig. 75 (b). The inlay weft is carried to the left for several repeats to make the first block. Then it is carried to the right to make the second block. The ridge (shown as a thick line) becomes a kind of spine from which the inlay stripes radiate to right and to left. Fig. 76 shows in detail the switch from left-ward to right-ward inlay, such as occurs at

the mid-point in Fig. 75 (b) (iii). It should be emphasized that it is impossible to move the ridge from one side to the other of a block simply by putting in a single inlay pick. This sounds as if it would work, but it is essential for the correct sequence of sheds that there should always be two picks (or some other even number) of inlay wefts.

B. Inlaying Several Blocks

One beauty of this technique is that however many inlay blocks there are across the width of the rug (each of course needing its own weft) only one ground weft is needed for all the intervening areas. But the ground weft has to take an increasingly zigzag course to compensate for each extra inlay block. Fig. 77 shows diagrammatically two

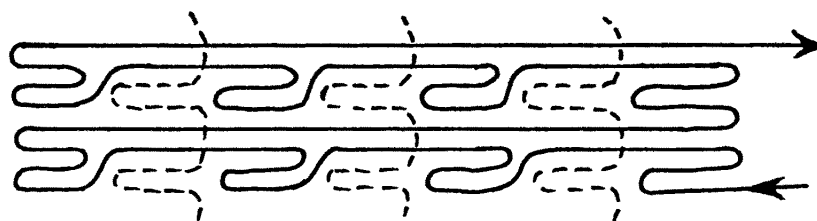


Fig. 77. Compensated Inlay. Weft plan when inlaying several blocks

complete repeats when there are three striped inlay blocks. Plates 21 and 22 show a hollow square and a hollow diamond. Naturally when weaving the middle third of these blocks, two inlay wefts have to be used and the jump-up ridge of the second weft can be seen to the left of each central hollow. Plate 23 shows a small sample woven with two inlay wefts. The weft forming the right half of the motif jumps up on its left, the weft forming the left half jumps up on its right. Because the method shown in Fig. 74 (d) was used, there are no ridges, just small vertical flicks of weft which give a toothed edge to the motif where it borders the central hollow. These teeth do not show on the reverse.

C. Two Inlay Wefts in One Block

In this development of the technique, two inlay wefts work in Contrary Motion within one block, see Fig. 78.

A convenient way to begin is to place the centre of a length of weft in the first shed so that there is weft to work with, hanging out of the left and right end of this pick.

Change shed, bring both wefts in towards the centre then bring them out of the shed in the space between raised warp ends 2 and 4.

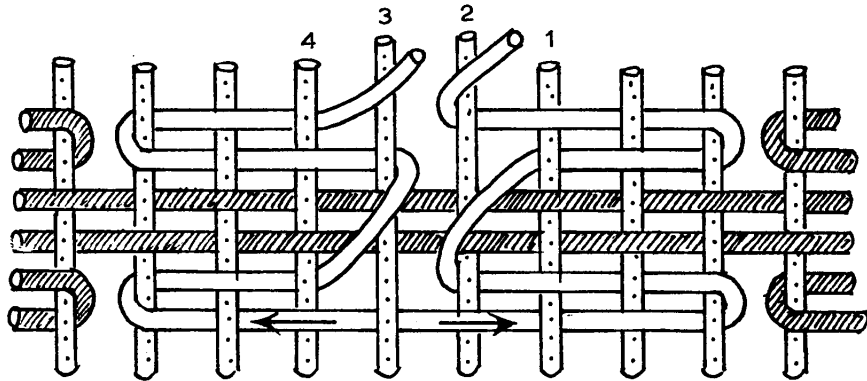


Fig. 78. Compensated Inlay. Using two wefts in one block.

Weave the ground weft, here inserted to give a striped block.

Carry both inlay wefts up over the ground weft, as shown, and down into the shed between raised ends 1 and 3. The wefts then separate in the first inlay shed and approach each other again in the second inlay shed.

Note—When making a spotted block, the method of working is similar to the above.

—As the inlay weft jump-up is at the centre of the block, both left- and right-hand edges of the block are controllable, and can assume any outline. So this method gives far greater freedom of design, see Plate 24.

—The ridge formed by the two wefts jumping up can be moved about the centre of the block to give vertical or inclined lines as in Plate 24, and becomes a prominent part of the design. With a striped block the ridge tends to be vertical, and with a spotted block, diagonal. A block in which a repeat as for stripes alternates with one as for spots has a very steeply angled ridge of pleasant texture, see Plate 27. The effects shown in Fig. 75 (a) for one weft can be applied to both the inlay wefts in this technique, see Plate 25.

There are other variations using two inlay wefts in one block, such as the following.

(a) There is, of course, no necessity for the two inlay wefts in the second pick to meet at the point they started from in the first pick. In other words, the jump-ups can be in a different place in each repeat, so that instead of their building up into a solid ridge, they appear as isolated elements dotted about the block.

(b) Instead of the two inlay wefts lying parallel at the jump-up point, they can cross over each other. This works best in a spotted block. Fig. 79 shows these crossed jump-ups. Note that they have been arranged haphazardly to illustrate the point made in (a) above. See Plate 26.

(c) The two inlay wefts forming a block can be of different colours, which either keep to their own side throughout the block or are switched over by means of crossed jump-ups.

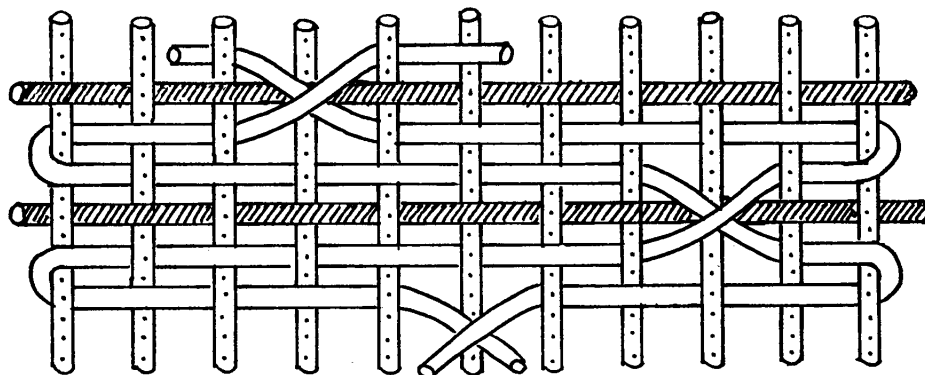


Fig. 79. Compensated Inlay. Using two wefts in one block and crossing them as they jump up

D. Four Inlay Wefts in One Block

Fig. 80 shows a block using four inlay wefts. It is really a pair of two-weft blocks side by side. To avoid a break in the centre, the two inner wefts are locked, and this lock is shifted from side to side to avoid any lumpiness. Note there are now two ridges which can be moved independently, see Plate 27. This variation gives the possibility of using up to four colours in one block.

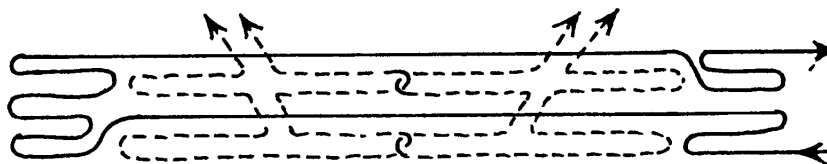


Fig. 80. Compensated Inlay. Using four wefts in one block

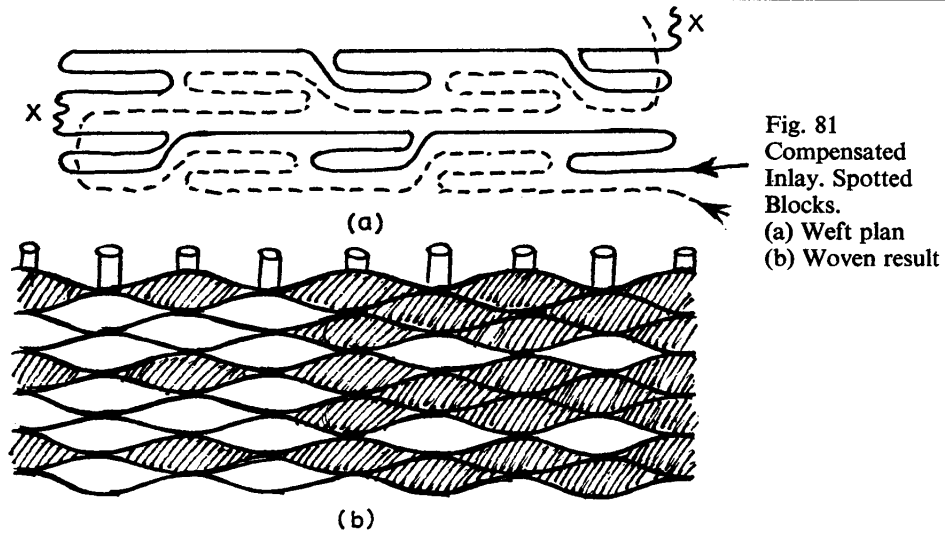
E. Several Blocks with One Inlay Weft

In this variation, both inlay weft and ground weft take a zigzag course from selvage to selvage. The chief advantage is that any number of blocks can be woven with just one inlay weft and one ground weft.

As with normal compensated inlay there are two main types of block.

(i) SPOTTED BLOCKS

Fig. 81 (a) shows the course taken by the two wefts to produce two spotted blocks. It will be obvious that the weft sequence in the blocks is three picks white, one pick black (which will appear as black spots on a white ground) and in the intervening areas it is three picks black, one pick white (which will appear as white spots on a black ground). Fig. 81 (b) shows this diagrammatically. The way wefts are disposed all over the rug means that the blocks are not greatly differentiated from the background. See Plate 28 where the central block seems to merge into the ground weave.



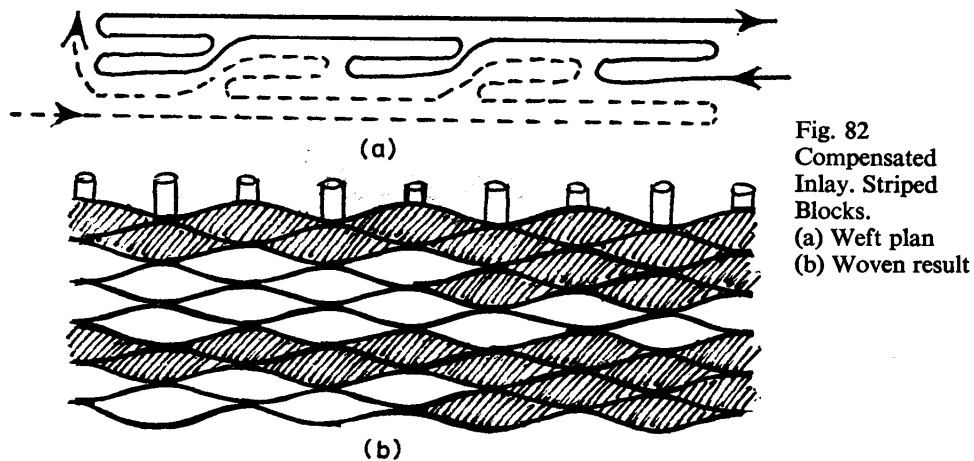
Note—Blocks and intervening areas should consist of an odd number of ends.

—The selvages are managed as described under ‘Spots’ in Chapter 4. The double twist of the ground weft around the selvage is indicated by X on Fig. 81 (a).

(ii) STRIPED BLOCKS

Here there is an extra pick of each weft which runs straight from selvage to selvage. That of the inlay weft occurs before its zigzag pick, that of the ground weft after its zigzag pick, see Fig. 82 (a). This method gives blocks and background areas even less differentiated than in the previous method. They both consist of stripes, the blocks having four picks white, two picks black and the background areas having four picks black, two picks white, see Fig. 82 (b).

Naturally these two types can be combined in one block.



3. TAPESTRY TECHNIQUES

The essence of all tapestry techniques is that a weft-face textile is built up of a mosaic of small areas, each of which is woven with its own differently coloured weft. No weft as a rule, passes from selvage to selvage; but at any moment in the weaving, there will be a number of discontinuous wefts which together span the total width of the textile.

A. Slit Tapestry or Kilim

INTRODUCTION

It should be noted that in *The Primary Structure of Fabrics*, Irene Emery casts doubt on the use of the word 'kilim' as a synonym for slit tapestry. This is probably true when the whole field of tapestry weaving is considered, but in the field of rugs the word is a useful abbreviation for a 'slit tapestry-woven rug', and will be here used with this meaning.

Knotted pile, kilim and soumak are the three great techniques that have been traditionally used for rug weaving. Of the three, knotted rugs have achieved considerably more importance, and are collected and prized as works of art. Much is known of their history, and they can be dated and assigned a place of manufacture with some certainty. Until fairly recently, kilims, with none of the appeal of a rich pile, have been thought of as inferior by Western buyers. This has had one advantage: no kilims in the Middle East have been specially woven with an eye on the export market. They have been woven for home consumption only and so tend to be more 'genuine' and less influenced by Western tastes. Their official standing can be gauged by the fact that the exhibition of Near Eastern Kilims held in the Textile Museum, Washington, in 1965, claimed it was the first entirely devoted to this type that had ever been held anywhere. But anyone who has really looked at and studied kilims knows that some of the finest rugs in the world are of this type.

The word 'kilim' (also spelt kelim, khelim, ghilleem) is supposedly related to the Arabic word for curtain, suggesting that their early use was as a decorative hanging textile. Kilims have also been used as blankets, horse trappings, bed covers, saddlebags, and as a strong material for wrapping around goods, so necessary in nomadic life.

In fact, their typical feature, the slit between adjacent colour areas, does not make them ideally suitable for Western floor-coverings; though the more sturdy varieties can take a great deal of hard wear.

HISTORY

The earliest known kilim was found in 1960 by James Mellaart at Dorak, a site near ancient Troy. It lined a king's tomb, and fitted it so exactly that it was probably made especially for that purpose. Although it fell to dust on contact with the air, the wool fragments still had sufficient colouring for the design to be reconstructed with certainty. This was in yellow, red, blue and black and was made up of those simple geometric motifs still found in kilims today. As it was dated definitely before 2500 B.C., the implication is that a span of 4,500 years has not greatly altered the appearance of this type of rug. This fact loses some of its surprise when it is realized to what extent the design of a kilim is controlled by technical limitations. The ancient weaver arrived at the same solutions to the same problems and from these solutions arose the design limitations which cut right across styles and cultures.

Though this is the earliest evidence of a kilim so far discovered, there is other evidence which suggests its history may reach back a further 4,000 years in time. Pottery found in Hacilar in S. Anatolia and dating from the sixth millennium B.C., is painted with simple geometric motifs typical of those found on kilims. The inference, supported by many other examples from other cultures, is that these motifs were derived from contemporary kilims. The astonishing finds made at Catal Huyuk, in 1961, included some wall paintings with similar kilim-like motifs. These are dated from the second half of the seventh millennium B.C.

So certainly for 4,500 years, and maybe for twice as long, this type of textile has been produced in the Middle East. In this time, many types have flourished, such as the silk kilims of Kashan, enriched with gold and silver threads, dating from the sixteenth and seventeenth century A.D., and the Sehna kilims which represent the finest produced in the last two centuries. More recent types have included bride kilims from Baghdad made as part of the trousseau, the boldly-patterned Kurdish kilims, and the Aleppo and Malatia kilims with their fine intricate details. The classification and description of the various types is not the concern of this book but will be found in books intended for collectors, a selection of which appear in the Bibliography.

Other countries, apart from Asia Minor, with a considerable history of weaving kilims and still producing them are Rumania (with its famous Oltenian kilims), Yugoslavia, Bulgaria, Poland, Denmark, Sweden, north coast of Africa, India, North and South America; in fact the technique seems universal.

TECHNIQUE

The essence of kilim technique is that the design is built up of small areas of solid colour, each of which is woven with its individual weft, and that between two such adjacent areas the respective wefts never interlock. The result is a vertical slit, which may be up to $\frac{1}{4}$ inch long. See Plates 29 and 30.

It is the ordering of the colour areas to avoid excessively long slits that results in the characteristic diamond, triangle and lozenge shapes.

As will be imagined, so universal a technique has many variations both of structure and of actual weaving processes. It is important to have a basic understanding of the technique before these are embarked upon. So to begin with, the weaving of a triangle of one colour on the background of another will be described in detail.

(i) WEAVING A TRIANGLE

(a) *Detailed Description*

Referring to Fig. 83 it will be seen that three wefts are necessary. One for the triangle (black), one for the background to the right of the triangle and one for the background to the left (both white). These are easier to handle as finger hanks than on shuttles.

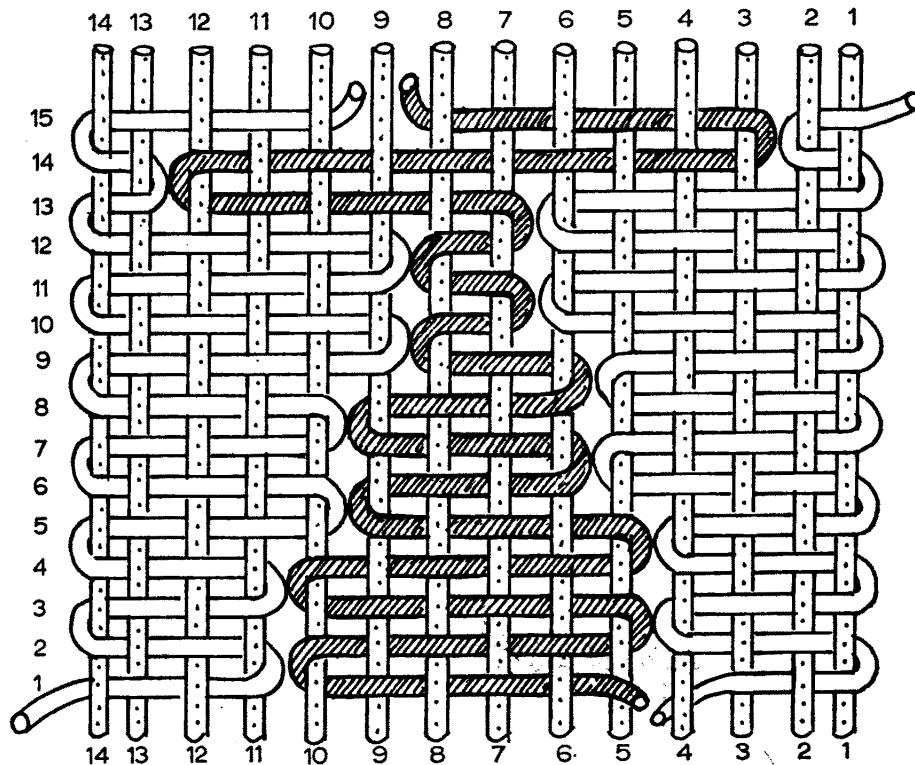


Fig. 83. Kilim. Weaving a triangle with wefts in contrary motion

The sequence is as follows:

Pick 1. Begin the three wefts in the first shed (even-numbered ends raised) so that each is running in the opposite direction to its neighbour. In Fig 83, the triangle's weft moves to the left, and the two background wefts move to the right. The triangle's weft is weaving under ends 6, 8 and 10, The background wefts weave under ends 2 and 4 on the right side and under 12 and 14 on the left.

Pick 2. Change shed. Return each weft back across its prescribed area, the triangle's weft going under ends 9, 7 and 5, and the background wefts going under 3 and 1, and 13 and 11.

It is very important that the triangle's weft should be weaving across an even number of warp ends at the base of the triangle. This is to ensure that when the tip of the triangle is reached, two ends still remain to weave on. Starting with an odd number at the base, there would only be one end at the tip on which it is impossible to weave. So as the second pick begins, move the triangle's weft first and ensure that it enters the shed down between raised ends 9 and 11, thus making the base of the triangle weave on six ends. If it enters down between raised ends 11 and 13, which from every other point of view it could equally well do, the base of the triangle will span an odd number of ends, i.e., seven. The left background weft enters the shed between the same two raised ends, i.e., 9 and 11, and moves to its own selvage. The right background weft moves in from its selvage.

Note that a small slit is left between ends 10 and 11 because as the two wefts turn round these ends to begin their second picks, they do not interlock.

Pick 3. Change shed. The three wefts repeat the first pick exactly. Note that the two wefts concerned leave a small slit between ends 4 and 5.

Pick 4. Change shed. The three wefts repeat the second pick, and the slit between ends 10 and 11 grows longer.

Four picks have now been completed with the triangle's weft weaving with six ends. Note that the three wefts are completely independent of each other. It is as if three miniature rugs are being woven, side by side, each with its own warp and weft. Obviously if this continued, the two slits would become impractically long; so in order to prevent this, the triangle's weft will begin to weave on only four ends in the next pick, i.e., the triangle will begin to taper. The background wefts will move inwards and now include the two warp ends (5 and 10) abandoned by the triangle's weft. Thus they weave across the top of the slit on their own side, and effectively close it.

Pick 5. Change shed. Weave the triangle's weft under ends 6 and 8. Weave the left background weft under ends 14, 12 and 10, closing the slit on its side, and weave the right background weft under ends 4 and 2.

Pick 6. Change shed. Weave the triangle's weft to right, entering the shed down between raised ends 9 and 11 and weaving under ends 9 and 7. Weave the right background weft, passing under ends 1, 3 and 5, thus closing the slit on its side. Weave the

left background weft to its selvage, leaving a new slit between ends 9 and 10. Note that, as the very first pick of the triangle's weft began towards the left, the left side of the triangle is always one move ahead of the right, e.g., the triangle tapers first on the left, and the left slit is closed before the right. This is inevitable. No tapering of the triangle can be accomplished in just one pick. It always needs two picks, one to the left to alter its left boundary, and one to the right to alter its right boundary.

Pick 7. Change shed. Weave the triangle's weft to left, entering the shed down between raised ends 4 and 6. Enter the right background weft in same space and weave to its own selvage. A new slit between ends 5 and 6 now begins to appear. Weave the left background weft inwards to meet the triangle's weft.

Pick 8. Change shed. This is exactly as Pick 6. The slit between ends 9 and 10 lengthens.

Four picks have now been woven with the triangle's weft weaving with four ends. To complete the triangle its weft must weave another four picks with the two central ends, 7 and 8. These four picks are exactly comparable with picks 5 to 8, so will not be described in detail. The slits produced in the last four picks are closed and two new slits appear on either side of the two central ends. This completes the weaving of the triangle.

From this simple example it will be seen that the angular junction between colours in a kilim is the direct result of the need to avoid over-long slits. The colour junction, i.e., the slit, is forced to step up to right or left, before it becomes an impractical feature in the rug. So colour junctions in a kilim can only be horizontal (as in ordinary cross stripes) or at an angle, never in a straight vertical line. This is the technical detail which controls kilim designs.

(b) Direction of Wefts

If Eastern kilims are examined, it will often be found that at any change of outline two wefts come together in one shed. This is because they are usually woven with all wefts going from right to left in one shed, and all returning from left to right in the next shed; whereas in the above description, each weft moves in the opposite direction to its neighbour in any one shed. Fig. 84 shows in detail what happens when all the wefts move in the same direction in the same shed, in weaving a triangle.

Where the triangle tapers, its weft and the background weft lie together in the same shed; these points are marked X in Fig. 84. Compare with Fig. 83. This small overlap of the two wefts does not really matter, but where there is a sudden large change of outline, as at the top of Fig. 83 and Fig. 84, the difference between the two methods becomes more obvious. From Fig. 83 it will be seen that with this first method, no difficulty is encountered. Any change of shape can be accomplished with ease. But Fig. 84 shows how in its movement from right to left, the triangle's weft has to lie in

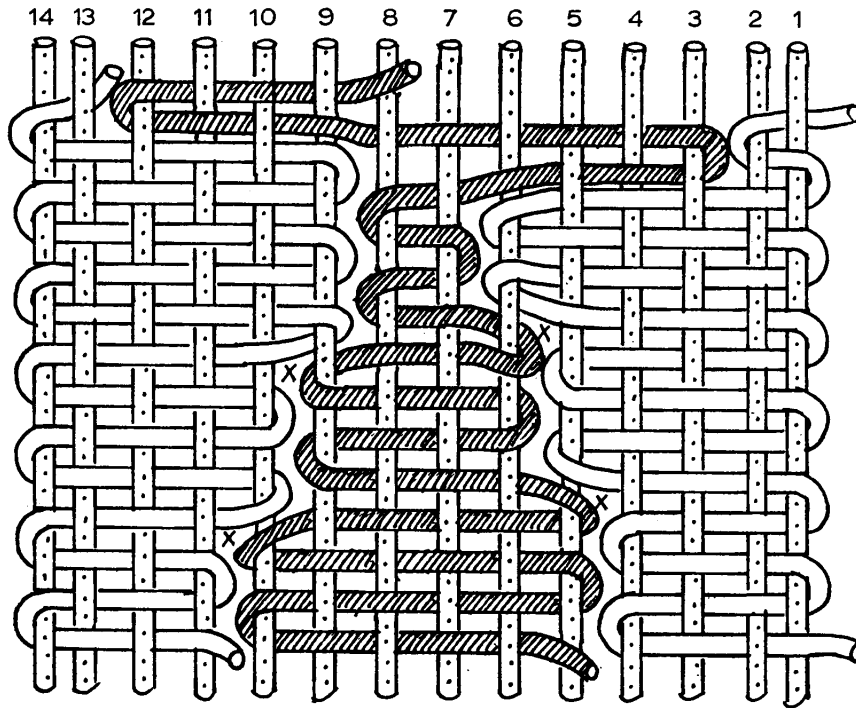


Fig. 84. Kilim. Weaving a triangle with wefts in parallel motion

the same shed as the background weft on both sides. Why this is the traditional method, may be explained by the three following facts.

(1) It can be used for any possible sort of design. Consider the introduction of the motif in Fig. 85, a common one in kilims, if it were to be woven with contrary motion of the wefts. The arrows show the direction of the wefts in one of the sheds. So starting

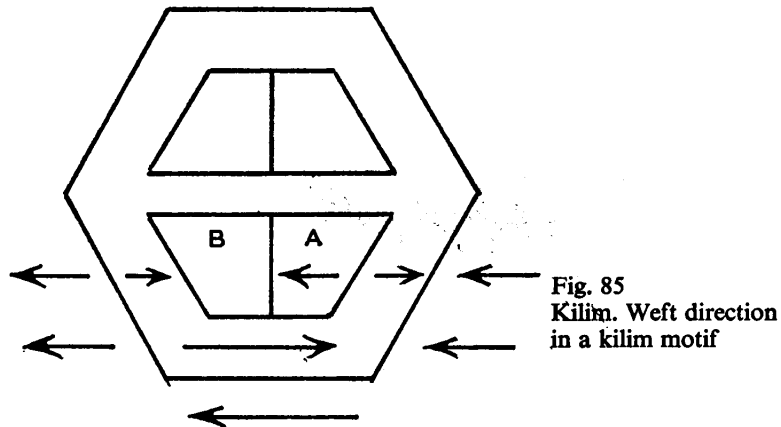


Fig. 85
Kilim. Weft direction
in a kilim motif

from the bottom, the background weft moves to the left in this shed. When the base of the motif is reached, its weft moves to the right, and both the background wefts move to the left.

When the two areas A and B are reached, only one of the new wefts, say, the one in A, can obey the rule and move in the opposite direction to its weft on the right. Whichever way the weft in area B moves, it will be the same as that of one of its neighbouring wefts.

In other words there are exceptions to the method using contrary motion of the weft. So it is simpler to use the method with no exceptions.

In some kilims with wefts moving in the same direction in the same shed, two wefts in a shed are avoided by having a float of weft at the back, see Fig. 86. This only works

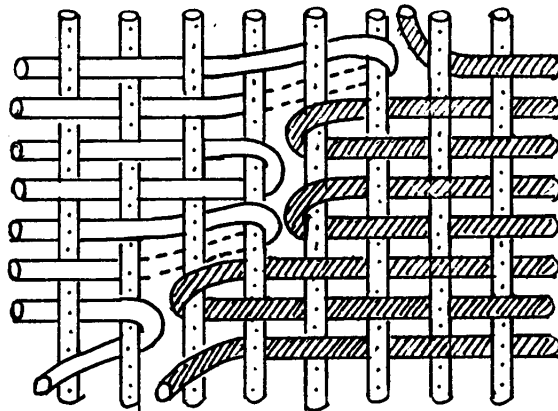


Fig. 86
Kilim. Method of
avoiding two wefts in
a shed when weaving
with parallel motion

if the colours are stepping up over an even number of ends (two in Fig. 86). The white weft is shown with dotted outline where it floats at the back passing behind three warp ends. Naturally this is not very practical and the Yugoslav kilims which have this feature are probably intended for decorative use only.

(2) In Eastern kilims the weft threads are finer than the warp. So a double thickness of weft at any point is not a great drawback; it does not mean that the warp will fail to be covered. Where the weft is much thicker than the warp, this does not apply.

(3) Visually, two wefts in a shed, give a very clear straight-line boundary between the colours involved, quite different from the usual wavy boundary line.

(c) Controlling Angle of Colour Junction

The exact angle of a colour junction can be varied within wide limits. This can be done in two ways.

(i) In Fig. 83, there were four picks before the triangle began to taper. There could equally well have been only two or any number over four that still kept the slit to a

practical size. The former would give a small triangle with flat sides, the latter a tall triangle with steep sides. The stepped character of the colour junction would be more obvious in the latter.

(ii) In Fig. 83, the triangle's weft only moved in one warp thread each side when it tapered. It could have moved in two or more.

By combining these two methods, a curved colour junction can be woven.

It is impossible to say at what angle the slits become impractical, because it is related to the number of ends per inch. This is shown in Fig. 87 where (a) has twice as many

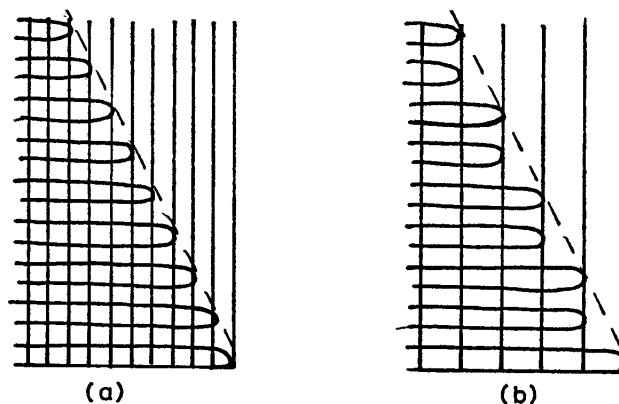


Fig. 87. Kilim. Angle of weft junction

ends as (b). So to achieve the same angle, the weft in (a) can have twice as many steps. This means it has twice as many slits, therefore they are half as long as those in (b).

45° or less is a practical angle to aim at. This is found in the heavier and more durable kilims from Scandinavia and the East.

(d) Two Methods of Weaving

In the above description of weaving a triangle, each weft was moved in each successive shed. Kilim rugs often consist of many motifs across their width, and to take up the finger hank for each weft in turn and weave just one pick would be a laborious process. So kilims are generally woven motif by motif, colour area by colour area. For instance, in Fig. 83 or Fig. 84, the central triangle would be woven first until it stood up as a complete shape with empty unwoven warp ends on either side. Then each of the background areas would be completely woven, one after the other. In weaving thus, the finger hank can be quickly passed from hand to hand across the width of each area, until it is completed.

Note—That once the triangle has been woven, the batten cannot be used for beating the background wefts. Its swing would be halted by the tip of the triangle

long before it reached the background weft. So in this method, some type of rug fork has to be used for all areas except the first one woven. With practice it will be found possible to weave four or six picks and then beat them all down together with the fork.

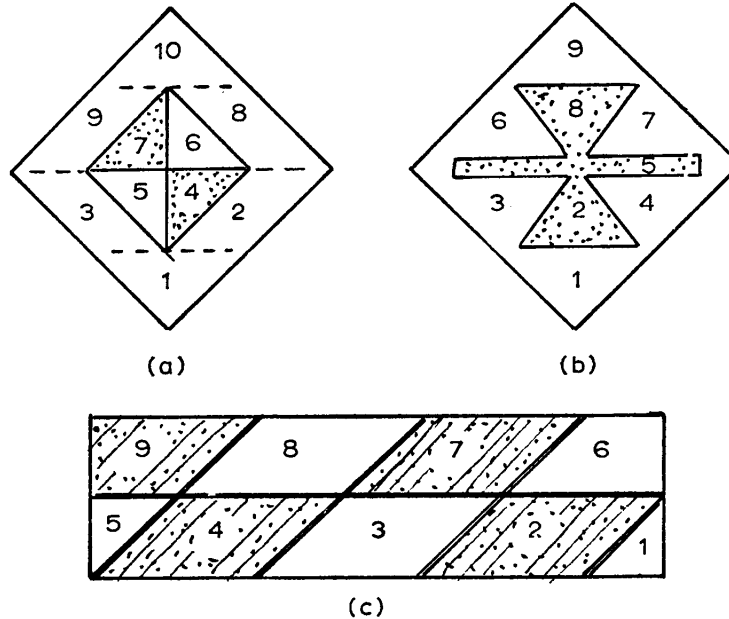


Fig. 88. Kilim. Sequence of weaving areas in typical kilim motifs

—That this method dictates a certain sequence of weaving the motif. For instance, in Fig. 83 or Fig. 84, the triangle has to be woven first. If the background areas had been woven first, the triangle's weft could only have been darned in with a needle. Fig. 88 shows some typical kilim motifs with the areas numbered in the order in which they could be woven.

(ii) PRACTICAL DETAILS

(a) *Beginning and Finishing the Wefts*

With so many small areas being woven, it is important to know how to start and finish off the many wefts involved.

Beginning:

A weft can be begun in the normal way, i.e., splitting it into two, bringing one half out of the shed, and taking the other half round the outer thread of the area concerned, and back into the same shed. However, if the weft is thin enough, its end can be left hanging out and be woven into the next shed. This, of course, gives two picks in a shed but as explained above, this need not matter

In some circumstances, neither way is very feasible, for instance when starting the point of a diamond. Here there are only two warp ends to weave on, so the normal method is quite impossible. The second method is often seen on Eastern kilims and provided the weave is very tight, is fairly practical. It is probably safest to leave the weft hanging out and later darn it down beside the appropriate warp end.

Finishing:

When finishing a weft, the normal way can be used. Another way is really the reverse of the second method of beginning a weft, see Fig. 89. After the last pick has been woven, it is pushed up away from the fell of the rug to allow enough room for the weft to be darned back into the *preceding* shed. This is a neat way, provided the warp and weft settings allow two picks in a shed.

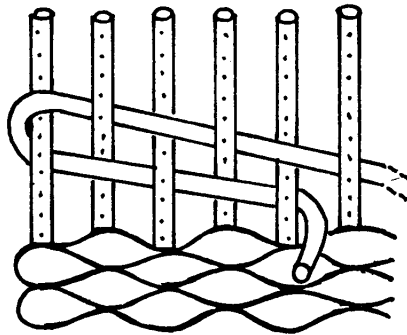


Fig. 89. Kilim. Finishing a weft by inserting into previous shed

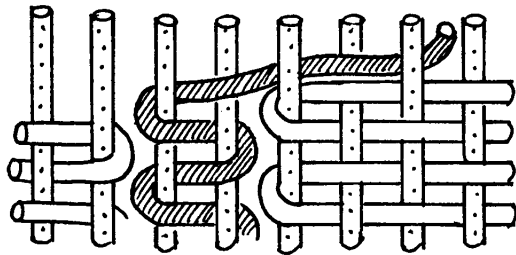


Fig. 90. Kilim. Finishing weft at tip of triangle by running it into surrounding weave

As above, there are times when neither method is feasible, for instance when finishing the tip of a triangle. The problem here is how to finish on two ends. The second method just described, is often seen but there are three other possibilities.

(1) Let the weft end run into the background colour for a short distance, see Fig. 90. This flick of colour coming from the tip of the triangle can be made a feature of the design.

(2) Darn the weft down beside the appropriate warp end.

(3) If the triangle has been built up separately, lay the weft at an angle down one side of it, in the same shed as the triangle's final pick. Then as the background weft is woven on that side, this end of the weft becomes firmly held between it and the triangle. See Fig. 91.

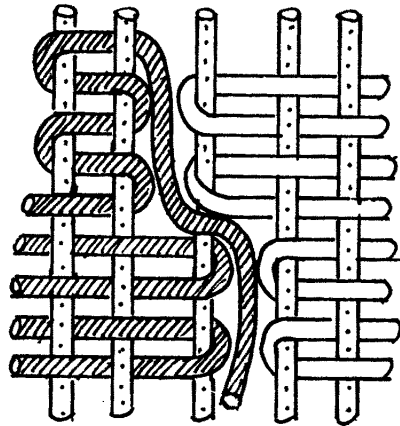


Fig. 91
Kilim. Finishing weft at
tip of triangle by running
it down side of triangle

(b) *Weft Tension*

In a kilim most wefts weave only across a small area, so in general it will not be found necessary to wave the weft to any extent. In fact, when weaving over only two or four warp ends, the weft has to be consciously tightened to avoid an over-loose texture. If a rug consists of stripes made up of kilim motifs alternating with normal cross stripes, the tension must be watched very carefully, otherwise due to the difference in tension, the selvage will bulge opposite each kilim stripe.

(c) *Warp and Weft Settings*

A warp of 6 e.p.i., double in a heald, therefore 3 working e.p.i., has often been mentioned for the various plain weave techniques described so far. This is possible for kilims, but there is a tendency for the slits to gape open at this setting. A closer setting, e.g., 4 to 6 working e.p.i., is more practical. A kilim with more of the traditional warp/weft relationship can be woven using 6-ply rug wool as the warp, set at 4 e.p.i., and 2-ply carpet wool used singly as the weft.

(iii) WEAVING VERTICAL COLOUR JUNCTIONS

Although the angled colour junctions are the most typical in kilims, there are occasions when a vertical colour junction is needed, such as between the borders and central field of an Eastern kilim. As mentioned earlier, this cannot be a straight-line vertical junction, unless as in tapestry weaving the long slit thus produced is later sewn up. So various methods are used to achieve a junction as near vertical as possible.

(a) Zigzag Junction

The most obvious way to do this is to make an angled junction which inclines to the right for a few steps and then inclines to the left for the same number of steps, as in Fig. 92. As shown at the bottom, this gives a vertical zigzag junction, which can be

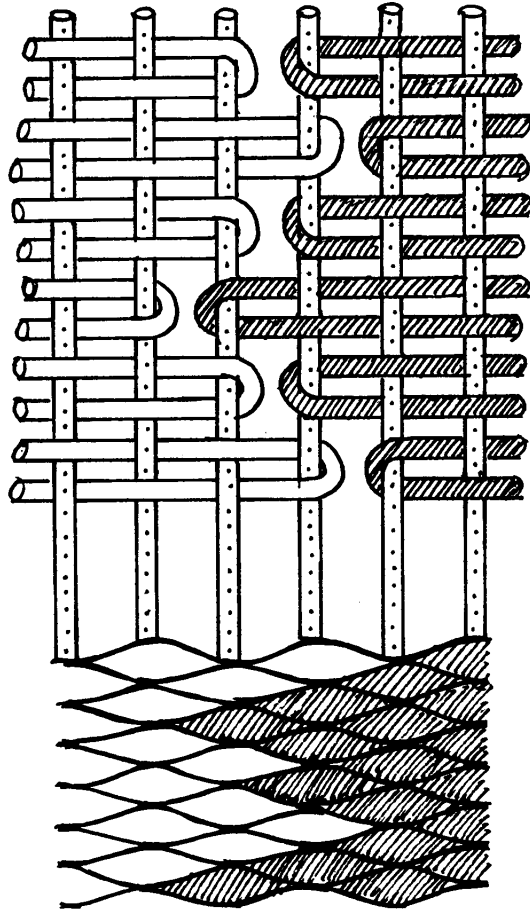
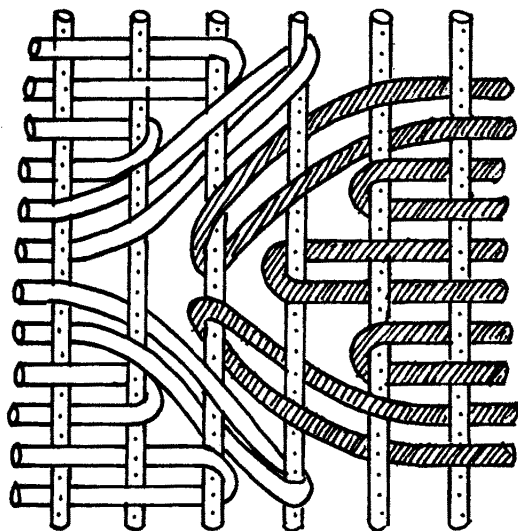


Fig. 92
Kilim. Vertical Colour
Junctions

continued indefinitely without causing any weakening of the fabric. This type of junction is often found in Rumanian kilims. In actuality, there would probably be more than two picks per step.

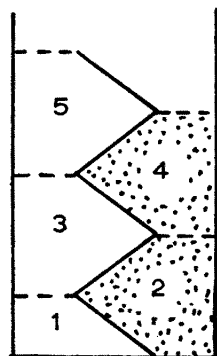
A development of this is shown at Fig. 93 (a), where, due to the sequence of picks, a curved black weft always meets a curved white weft at the line of junction. This gives a clean-edged boundary between the two colours, not a stepped boundary as in the above method.

The first method could be woven either by moving both of the wefts in each successive shed, or by building up an area at a time in the sequence shown in Fig. 3 (b).



(a)

Fig. 93
Kilim. Vertical Colour
Junctions involving
curving of both wefts.
(a) General view
(b) Sequence of weaving
areas



(b)

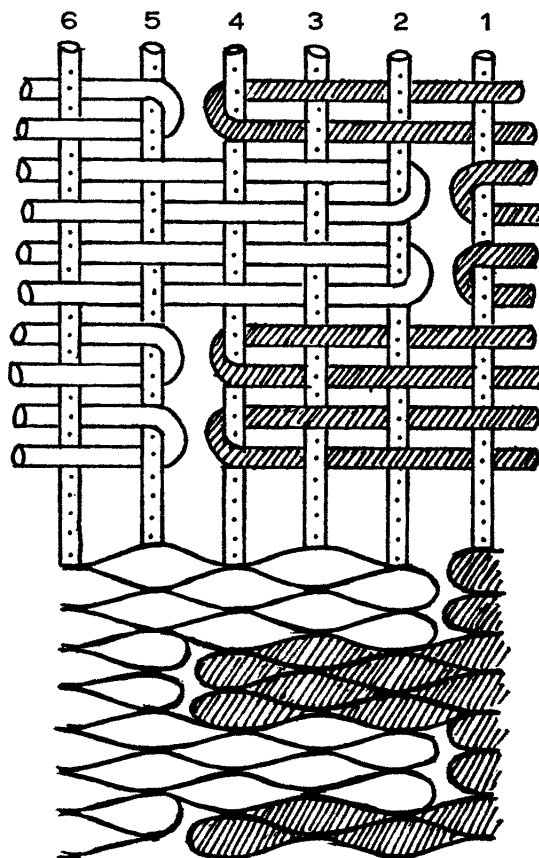


Fig. 94. Kilim. Vertical Colour Junctions.
'Brick join'

The second method can only be woven as in Fig. 93 (b), a complete 'wedge' of black being woven, then a complete 'wedge' of white.

(b) 'Brick Joining'

The vertical junction can be based on the idea of alternating the colour junction, and therefore the slit, between a right and left-hand position. See Fig. 94 where the slit between black and white wefts alternates from between ends 1 and 2, to between ends 4 and 5. The lower half of Fig. 94, shows how this appears when woven. The two colours overlap each other as do successive courses of bricks in a wall; hence it is sometimes called 'brick joining'. In actuality more than four picks would be woven before moving the slit.

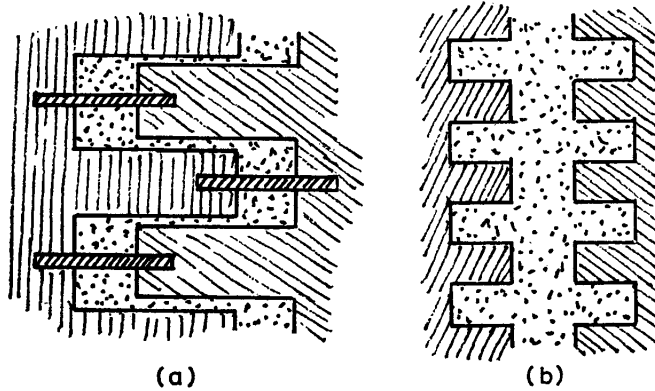


Fig. 95
Kilim. Vertical Colour
Junctions. Decorative use
of 'brick joins'

This practical idea can be developed decoratively. Figs. 95 (a) and (b) show more elaborate junctions involving extra wefts. Note that the small cross bars of this extra weft in Fig. 95 (a), besides being decorative, prevent an over-long slit.

(c) *Dovetailing*

Dovetailing is neither true slit nor interlocked tapestry but is described here for convenience. Though it is used in tapestry, it is not often found in rugs. As Figs. 96 and 97 show, both wefts weave round a common warp end where the two colours meet. So

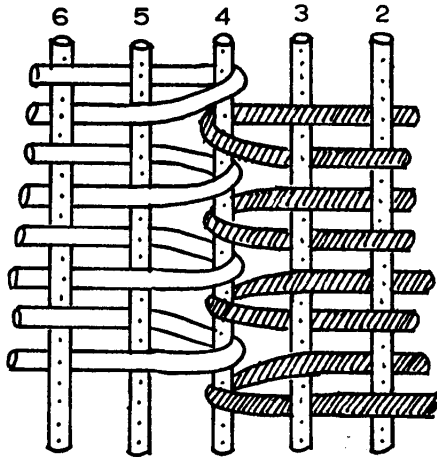


Fig. 96. Kilim. Vertical Colour Junctions.
Single Dovetailing

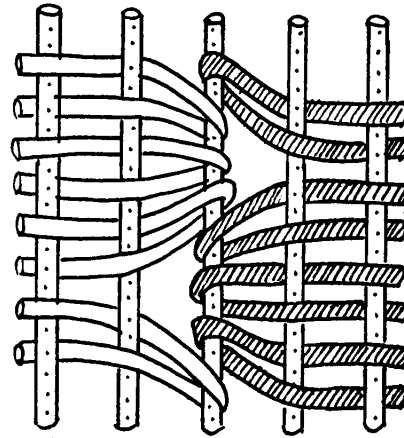


Fig. 97. Kilim. Vertical Colour Junctions.
3/3 Dovetailing

this end has double the normal number of weft picks passing round it. If this vertical junction is continued too long in the same position, there is a tendency for the rug to buckle or not lie flat. But if junctions of this type are staggered they are quite feasible and their characteristic toothed outlines can be an interesting element in the design.

In single (or 'comb-tooth') dovetailing, two picks of each colour are woven alternately, see Fig. 96. They both include warp end 4 in their passage, so this is the end bearing twice the normal number of wefts. The two colours are finely intermingled at the junction and appear as very small teeth, hence the name.

The two wefts concerned can turn round the common warp, so that it bears two loops of one, then two of the other (2/2 dovetailing), or three loops of one then three loops of the other (3/3 dovetailing). The latter is shown in Fig. 97. When beaten down these types give a much coarser tothing at the junction; hence they are sometimes called 'saw tooth' dovetailing.

(d) Method Found in Sehna Kilims

A combination of toothed and brick joining is seen on Sehna kilims, and as might be expected with this type of rug it involves curving the weft.

As Fig. 98 (a) shows, at each slit, four picks of one colour face eight picks of the other colour. For instance, at the slit between ends 1 and 2 (marked X) four white picks on the right come up against eight black picks on the left. It is this preponderance of one weft over the other at each colour junction that causes the curving of the weft. Note that ends 2 and 3 and ends 6 and 7 have twice the normal number of picks weaving with them. So this extra 'load' of weft is spread over more ends than in the types of dovetailing already described.

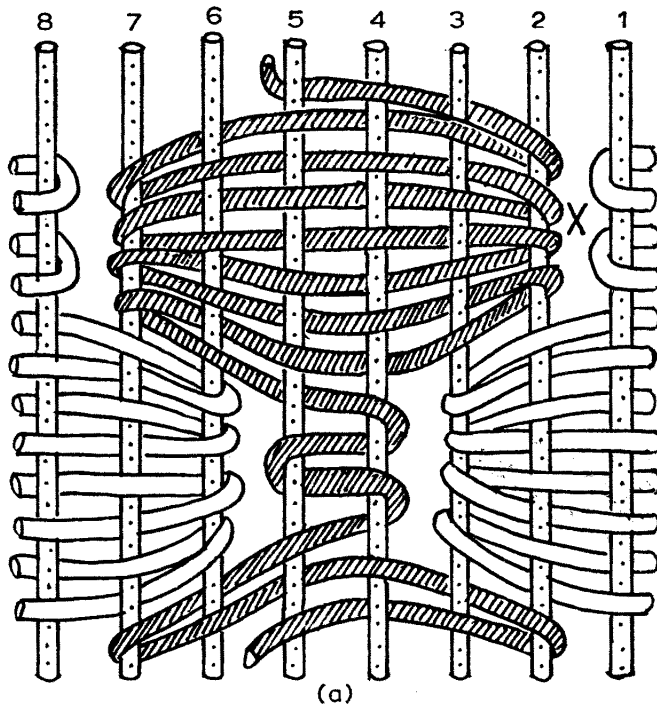


Fig. 98(a)
Kilim. Vertical Colour
Junctions. Method
used in Sehna Kilims.
(a) General view

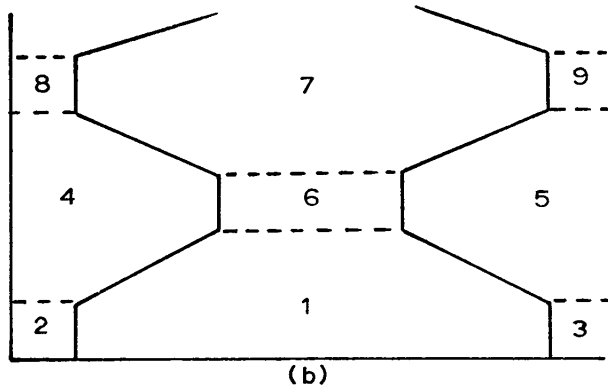


Fig. 98(b) Sequence of weaving areas

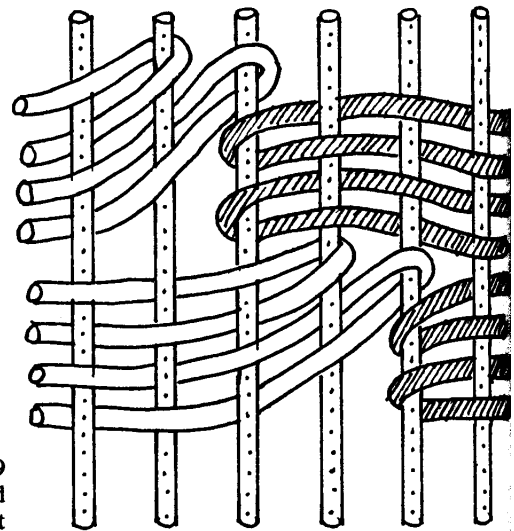
Fig. 99
Angled Colour Junctions. Method
involving curving of one weft

Fig. 98 (b) shows the outline this join assumes when beaten down. The numbers indicate the order in which the blocks are woven, thus:

- Eight picks black (weaving on 6 ends)
 - Four picks left-hand white
 - Four picks right-hand white
 - Eight picks left-hand white
 - Eight picks right-hand white
 - Four picks black (weaving on two ends)
- This sequence is repeated.

It is when the eight picks areas are being beaten down that the curving of the wefts appears. In actuality, the number of picks might be twelve and six, or sixteen and eight, nor is there any necessity for one number to be exactly double the other.

(iv) VARIATIONS OF ANGLED COLOUR JUNCTIONS

Several techniques can be used when weaving a colour junction at an angle which gives it a serrated character instead of the normal regular steps. These are not structurally necessary but are used for their visual effect.

(a) Fig. 99 shows one such technique in which the black weft moves two warp ends along at each step and has four picks per step. The white weft however, moves only one warp end along in each step and has only two picks per step. As the diagram shows, the four black picks always precede the four white picks thus causing the white picks to tilt upwards.

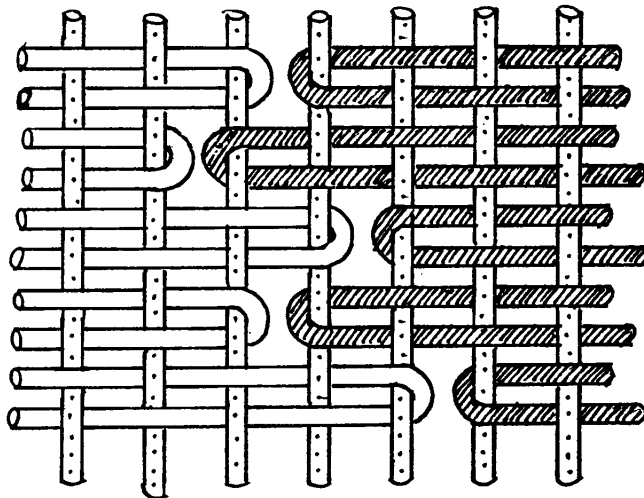


Fig. 100
Kilim. Angled Colour
Junctions. Alternative
method

(b) Fig. 100 shows another technique. It will be seen that the steps move over two ends to the left and then move back over one end to the right. This is repeated so that the sum effect is a slow movement to the left. In actuality there would be more than two picks per step, so this is really the brick-joining made at an angle.

(c) Fig. 101 (a) shows yet another, slightly more complicated, method, which brings an angled section of both wefts into contact with one another. A finer weft of another colour can be woven in between the two main wefts as shown in Fig. 101 (b). Three picks of this fine weft follow each six picks repeat of black or white, giving an intricate zigzag line which emphasizes the character of this colour junction.

Obviously these overlapping junctions make it impossible to build up one complete motif before another in the manner already described. A few picks of each colour in turn have to be woven all across the width of the rug.

(v) 'LAZY LINES'

In a kilim it is always easier to weave a small colour area (e.g., up to 6 inches in width) than a wider one. With the small area, the weft can be passed from hand to hand in each succeeding shed; it does not have to be awkwardly poked along the shed for some distance between its point of entry and exit.

For this reason, a large area of one colour is often broken up into small sections, each of which is a typical kilim shape, i.e., triangle, diamond, or lozenge. The only visible evidence that an area has been woven in this way are the faint diagonal lines, sometimes called 'lazy lines', where one small section meets another. These may be better seen when the rug is held against the light. Fig. 102 shows how a large, one-colour area, to the left of a central motif, might be dealt with. The sections could be

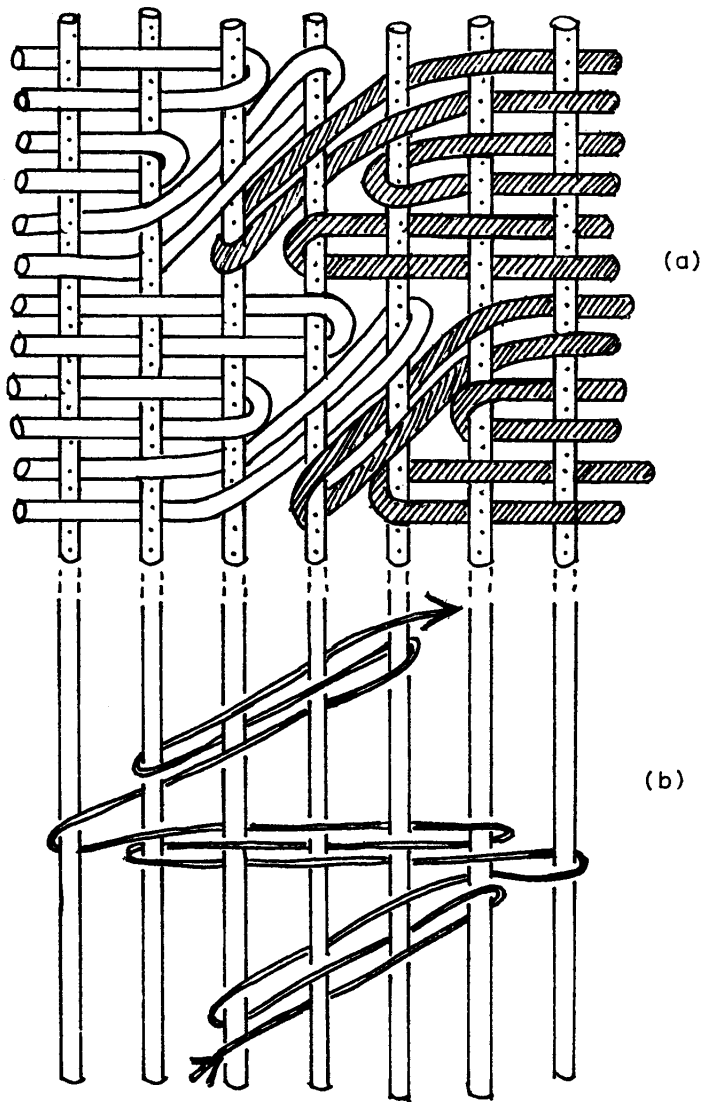


Fig. 101
Kilim. Angled
Colour Junctions.
Method involving
curving of both
wefts.
(a) General view
(b) Inserting a third
colour

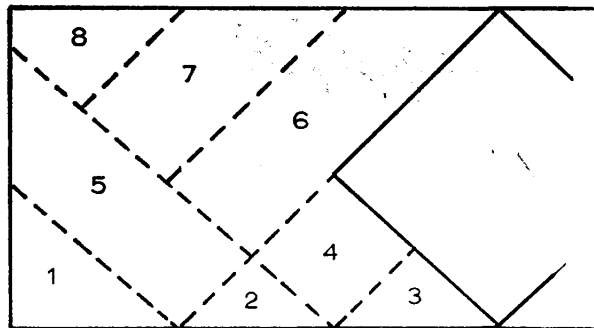


Fig. 102
Kilim. 'Lazy Lines'

woven in the order they have been numbered. The dotted boundaries between these sections represent the 'lazy lines'.

(vi) OBLIQUE AND CURVED WEFTS. ECCENTRIC WEFTS

Wefts lying in curves or obliquely (often called Eccentric Wefts), are found almost everywhere that the tapestry technique has flourished. Thus they are seen in early Peruvian tapestries and in modern Polish, Swedish and Norwegian tapestries. They are known to French tapestry weavers as *ressaut* or *crapaud*. However, it was the Copts who exploited this method to its fullest in their small tapestry panels. Examination with a magnifying glass often shows that there is hardly a single weft lying at right angles to the warp. The picks outline shapes and fill in areas with a complete freedom that gives additional life and movement to the already lively designs. As a result of the inclined wefts, and their sequence of weaving, the warp ends are pulled out of the vertical and curve this way and that under the influence of the varying tensions. That this also adds to the liveliness of the tapestries is undeniable, but it is questionable whether it was consciously intended. While the tapestries were being woven, the warp was held under tension and so these eccentric warps probably appeared only when the tapestries were taken from the loom.

In the field of kilim weaving, it is the rugs made by the Kurds near Sehna in West Iran (now known as Sinneh) that have made most use of this technique. In addition to this feature, old Sehna kilims are often exceedingly fine and represent the result of a very highly-developed weaving skill. Curved wefts are also a marked feature of the Rumanian kilims from Oltenia.

(a) *Outlining Areas*

The idea of laying in wefts obliquely and in curves follows naturally from using the method of kilim weaving in which one complete motif or colour area is woven at a time. For instance, in Fig. 103 (a), a small triangle has been woven. Now before the background areas are woven, weave some picks of another weft (black in diagram) right across the top of the triangle, travelling from end 1 to 6 and back again. Then weave in the background areas.

The curved weft will appear as a thin black outline to the triangle.

Note—A minimum of two picks is necessary to give a curved line. One pick will only give spots.

—Great care must be taken with the curved weft so that it will lie correctly tensioned when the background weft has been beaten in beside it.

—The curved weft can only be poked into place with the fingers or a stick, a rug fork is not much help.

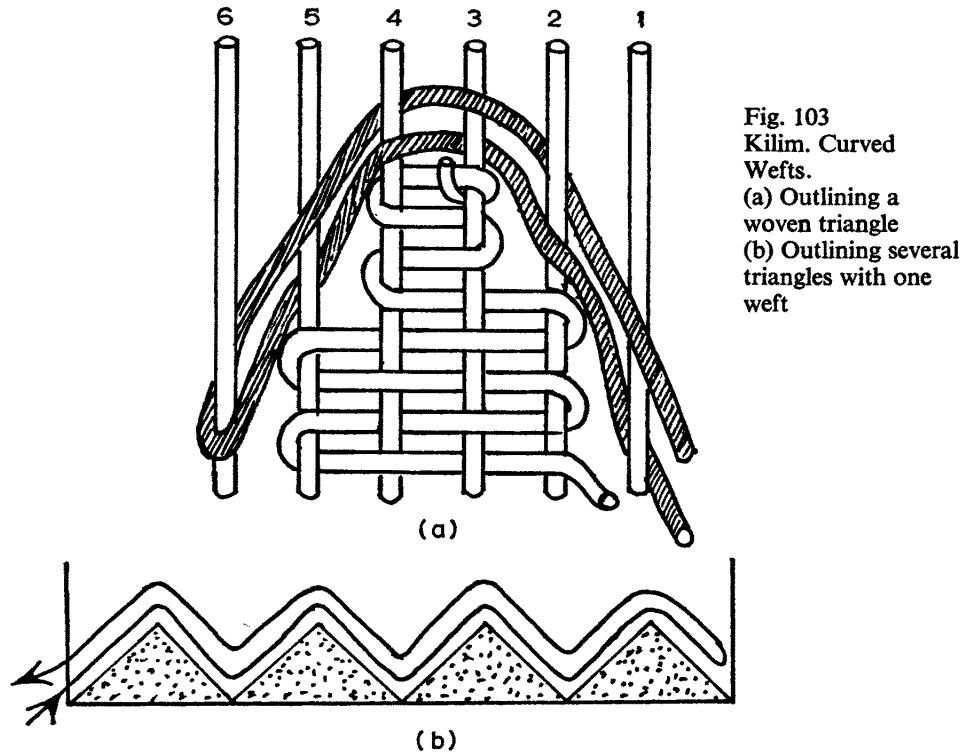


Fig. 103
Kilim. Curved
Wefts.
(a) Outlining a
woven triangle
(b) Outlining several
triangles with one
weft

—If the angle of the weft is less than 45° to the vertical, this technique becomes impractical. The oblique weft lies too loosely and does not bed in with the surrounding weft.

This sort of outlining can be carried right across the width of a rug, if, as in Fig. 103 (b), a series of triangles have been woven to receive it.

(b) Building Up Whole Areas

In the above example it was an extra weft that lay obliquely, but the ordinary wefts used in building up kilim motifs can lie obliquely or in curves for part of their course. This has one definite result, in that it avoids stepped outlines at angled colour junctions, and one possible result in that it may reduce the number of finger hanks needed to weave certain motifs.

Both results appear in Fig. 104 which shows in detail the weaving of interlocking black and white triangles, and whose sequence is as follows.

Start the black weft at the right selvage (lower arrow). Weave a small triangle. In

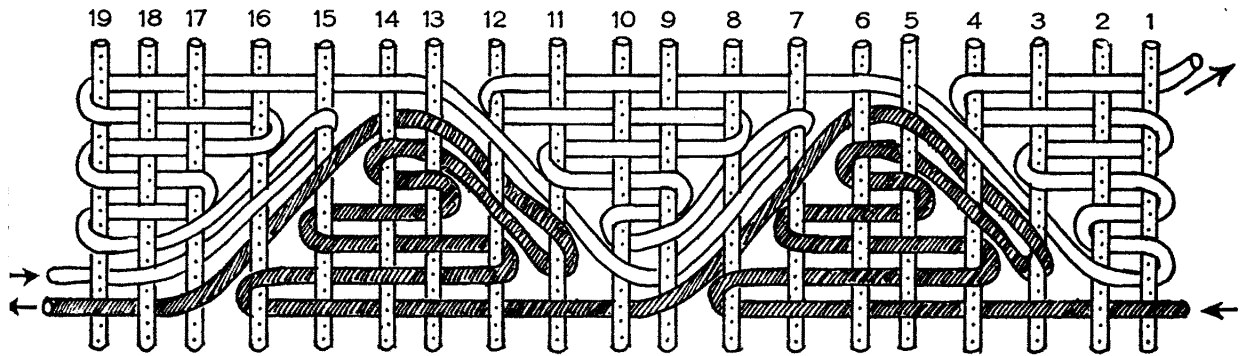


Fig. 104. Kilim. Using curved wefts to weave interlocking triangles

the diagram only the bare bones of the weaving have been shown, obviously more picks will be needed to build up a reasonably-sized triangle.

When the weft has reached the top of the triangle (weaving on ends 5 and 6) take it down the right side of the triangle to end 3, i.e., one end beyond the base of the triangle. Then in the next shed take it up the right side and down the left side of the triangle and carry it on to start weaving the base of the second triangle. Weave the second triangle exactly as the first. The black weft ends at the left selvage (lower arrow).

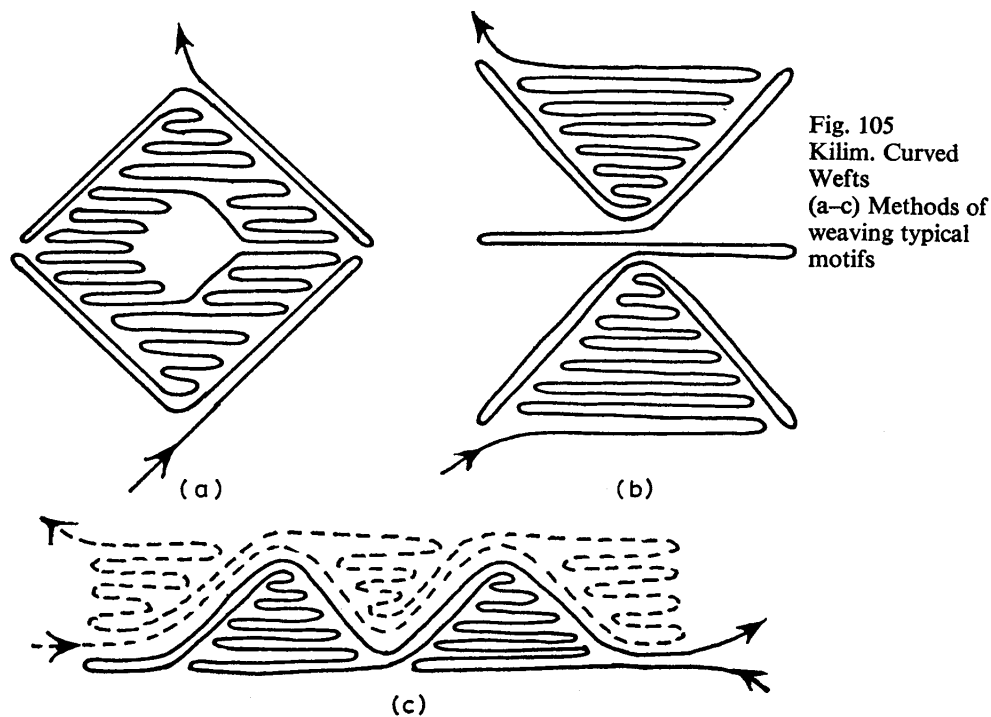
Start the white weft from the left selvage (upper arrow). Take it up the side of the left-hand triangle and down again, then start weaving normally. When the weft is level with the top of the triangle, take it over the top and down into the dip between the two black triangles, then up the side of the right-hand triangle and down again. Fill in the dip with normal weaving. Finally take the weft over the top of the right-hand triangle, and down to the right selvage. Weave normally, until the white weft ends at the upper arrow.

Note—Wherever the oblique wefts of the two colours lie together, the sheds are in the correct sequence. This will always happen and is independent of the sides from which the two wefts begin.

—Despite the oblique wefts, there are eight picks weaving with every end in the diagram. This is not always easy to arrange but is obviously the ideal to aim at.

—Only two wefts have been used for weaving five areas.

After this detailed description, the more diagrammatic representations in Fig. 105 will be understood. In these, only the course taken by the motif weft is indicated. The warp and the background weft are both omitted. One diagram shows an alternative method of weaving interlocking triangles.



(c) *Motifs Consisting Entirely of Curved Wefts*

Complete motifs such as ovals can be built up entirely from curved wefts.

The sequence of weaving an oval is shown in Fig. 106 (a). First weave the left and right half of the 'socket' to receive the oval, i.e., the background below the oval's mid-point. Then weave the oval itself, followed by the background above its mid-point. The 'socket' should be as curved as possible. So leave a flat base (ends 6, 7 and 8 in Fig. 107) and then step up the weft on either side in such a way as to make a gentle curve.

The principle of weaving the oval is shown diagrammatically in Fig. 106 (b). Start the weft at the mid-point on the left, dip right down into the 'socket' and up the other side, change the shed and return the weft. Continue thus with the weft travelling less far in each successive pick, until half the oval has been woven. At this point, two conditions should be fulfilled. The weft should be weaving on the central ends of the oval and the oval should, at its deepest point, have as many picks as have the sides of the 'socket'. These two conditions are not automatically fulfilled. For instance, if the picks have decreased in length too slowly, a shape as in Fig. 106 (c) will be woven by the time the central ends are reached. Alternatively, if they have decreased too quickly, the opposite fault, as in Fig. 106 (d), will be seen. Both of these are quite valid shapes

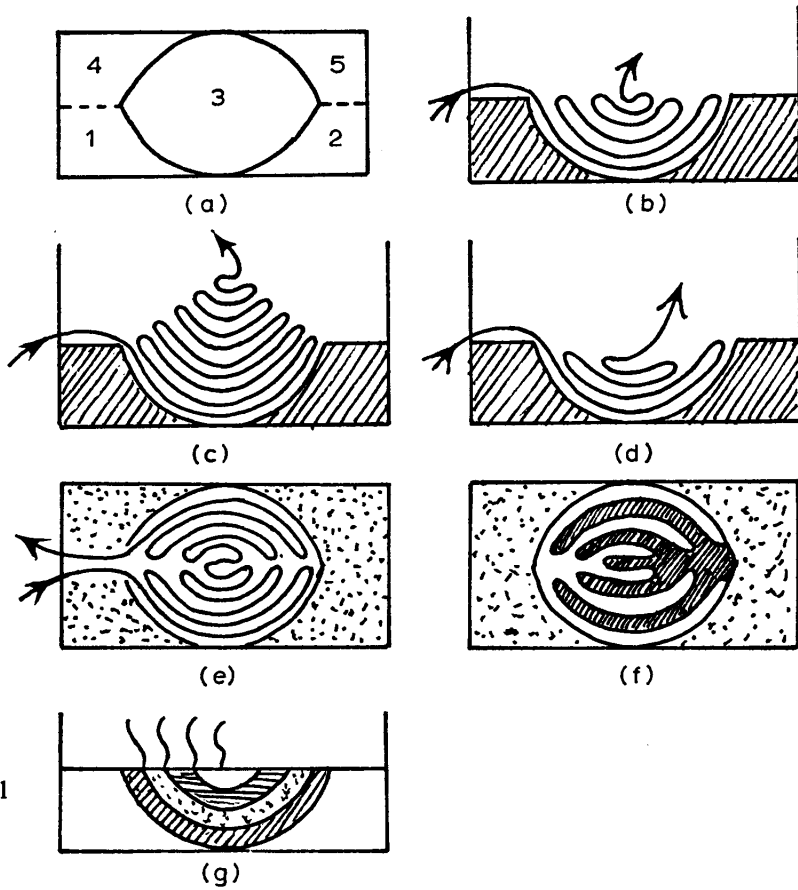


Fig. 106
Kilim.
Weaving an oval

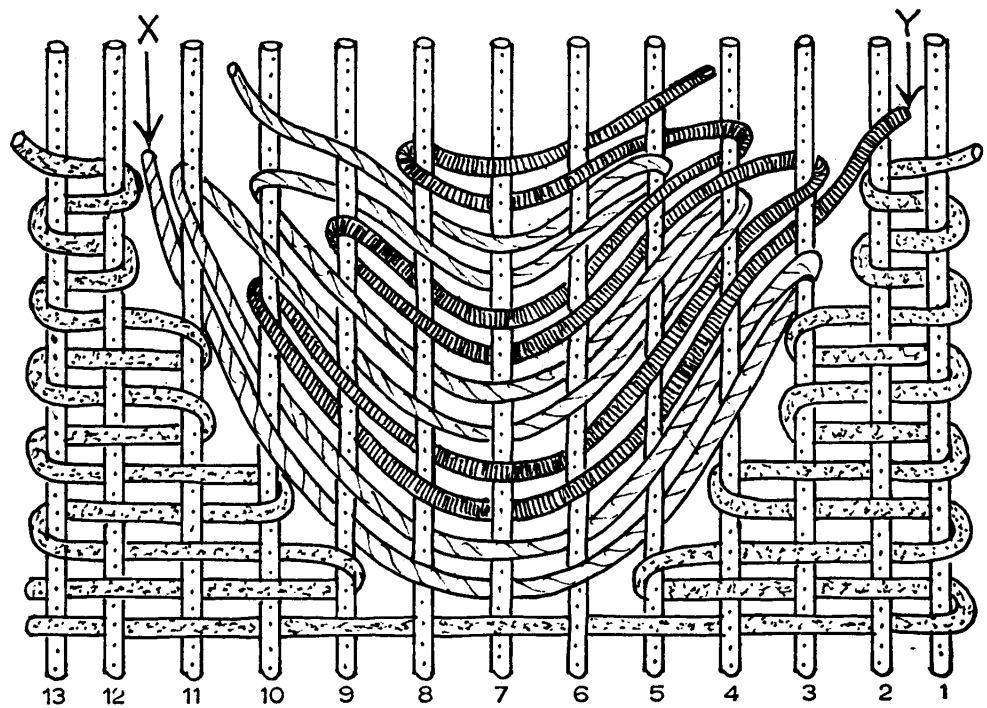


Fig. 107
Kilim. Weaving an
oval with two wefts,
detailed view

in themselves, but are not what is being aimed at. So either by trial and error or by a simple calculation, find out how to decrease the lengths of the picks to fulfil these two conditions.

Weave the top half of the oval simply by reversing the steps taken for the lower half. So the weft starts at the centre. From here it weaves picks of ever-increasing length until the oval is completed with the weft ending on the side from which it started, i.e., the left, see Fig. 106 (e). Then weave in the background, repeating in reverse order the picks that made up the 'socket'. It is not until these picks are woven that the oval assumes its final shape.

Note—There is always a tendency for such an oval, or any area of oblique wefts, to bulge and buckle when the warp tension is released. This can be overcome by ensuring that the curved picks are correctly tensioned. For instance, the first few picks of an oval must not only be at correct tension when laid in, they must be at this tension when succeeding picks have forced them down into the 'socket'. It is also important to have the correct number of picks in the oval.

For simplicity's sake, the above description concerns an oval woven with only one weft. Such an oval shows a slightly curved grain to the weft, but it is obvious that it is only when two or more wefts are being used that the curved nature of the picks can be brought out. Such wefts can be woven so as to give concentric ovals of different colours. Fig. 106 (g) shows diagrammatically the state of affairs when half such an oval has been woven. Note that the ends of the four wefts concerned have not been darned-in but are left hanging out and so are ready to weave the appropriate curved stripe as the top half of the oval is completed.

A very effective way of using two wefts is shown in detail in Fig. 107. Two picks of white starting from the left (at arrow X) are followed by two picks of black starting from the right (at arrow Y). This striping is repeated until half the oval is woven (a total of twelve picks in the diagram) and then the process reversed in the usual way. The result is an interlocking black and white figure as in Fig. 106 (f).

Note—That in the diagram, the black weft moves one end less to the left in each of its stripes, and that the white weft similarly moves one end less to the right.
—Twelve picks were used to build up the background area on each side, but there are not exactly twelve picks weaving with every warp end involved in the half oval. This seems unavoidable.

(d) *Wedge-Weave Rugs*

There is a technique relying on oblique wefts which is found in Navajo blankets from the 1880s. These are known as 'pulled warp' or 'wedge-weave' blankets, names which highlight two of the peculiarities of this technique. It can equally well be used

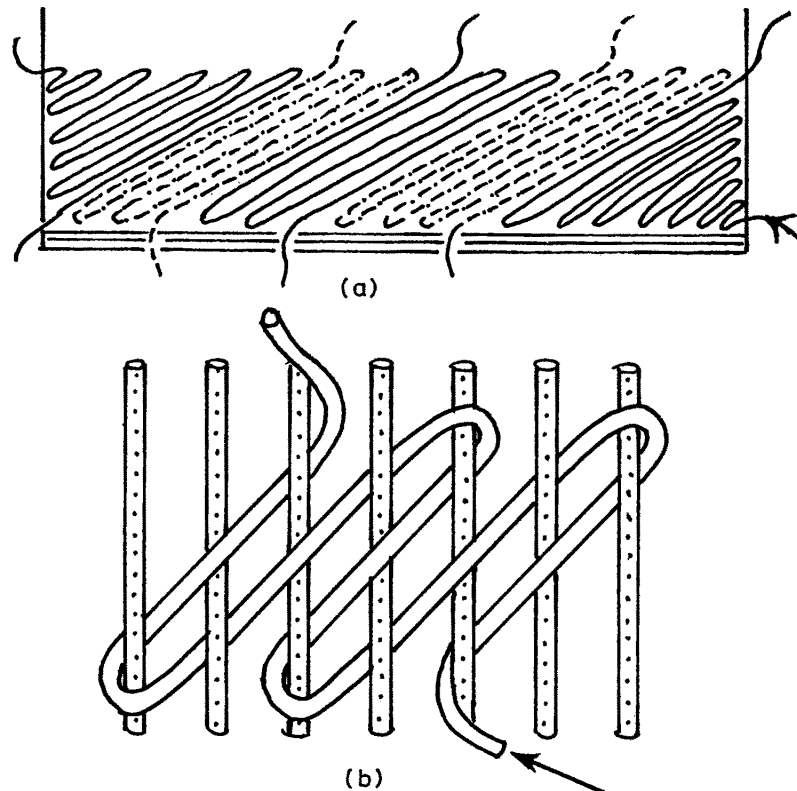


Fig. 108. Wedge-Weave Rugs. (a) Arrangement of wefts in first woven band (b) Detail of one stripe within the band

for floor rugs and is interesting because of the very close connection between the method of weaving and the designs produced.

The technique is as follows:

Start with a few picks of normal weaving from selvage to selvage, see Fig. 108 (a). Then begin weaving at the right selvage (see arrow), first on only a few warp ends, but gradually including more and more as the work grows upwards. So the right-hand extremity of each pick is always the right selvage, but the left-hand extremity moves in some orderly way towards the left, i.e., it includes two (or four, or six) more ends every two picks. As this is beaten down with a rug fork, not the batten, the fell of the rug will tilt down to the left as shown. So in effect, a right-angled triangle or wedge is being woven, with all the picks lying parallel to its longest side. When this triangle is 2 or 3 inches high, stop weaving with this weft, leaving it hanging out at the top of the wedge for later use. Do not darn it in.

Now weave a number of oblique stripes of varying colours, following the angle set

by the weft in the triangle. In each of these stripes, the weft (starting at the bottom as shown in Fig. 108 (a)) includes two (or four or six) more ends to the left at its lower end each second pick, and stops weaving round a similar number at its upper end each second pick, see Fig. 108 (b). Thus the upper boundaries of the stripes join to make a straight horizontal line across the warp, parallel with the first starting picks of the rug.

Continue thus right across the rug, remembering to leave the weft of each stripe hanging out at the top. The last weft at the left selvage cannot be a stripe but has to be a triangle similar to the starting triangle, but inverted, i.e., the left extremity of each pick is the left selvage, but the right extremity moves to the left every two picks. Stop weaving this final weft at the left selvage as shown in Fig. 108 (a).

Having completed this band of oblique stripes, the next step is to repeat the whole process exactly, but starting from the left selvage, see Fig. 109.

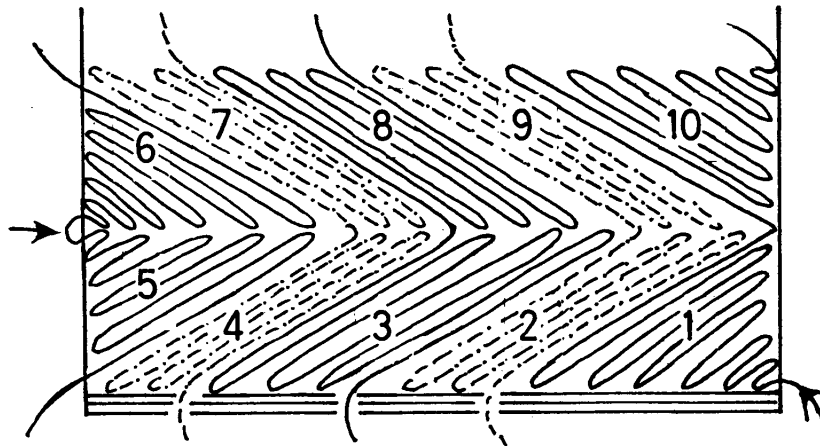


Fig. 109. Wedge-Weave Rugs. Arrangement of wefts in first two woven bands

With the weft from the final triangle in the first band, start to build up a triangle or wedge at the left selvage (see arrow at left). Weave this in exactly the same way as the first triangle in the first band. The weft will slope down to the right instead of to the left. The weaving stops when it exactly covers the triangle below it. Leave the weft hanging out at the top of the triangle.

Now pick up the weft from stripe 4 in the first band and weave a similar stripe above it, No. 7. Then pick up the weft from stripe 3 and weave stripe 8 above it. Continue thus all the way across to the right, ending with an inverted triangle as before (No. 10).

These two bands with stripes sloping in opposite ways can be repeated for the whole length of the rug. Or such bands may be interrupted by stripes of normal selvage to selvage weaving. Note that there are always an odd number of picks in each oblique stripe, as the weft always begins at the lower boundary and ends at the upper.

Distortion of the Warp

As might be expected with such large areas of oblique weft, the warp becomes distorted. Each succeeding band of stripes tends to pull it out of its true line, first to one side then to the other, hence the alternative name for this technique, 'pulled warp'. For instance, the first band in Fig. 109, pulls the warp to the left to the extent that it crosses each weft almost at right angles. The second band pulls it to the right in a similar way.

Fig. 110 (a) shows the path taken by a few ends as they pass through four bands of stripes. This is not very obvious in the body of the rug, but it means that the edges of the rug bulge to give the wavy or scalloped outline, typical of this technique.

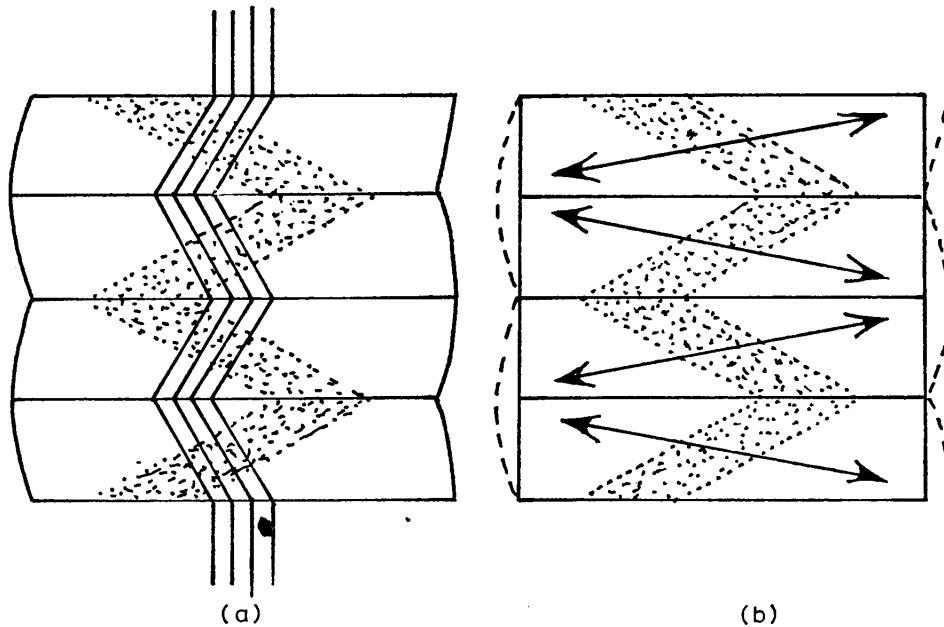


Fig. 110. Wedge-Weave Rugs. Explanation of warp distortion

Another way to look at this feature is to consider each band separately. In Fig. 110 (b) the bottom band has wefts sloping down to the left. So when forces are exerted on the sides of the rug in use (e.g., when shaking it) it can only stretch in the direction shown by the diagonal arrow. This is like stretching a bit of cloth on the bias. It cannot stretch along the other diagonal as this is the direction in which the wefts lie, and they will resist any pull. Taking the next band, the same reasoning shows that it can only stretch in the opposite direction as indicated by its arrow; and so on, through all the bands. The net result will be that the edges bulge as shown by the dotted lines.

Junction Between Bands

The horizontal junction between two bands tends to be a point of weakness as weft, and to a lesser degree, warp change direction along this line. It can be strengthened if the wefts of the second band loop round different warp ends from those used by the first band. See Fig. 111 (a) which shows this line of junction at the point where two colour stripes meet. This arrangement of the wefts also gives a sharper point to the angle where two stripes meet.

The steeper the angle of the wefts, the greater this weakness will be, and also the more the selvages will bulge and the less likely the rug is to lie flat. A weft angle of about 20° to 30° to the horizontal is a good one to aim at.

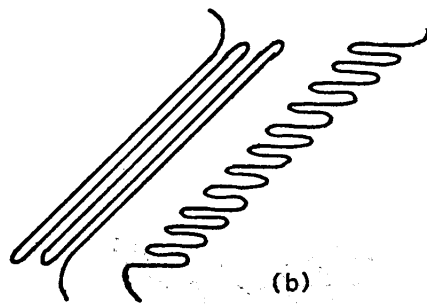
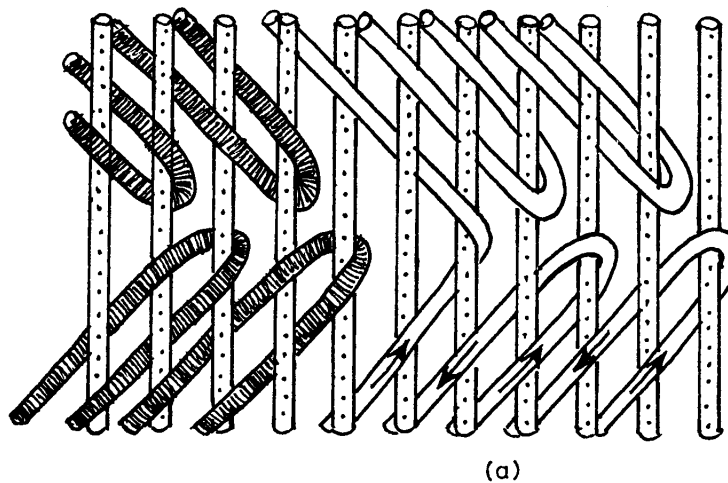


Fig. 111. Wedge-Weave Rugs
 (a) Detail of junction between bands
 (b) Comparison of narrow, angled stripe when woven normally and when woven with oblique weft

Design

It will be understood that the purpose of weaving in this way is to produce stripes that zigzag down the length of the rug, though, conceivably, a rug woven in only one colour might have an interesting surface 'grain' due to the angling of weft and warp. Such zigzag stripes can, of course, be woven in the normal kilim way but there are two differences.

(i) A narrow oblique stripe, which, in wedge-weave needs only five picks, would require many more picks if woven as in normal kilim, see Fig. 111(b). So wedge weave is a quicker method. For the same reason, while two 1-inch stripes in wedge weave take the same time to weave as one 2-inch stripe, they take twice as long in normal kilim.

(ii) The junction between adjacent colours is a clean one, not a stepped one as in normal kilim.

So on this basis, it is fine oblique stripes which should be exploited if this technique is to be used to its fullest.

B. Interlocked Tapestry

The distinguishing feature of the vertical colour junction in slit tapestry is the absence of any interlocking of the two wefts involved. But there is a well-developed and much used method of interlocking, which allows the weaving of vertical junctions of any length without the formation of a slit.

The Swedish word, *rölakan*, is sometimes used for this technique of interlocked tapestry. It is derived from *rygg-lakan*, the name of a textile hung on the wall behind a seat. This textile has interlocked wefts as do the modern Swedish *rölakan* rugs.

Because there is no slit, vertical colour junctions can be used freely in the design. In some traditional textiles the design is built up entirely of small squares of colour, so there are no angled colour junctions at all. In other weaves, such as in Navajo blankets, angled and vertical colour junctions are combined. It is, of course, in true tapestry weaving that this combination is exploited to the fullest and a technique is achieved which imposes practically no limitations on the designer. Against the great freedom in design must be set this technique's slowness of execution.

The interlocking of wefts is found in early tapestry-woven textiles from Peru and North America. In the East, slit tapestry has always been used more than interlocked tapestry, but the latter is found in some rugs from this area.

There are two types of interlocked tapestry:

Single Interlocked Tapestry or Norwegian *Rölakan*

Double Interlocked Tapestry or Swedish *Rölakan*

(i) SINGLE INTERLOCKED TAPESTRY

This is much the more used and is almost certainly the older of the two types. It produces a completely reversible rug, with no ridge or extra thickness where the wefts interlock.

(a) *Scandinavian Method of Weaving*

The following description is the classical Scandinavian one, but as will be seen later, it need not be regarded as the only possible method.

Referring to Fig. 112 note that each area must have an even number of warp ends.

Starting in the shed that lowers the left-hand end of each area, enter each weft from the left and carry it across to the right boundary of its particular area, see Fig. 112 (a). Deal with each weft's end either by putting it into the next shed (if weft is thin enough to allow this) as shown in diagram, or by the normal method of starting wefts. There will now be a whole series of picks across the width of the rug, all going from left to right. Only two wefts are shown in the diagram.

Change sheds. Starting from the right selvage, weave the extreme right-hand weft (black) with its allotted warp ends and then bring it out of the shed and lay it across the next weft to the left (white), see Fig. 112 (b).

Now pick up the white weft and weave it across its colour area. Note that as it enters the shed, its returning loop catches round the black weft, see Fig. 112 (c). Bring the white weft out of its shed and lay it across the next weft to the left (not shown in diagram).

Carry on thus right across the rug until the left selvage is reached. Wave each weft according to the width of its colour area. Each weft should now be coming from the left boundary of its area and should be looped around the next weft to the right, see Fig. 112 (c).

Change sheds. Starting from the left selvage, weave each weft in succession across its own area, but do *not* interlock, see Fig. 112 (d). The important feature of this pick is to tension each weft so that the previous interlock lies flat and causes no looseness or lumpiness in the weave. So after each weft is carried across its own area, put a finger of the left hand over the relevant interlock and pull the weft to the right until the interlock feels tight and lies centrally between the two ends that flank it. It is sometimes difficult both to do this and to leave sufficient slack in the weft for the normal waving. But it should be persevered with as the good looks of the rug depend on the proper adjustment of the interlock.

This sequence is repeated, locking when the wefts go to the left but not locking when the wefts return to the right.

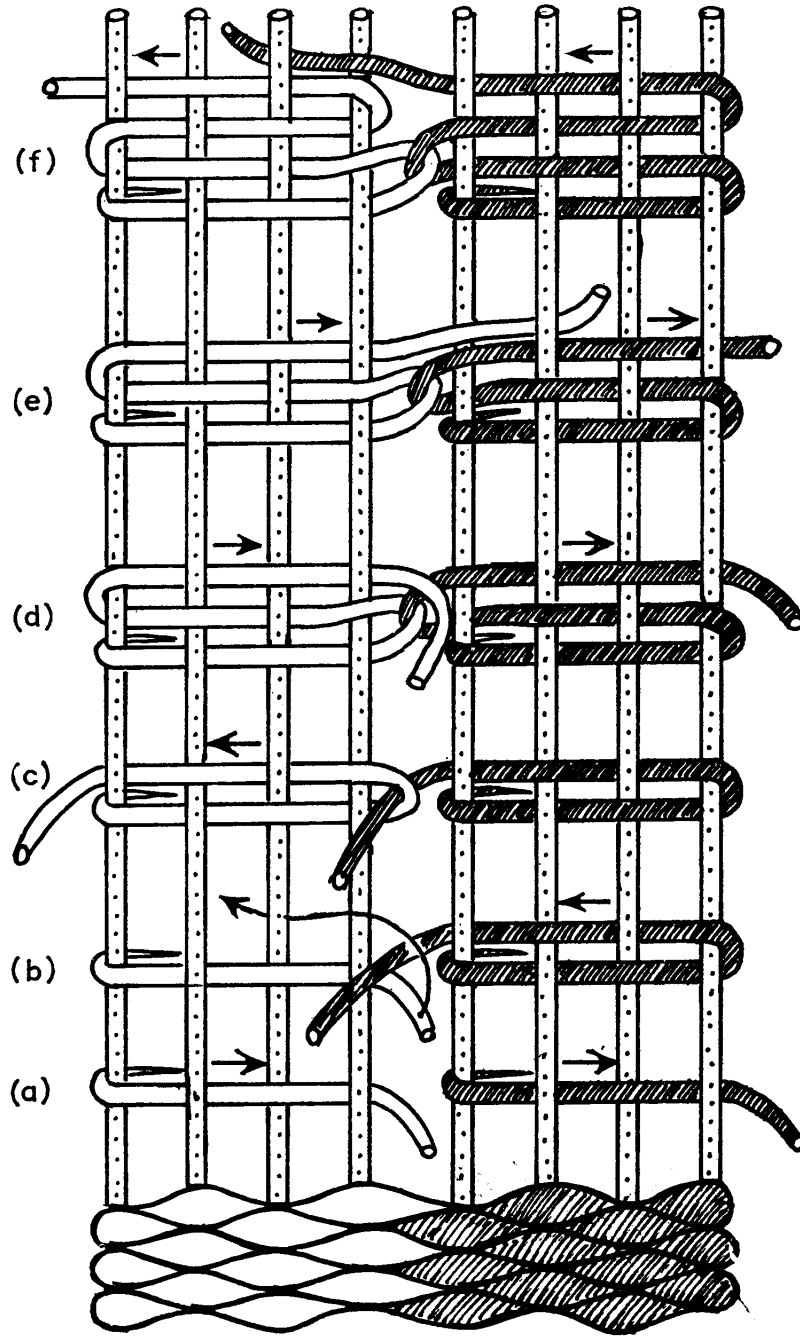


Fig. 112. Single Interlocked Tapestry. Scandinavian Method.
(a)–(d) Stages in weaving
(e) and (f) Moving colour area to right and to left

Changing Outline of Design

As all wefts move in the same direction in the same shed, any shift in position of the colour areas implies that at some point two wefts have to lie together in a shed.

To Move Colour Area to Right

This is naturally done in the shed in which all wefts move to the right. See Fig. 112 (e) in which the white weft moves to the right. Normally in this shed, the white weft weaves before the black weft. But if the white colour area is to shift to the right, this sequence must be reversed. So weave the black weft first, then weave the white carrying it across the black area as far as the pattern requires. Note that as it does so, the white weft has to lie in the same shed as the black.

In the next shed, all wefts move from right to left as normally, interlocking as they go. The black and white weft will interlock at their new point of junction.

To Move Colour Area to the Left

This is naturally done in the interlocking shed, when all wefts move to the left. See Fig. 112 (f) in which the black weft moves to the left. Normally the black weft moves before the white in the shed, but as above, this sequence has to be reversed. So first weave the white to the left, then weave the black carrying it across the white area as far as desired. This brings two wefts into the same shed. Note that the white and black wefts cannot, and do not need to, interlock.

In the next shed, the wefts will return normally to the right.

In the next shed, the wefts will interlock, black and white doing so at their new point of junction.

To Introduce a New Colour Area

Figs. 113 (b) and (c) show how a small black area is introduced in the centre of a white area.

First weave the white weft across the full width of its area, in the shed in which all wefts move to the right. Then on top of it in the same shed, lay the black weft where required and also another white weft to its left, see Fig. 113 (b). Ensure that the two new wefts move to the right.

In next shed, weave normally beginning at the right. The original white weft is locked with the new black weft, which is in turn locked with the new white weft, see Fig. 113 (c). Weaving then proceeds normally.

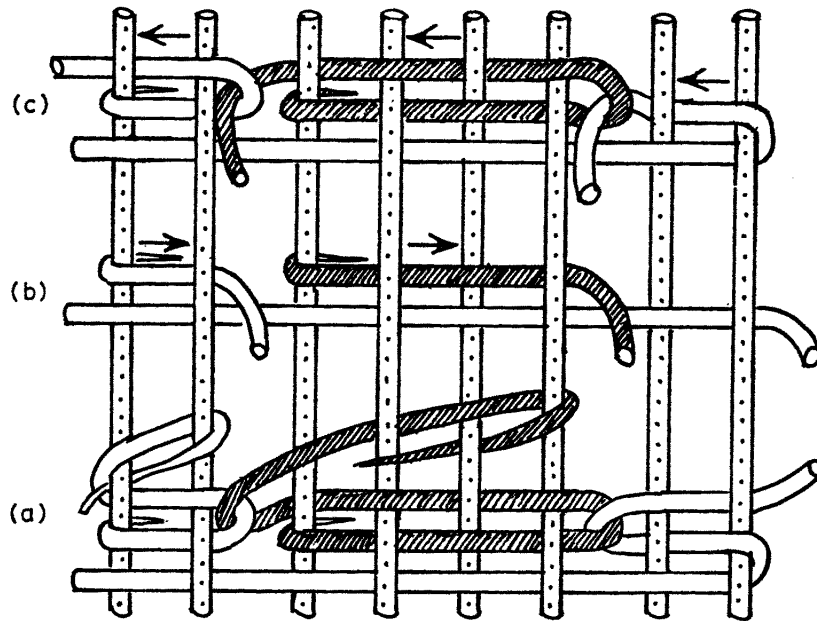


Fig. 113. Single Interlocked Tapestry. Scandinavian Method.
 (a) Finishing off a colour area
 (b) and (c) Introducing a new colour area

To Finish a Colour Area

Always do this in the shed in which all wefts move to the right. Having tightened the interlocks, push the wefts up away from the fell of the rug, so that the free ends can be darned back into the previous shed.

In Fig. 113 (a), the black weft and the left-hand white weft are both being finished off in this way. In the next shed, the original white weft can carry across the full width of its area again. As a colour area both starts and finishes in the same shed (i.e., when wefts move to the right), it must always contain an odd number of picks.

Note that the single interlocked colour junction is not a clean one but is slightly blurred, rather like that produced by single dovetailing.

The smallest possible unit of pattern is that spanning two ends. When weaving such a small area, great attention has to be paid to weft tension. No weft waving is necessary and the interlocks on either side of the area must be pulled tight to avoid a loose patch in the weave.

(b) Alternative Method of Weaving

Single interlocked tapestry can also be woven with contrary motion of wefts, see Fig. 114.

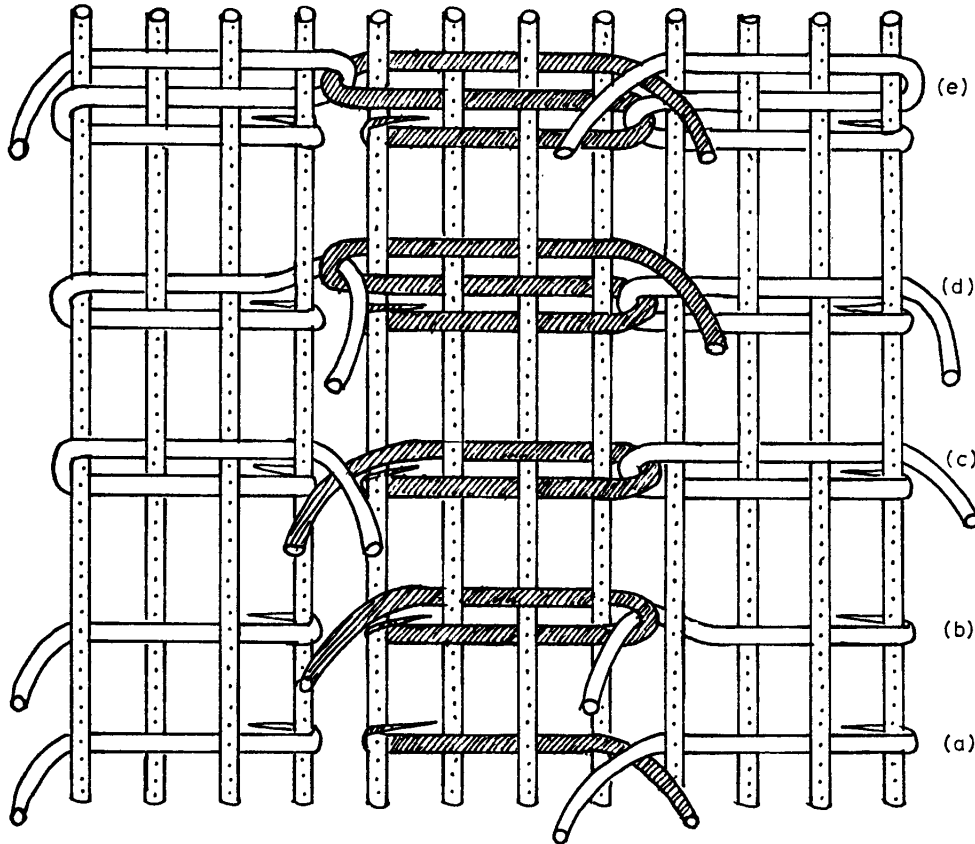


Fig. 114. Single Interlocked Tapestry. Alternative Method.
(a-e) Stages in weaving

In the first shed, start each weft in the opposite direction to its neighbour, making sure that the weft on the extreme right moves in from the selvage, see Fig. 114 (a).

All the way across the rug, there will now be, at intervals, two adjacent wefts coming out of the shed together, e.g., black and right-hand white in Fig. 114 (a). Fig. 115 (a) shows how this appears on the full width of a rug. Note that the pairs of wefts come out from every *other* colour junction; and, because in this example there is an odd number of colour blocks, there is one single weft at the left selvage.

Change sheds. Starting from the right, weave each of these pairs of wefts in turn. First, weave the weft from the left-hand of the two adjacent blocks (i.e., black). As it enters the shed it catches the other weft of the pair, see Fig. 114 (b). Secondly, weave

the weft from the right-hand block (white), see Fig. 114 (c). Pull these two wefts against each other to tighten the interlock.

Repeat this with the next pair of wefts to the left and so on all across the warp, dealing with each pair in turn, until finally the odd weft at the left selvage is woven in.

The positions of the pairs of wefts are now as in Fig. 115 (b). Note they are now

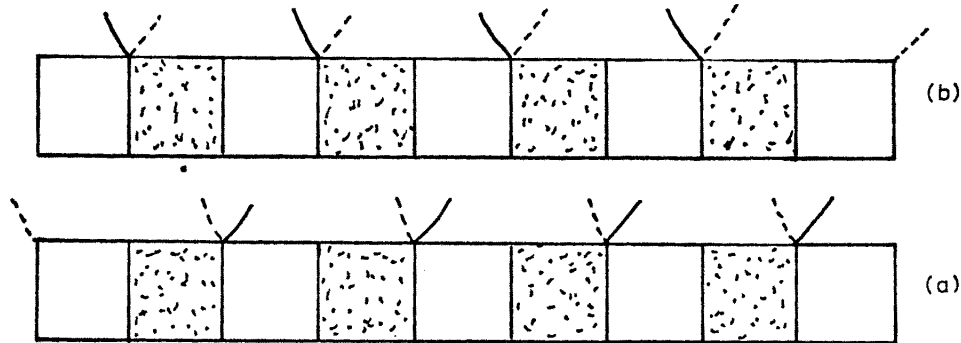


Fig. 115. Single Interlocked Tapestry. Alternative Method.
(a) and (b) How wefts emerge from design blocks

emerging from different colour junctions and that the odd single weft is at the right selvage.

Starting from left, weave each of the pairs in turn. First, weave the weft from the right-hand of the two adjacent blocks (i.e., black). Note that this is the weft moved first in the last shed. In fact it is always the weft from the even-numbered block that is moved first, see Fig. 114 (d). Secondly, weave weft from the left-hand block (i.e., white), see Fig. 114 (e). Pull the wefts apart to tighten the interlocks.

Repeat with the next pair of wefts to the right and continue thus across the warp until the single weft at the right selvage is reached and woven in.

This is the complete repeat.

Note—That on emerging from the shed, the free ends of two adjacent wefts cross each other in a certain way. The weft from the odd-numbered block (white) always lies on top. This happens quite naturally if the above description is followed exactly. A very awkward, bulky interlock, as at Fig. 116 (c), will result if this is not done correctly.

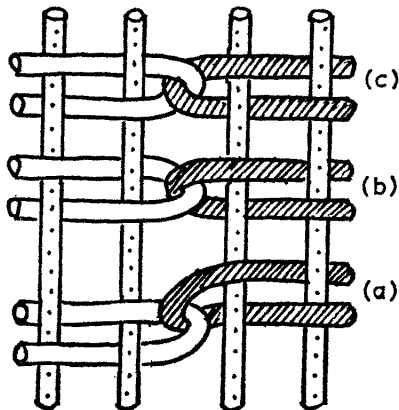


Fig. 116
Single Interlocked Tapestry. Methods of
weft interlock.
(a) In Scandinavian Method
(b) and (c) Correct and Incorrect Types
in Alternative Method

—That in this method, interlocking takes place in every shed. Each particular weft locks with the weft to its left in one shed and with that to its right in the next shed.

Changing Outline of Design

This is easily accomplished and does not involve two wefts in one shed. When a weft is moving to the right it can move as far as is required across the block to the right, and similarly to the left, see Fig. 117 (c).

Introducing a New Colour Area

Fig. 117 (a) and (b) show how a small black block is introduced in the centre of a white block. The original white weft is woven part way across its area. In the same shed, a new black and white weft are laid in. The black moves in the opposite direction and the new white in the same direction as the original white weft, see Fig. 117 (a). Weaving proceeds normally; Fig. 117 (b) shows the next pick.

A colour area is stopped in the same way as described above.

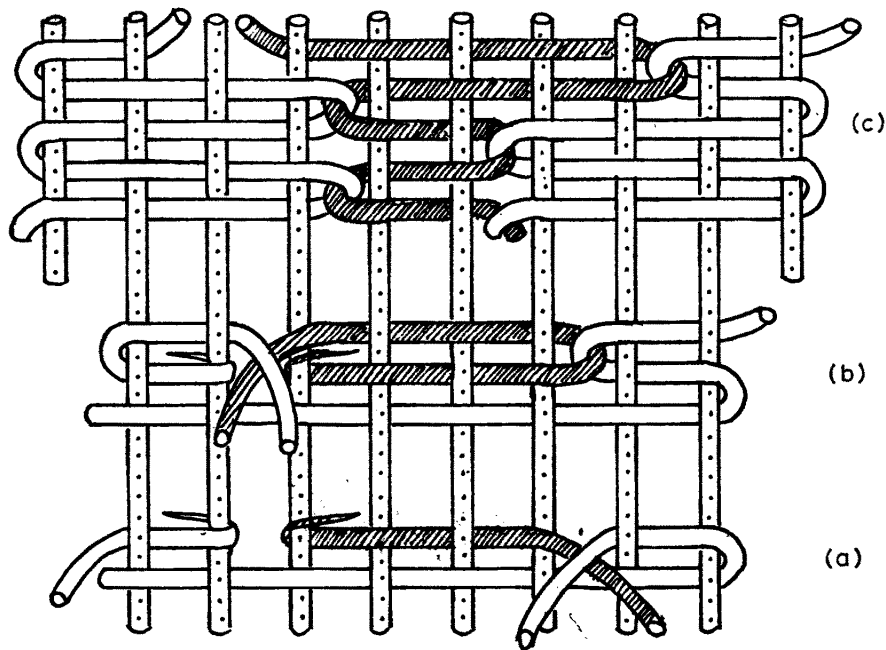


Fig. 117. Single Interlocked Tapestry. Alternative Method.
 (a) and (b) Introducing a new colour area
 (c) Moving a colour area to right and to left

The only objections to weaving interlocked tapestry in this way would seem to be:
 (i) that it is slightly less orderly. There is not a specific interlocking shed and a tightening shed, as in the Scandinavian method.

(ii) that a design can be encountered which upsets the contrary motion of wefts. This has been discussed in connection with kilims.

The main advantage is the ease with which colour areas can be moved and new colour areas introduced without each time having two picks in a shed.

Fig. 116 compares the different ways adjacent wefts are locked in single interlocked tapestry.

- (a) is found in the Scandinavian method.
- (b) represents the correct way in the alternative method.
- (c) represents the incorrect way in the alternative method.

(ii) DOUBLE INTERLOCKED TAPESTRY

Whereas with single interlocked tapestry, the vertical colour junction is flat and unobtrusive, with the double interlock it is in the form of a definite ridge. This lies on the upper surface as the textile is being woven; Fig. 118 shows the various stages in weaving double interlocked tapestry.

Begin as for single interlock, i.e., with all wefts going to the right in the first shed, see Fig. 118 (a). The blocks can span an odd or even number of warp ends. The white and black span three ends in Fig. 118.

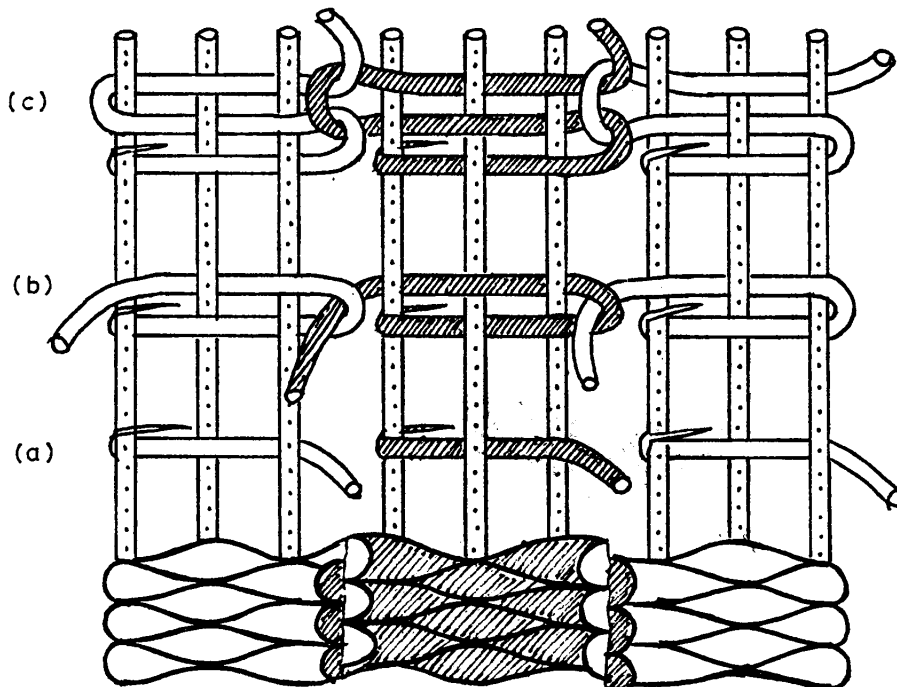


Fig. 118. Double Interlocked Tapestry.
 (a-c) Stages of weaving

Change shed. Beginning at the right selvage, move each weft in turn, making an interlock, see Fig. 118 (b).

Change shed. Beginning at the left selvage, move each weft in turn, also making an interlock, see Fig. 118 (c).

Continue thus, locking in every shed.

As the diagram shows, each colour junction has a ridge made up of interlocking loops of both wefts. When beaten down this ridge appears as at the bottom of Fig. 118, but on the back of the rug there is a perfectly clean join.

The technique is sometimes used in tapestry. The great strength of the join is useful when a large tapestry is hung, as is common practice, with the weft lying vertically. Also it is suitable for the intricacies of a tapestry design, as a weft can be woven spanning a single warp end.

Though strength of construction is desirable in rugs, the ridge is a definite disadvantage and the single interlock variety is always used.

But there is one interesting application of double interlocked tapestry to rugs, in which the ridge becomes the chief feature of the design. This is woven with several wefts, but all of the same colour, and the upper side as woven is the upper side as used. So the rug has vertical ridges lying on flat areas. The ridges can be moved to left or right in exactly the same way as colour areas are shifted in interlocked tapestry. Similarly a ridge can be started, or discontinued.

There are not many techniques which give the weaver a freely-controllable vertical element like this, so although the weaving is slow it is a worthwhile addition to the repertoire of techniques. See Plate 31.

(iii) TWO-COLOUR AREAS IN INTERLOCKED TAPESTRY

A colour area need not be woven with a single weft. It can consist of two wefts woven in some sequence, producing cross stripes or pick-and-pick stripes.

(a) *2-and-2 Stripes*

Start in the normal way with all wefts going to the right in the shed that lowers the left-hand end of each block (which must contain an even number of ends).

Introduce the first colour of the stripe, A, in this shed. Weave two picks in the normal way, i.e., an interlocking and a tightening pick, see bottom of Fig. 119. Introduce a second colour, B, in exactly the same way. Weave two normal picks using B, A meanwhile hanging out of the shed unused, see top of Fig. 119. Bring A back to weave the next two picks, leaving B unused. Continue thus, using the two colours alternately for two picks.

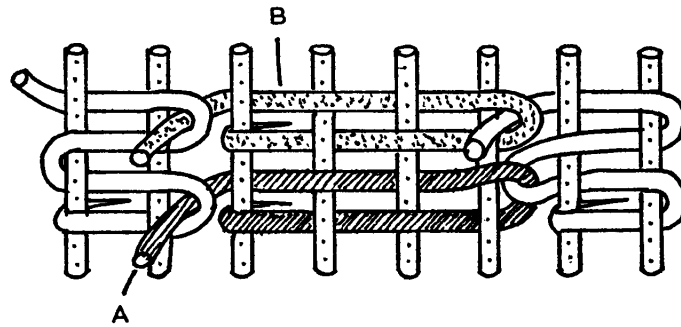


Fig. 119. Single Interlocked Tapestry. Weaving an area with two wefts in cross stripes

Note—That as each weft begins a new stripe, it has to be brought up at an angle over the preceding stripe. For example, in Fig. 119, A will have to be carried across the stripe of B before it can weave its next stripe. This gives a slight downward slant to the left-hand of each stripe.

(b) *Pick-and-Pick Stripes*

There are several ways of weaving a block of pick-and-pick stripes, all of them fairly complicated. Fig. 120 shows diagrammatically one such method. Note that only one of the wefts involved (black) locks with the wefts of the surrounding area.

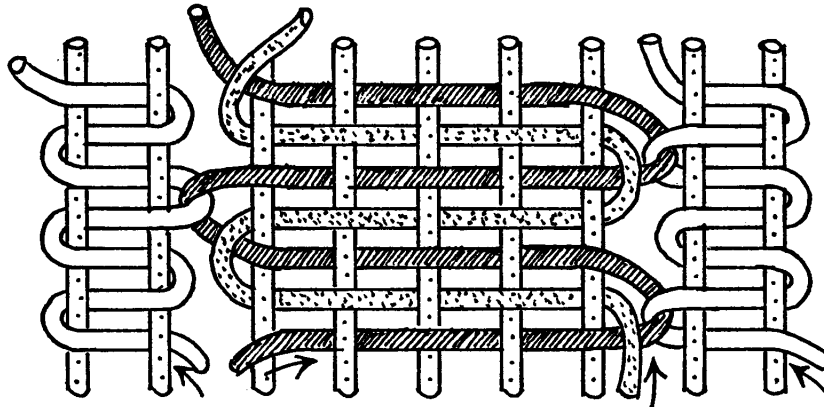


Fig. 120. Single Interlocked Tapestry. Weaving an area with two wefts in pick-and-pick stripes

A pick-and-pick area can be woven in a far simpler way if one of its colours is also the colour of the areas on either side, see Fig. 121. In this case, every other pick goes right across the warp.

Referring to the bottom of Fig. 121, weave the shaded weft from left to right across the full width of the warp. (Pick 1)

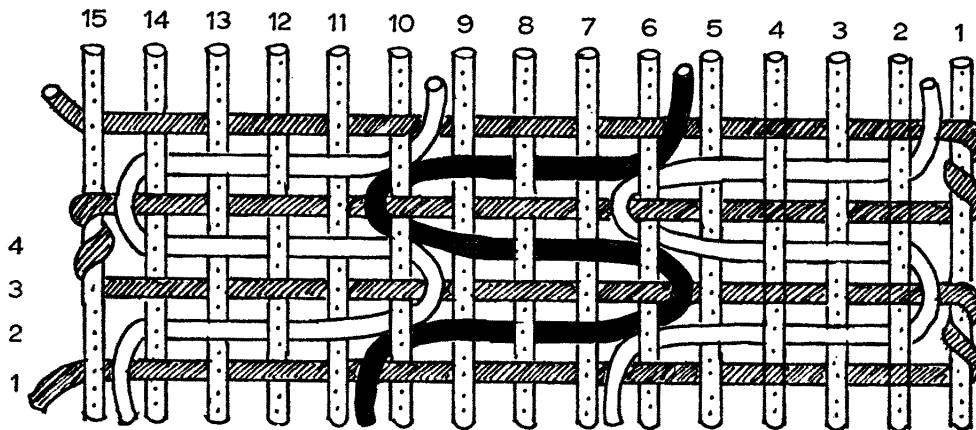


Fig. 121. Weaving areas of pick-and-pick stripes which share one weft

Change shed. Introduce three tapestry wefts as shown. (Pick 2)

The right-hand white weft passes under ends 6, 4 and 2.

The central black weft passes under ends 10, 8 and 6.

The left-hand white weft passes under ends 14, 12 and 10.

Change shed. Weave shaded weft to the left, first making a pick-and-pick selvage at the right. (Pick 3)

Change shed. Weave the three tapestry wefts towards the left, starting with the left-hand one. (Pick 4)

The left-hand white jumps up vertically into the new shed and goes to the left selvage.

The central black also jumps up vertically, and weaves to the left. It is brought out of the shed when it has passed under the first end that the last weft passed under, i.e., end 10.

The right-hand white weaves to the left similarly, leaving the shed after it has overlapped the black weft under end 6.

This is the whole repeat.

Note—When the tapestry wefts weave towards the left, it is the left hand one which moves first, and vice versa. This is to ensure that they overlap correctly behind ends 6 and 10.

—This is not true interlocked tapestry, as the tapestry wefts are locked by passing vertically over the selva-to-selva weft, and are not locked with each other.

—The selva-to-selva weft is shown shaded for clarity. Naturally, it would have to be white to make the two side areas a solid colour.

C. Tapestry Techniques not in Plain Weave

The following techniques can conveniently be described here.

(i) TWILL TAPESTRY

The tapestry principle, i.e., a textile woven of discontinuous wefts, can be applied to structures other than plain weave. 2/2 twill is a commonly used weave for this purpose and may be a simple diagonal twill or a diamond twill.

With a simple twill, the weaving is very similar to plain weave tapestry, except that it requires four picks, not two, to make a solid line of colour. The twill lines may be used as diagonals along which colour junctions can be made, see lower half of Fig. 122 where the colour areas slope up to the right, following the twill lines. In the upper half, the twill has been reversed to allow the colour areas to change direction. In a more complex weave of this type, the sheds are finger- not shaft-controlled. This means that the twill only needs to reverse where the design demands it and the reverse need not take place right across the width of the textile as in Fig. 122. Thus, far more intricate designs can be woven. The twill lines can run parallel with the axis of each motif helping to emphasize it.

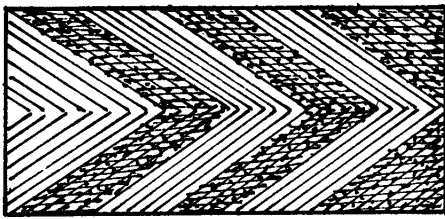


Fig. 122. Twill Tapestry. Colour areas following twill lines

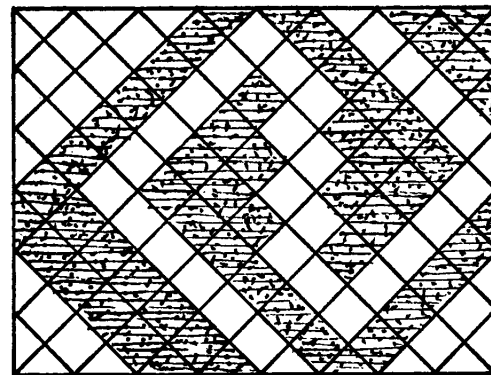


Fig. 123
Diamond Twill Tapestry. Showing rug surface made up of mosaic of diamonds

Another method for more complex designs is to use a diamond twill as this provides diagonals in both directions along which colour junctions can be made. The surface of the rug is made up of a mosaic of small diamonds, as indicated in Fig. 123, and shown in greater detail in Fig. 124. These diamonds are the unit of design and each one consists of a solid colour. Where adjacent diamonds are of different colours, the wefts can be interlocked along the dividing line. Plate 32 shows a sample whose warp was threaded (4,3,2,1,2,3) repeat. The shafts were lifted 23, 12, 14, 12, 23, 34, 41, 34, repeat. The first four lifts give the lower two diamonds in Fig. 124, the last four lifts the upper two diamonds. Note that the pick when 23 is raised is both the last pick of one row of diamonds and the first pick of the next row. If different colours are used for the first four and second four lifts, the rows of diamonds at either end of the sample appear automatically. The central motif was built up in diamond twill tapestry technique a

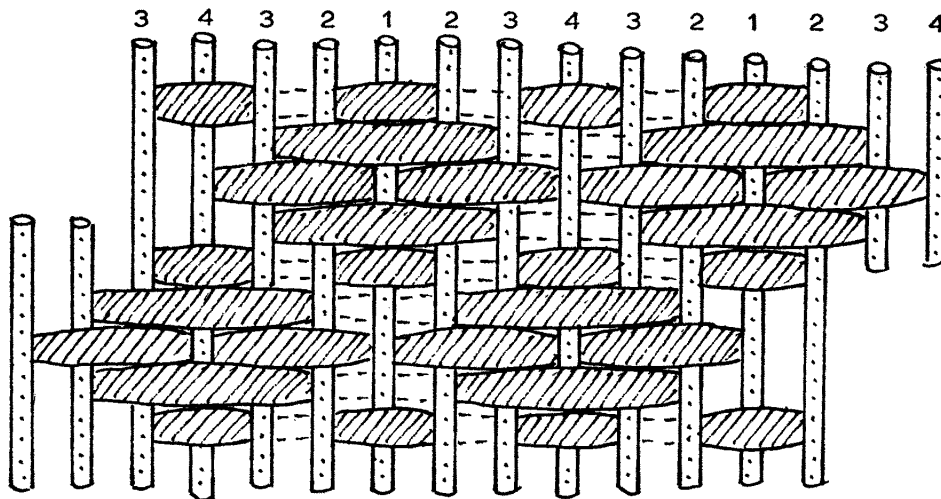


Fig. 124. Diamond Twill Tapestry. Detail of weave

separate weft being used for each colour area. Visually the result is little different from plain weave tapestry and it is certainly more difficult to weave. With a warp set at 5 or 6 working e.p.i. and a weft of 2-ply carpet wool used threefold, the resulting rug is of good texture.

For further details of this and related techniques see *Cultivation and Weaving of Cotton in the Prehistoric South West United States*, mentioned in the Bibliography.

(ii) TAPESTRY OF WEAVES

In normal tapestry, the design areas are distinguished from each other by the colour of the various wefts used. In this technique, the design areas are produced by varying the weaves. The rug could, in fact, be of one single colour, the areas only being distinguished by the differing surface textures, resulting from the different weaves. So it is a tapestry of textures rather than of colours.

Weaves which can be combined are plain weave, hopsack, straight and broken 2/2 twill. Each area is built up separately using its own weft, the number of picks required per inch depending on the weave used. Plate 33 shows a sample in which the central motif is woven in straight 2/2 twill, the triangles at each side in broken 2/2 twill and the intervening areas in plain weave. The technique has great possibilities but is naturally very slow.

6 · Weft-face Rugs in Plain Weave

PART THREE: TECHNIQUES GIVING A RAISED SURFACE DECORATION

INTRODUCTION

All the techniques described so far (with the exception of double interlocked tapestry) produce a rug which is flat on both sides. So it can equally well be used either way up, though there may be very slight differences of design between the two sides. In the methods described in this Chapter, there is some sort of surface decoration or texture on the upper side of the rug as it is woven, so the rug definitely has a right and a wrong way up. In some cases, however, both sides are equally practical to use.

1. SOUMAK OR WEFT WRAPPING

The word Soumak is said to derive from Shemakha, which was once the capital of the Khanate of Shirvan in the Caucasus, but is now in the province of Azerbaidzahn, U.S.S.R. This region was the source of the classical soumak rugs which though produced in smaller quantities than knotted and kilim rugs, were in no way inferior in quality or beauty.

HISTORY

The technique itself can be traced back at least to 2000 B.C. which is the approximate date of some famous linen fragments found in a lake dwelling at Irghausen, Switzerland. These show a two colour design in soumak and include a very complicated use of it in the formation of a border. Other early examples come from Egypt (1500 B.C.), from Peru in neolithic times and from Persia (eleventh century A.D.). The technique is said to have reached Sweden in late Roman times and there still exist some splendid wall hangings dating from the twelfth or thirteenth century, which were found in churches at Skog, Dal and Overhogdal. These use the soumak technique (known as snärjevåvad in Sweden) to represent very stylized people and animals and

they tell a story in the way the Bayeux tapestry does. The decorative use of the technique has also been discovered by many primitive people, such as the Ainu of Japan, and the inhabitants of New Caledonia and of Guiana.

A. General Technical Details

As with most methods in this Chapter there are basically two wefts. One is the ground weft which weaves with the warp to make a normal weft-face structure, the other is the soumak weft which crosses the warp at intervals, wrapping round its ends, more in the manner of an embroidery stitch than of weaving. So the soumak weft adds little to the structure of the rug but is predominantly decorative, forming a ridge raised above the level of the surrounding plain weave.

Fig. 125 (a) shows one row of soumak following two picks of plain weave. The

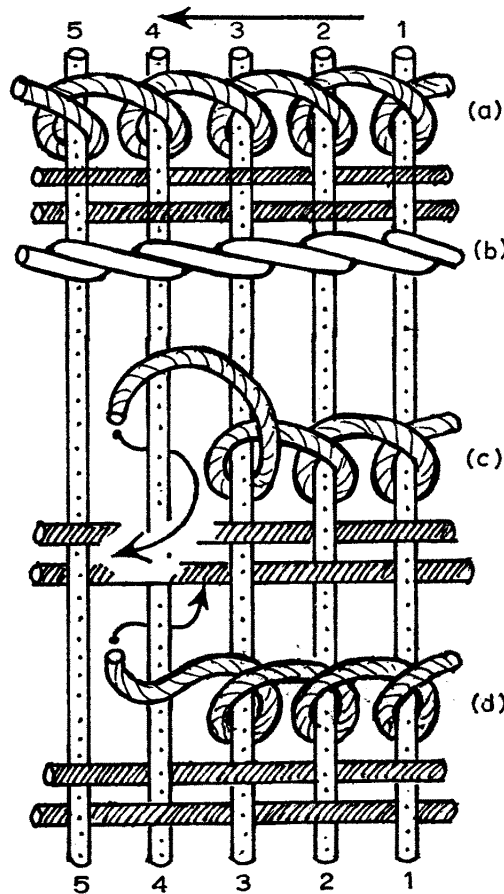


Fig. 125
Soumak.
(a) and (b) Two views
of 2/1 soumak
(c) Locking soumak
(d) Non-locking soumak

soumak weft is white, the ground weft is shaded. As the arrow indicates, the soumak weft is moving to the left. The soumak weft passes forward over two warp ends and then backwards under one, taking a wrapping course around the warp similar to that found in backstitch or stem stitch.

This is the simplest form of soumak and can be called 2/1 soumak. There are many other types in which the soumak weft wraps round a different number of warp ends, e.g., 4/2 soumak, where it passes forwards over four ends and backwards under two, 3/2 soumak, 6/3 soumak, and 9/3 soumak (as used in the Skog hanging). But it is 2/1 soumak which gives the closest texture and has been most used in rugs and saddlebags. Note that the soumak weft engages with all the warp ends, i.e., no shed is opened when the soumak is worked. It is carried out on the flat warp ends.

B. Surface Angling

Fig. 125 (a) shows that the forward-moving portions of the soumak weft do not lie at right angles to the two warp ends they cross, but at a definite angle, in this case slanting upwards to the left. These are the only parts of the soumak weft visible in a well-beaten rug and this angling gives the characteristic surface to a soumak rug, see Fig. 125 (b).

Whether this angle slants up the the left or right depends on two things, the exact way the soumak weft is wrapped around the warp and the direction in which the soumak weft is moving.

(i) METHOD OF WRAPPING GIVING LOCKING AND NON-LOCKING SOUMAK

The normal way of wrapping is shown in Fig. 125 (c). Place a loop of soumak weft over warp end 4, then pass it backwards under this end. Bring it up in the interval between its forward-moving portion and the last pick of ground weft, as shown by the arrow. Pull the soumak weft tight. As it now lies in the form of a half-hitch round the warp end, it will stay tight. For this reason, this type will be called *locking* soumak. Note that when locking soumak is worked from right to left (as in Fig. 125 (c)), its surface weft spans slant up to the left.

The alternative method is shown in Fig. 125 (d). Place the soumak weft over warp end 4 and pass it backwards under this end. But here, bring it up beyond its forward-moving portion, as shown by the arrow. Tighten. As in this case the weft makes no form of knot with the warp, it can easily become loose again, hence it is the less-used method. For this reason, this type will be called *non-locking* soumak. Note that when non-locking soumak is worked from right to left (as in Fig. 125 (d)) its surface weft spans slant up to the right, i.e., in the opposite direction to locking soumak.

(ii) DIRECTION IN WHICH SOUMAK IS WORKED

If one row of locking soumak made from right to left is followed by another row from left to right (with some ground weft in between), the weft spans of the first row will slant up to the left and those of the second row up to the right, see Fig. 126 (a). As working alternately to left and to right would seem to be the simplest and most natural way to carry out soumak, the resultant alternation of the surface angling can be regarded as normal, see Fig. 126 (b). It is the method found in most classical soumak rugs. A similar result is naturally obtained if non-locking soumak is worked alternately to left and to right.

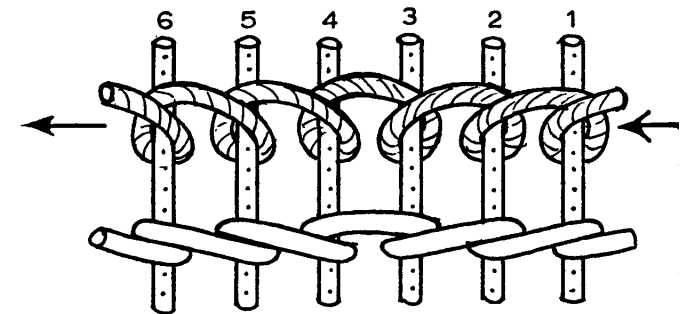
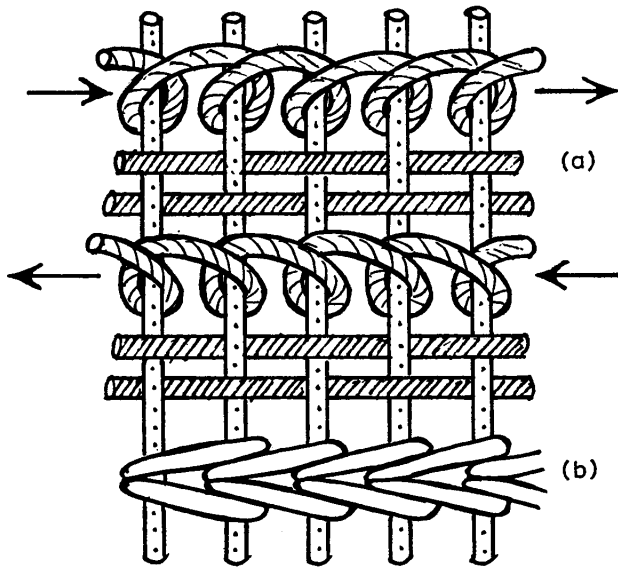


Fig. 127. Soumak. Reversing angle of weft spans

126. Soumak.

(a) Angling of weft spans up to the left and up to the right
(b) Woven result

If, however, several rows with identical angling are wanted, there are two possible ways of producing this. One is to keep the normal right to left, left to right sequence, but to use locking and non-locking soumak in alternate rows. The other is to work, with only one type of soumak but always move from left to right or always right to left. In other words the soumak weft will either have to be finished off at the end of each row or returned to its starting selvage in a plain weave shed.

From the above it will be understood that the surface angling is always under the control of the weaver. Moreover the angling can be reversed in the middle of a row of soumak, by changing from the locking to the non-locking type, or vice versa. Fig. 127 shows such a reversal. The soumak (going to the left as shown by the arrow) is non-locking around ends 1-3 and locking around ends 4-6. In this way, blocks of soumak with opposite surface angling can be produced.

C. Types of Soumak**(i) SINGLE AND DOUBLE SOUMAK**

So far, only single soumak has been described, in which the weft makes a single wrapping movement around one or more warp ends. Double soumak in which the weft wraps around two separate warp ends, or groups of warp ends, gives a much thicker ridge.

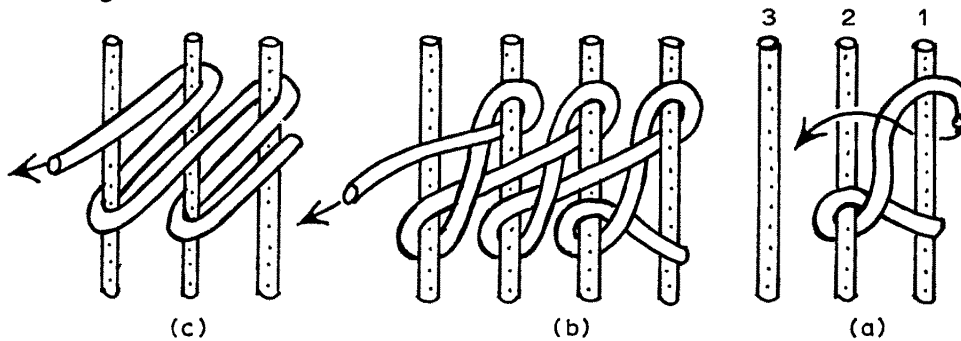


Fig. 128. Soumak. (a) and (b) Double locking soumak (c) Double non-locking soumak

Referring to Fig. 128 (a), wrap the weft round end 2 as in normal locking soumak. Then carry the weft backwards and wrap it round end 1, again in the locking manner, as shown by the arrow. Now wrap the weft round end 3, then carry it backwards and wrap around end 2.

So in each complete repeat, the weft wraps once around a new, unused, end and once around the end just used. Fig. 128 (b) shows several repeats and indicates why this is also called figure-of-eight soumak.

Fig 128 (c) shows several repeats of double non-locking soumak. This gives a far less prominent ridge.

Once the principle of double soumak is understood, other variations of this type will occur to the weaver.

(ii) BUSHONGO TYPE OF SOUMAK

The raffia cloths from the Bushongo tribe in central Africa are decorated with areas of raffia pile and with thin lines carried out in a variation of soumak. Both of these were embroidered on the finished cloth. But this soumak variation can be carried out when weaving and was extensively used in the Shiant rugs, designed by Jean Milne and woven in the Scottish islands. Fig. 129 shows how it is carried out. Comparison with Fig. 125 (c) will show how it differs from normal locking soumak. Note that each loop is tightened by pulling the soumak weft to the *right* in Fig. 129. This type of soumak

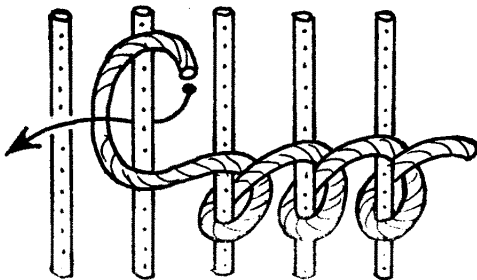


Fig. 129. Soumak. Bushongo type

gives a thin ridge that stands up well above the ground weave. It is often used to give a ridge lying at an angle to the fell of the rug.

(iii) TWO-COLOUR SOUMAK

Any of the types of soumak described so far can be carried out with two soumak wefts of different colours. The simplest sort, two-colour single soumak, is occasionally seen on Eastern knotted rugs as a decorative line across the knotless plain weave strip at either end. It is shown in Fig. 130 (a).

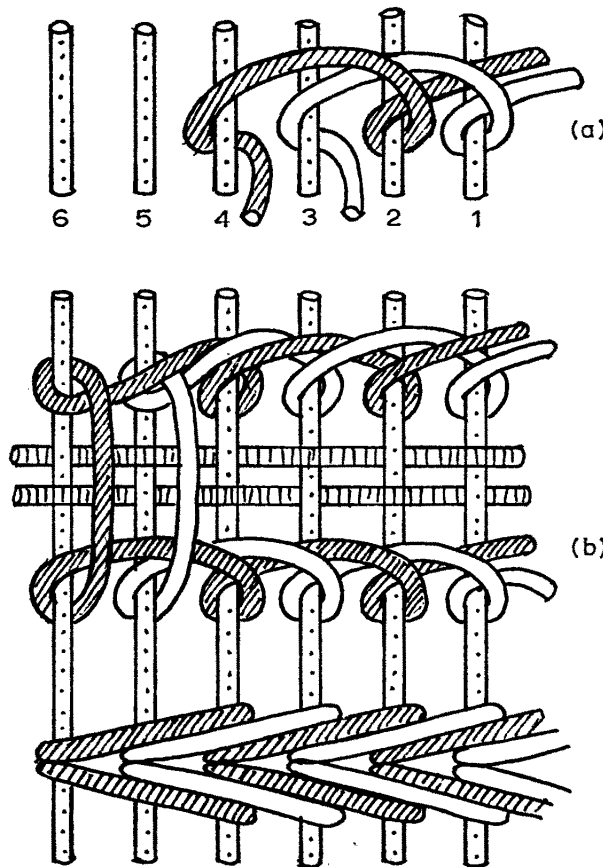


Fig. 130
Soumak. Two-colour,
single soumak.
(a) General view
(b) Jumping up from
one row to the next
(c) Woven result

Wrap the white weft in the locking manner around end 5 and then bring it down over the already-woven rug. Then wrap the shaded weft similarly around the next end, 6, and bring this weft down over the rug.

This gives a ridge in which the angled weft spans are alternately of two colours. If a second row of two-colour soumak is added, the two wefts are carried up as in

Fig. 130 (b). The lower part of this diagram shows that this will appear as chevrons of the two colours. This is, however, only one of several possibilities.

If the second row is made in non-locking soumak, its weft spans will lie at the same angle as those in the first row. If, again, in the jump-up from one row to the next, the two colours are crossed (so that the white weft in the second row is wrapping round the ends used by the shaded weft in the first row and vice versa), then the colour positions will be reversed. By playing with these variables, the weft spans can be made to appear as vertical or oblique stripes of the two colours. This is exactly comparable to the effects given by two-colour weft twining, illustrated in Chapter 13. In fact anything possible in the latter technique is also possible in two-colour single soumak.

Fig. 131 shows one of the forms two-colour double soumak can take.

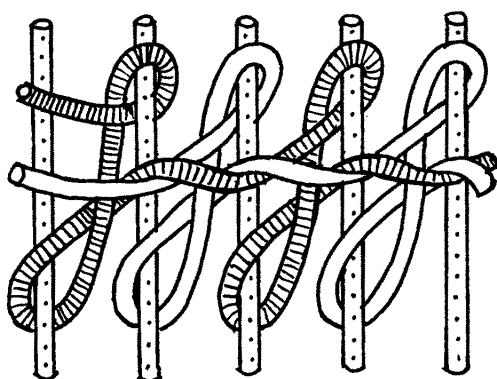


Fig. 131
Soumak. Two-colour,
double soumak

(iv) GAUZE SOUMAK

The angled weft spans of normal soumak show only on the upper surface of the rug. Gauze soumak was the result of trying to discover some type of weft wrapping which would show equally on both sides.

Referring to Fig. 132 (a), take the soumak weft forwards over two ends, backwards under one and over one, then forwards under two ends. Repeat.

As the cross-section in Fig. 132 (b) makes clear, this gives a weft span over two ends on both sides of the rug. This is not angled.

A simpler way to work this type involves twisting the warp, hence the name gauze soumak.

Of the next two warp ends to be wrapped around (7 and 8), twist the left-hand over the right-hand, and through the opening thus formed, pass the soumak weft, see Fig. 132 (a). Make the two ends untwist, either with the fingers, or by beating, and if the weft was at the correct loose tension it will now lie in the form of gauze soumak. With practice several repeats can be worked before beating.

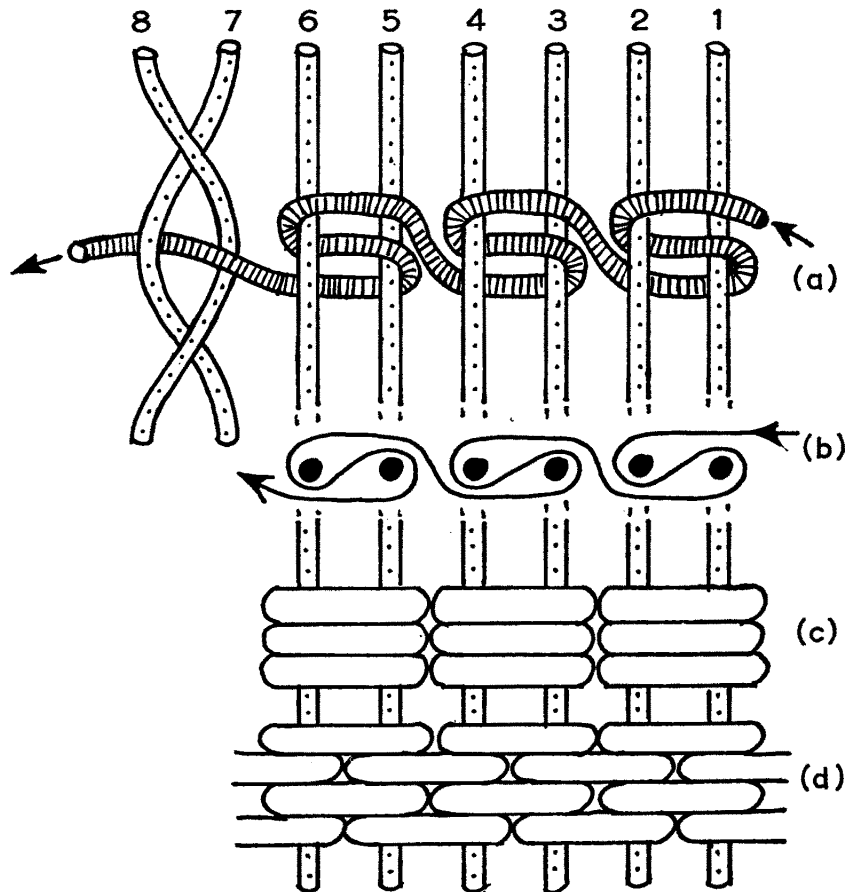


Fig. 132. Gauze Soumak. (a) Method of production (b) Cross-section (c) and (d) Methods of arranging weft spans in successive rows

Note—The two warp ends could equally well be twisted right over left, if this is found more convenient.

—Gauze soumak is very simple to undo. Simply pull the weft from both ends, thus crossing all the pairs of warp ends. The weft, now lying in a straight line, can be easily withdrawn.

As shown in Fig. 132 (c) and (d), the weft spans lie end to end, rather like bricks in a wall. If the next row of gauze soumak is worked round the same pair of warp ends (with, of course, some plain weave in between) the result will be as in Fig. 132 (c). If alternate rows of soumak use different warp ends, then the result will be as in Fig. 132 (d).

D. Uses of Soumak

(i) RIDGES

The simplest use of soumak is to make raised ridges across the width of a rug. The prominence of these varies with the thickness of the yarn and the type of soumak used. The tension of the soumak weft should be carefully adjusted or the rug will be pulled in by each soumak row.

Such a soumak ridge need not lie parallel with the fell of the rug, but can slope upwards at an angle and is made thus.

Make one wrapping of soumak. Then weave a few picks of plain weave with the ground weft from selvage to selvage. Make one more soumak wrapping, repeat the plain weave. See Fig. 133.

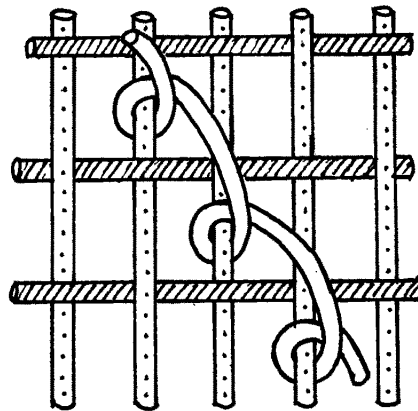


Fig. 133
Soumak. Forming a
ridge at an angle

The more picks of plain weave, the steeper the angle at which the soumak will lie. In Fig. 133 only one pick of ground weft has been shown for simplicity's sake.

A sloping ridge of soumak can be used to outline a kilim motif. First weave the motif, say, a triangle, then carry the soumak up one side and down the other. Then weave in the background area. This is comparable with outlining a kilim motif with plain weave, e.g., the black weft shown in Fig. 103 (a) in Chapter 5.

(ii) BLOCKS

A more interesting use of soumak is to make soumak blocks (whose shape is always controllable) on a plain weave ground, so the soumak stands out as a raised and textured area lying on a flat plain weave background. This can be done in several ways.

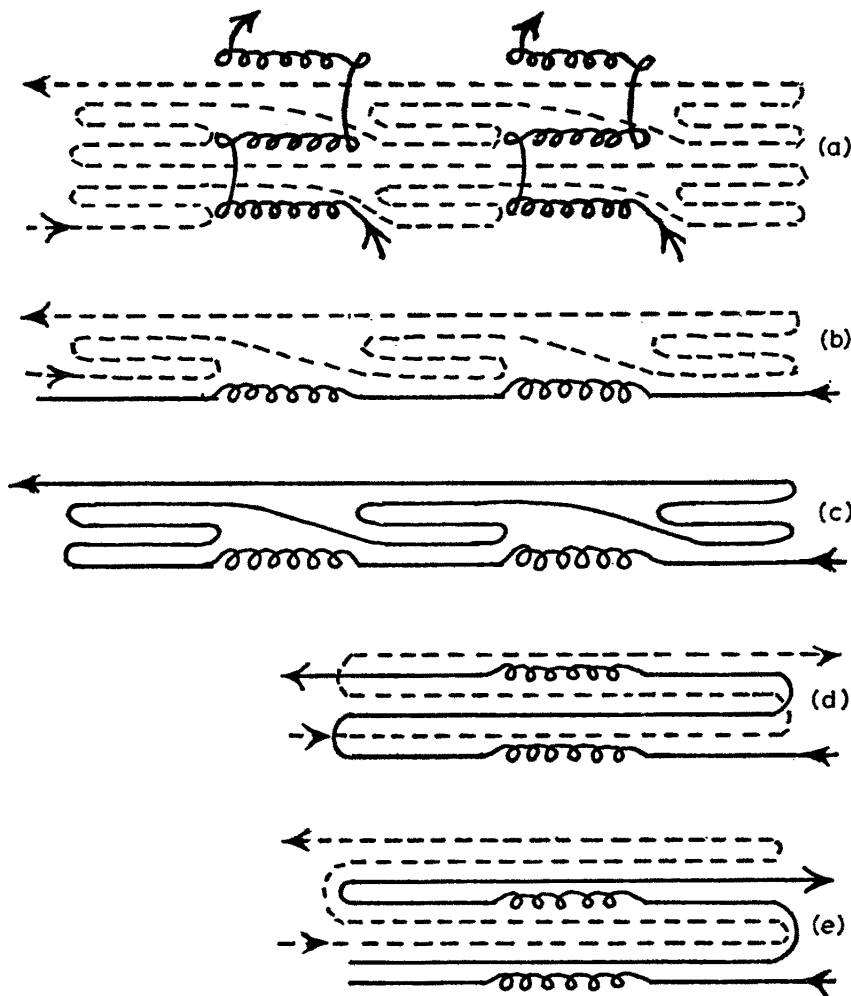


Fig. 134
Soumak. Methods
of making blocks
of soumak on a
plain weave
ground
(a) Using separate
weft for each block
(b) Using one weft
for all blocks
(c) Using one weft
for both soumak
blocks and ground
weave
(d) Producing pick-
and-pick stripes in
background area
(e) Producing cross-
stripes in back-
ground area

(a) *Separate Soumak Weft for Each Block*

Referring to Fig. 134 (a), carry each soumak weft across its prescribed area. Then weave with ground weft as shown. Make the second row with each soumak weft, then the ground weft as before.

The compensatory zigzag course of the ground weft may not be necessary after every row of soumak. If the soumak weft is thin, the ground weft can sometimes go straight from selvage to selvage. Do whatever gives a level fell to the rug.

(b) With One Soumak Weft for All the Blocks

Referring to Fig. 134 (b), start soumak weft at the right selvage, see arrow. Carry it in a plain weave shed up to the edge of the first proposed block. Then bring it out of the shed, and, on a closed shed, work it in soumak across the width of the block. Re-open the same shed and insert the soumak weft, carrying it up to the edge of the next block. Continue thus all the way across the rug to the left selvage.

At this point two things can be done, either introduce a ground weft and weave as shown in Fig. 134 (b), or let the soumak weft act as the ground weft as in Fig. 134 (c). In either case the compensatory zigzag course may not be necessary if the soumak weft is not too thick. In both cases repeat the whole process, taking the soumak weft in its partly woven, partly wrapped, course across the warp, followed by plain weave.

Note—That in the second method, one soumak weft can make any number of blocks across the width of the rug.

- That each time the soumak weft is carried across there is the possibility of altering the boundaries of the block. So their shape is constantly under the weaver's control.
- That in the type shown in Fig. 134 (b), the plain weave ground will show spots of the soumak weft colour on the ground weft colour. Other two-colour effects can be obtained in this area, e.g., pick-and-pick stripes as in Fig. 134 (d), and 2-and-2 cross stripes as in Fig. 134 (e). These sequences will probably have to be interrupted at intervals with compensatory zigzag picks.
- Making soumak blocks becomes far quicker if the soumak is carried out on the *raised* ends of an open shed. There is then no need for any compensatory picks. The ground weft can pass from selvage to selvage in the normal way.

If when using 4/2 soumak, a very crisp edge to the block is wanted, start with one repeat of gauze soumak (putting right-hand warp over left, if working from right to left). Then continue with 4/2 soumak to the edge of the block. Fig. 135 shows this being used to make the smallest possible block, i.e., spanning four ends as it is in 4/2 soumak. If a similar block is made when the soumak weft returns, they will combine to form a small raised spot as in Fig. 135.

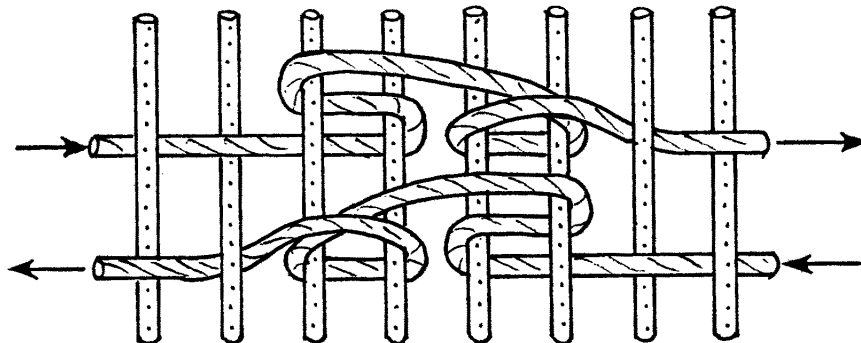


Fig. 135. Soumak. Using Gauze soumak to start a block

(iii) ALL-OVER SOUMAK

The classical soumak rugs are covered with the weft spans of closely packed rows of soumak. No plain weave is visible. Each soumak weft is worked from the right edge to the left of its own colour area and then back again, exactly as a tapestry weft is woven. But because of the ground weft (weaving from selvage to selvage), one soumak motif cannot be built up ahead of the rest, as is often done in tapestry. So the soumak weft of every colour area, all the way across the rug, has to be worked before the ground weft can be woven and the whole process repeated. This may explain why the design on the right side of a soumak rug rarely gets out of step with that on the left side, a thing that can easily happen with a kilim.

Designs of an intricacy approaching those found in knotted carpets can be produced with all-over soumak, see Plate 34. This is partly due to the high number of ends per inch found in soumak rugs and saddlebags, e.g., 14 to 18 e.p.i. Fine vertical lines are obtained by wrapping the weft round a single warp end. The only effect knotting can give which is unobtainable with soumak is a single spot of colour (one knot). The inside of a soumak saddlebag shows the short cuts taken by the weaver. Where several areas of the same colour are required, the soumak weft is looped across behind the intervening areas to avoid the use of several separate wefts.

A loop is also found on the back where a motif suddenly changes its outline. In Fig. 136, the dotted line shows where the soumak weft would have a loop at the back

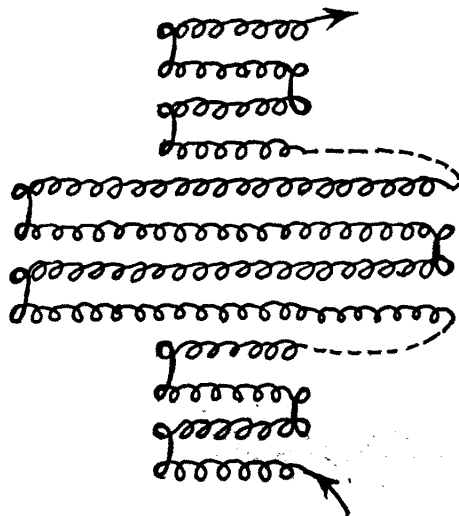


Fig. 136
Soumak. Showing weft loops at the back when working a cross shape in soumak

in the weaving of a cross. This is another form of the problem met with in tapestry technique where a sudden change of a motif's outline can lead to two wefts in a shed.

In such an all-over soumak rug, there are naturally many places where the soumak weft from the end of one row jumps up to start the next row and in so doing passes

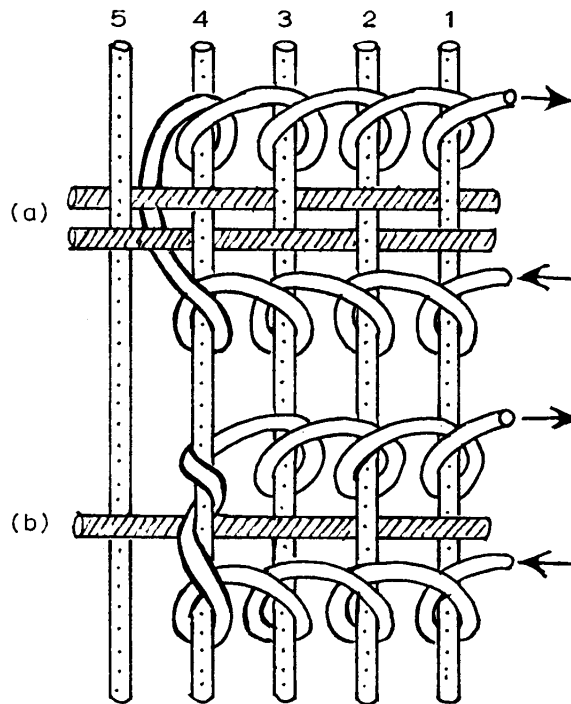


Fig. 137
Soumak. Two
methods of carrying
weft up from one
soumak row to the
next

over the intervening plain weave picks. Many methods are used, one of which is that shown in Fig. 139, in connection with selvages. Another is shown in Fig. 137 (a).

Complete the row of soumak by wrapping the weft around end 4. Push the weft between ends 4 and 5 through to the back. Weave two picks of ground weft. Bring the soumak weft forward between ends 4 and 5 and start the second row of soumak.

A third method which does not give such a regular edge to the motif is shown in Fig. 137 (b). It is generally associated with only one pick of ground weft.

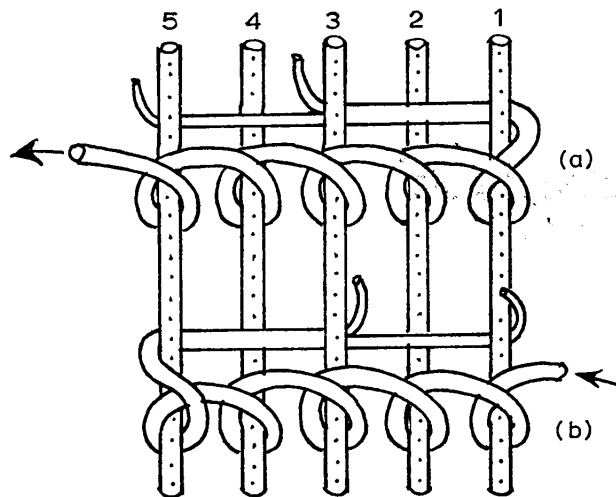


Fig. 138
Soumak.
(a) Starting a
soumak weft
(b) Finishing a
soumak weft

Complete the row of soumak by wrapping the weft around end 4 and then weave the ground weft. Wrap the soumak weft twice around end 4 in the direction shown and begin the soumak around end 3.

Either of these methods could be used at the selvage instead of the one shown in Fig. 139.

E. Practical Details

(i) GENERAL

As soumak is basically a decoration imposed on a weft-face rug, the remarks concerning the warp and weft setting of weft-face rugs in Chapter 4 apply to the warp and ground weft of soumak rugs. The soumak weft itself is generally thicker than the ground weft. It could consist of 2-ply carpet wool used sixfold to eightfold, if the ground weft consisted of the same yarn used fourfold. Its thickness naturally controls the boldness with which the soumak ridges stand out.

The ground weft should be on a normal rug shuttle, the soumak weft should be in a finger hank, which can easily be wrapped round successive warp ends.

If each row of soumak is followed by about two picks of ground weft, the former will completely hide the latter and the surface of the rug will be made up of the slanting weft spans of the soumak weft. More picks of ground weft will give some separation between successive rows of soumak.

(ii) STARTING AND FINISHING SOUMAK WEFTS

(a) Starting, See Fig. 138 (a)

Work a row of soumak to the left leaving the starting end of the soumak weft hanging out at the right end of the row. Open the plain weave shed which raises the first warp end included in the soumak (No. 1 in Fig. 138 (a)) and tuck the soumak weft around this end into the shed, bringing its threads out at intervals as shown.

(b) Finishing, See Fig. 138 (b)

Having finished a row of soumak to the left, open the shed that raises the last warp end included in the soumak (No. 5 in Fig. 138 (b)). Tuck the soumak weft around this end into the shed, bringing its threads out at intervals.

In both cases the subsequent weaving will force the tucked-in end under the soumak so that it is well hidden.

Note that these methods apply only when separate soumak wefts are being used for blocks on a plain weave ground, or for colour areas in an all-over soumak rug. The more usual method is described below.

(iii) SELVAGES

It is best not to work the soumak right across from selvage to selvage. If a few warp ends at each selvage are excluded, the rug will both look neater and lie flatter. Exactly

how this is done will depend on the number of picks of ground weft between each row of soumak, how the surface angling of the soumak is being arranged, and many other factors.

Fig. 139 shows a typical example in which two rows of plain weave separate each row of locking soumak.

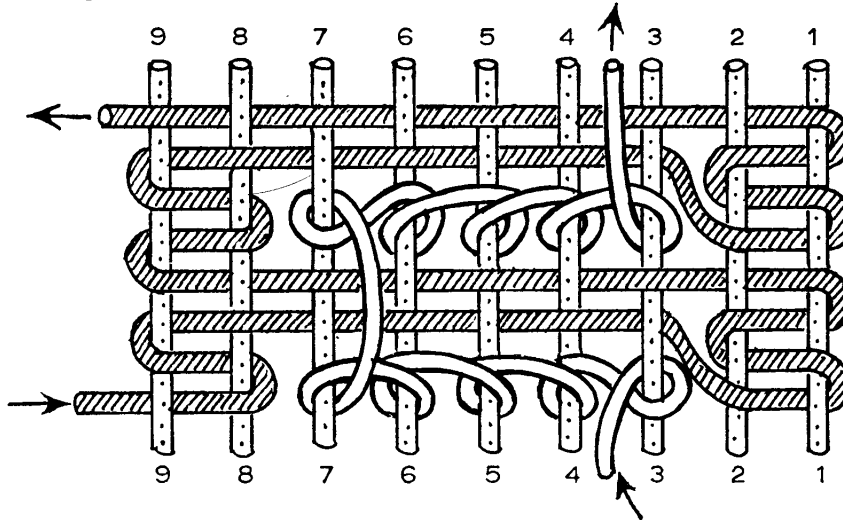


Fig. 139. Soumak. Showing how selvages are woven, when a separate plain weave weft is used

Start soumak round end 3 and carry across to end 7. Starting from the left, weave the ground weft up to the edge of the soumak, then back to the left selvage. These two picks on ends 8 and 9 compensate for the thickness of the absent soumak. Weave ground weft straight across to the right selvage, noting that it dips down as it reaches ends 2 and 1.

Weave up the edge of the soumak and back to the right selvage. These two picks on ends 1 and 2 compensate, as at the opposite selvage, for the absence of the soumak.

Then weave the ground weft straight across to left selvage. The fell of the rug should now be quite level.

Pick up the soumak weft and, beginning around end 7, carry it across to end 3.

Fill in the ground weft exactly as before. The extra compensatory picks around the two outer ends may not always be necessary.

The jump-up of the soumak weft from one row to the next which looks so prominent on the expanded diagram, is small and inconspicuous in actuality.

Soumak is sometimes woven with a single weft which acts as both a ground and a soumak weft. Fig. 140 shows how the selvage is managed in this case.

Starting at the right selvage (see bottom arrow) weave with the first three ends in a plain weave shed. Close the shed then work the weft in soumak around ends 4 to 7.

Open the same plain weave shed and weave in this to the left selvage.

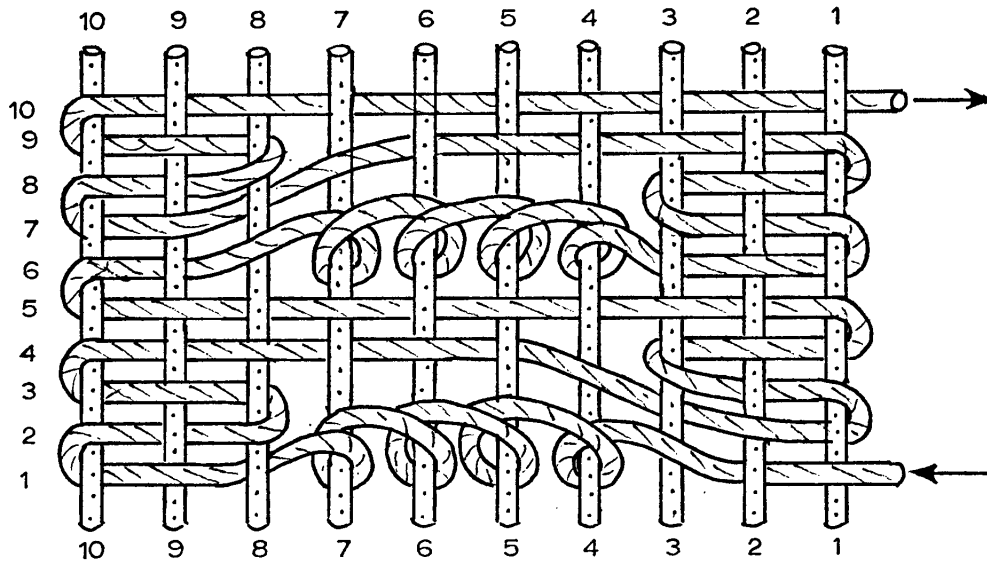


Fig. 140. Soumak. Showing how selvages are woven, when one weft is used for both soumak and ground weave

Then weave for the next four picks exactly as in the previous example. This brings the weft back to the left selvage. Repeat the process from that side, beginning with pick No. 6.

Note—That if picks 5 and 10 were omitted, i.e., if only one pick of plain weave separated each soumak row, the soumak would always be moving from right to left. This would result in the weft spans of successive rows all slanting in the same direction. It would also occur if an extra pick of plain weave were woven.

For other methods of carrying up the soumak weft from one row to the next, see Figs. 137 (a) and (b).

F. Types of Vertical Soumak

(i) VERTICAL SINGLE SOUMAK

It has already been mentioned that a ridge of soumak can slope up at an angle to the fell of the rug. The ridges can also lie vertically; and in this present technique, vertical soumak ridges completely cover the surface of the rug.

The principle will be understood from Fig. 141, where a series of parallel soumak wefts are seen moving up the surface of the rug, with picks of plain weave separating their points of attachment to the warp. In actuality, the soumak wefts are of such a thickness that their upward-moving spans completely cover the plain weave, thus giving a characteristic angled surface to the rug, see Plate 35. The method is as follows:

Begin the rug with some picks of plain weave. Then make a sufficient number of finger hanks of soumak weft to cover its surface, remembering that a few ends at each selvage will carry plain weave only, as in Fig. 141. So if the warp had four working e.p.i. and the soumak wefts are to wrap around two ends, two finger hanks for every 1 inch width of the rug are needed. They need not all be of the same colour.

Tuck each weft under a pair of warp ends from right to left. The starting end of each weft hangs out from the right side of each warp pair, see bottom of Fig. 141.

Weave $\frac{1}{2}$ to 1 inch of plain weave with a separate weft. At both selvages, compensate for the absence of thickness of the soumak weft by some extra picks, as shown in Fig. 141.

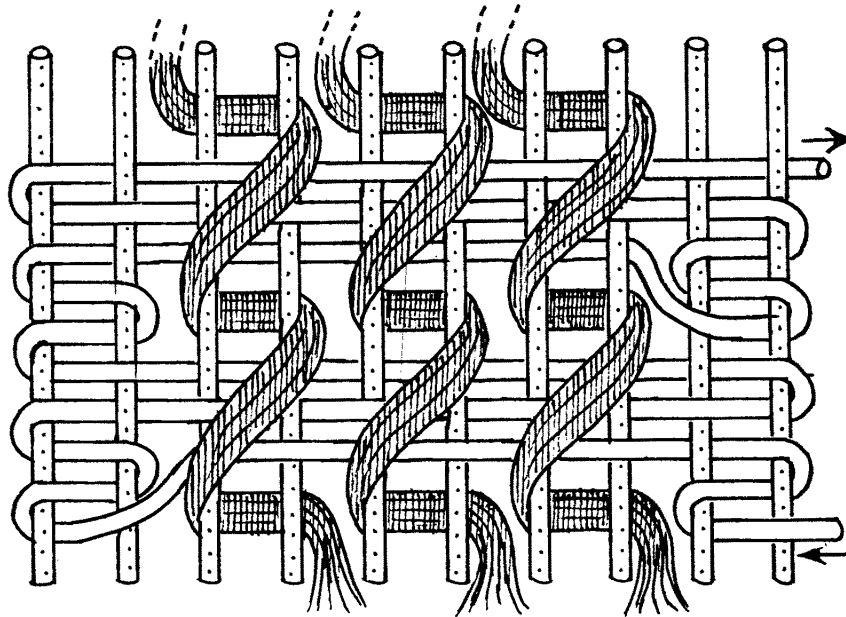


Fig. 141. Vertical Single Soumak. General view

Take each soumak end in turn and wrap it around the same two ends and in the same direction as before. This will produce surface spans of the soumak wefts which all slant up to the right and completely cover the plain weave.

Continue thus, alternating a plain weave section with a step-up of all the soumak wefts, to the end of the rug.

As the soumak wefts are very thick (two to four times the thickness of the ground weft), the finger hanks, if they are to contain enough weft for the whole rug, will be very bulky and hard to handle. Again due to their thickness, a join in the wefts can never be unobtrusive or very neat. Fig. 142 shows such a join. The finishing ends of the old wefts have been laid to the left in one shed and the beginning ends of the new wefts have been laid to the right in the next shed.

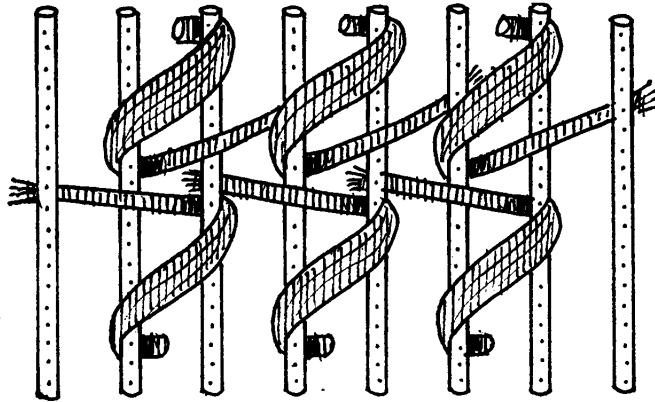


Fig. 142
Vertical Single Soumak.
Starting and finishing
soumak wefts

VARIATIONS

(a) *Angle of Weft Spans*

There is no need for all the weft spans to slant up to the right. They can equally well be made in the reverse direction, see bottom of Fig. 144 (b). So one rug could use both types; this would give a faint stripe in a monochrome rug. The angle can also be changed at any point in a rug (see Figs. 143 (a) and (b) for two methods), giving more possibilities, e.g., checks with weft spans at opposite angles.

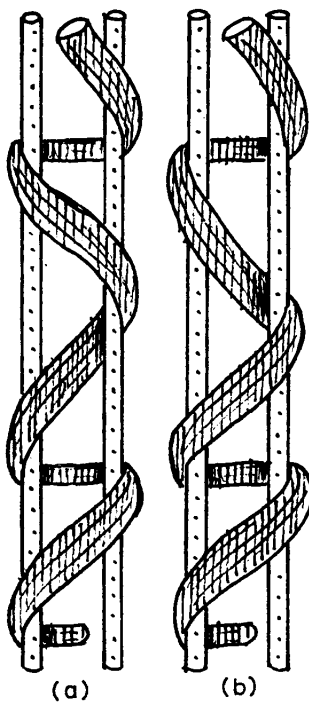


Fig. 143. Vertical Single
Soumak. Changing
angle of weft spans

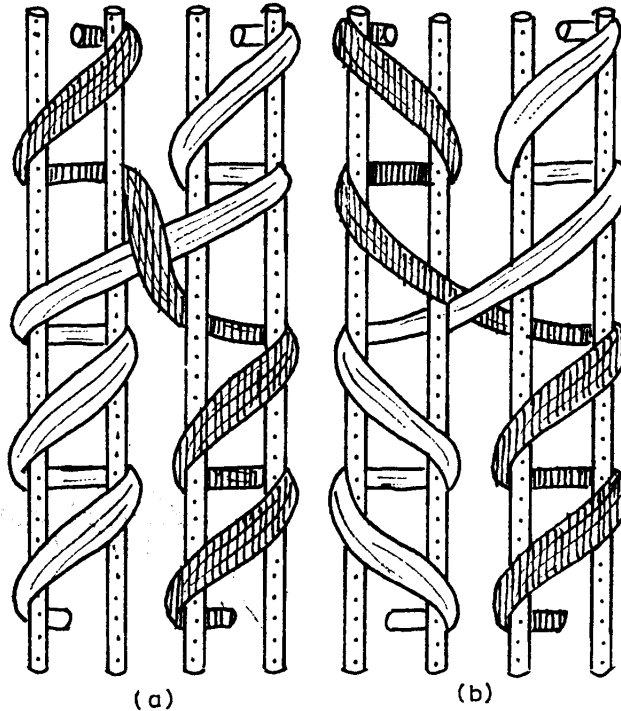


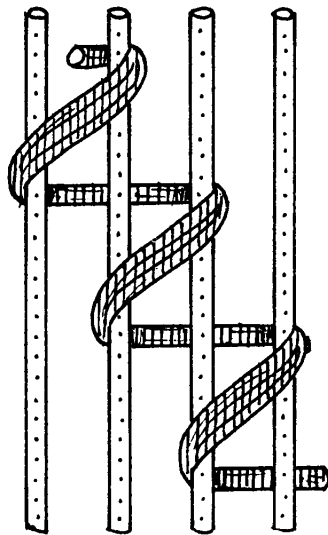
Fig. 144. Vertical Single Soumak. (a) and (b)
Changing two adjacent colours

(b) Switching Colours

If two adjacent columns of soumak weft are of different colours, they can easily be switched over. The centre of Fig. 144 (b) shows how this is done if the weft spans of the two colours are at opposite angles. Fig. 144 (a) shows the procedure if the weft spans slant in the same direction. Note that in this case, there has to be a long and a short weft span, so use the short to bind down the centre of the long.

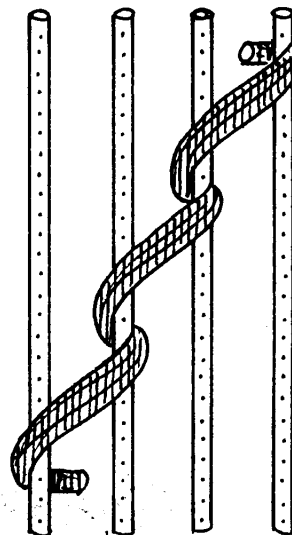
(c) Combination with Flat Areas

There is no need to cover a rug with the soumak wefts. Warpway stripes of plain weave can alternate with warpway stripes of this technique. Moreover the stripes need not be parallel to the warp. As is shown in Fig. 145 (a), if the weft is wrapped around more ends (three) than it passes over (two), the stripes will slant up in one direction, and if as in Fig. 145 (b) it is wrapped around fewer ends (one) than it passes over (two), the stripe will slant up in the opposite direction. Which actual direction it takes depends on whether the weft spans themselves are angled up to the right as shown or up to the left. By this means warpway stripes of the technique can be angled at will across the surface of the rug giving considerable freedom of design.



(a)

Fig. 145(a) Vertical Single Soumak. Angling the soumak stripes



(b)

Fig. 145(b) Vertical Single Soumak. Angling the soumak stripes

(d) Cutting the Soumak Wefts

At any point weft spans can be left very loose and later cut to produce a pile. As the weft is not in any way knotted to the warp, the security of the pile depends on how tightly the plain weave grips the soumak wefts. So it is only safe to cut the soumak weft at intervals, for instance after it has stepped up three times in the normal way. Plate 35 shows a sample with cut pile.

A line of pile across the rug can be used as a method of finishing one set of wefts and starting a new set, in place of the method shown in Fig. 142. Obviously, at any such point, a soumak weft of a new colour can be introduced. Normally with this technique, any colour stripes in the soumak wefts have to run the length of the rug. But with a line of pile across the rug at intervals (at which every weft has the opportunity of being changed) this is no longer necessary and a far greater freedom is achieved.

Practical Details

Anything from 3 to 6 working e.p.i. can be used for the warp. Use the appropriate thickness of plain weave weft to produce a firm weft-face weave. The thickness of soumak weft necessary to cover the plain weave depends on the angle at which its weft spans lie. The more nearly parallel they are to the fell of the rug, the thinner the weft need be. The angle of the weft spans is governed by two factors.

- (1) The amount of plain weave between each step-up of soumak wefts.
- (2) The number of ends around which the soumak wefts are wrapped.

(ii) VERTICAL DOUBLE SOUMAK

This is similar in principle to the last technique but, as the vertical ridges formed by the soumak wefts have a pleasant angular character, the technique is probably better employed in forming distinct ridges alternating with plain weave rather than as an all-over technique. See Plate 36.

The idea was derived from one of the Argatch techniques described in the section on knotted pile in this Chapter, but it can also be considered as vertical double soumak. Compare Fig. 146 (a) with Fig. 128 (a).

Each vertical ridge needs its own separate weft wound as a finger hank.

Begin as in Fig. 146 (a) by wrapping the free end of the weft around a warp that was raised in the last plain weave shed, e.g., end 2.

Weave three picks of plain weave.

Wrap the weft around the next warp end to the right, No. 1 in Fig. 146 (a). Note that this too was raised in the last plain weave shed.

Weave three picks of plain weave.

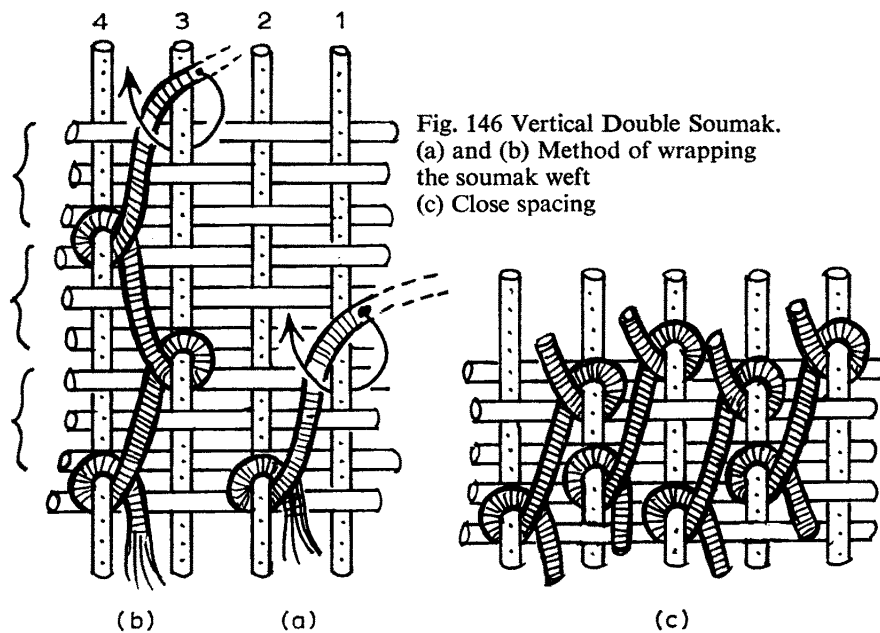


Fig. 146 Vertical Double Soumak.
 (a) and (b) Method of wrapping
 the soumak weft
 (c) Close spacing

Continue thus, alternating three picks of plain weave with one wrapping movement of the soumak weft, which moves from left to right of the two warp ends that carry the ridge, see Fig. 146 (b).

Because the weft is wrapped around an end raised in the last plain weave shed, it slides down over the plain weave weft and does not seem to add any extra bulk to the weave at that point. Hence the plain weave can always pass from selvage to selvage and not take a compensatory zigzag course, thus saving much time.

Ridges can be made on every two adjacent warp ends across the rug's width. But these will not cover the plain weave surface as did the ridges in the last technique. In order to cover the plain weave, the wefts have to be placed closer still so that every warp end is wrapped around by two adjacent wefts, see Fig. 146 (c).

Fig. 147 shows how a ridge can be carried sideways to the right. Starting from the bottom of the diagram, the weft is wrapped around end 3, then 4, then carried across to the right and wrapped around end 2, then 3. Always make the sideways movement when the weft is in any case moving in that direction.

In Plate 36, the yarn used for both ground weft and soumak weft was of the same thickness. This gives compact and practical ridges.

The starting and finishing ends of the soumak wefts can either all be laid in a plain weave shed or left hanging out to form an additional fringe to the rug or be darned in along warp ends in the normal manner for wefts.

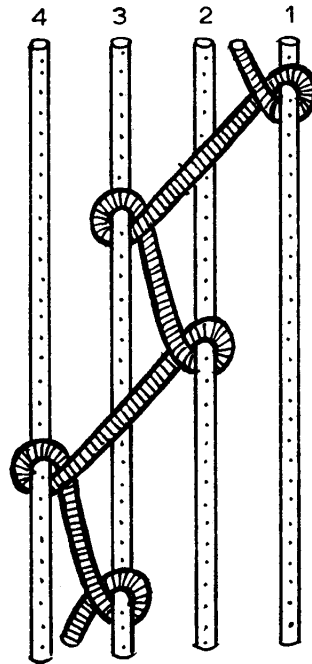


Fig. 147
Vertical Double Soumak.
Moving the ridge to the right

2. WEFT CHAINING

Most weavers know how to chain a warp as it is taken from the mill, manipulating it in a manner similar to crocheting. The same idea, combined with twisting, is applied to single warp threads by some primitive people, as a simple way of making what is more or less a 3-ply thread.

It is surprising that the idea has not been applied to the weft until relatively recent times, as it has an effect rather like soumak and is far quicker to carry out. There are two types, both of which need a chaining weft and a ground weft.

A. First Type

(i) USING ONE CHAINING WEFT

Of the two types, the first to be described is more like soumak, in fact one row of this type looks very like two rows of soumak.

Referring to Fig. 148, begin by weaving the chaining weft with a few ends at the right selvage to anchor it. Then pass it *under* the warp all the way to the left selvage. In Fig. 148 (a) it has woven with ends 1 to 4, then passed under ends 5 to 12 to the left selvage.

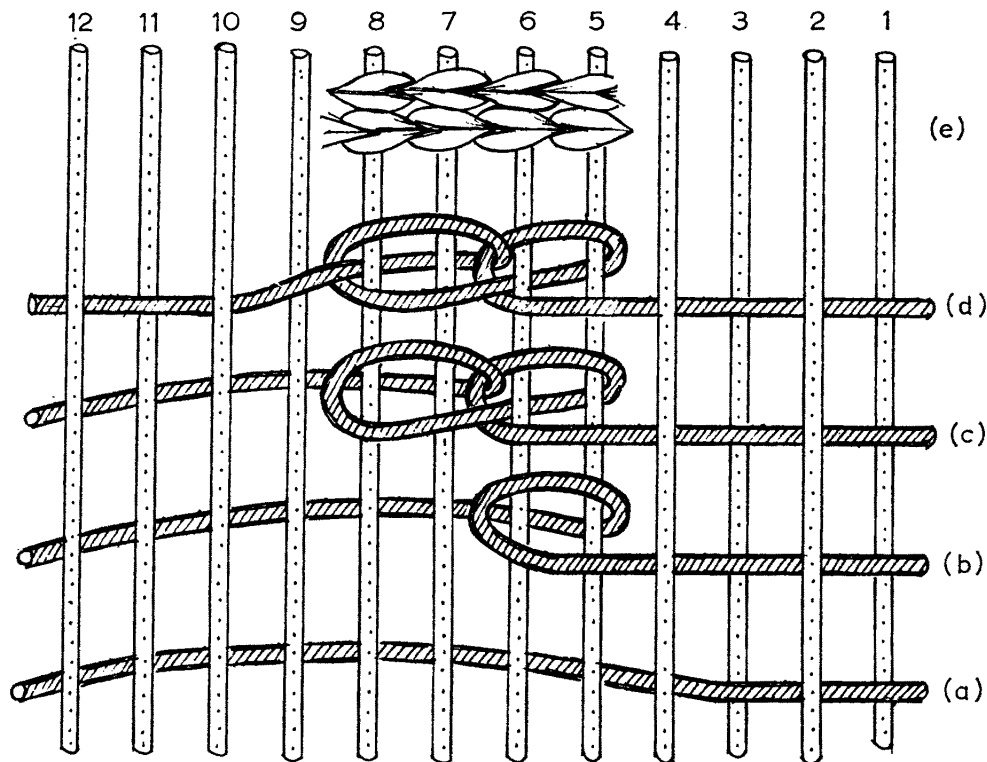


Fig. 148. Weft Chaining. (a-c) Stages in forming the chain (d) Locking the chain (e) Actual appearance

Hold the weft at the left selvage with the left hand. With the right hand pull up a loop of it between ends 4 and 5, see Fig. 148 (b).

Put the right finger and thumb through this loop and pull up another loop of the weft, drawing it up between ends 6 and 7, see Fig. 148 (c).

Continue thus, always picking up a new loop of weft and drawing it up between two new warp ends and up through the previously made loop.

As each new loop is made, pull it to the right to tighten the previous loop. The slack that consequently enters the new loop makes it over-large. So reduce its size by pulling on the free end held in the left hand, before the next loop is pulled up. This control of tension is very important as there is a tendency for the loops to become larger and looser as the work proceeds.

A few ends before the left selvage is reached, lock the chaining by pulling the free end of the weft (instead of a loop), up through the previous loop and then laying the weft in a plain weave shed to the selvage, see Fig. 148 (d). If it is not locked, the chained weft will undo just as easily as does a chained warp.

Now weave three or more picks of ground weft, and repeat the above sequence. The

ground weft will occasionally have to take a compensatory zigzag course as described under soumak.

When the chaining is worked from left to right it is naturally the left hand which pulls up the loops and the right hand that holds the free end.

The result is a bold raised ridge which overlaps the ground weft immediately preceding and following it. Its structure is identical with chain stitch, either as produced by hand in embroidery or automatically by the single-thread sewing machine.

Relationship of Weft Thickness to Spacing of the Chained Loops

The weaver must ensure that the ridge is tight and compact enough to be practical, yet is not so tight that it pulls in the selvage. The necessary balance depends on the correct relationship between the thickness of the chaining weft and the spacing of the loops. In the above description, the loops were pulled up between every other warp end. But they could equally well have been pulled up between every pair, i.e., between ends 4 and 5, 5 and 6, 6 and 7, etc., or between every third pair, i.e., between 4 and 5, 7 and 8, 10 and 11, etc., or in some other sequence.

A weft of such a thickness that it gave a correct chain when pulled up as in Fig. 148, would, when pulled up between *every* pair of ends, give an over-tight, bulky ridge that would probably not lie flat. The same weft when pulled up between every third pair of ends would either pull in the selvages if the loops were correctly tightened or would give a loose chain, not affecting the selvages, if the loops were left slack.

So either decide on a thickness of weft and find by trial and error the correct spacing of the loops to suit it, or decide on a spacing of loops and adjust the thickness of the weft to suit that. In the first case it may be necessary to space loops in an irregular sequence to achieve exactly the right result.

Fig. 148 (e) shows the appearance of two rows of weft chaining when the loops are pulled up between every pair of ends. The similarity to four rows of soumak is obvious. Plate 37 shows weft chaining carried out in rope with a ground weft of sisal and hemp yarn.

(ii) USING TWO CHAINING WEFTS

This technique is well suited to all-over weft chained rugs. There are basically two methods; in the first, each row of weft chaining consists of alternate loops of the two colours, in the second, loops are pulled up in such a way that a completely free, two-colour design can be produced.

(a) Start both colours (black and white in Fig. 149) at the right selvage in successive sheds and then pass both of them under all the warp ends to the left selvage, see Fig. 149 (a).

Between ends 4 and 5 pull up a loop of the weft which is nearest to the fell of the cloth (white) with the right hand, see Fig. 149 (b). Insert the fingers of the right hand

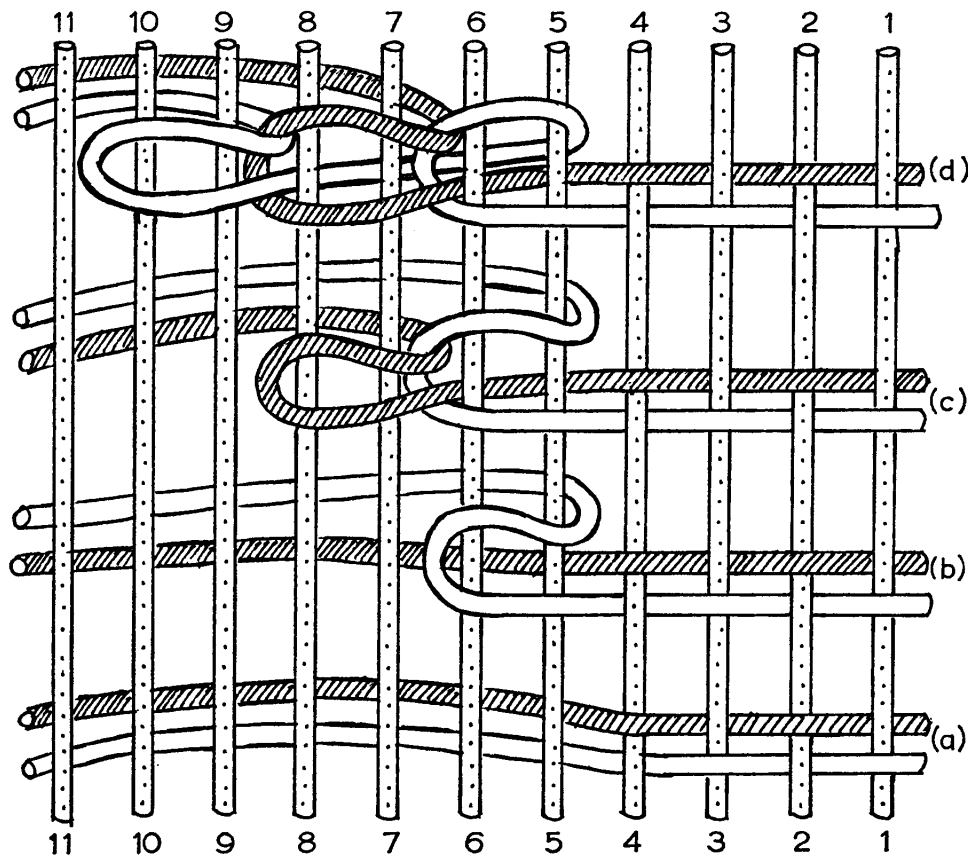


Fig. 149. Two-colour Weft Chaining. (a-d) Method I

down through this white loop and down between ends 6 and 7 and pull up a loop of the other weft (black), see Fig. 149 (c). Tighten the white loop by pulling on the white weft with the left hand at the left selvage.

Now through the black loop, pull up a loop of white weft, drawing it up between ends 8 and 9, see Fig. 149 (d). Tighten black loop by pulling on black weft at left selvage.

Continue thus, pulling up a black weft through a white loop, and a white through a black. After pulling up a black weft tighten the white, after pulling up a white, tighten the black. Finish by locking the chain. If the last loop pulled up was white, then pull the whole of the black weft up through this loop to lock it.

Insert the black weft in a plain weave shed, followed by the white in the next plain weave shed. Then weave some plain weave picks.

In the returning row, pull the loops up in different warp interspaces from those used in the first row. So if the first row ended with loops between ends 11 and 12, 13 and 14,

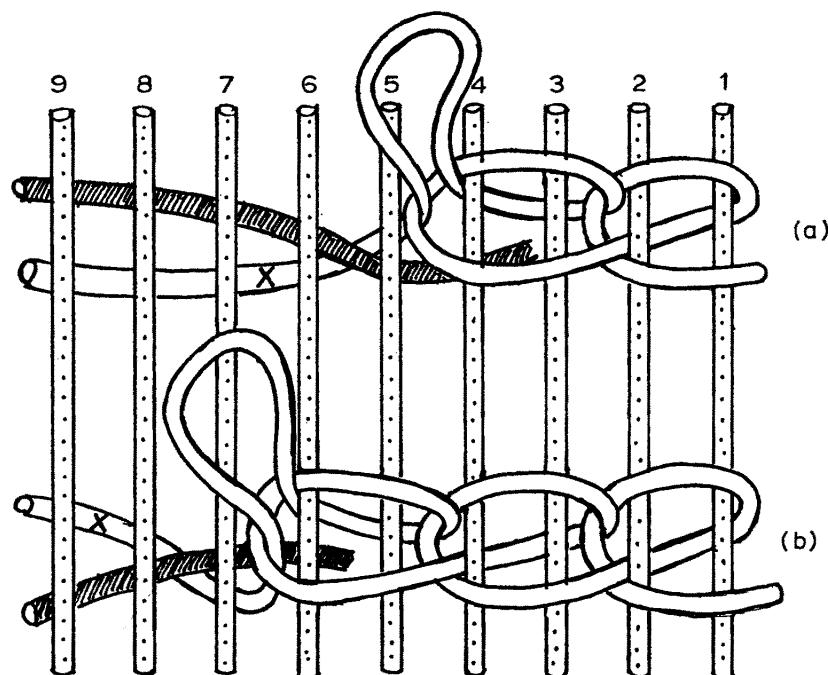


Fig. 150. Two-colour Weft Chaining. (a) and (b) Method II

15 and 16, etc., then the second row begins with loops between ends 15 and 14, 13 and 12, 11 and 10, etc.

If this is done and the row begun with the appropriate colour, the black and white loops of the second row will lie almost vertically over the black and white loops of the first row. In the third row pull the loops up in the original warp interspaces. The fourth row is exactly like the second.

The result is wavy warpway stripes of the two colours, as seen in Plate 38. Other effects are easily obtained by positioning the loops and colours differently.

(b) The second method begins exactly as the first. If the design dictates there should be an area of white, start normal chaining with the white weft only. But something has to be done to prevent a long float of the black weft at the back.

So before each loop of white is pulled up, cross the white weft *behind* the black, with the left hand, see Fig. 150 (a). Now pull up a loop of white between ends 6 and 7. Again cross white behind black, but this time in the reverse direction, see Fig. 150 (b), otherwise the black and white wefts will tangle around each other at the back of the warp. Pull up a loop of white between ends 8 and 9.

Where the design demands black, just reverse the procedure, i.e., bring up a black loop and then continue chaining with the black weft catching the white weft at the back, as explained above.

Plate 39 shows examples of this technique. In one, the colour boundaries are at an angle, and this was done by bringing the loops up in different warp interspaces in each alternate row. Note the characteristic toothed outline to the motif. In the other, the loops were pulled up in the same warp interspaces in each row, and this lends itself more to vertical colour boundaries.

B. Second Type

The second type of weft chaining gives a ridge which closely resembles a chain lying on the surface of the rug.

As with the first type, anchor the chaining weft in a plain weave shed at the right selvage, see Fig. 151 (a). Then bring it out of the shed so that it lies *above* the warp.

With the left hand pass a loop of the weft under end 6, see Fig. 151 (b). Then through this loop pull another loop of weft and immediately pass the new loop under end 8, see Fig. 151 (c). This can be done in one movement if the fingers of the left hand work correctly. Tighten each loop by pulling on the free end of the weft held in the right hand.

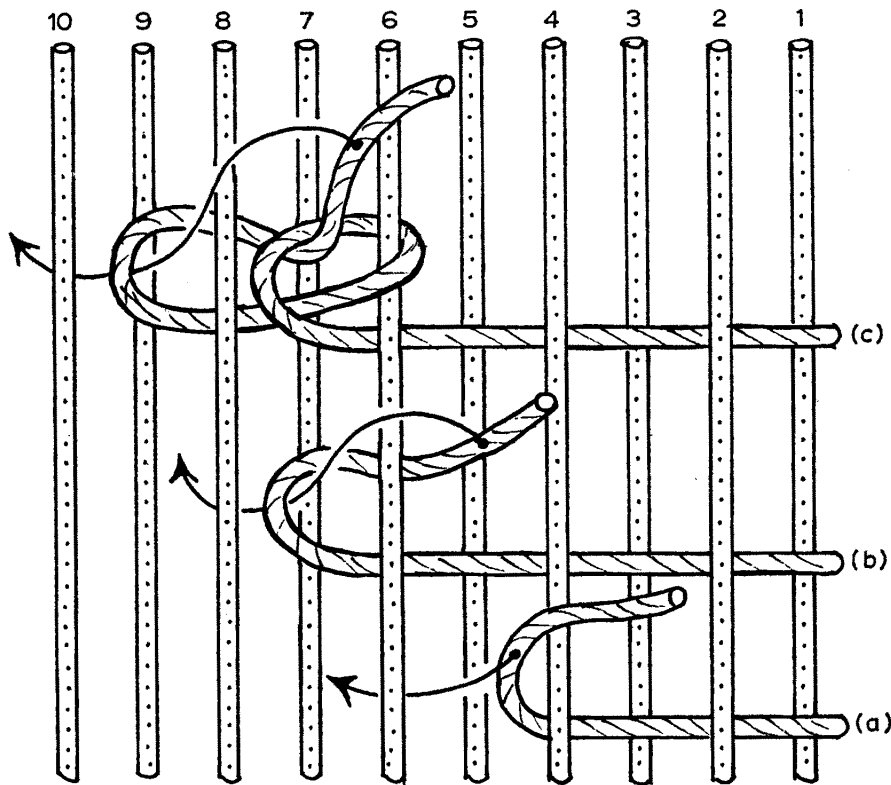


Fig. 151. Weft Chaining. Second Type. (a-c) Method of production

Finish row by locking the last loop and laying the weft in a plain weave shed at the left selvage exactly as for the first type. If tensioned correctly, the chaining should look as in Fig. 152.

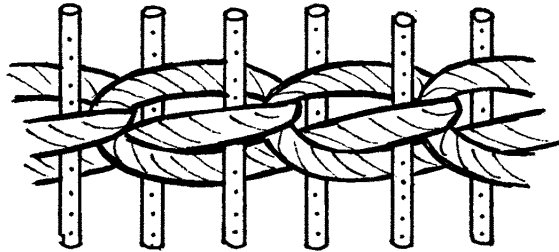


Fig. 152
Weft Chaining.
Second Type. Actual
appearance

Note—That in the above description the loops are only inserted under the even-numbered warp ends, so the chaining can be worked on the open shed in which these ends are raised. This is also the shed in which the chaining weft lies at either selvage.

—The loops can be inserted under every end, or at every third end or at any desired interval. If they are inserted under every third end, e.g., under 6, 9 and 12 in one row and then under 7, 10, 13 in the next row, under 8, 11, 14, in the next row, there will be a definite twilled effect in the surface texture.

One possible variation is as follows.

Having reached the stage shown in Fig. 151 (c), draw a loop of weft through the last-made loop and then continue chaining with the fingers but without attaching the chain to the warp. After two or three repeats of this chaining 'in the air', tuck the last-made loop under end 10 and proceed normally. The result is a knob of chained weft, that stands out from the level of the rug. If in subsequent rows, the process is repeated in the same place, a vertical ridge will be produced. There can obviously be as many of these ridges as wanted across the width of the rug, and they do not have to lie vertically; appropriate positioning of the knobs will give ridges at an angle.

C. Practical Details and Uses

The practical details are all as described for soumak, i.e., any warp setting from 3 working e.p.i. upwards can be used. However, all-over weft chaining (especially using two chaining wefts) adds so much to the bulk of the rug that with a setting as low as 3 working e.p.i., the rug may be too heavy. So 4 or 5 working e.p.i. are better. The ground weft is always of a thickness appropriate to the warp setting.

Weft chaining can be used to make ridges which can be straight, oblique or curved, to make raised blocks of any shape, or to cover completely the surface of a rug. Remember that if several blocks are made across the width of the rug, the chaining weft has to be locked as each one is finished.

Though all-over weft chaining is not commonly used, it can be a very effective technique, e.g., when using thick sisal as the chaining weft or when using two chaining wefts. Always begin and end each chaining row with the weft lying for some distance in a plain weave shed, as this will prevent the rug from curling up at the edges.

3. WEFT LOOPING

The idea of decorating or thickening a textile with loops made during weaving is an ancient one. Some hold the opinion that it preceded the technique of knotted pile, because the yarn in a looped pile would presumably wear better than the cut ends of a knotted pile and durability would, in early times, be the first consideration. This is partly supported by the fact that several of the methods of producing a knotted pile involve first making a weft loop, then cutting it. When the decorative aspect of such textiles became more important, the weft loop had to yield to the knot, as the latter is by far the more flexible technique, imposing hardly any limitations on the designs that can be carried out with it.

The loops may be made either from the weft lying in a shed, e.g., pulled-up and wrapped loops, or from an extra yarn, e.g., Sehna loops and many unnamed varieties.

A. Pulled-Up Weft Loops

HISTORY

One of the earliest finds using a pulled-up weft loop is a patterned towel from Deir el-Bahri, Egypt, dated about 2160 B.C. Both warp and weft are of linen. In certain areas, every other pick is of a much thicker yarn and it is this that is pulled up in loops to give various patterns. Later, in Egypt, wool was used for the weft loops and later still, short lengths of different-coloured wools were laid in the same shed and loops pulled up so that a polychrome looped design was produced (A.D. 400 to 500).

Strangely, weft loops were a technique not much exploited in Peruvian weaving. They are sometimes seen in pictorial tapestries where, for instance, a furry animal may be represented entirely in pulled-up loops.

Its use in heavier fabrics is now found in the rugs of the Alpujarras region, south of Granada, in Spain, in Sardinian rugs, in some gravecloths of Eastern Europe, and in Scandinavian rugs. They are sometimes called boutoné rugs.

(i) GENERAL TECHNICAL DETAILS

The sequence is as follows:

Referring to Fig. 153 (a), throw a weft and keep the shed open. Beginning at the selvage from which the shuttle was thrown (right in Fig. 153 (a)), pull up loops of this weft between every other pair of the raised warp ends, e.g., between 4 and 6, 8 and 10, and so on. If the yarn is of the correct spin and springiness, the loops will probably twist once or twice as in Fig. 153 (b).

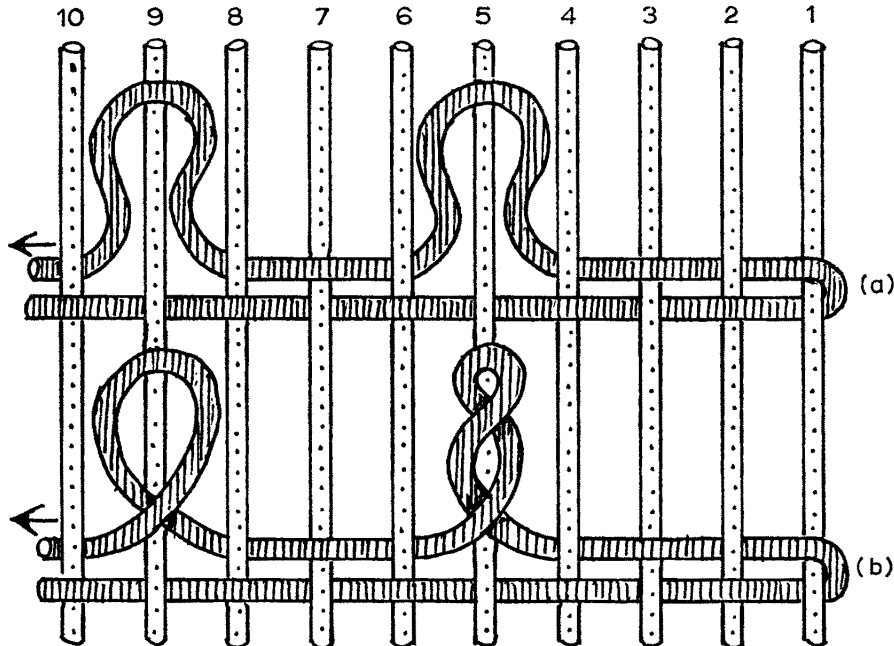


Fig. 153. Pulled-up Loops

When the row is completed, weave some picks of plain weave using either the same or another weft.

Then repeat the row of loops, followed by more plain weave.

There could be one, two, three or more picks between each row of loops, or two rows of loops could be followed by two picks of plain weave, or some such sequence.

It is the plain weave surrounding the loops that holds them in place, so it must be tightly woven. It is also for reasons of security that the loops are not pulled up between every pair of raised ends.

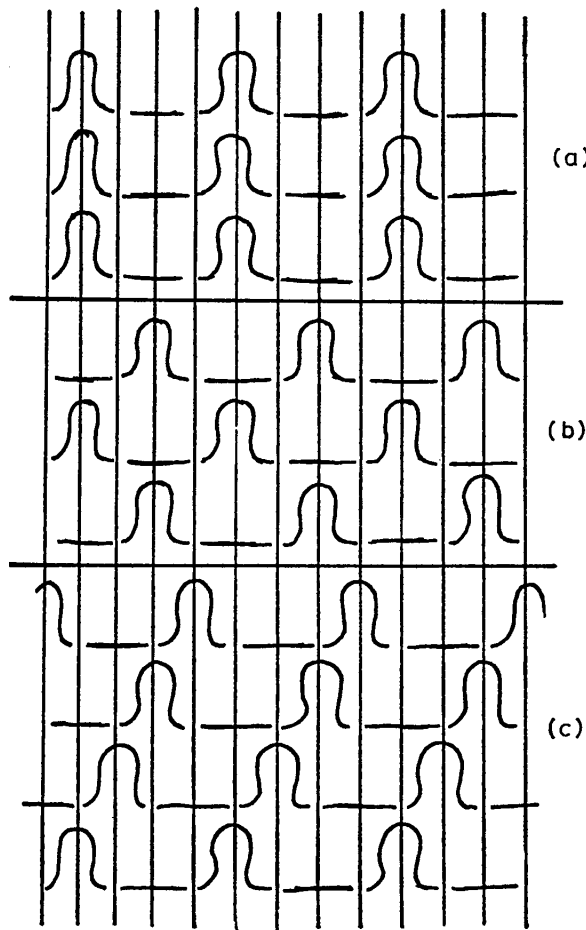
To achieve regularity of size, each loop can be slipped over the end of a smooth stick. This is slid in from the right by the right hand while the left hand pulls up the loops. Do not slide out the stick until the plain weave that follows has been woven. The hand positions are, of course, reversed when the loops are begun from the left side.

(ii) PLACING THE LOOPS

If there is an odd number of plain weave picks between each looping row, the latter will always lie in the same shed. If there is an even number, each looping row will lie in a different shed to its predecessor. Which of these two alternatives is chosen depends on the effect and design required.

(a) With the loops always coming from the same shed there are two possibilities. Either pull up the loops from the same warp interspace in each row, which gives vertical rows of loops, see Fig. 154 (a). Or pull them up from different warp interspaces in successive rows. This is a common method and gives a good regular coverage of loops over the rug, see Fig. 154 (b).

(b) When the loops are pulled up from different sheds, there are more possibilities, because there are four positions in which a loop can be pulled up. Fig. 154 (c) shows loops pulled up successively in these four positions to give angled lines of loops. If



(a)
(b)
(c)

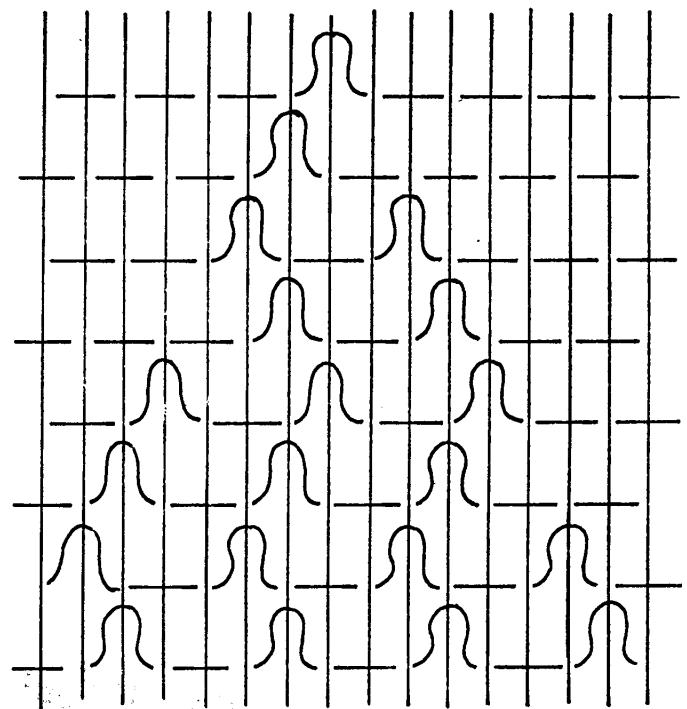


Fig. 155. Pulled-up Loops.
Loops pulled up to give a triangle

Fig. 154. Pulled-up Loops.
(a-c) Possible arrangements of loops

the lower two rows in Fig. 154 (c) were repeated several times, vertical rows of loops would result, wider than the rows in Fig. 154 (a). Fig. 155 shows how a triangle of loops can be built up. Note that, starting at the tip, there are two rows with only one loop, two rows with two loops, two rows with three loops, etc. In the whole of Figs. 154 and 155 the plain weave has been omitted for the sake of clarity.

There tends to be a weakness in the rug under each loop, especially if the warp is widely set. So an extra weft is often run in the same shed as the looping weft to overcome this.

(iii) USES

(a) Pulled-up loops are very commonly used in monochrome rugs, whose design depends entirely on the contrasting areas of loops and of plain weave. In other words, loops are not pulled up from selvage to selvage, but only in those areas dictated by the design. This is very similar to the making of blocks with soumak or weft chaining.

(b) Rugs with all-over coverage of loops are not so often woven. They can be of one colour or striped, but the most interesting method gives a free design in two colours. The two colours are both thrown in the *same* shed. Loops are pulled up from selvage to selvage in each row, using now one colour, now the other, as the design dictates. The colour that is not being pulled up just lies in the shed, strengthening the weave as described above, see Fig. 156. This gives a very sound construction and, if

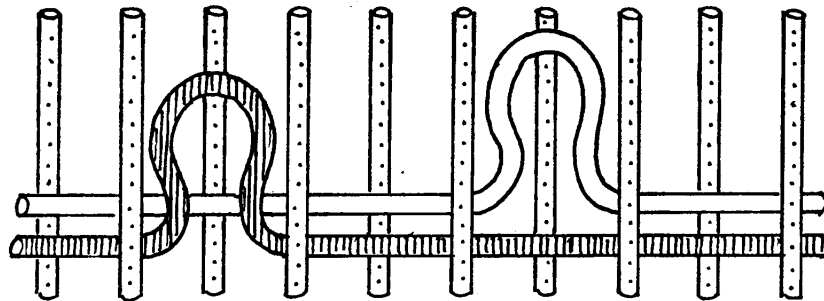


Fig. 156. Pulled-up Loops. Using two wefts in a shed

wanted, loops can be pulled up in every pick without any intervening plain weave. As there is twice as much weft as normal in each shed, it will naturally not beat down and cover the warp. But as the rug is completely covered with loops, this will only be apparent on the back

(iv) PRACTICAL DETAILS

The warp could have from 3 to 6 working e.p.i. according to the thickness of rug required.

The looping weft should be springy, so the loops will stand up again when trodden on, and have enough spin in it to ensure that the loops twist into a compact form as suggested in Fig. 153 (b). To achieve the latter requirement, extra spin may have to be added to the yarn as bought, either on a spinning wheel or on a bobbin winder, as described in Chapter 4. If this is combined with very long loops, something resembling a pile is produced, see Fig. 157.

With unsuitable yarns, pulled-up weft loops can appear very sad and slack.

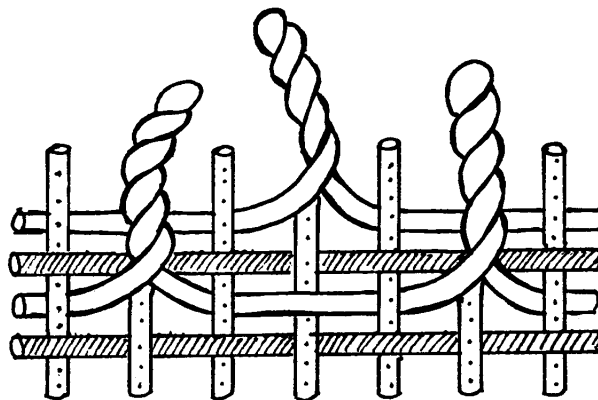


Fig. 157
Pulled-up Loops.
Appearance of loops
made from highly
twisted yarn

(v) CHAINED LOOPS

In this interesting development, pulling up weft loops is only the first of two stages. In the second stage, the loops are themselves chained into each other to give rows resembling weft chaining, but lying in the warp direction, see Fig. 158.

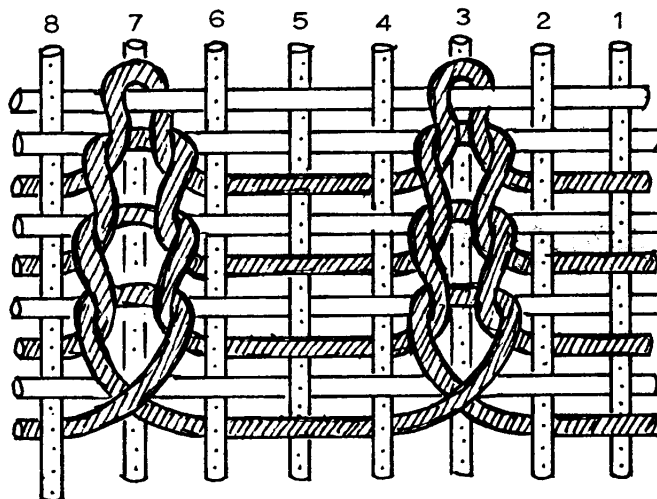


Fig. 158
Chained Loops.
General view

First pull up weft loops between ends 2 and 4, 6 and 8, etc., then throw some picks of plain weave.

Repeat this several times, to make vertical rows of loops.

Then, using the fingers or an improvised hook, work on the right-hand vertical row of loops, pulling the second loop through the first, the third through the second, the fourth through the third, and so on. Then move to the next row and do likewise.

The two vertical chains thus produced lie flat on the rug and as the loops are all interlocked there is not the danger of their being pulled out, always present in other types of pulled-up loops. For this reason loops can be pulled up between every pair of warp ends with perfect safety, see Figs. 161 and 162.

As an interesting sidelight on the interrelation of textile methods, note that if in Fig. 158 the warp and the plain weave weft were extracted, a piece of normal weft knitting would be left.

To make the chaining compact and practical, the loops must be made exactly the right size in relation to the distance between each horizontal row of loops. Otherwise the chain will either be loose or so tight that the rug will curl up when taken from the loom. So a stick of just the right diameter must be used on which to slip the loops as they are made.

Note that in Fig. 158 the loops in the first row were twisted once before the loops in the second row were pulled through them. This makes a neat beginning.

At the end of a vertical chain, the last loop must be locked. As shown at the top of Fig. 158, this is done by bringing a weft out of the shed, passing it through the final loop of the first chain and then back into the shed as far as the final loop of the next chain. This weft cannot be on a shuttle as the latter will not fit through the final loops.

Possibilities of Chained Loops

(a) Chained loops can be used as a method of obtaining warpway raised ridges on a flat ground. By pulling the loops up appropriately these ridges can slope or curve or lie parallel to the warp. Two adjacent ridges can merge into one, as shown in Fig. 159.

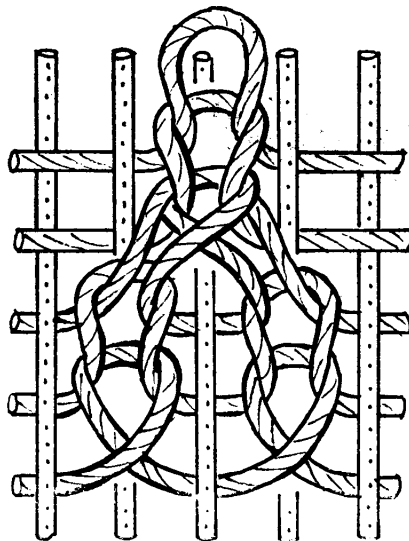


Fig. 159
Chained Loops. Two ridges
merging into one

(b) When used as an all-over technique, it gives a design which depends on the controlled placing of the loops from two coloured wefts. An effective method is shown in Plate 40, in which black and white loops have been pulled up to give alternate stripes of the two colours, whose angular direction is decided by the weaver. These stripes are then chained, as already described. Fig. 160 shows diagrammatically (and without plain weave) four such stripes sloping up to the right.

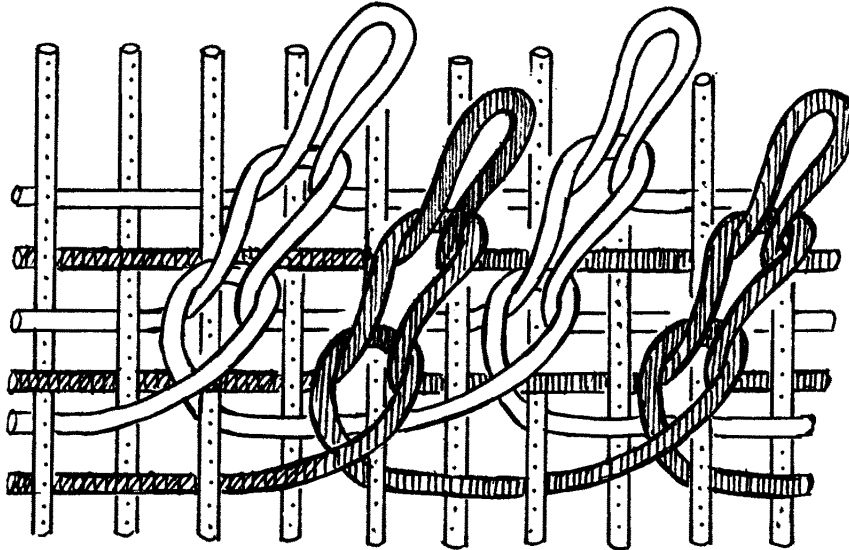


Fig. 160. Chained Loops. Using two colours to make oblique stripes

(c) Figs. 161 and 162 show two of the many other possible all-over uses of chained loops. Alternate rows of loops (pulled up at every available warp interspace) are made of two colours. An even number of plain weave picks, not shown in diagram, are woven between each row of loops. The loops can then be chained, either as in Fig. 161 or as in Fig. 162, the surface texture being quite different in the two cases.

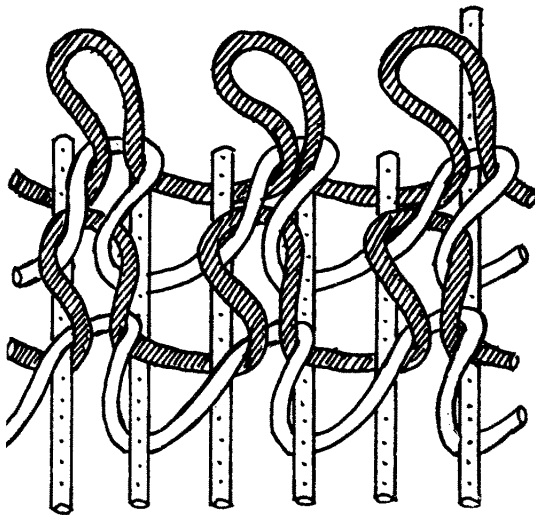


Fig. 161. Chained Loops. Another method of using two colours

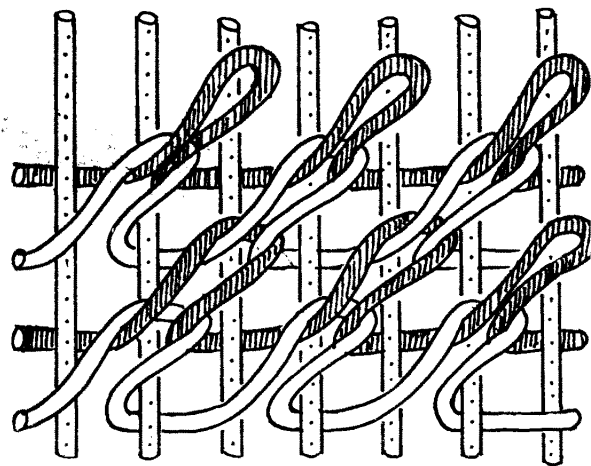


Fig. 162. Chained Loops. Another method of using two colours

(d) Another variation is to twist each loop in the chaining stage, just as the first loop is twisted in Figs. 158, 159 and 160.

This is applicable both to vertical ridges and all-over chained loops. The twists which may be single or multiple can be either in the S or Z direction. Contrasting the two directions of twist in the same rug is another possibility.

The relation to weft knitting has already been mentioned and a study of knitting methods might lead to the discovery of other variations of this technique.

B. Wrapped Weft Loops

This is the second type of loop made from a weft lying in the shed and again it can be traced back at least 2,000 years. In the earliest finds, it was used to make a looped pile of wool.

Fig. 163 (a) shows how it differs from a pulled-up loop.

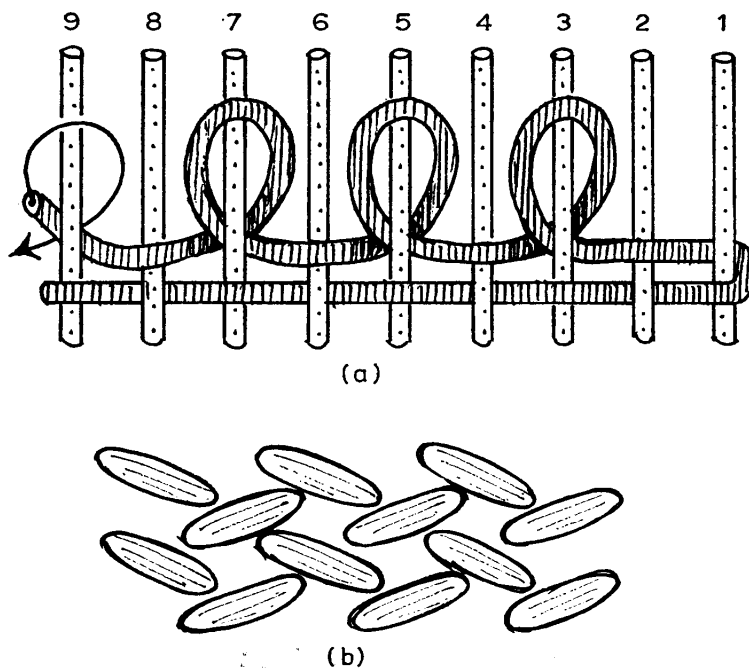


Fig. 163. Wrapped Loops. (a) General view. (b) View from above

Open the shed which raises the odd-numbered warp ends. Insert the weft from the right selvage under the first two raised ends, 1 and 3, and then bring it out of the shed between ends 3 and 5. Cross it to the right over end 3, and re-insert it into the shed between ends 3 and 1. Pass it under ends 3 and 5 and bring it out of the shed again between ends 5 and 7. Wrap it round end 5 as before and re-insert into the shed.

Continue thus across the warp. The result is a row of loops which wrap round ends 3, 5, 7 and so on.

This is naturally much slower to work than pulled-up loops, but it produces more firmly held loops. For this reason, the loops can be made more closely together (compare with Fig. 153 (a)). Another advantage is the absence of the structural weakness found behind each pulled-up loop, so there is never any need to run another weft in the same shed.

Practically all the remarks made about pulled-up loops also apply to wrapped loops. They can be made on a rod to control their size, they need plain weave to hold them in position, they can be spaced as in Figs. 154 and 155, their uses are identical, and they can be chained.

Because of the way they are made, the loops all have a slight tilt when looked at from above. When worked from right to left, the loops tilt up to the right, see bottom row in Fig. 163 (b). When worked in the opposite direction, they tilt up to the left, see next row in Fig. 163 (b). A pleasant texture can therefore be produced by looping from right to left in one shed and from left to right in the next shed and then weaving two picks of plain weave, or some such sequence. Plate 41 shows wrapped loops of coir.

The wrapped loop is related structurally to the one-warp knot, described later in this Chapter. If, in Fig. 163 (a), the loops were made by pulling forward the parts of the weft lying in the shed (not the parts wrapping round the warp ends) and if these loops were cut, the result would be a row of one-warp knots.

C. Sehna Loops

Loops of this type, both in linen and wool, are found in Egyptian textiles dated about A.D. 400 and in earlier finds at Dura-Europas on the Euphrates. A woollen textile from Jericho, dating back to the second century A.D., has Sehna loops on *both* sides, those on the face being a different colour from those on the back. There also exists a large fragment of a Coptic rug in this technique. It is used today in the making of Tibetan rugs.

The name, Sehna loop, is based on the fact that if the loop is cut, the yarn is attached to the warp as in a Sehna knot. There is, however, a slight difference which will be explained later.

Unlike wrapped and pulled-up loops, Sehna loops are not made from a weft lying in the shed but from a separate extra weft.

Begin by fixing this looping weft in a shed at the right selvage, then bring it out of the shed so that it lies on top of the warp ends, see Fig. 164 (a).

With the shed still open (even-numbered ends raised) pull a loop of the weft under, end 4 as shown by arrow in Fig. 164 (a). Note that the loop passes *forwards* (i.e., in the direction the work is moving), and points down to the left. Slip this loop, shown in

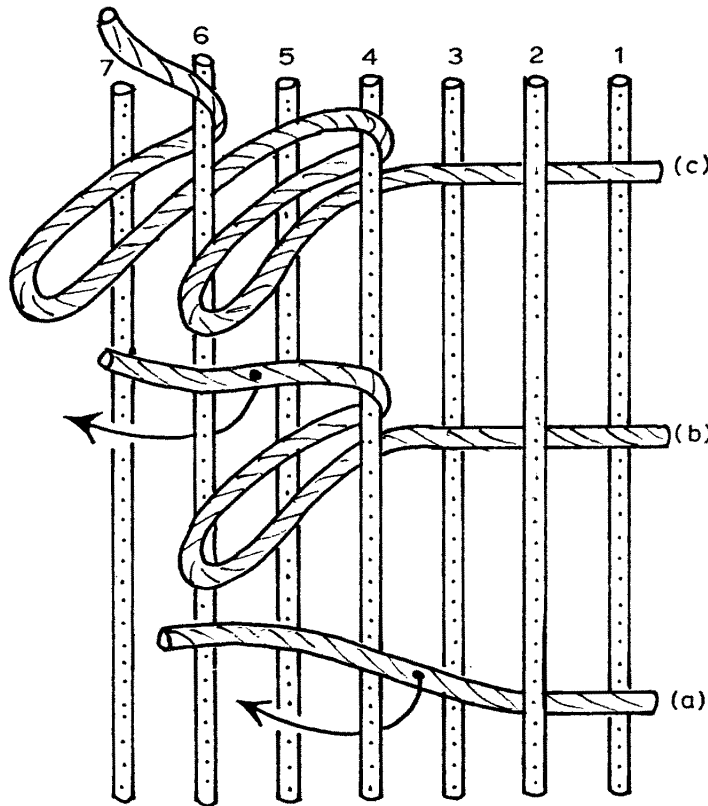


Fig. 164
Sehna Loops
(a-c) Method of
production

Fig. 164 (b), onto a stick. Pull another loop under the next raised end, No. 6, and also slip it onto the stick. See Fig. 164 (c).

Continue thus, pulling loops under the raised ends until the left selvage is reached. Then enter the weft into the shed to fix it. Plain weave picks now follow.

As shown in Figs. 165 (a) and (b), the loops can be pulled in the reverse direction that is, they pass *backwards* under the raised ends and then point downwards to the right. The right- and left-inclined Sehna loop is directly related to the right- and left-hand Sehna knot.

There is no reason, apart from convenience, for making these loops on the raised ends of an open shed. They can equally well be made on a closed shed, in which case a loop can be made around every warp end as in Fig. 165 (c), or around two ends as in Fig. 165 (d), or around more. When made around every end, the Sehna loop gives the closest form of looping available.

All these types are very securely held.

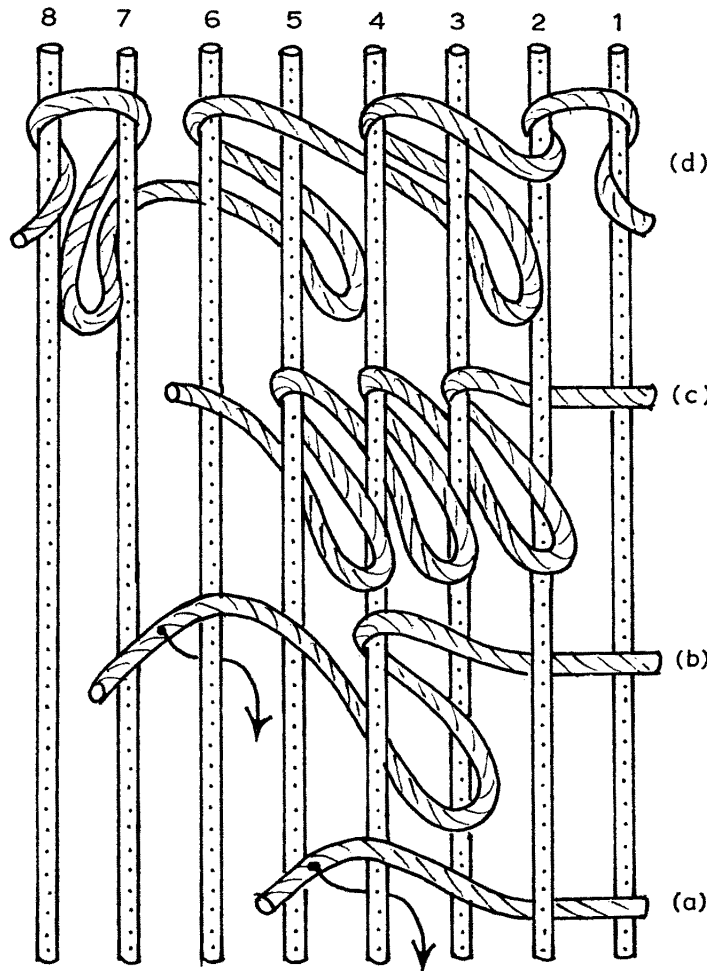


Fig. 165
Senha Loops
(a-c) Method giving
loops pointing in
reverse direction
(d) Starting and
finishing a row of loops
with Ghiordes knots

An alternative way of beginning and ending a row of Senha loops is with a Ghiordes knot, as found in Tibetan rugs, see Fig. 165 (d).

An extremely well-tethered loop that can be regarded as a development of the Senha loop, is shown in Fig. 166. Working from right to left, make a Senha loop around end 2. See Fig. 166 (a), where the loop has been pulled upwards for clarity's sake.

Now take the same weft loop around end 1 as shown by the arrow and pull it tight.

The loop will now hang down as in Fig. 166 (b). It will be found that the path taken around end 2 and 1 by the weft loop is exactly the same as that taken by a free end of weft in double locking soumak.

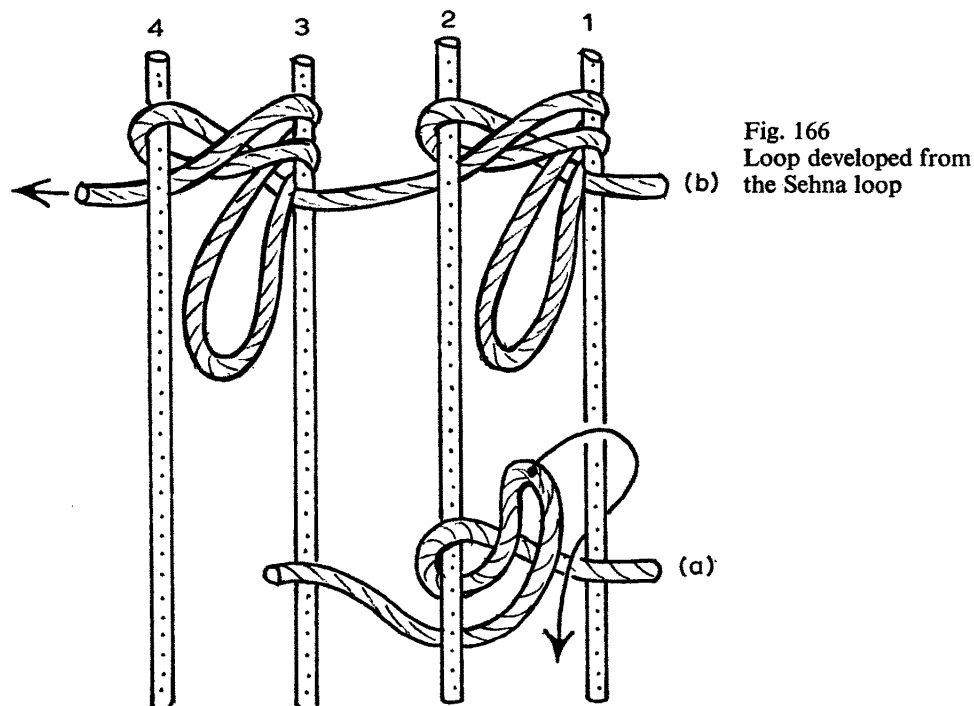


Fig. 166
Loop developed from
the Sehna loop

D. Pulled-Up Loops Based on Soumak

This type of loop is pulled up from the normal soumak structure, so is extremely secure. There are several varieties.

(i) Fig. 167 (a) shows loops based on 4/2 soumak. Normal locking 4/2 soumak is worked to the left. From that part which passes backwards under two ends, pull up a loop, as shown by the arrow between ends 5 and 6.

(ii) Fig. 167 (b) shows normal 3/1 soumak. As indicated by the arrows, the loops are drawn from the weft as it passes forward. The result, see Fig. 167 (c), is that the weft wraps around one end and then has a blind loop tucked under the next end, and this sequence is repeated. In working this type it is easier to make these two movements alternately, rather than trying to make the soumak and then pull a loop from it.

(iii) A loop can be based on gauze soumak, see Fig. 168 (a)

Work the soumak to the left. Of the next pair of warp ends, cross the left over the right. Pass the weft forwards through the opening so formed. Then pull a loop of the weft backwards through the opening and round to the front as shown by the arrow in Fig. 168 (a). This will both form a loop and untwist the warp ends. Note that the forward-moving weft and backward-moving loop take a different path through the opening between the crossed warps. It is easy to make the loop with the right hand. Put the index and third finger through the opening from behind forwards. Take hold of the weft and pull a loop through to the front.

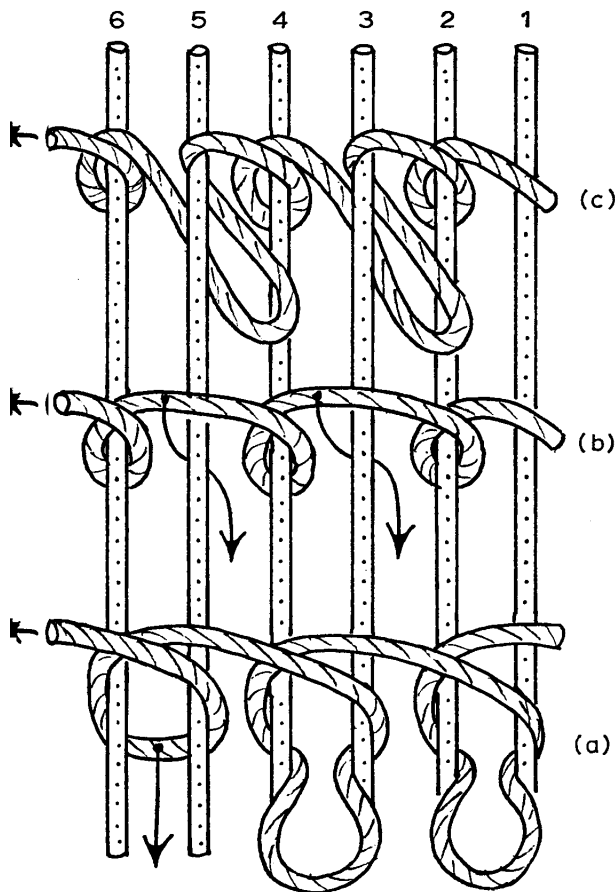


Fig. 167. Pulled-up Loops based on (a) 4/2 soumak (b-c) 3/1 soumak

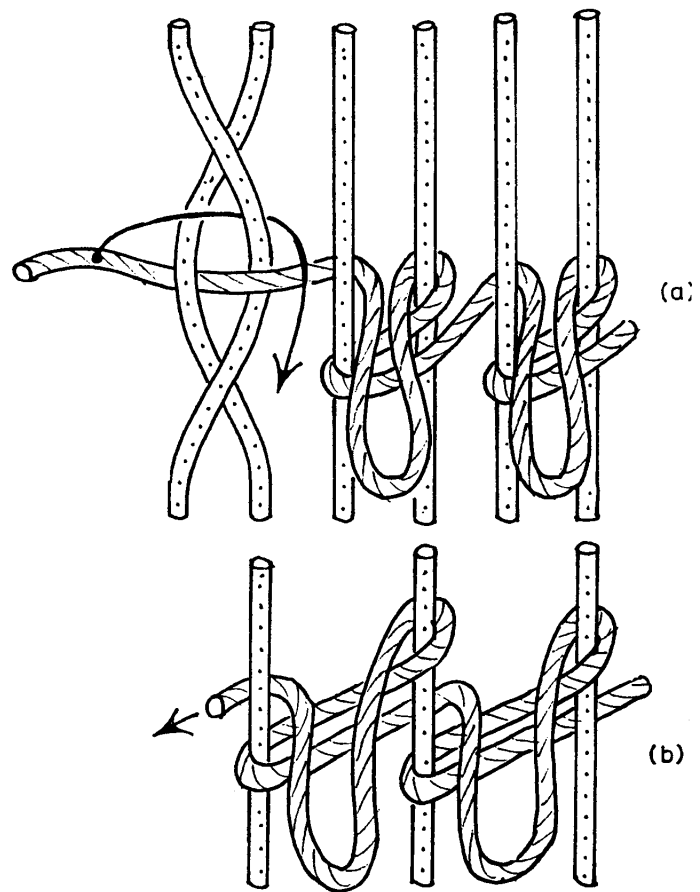


Fig. 168. Pulled-up Loops based on gauze soumak. (a) Method of production (b) Close spacing

Very close loops can be made this way if, of the two warp ends crossed, one is a new one, and one is the left-hand of the two just used, see Fig. 168 (b).

E. Loops Based on the Ghiordes Knot

Both of the types included here are on the borderland between knots and loops, in fact if the first type is cut, it gives a perfect Ghiordes knot.

The arrow in Fig. 169 (a) shows how a loop is pulled from a yarn lying over the warp and wrapped around two ends, to give the configuration seen in Fig. 169 (b). This really amounts to tying a Ghiordes knot with a blind loop of yarn.

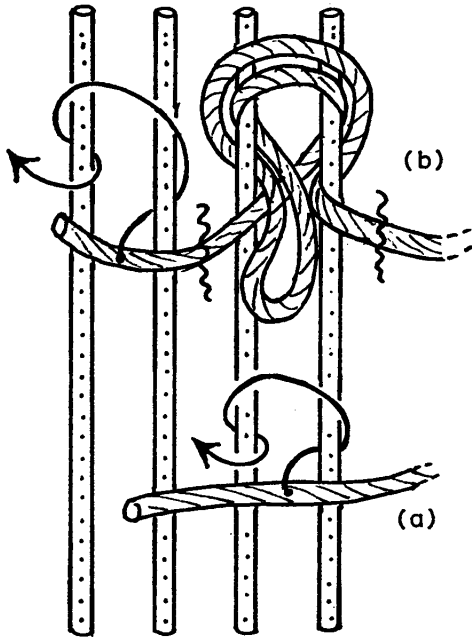


Fig. 169. Loop based on Ghiordes knot

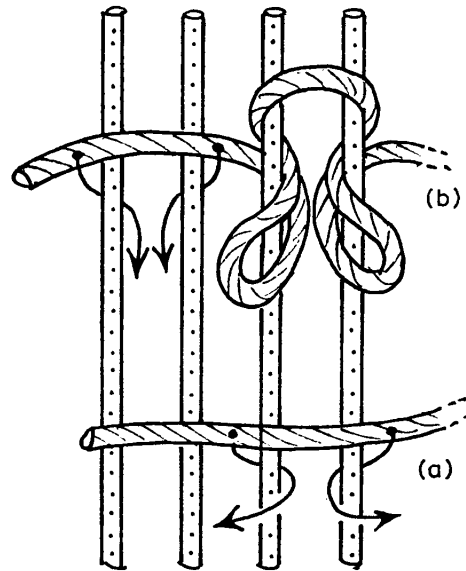


Fig. 170. Loop based on Ghiordes knot

In the other type, the weft is pulled in two places, as shown in Fig. 170 (a), to give symmetrical loops emerging from between adjacent ends, see Fig. 170 (b).

Both of these types are found in old Swedish ryas.

4. KNOTTED PILE

HISTORY

More has been written about the history of knotted pile rugs than about any other type of rug. But it is out of place in this book to attempt a summary of this large mass of information. The reader is referred to the Bibliography, especially to those books written for collectors of carpets.

The Earliest Physical Evidence of Knotted Pile Rugs

In 1953, Russian archaeologists discovered a series of tombs in Pazyryk, in the Altai mountains of southern Siberia. For some reason, these had become filled with perpetual ice, so that their contents were perfectly preserved. It is to this freak occurrence that the Pazyryk rug owes its remarkable survival from about 500 B.C. to the present

day. The rug, now in the Hermitage Museum, Leningrad, measures 6 by 6½ feet. It is of such assured and developed design, with a central field and five main borders, that it is obviously representative of a long tradition of carpet weaving, of which absolutely nothing is known at the present time. The rug is knotted of fine-spun wool in various natural colours using the Ghiordes knot.

There is a gap of 800 years until the date of the next known rugs. These are merely fragments which were found at Dura-Europas on the Euphrates and at Loulan in E. Turkistan, but they already show a great variety of knotting techniques. Knots of the three main types appear and one piece even has pile on both sides.

Earliest Written Evidence

The first written record concerning a carpet is an Oriental manuscript which states that the Arabs, on conquering Ktesiphon, then capital of Persia, in A.D. 635, found a huge and magnificent carpet. This has been called the Spring or Winter Carpet of Chosroes, the king of Persia. It is thought to have been 84 feet square, and represented a garden with paths, flower beds, water courses, and shrubs, and was the inspiration for many Garden Carpets that were later woven.

The Scandinavian Ryas

Probably the best documented piece of rug history is that of the rya in Finland and Sweden, where over the last few centuries a development can be traced from the use of pile textiles merely for warmth and thickness (as bedcovers), to their use as decorative, fine art products. The earliest are made with uncut loops and are either monochrome or striped. Later, in the sixteenth century, knotted types appear but with a thick yarn tied in widely spaced knots, often on both sides of the rug. These could be quickly and easily made by the members of a household for their own use. Then as the decorative qualities were developed, the pile became shorter and more closely set to allow of greater detail and precision in the design, until some ryas approached the texture of Eastern rugs. More recently, when richness of colour and texture, rather than complexity, became the aim of the rya designers, the pile again became long but remained fairly closely set.

This shows how a basically simple technique can be adapted to the needs of the moment. It may also give an indication of the development of carpet weaving which led up to the Pazyryk rug, a development which will probably always remain conjectural.

A. Types of Knots

(i) GHIORDES, SMYRNA OR TURKISH KNOT

Ghiordes and Smyrna are both towns in northern Irak from which have come rugs knotted in this manner.

The Ghiordes knot is now the one most used for attaching a pile weft to the warp. Of the three main types, it is the most secure and so lends itself to long-pile rugs or to the use of unusual materials.

It is a symmetrical knot tied round two warp ends and can be produced in a number of ways.

(a) *Knotting from Continuous Pile Yarn and Cutting each Knot as it is Tied*

Wind the yarn to be used in some convenient form, e.g., a finger hank. Pass the free end down between the two warp ends and bring it up to the right of the right-hand end. The pile weft is now looped round one end as shown in Fig. 171 (a).

Now take it across both ends, to the left, down behind the left-hand end and finally up between the two ends, as shown by the arrow. The result is as Fig. 171 (b).

Hold the free end of weft so that it gives the required length of pile, and tighten the knot by pulling on the part that runs to the finger hank. Then cut this latter part at the appropriate point, indicated by wavy line in Fig. 171 (b), and the knot will appear as in Fig. 171 (c).

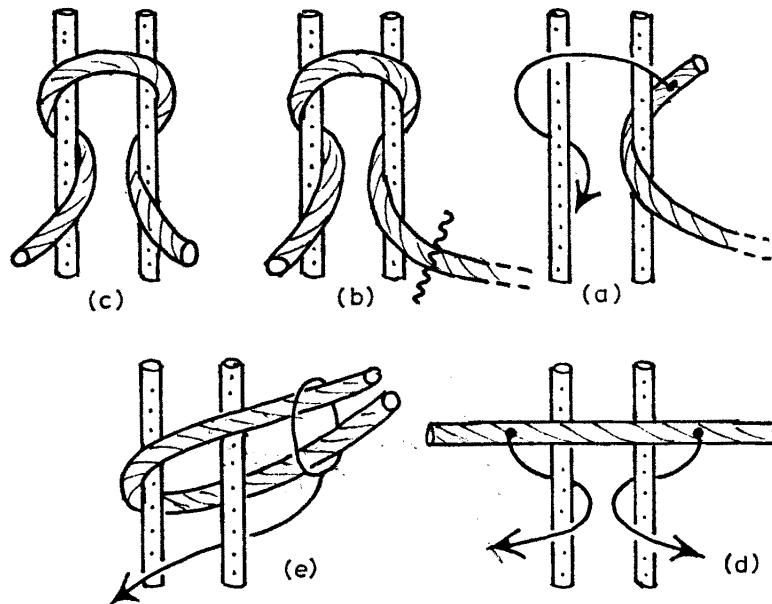


Fig. 171. Ghiordes Knot. (a-c) Knotting from continuous yarn
(d) and (e) Knotting with cut yarn

With practise the knot can be tied in this way with some speed, say, 10 to 15 knots a minute. The actual finger movements are as follows.

The middle finger of the left hand raises and parts the two ends that are to carry the knot. The fingers of the right hand tie the right half of the knot, pass the yarn to the thumb and index finger of the left hand which tie the left half of the knot.

Carry the scissors in the right hand all the time. If weaving scissors are used (these have a spring to keep the blades open and only one fingerhole), wear them on the fourth finger, see Plate 42. The thumb, index and middle finger are then left free for the knotting. If using normal scissors, a pair about 5 inches long is best. Put the fourth finger of the right hand in one of the fingerholes and carry the scissors in the hand, as a surgeon does, see Plate 43. As above, this leaves the thumb and next two fingers free. When a knot is to be cut, slip the thumb into the scissors' other fingerhole. It is probably easier to cut a thick pile yarn with ordinary scissors than with weaving scissors.

It is an advantage to become used to this method of holding a pair of scissors, as it can help in several other techniques, e.g., corduroy.

The finger hanks of the various colours needed lie on the already woven rug and are picked up as required.

The Eastern carpet weaver holds a small curved knife in the right hand to cut the weft after each knot is tied. A hook at its end is sometimes used to assist in the second stage of tying the knot. The yarn usually comes from a series of large bobbins, one of each colour needed, held on a crossbar above the weaver's head.

(b) Knotting with Cut Lengths of Pile Yarn

The method by which the yarn is first cut into equal lengths and then knotted may have arisen in Scandinavia. It is slower but lends itself to very subtle colour changes.

The pile yarn is wound around a long square-section stick. This stick, whose size determines the pile length, has a groove running down one of its long sides. It may be attached to the spindle of a spinning wheel, to a bobbin winder, or may be housed on a special stand with a turning handle. By turning the stick, the yarn is wound spirally on it with no overlapping. When a knife is run down the groove, the yarn falls off in equal lengths. Each colour is treated in this way and then put into the compartments of a tray or some convenient holder.

The method of knotting is as follows.

Select the colours required for one knot and place the yarns over two warp ends as in Fig. 171 (d). Wrap the two free extremities of the yarns around the warp ends as shown by the arrows and pull them tight. This can be done very quickly if both hands move together and symmetrically, as follows.

Raise and separate the two warp ends with the middle fingers and hold the yarns

Referring to Fig. 172, make a knot around ends 1 and 2. Then pass the pile weft under the rod, up over it, and make a knot round ends 3 and 4. Repeat. Tighten each knot as it is made. When the row is complete and the plain weave picks have been inserted, turn the rod on its edge so that the groove is uppermost and slice through the loops with a knife.

(d) Cutting Weft Loops

Ghiordes knots can be produced by cutting the first type of loop described in Section 'E', under 'Weft Looping', see Fig. 169 (b). As the yarn is doubled in the tying, a yarn of half the normal thickness must be used. It could be cut only where indicated by wavy lines, in Fig. 169 (b), in which case one end of the knot will be formed by a loop of yarn and the other by two cut ends, thus combining a cut and looped pile.

(e) Mechanical Methods of Tying Ghiordes Knots

The various mechanical devices for tying knots have all concentrated on reproducing the Ghiordes knot. The simplest is a small Swiss tool which is held in one hand. By pressing a plunger, a knot is tied with yarn fed to it by the other hand.

A much more elaborate power-driven machine exists which can tie knots in any one of twenty-one colours. The colour for each successive knot is selected by the weaver, who presses any one of the twenty-one typewriter-like keys on the machine, as it passes slowly across the warp. It can work at a speed of over a knot per second, and at a great variety of knot densities.

Also, at any point, knots can be tied in by hand if another colour, or special effect, is wanted. The plain weave picks are woven by hand. It can be regarded as a very sophisticated tool, rather than as a machine, because it is entirely under the weaver's control.

There also exist completely automatic power looms which tie the Ghiordes knot. These are generally used to make very high quality carpets of one colour or of simple design.

Direction of Pile

Because of the way the knot is tied the pile weft always slopes down towards the weaver. The shorter the pile, the more regularly the cut ends slope in this direction. As the colour of a yarn always looks many tones darker when viewed end on, i.e., when looking at the cut end, a short pile rug when tied with Ghiordes knots appears much darker and richer when viewed from the end at which the weaver started. So simply by walking round such a rug, the starting and finishing ends can be distinguished. Naturally with a long pile, as in a rya, this one-way slope of the pile weft is somewhat obscured.

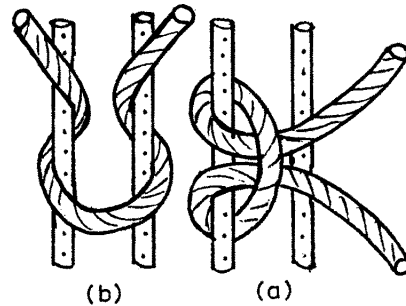


Fig. 173
Ghiordes Knot. Knotting
in reverse direction and
sideways

The Ghiordes knot is sometimes found knotted sideways on one warp end in old Finnish ryas, see Fig. 173 (a). It can also be inserted upside down, with the pile sloping away from the weaver, see Fig. 173 (b). So by using knots tied in these various ways, the direction in which the pile weft lies can be altered at will and thus become another element in the design of a knotted rug.

(ii) SEHNA OR PERSIAN KNOT

Despite its past importance, the Sehna knot is little used by weavers today; but it has features which make it quite distinct from other knots and it is therefore worth studying.

The features that commended it to Eastern weavers were the fact that it gave an even distribution of pile over the surface of the rug (i.e., one end of the pile yarn protrudes in the gap between every warp thread, whereas with the Ghiordes knot two ends protrude in one gap and no ends in the next gap), and the fact that more knots per square inch could be tied with it.

It can be tied in three main ways.

(a) Wind yarn into a finger hank. Take the free end down between the two warp ends that are to carry the knot, and up to the right as shown in Fig. 174 (a). Then, as arrow in Fig. 174 (a) carry it to the left over the right-hand end and under the left-hand end. The knot is now as in Fig. 174 (b). Pull the free end to the required length, tighten the other end and cut it as shown by the wavy line. The knot will now lie as in Fig. 174 (c).

Note that both ends point to the left so this can be called a left-hand Sehna knot. By a similar but opposite procedure a right-hand Sehna knot can be tied, see Fig. 174 (d).

As with the Ghiordes knot, the right half of the knot is tied by the fingers of the right hand, the left by those of the left hand. Being a simpler knot it is quicker to tie and is only a little less secure.

(b) The Sehna knot can also be tied from a cut length of yarn as shown in Fig. 174 (e).

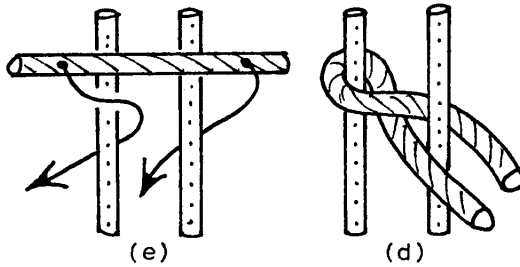
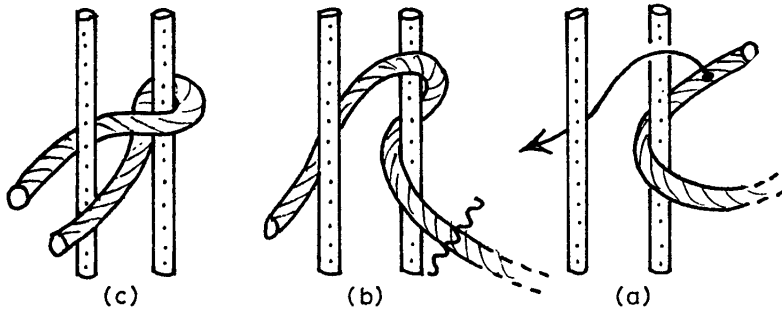


Fig. 174
Sehna Knot.
(a-c) Knotting from
continuous yarn
(d) and (e) Knotting with
cut yarn

(c) It can also be tied using a guide rod, exactly as was the Ghiordes knot. But a far quicker way is to make Sehna loops over a guide rod and then cut these. If the loops shown in Fig. 165 (c) were cut, the result would be Sehna knots as in Fig. 175 (a). Note that the knots overlap each other, giving twice the normal number (shown in Fig. 175 (b)). Each warp end is involved in two knots instead of only one.

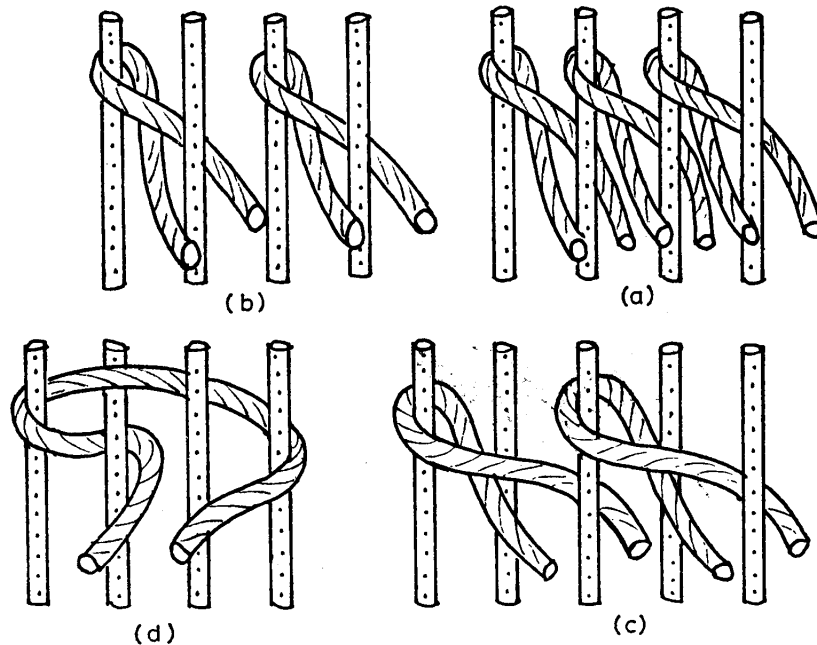


Fig. 175. Sehna Knot. (a) Result of cutting Sehna loops
(b) Spacing of normally tied knots
(c) Knotting on raised warp ends
(d) Variety found in Afghan rugs

As mentioned before, this is the method used for Tibetan cut pile rugs. It was also used on a famous fourth century Egyptian rug, but in this case the looping was carried out on the raised ends of an open shed. So when cut, the pile was as in Fig. 175 (c).

The pile weft of a short pile Sehna knotted rug slopes either towards the right selvage or the left. An interesting use of this feature is found in Mongol saddle rugs. These are made in two halves and joined in such a way that the pile slants downwards on either side of the saddle. Thus they shed the rain and dust and also make a more comfortable contact for the rider's legs.

Fig. 175 (d) shows a variety of Sehna knot which spans four warp ends and is found in some Afghan rugs.

(iii) SINGLE WARP OR SPANISH KNOT

This is the simplest of the three knots found in classical knotted rugs. It is made on a single warp end, which the pile weft completely encircles, see Fig. 176. In Spanish

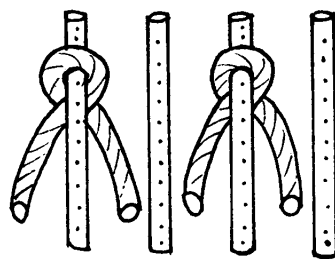


Fig. 176
Single Warp Knot

carpets this knot is made on alternate ends as shown. In the second row the knots are made round the ends missed in the first row. This gives rise to a distinguishing feature in the finished rug, namely that there is a smoother contour to a diagonal than to a vertical line.

This is an insecure knot and depends a great deal on the preceding and following plain weave to hold it in place.

(iv) OTHER KNOTS

When a pile with no suggestion of one-way slope is wanted, there are several knots to choose from. These are generally used with a long shaggy pile.

A clove hitch on one or two warp ends is used in some Morrocan rugs. As shown in Fig. 177 (a) this can easily be tied with the free end of yarn from a finger hank.

First wrap the yarn around a warp end, bringing it up towards the fell of the rug, see Fig. 177 (a). Then, as shown by the arrow, carry it across to the left and wrap it around the warp end again, bringing it out towards the left. See Fig. 177 (b). Cut the part that runs to the finger hank as shown by the wavy line.

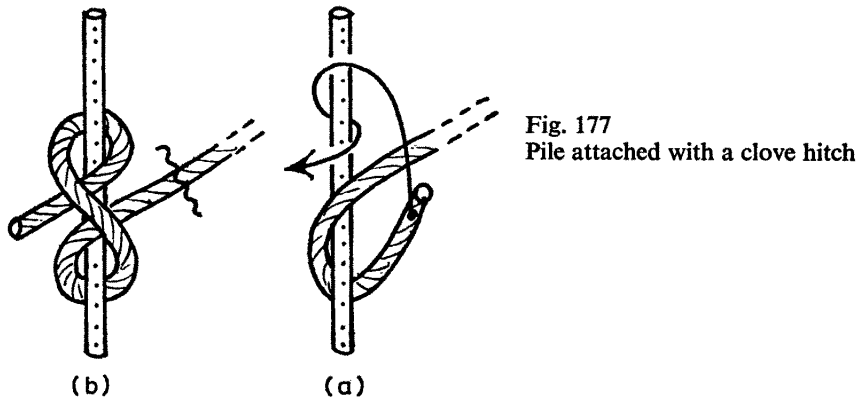


Fig. 177
Pile attached with a clove hitch

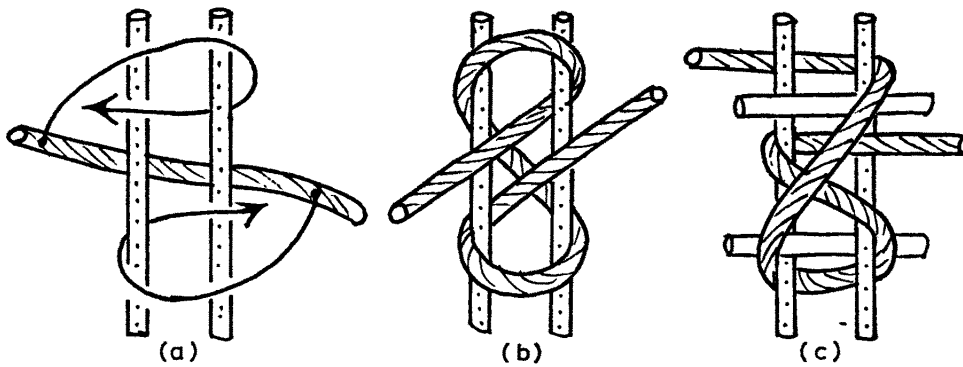


Fig. 178. (a) and (b) Very secure pile knot (c) Related knot used in Danish Bronze Age

A more complicated knot, as shown in Fig. 178 (a) and (b), is best tied with a cut length of yarn.

Pass this under two warp ends, see Fig. 178 (a). Then, as shown by the arrows, carry each end of the yarn across the two warp ends and up between them. See Fig. 178 (b).

This is extremely secure and is closely related to a knot thought to have been used in the Danish Bronze Age, see Fig. 178 (c).

Another knot of this type is shown in Fig. 179 (a). It is rather like a Ghiordes but with the right-hand end turned upwards instead of downwards. It can also be regarded as a cut soumak knot, for as shown in Fig. 179 (b), it can be made by cutting every

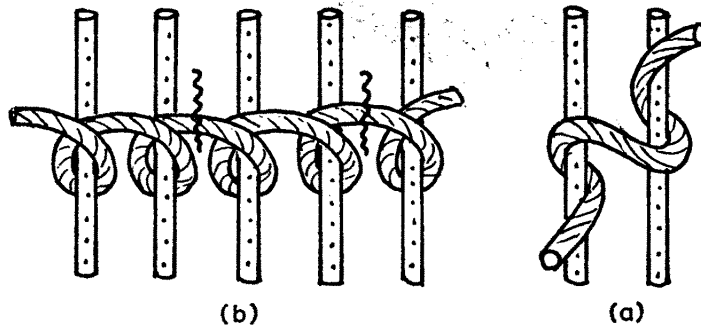


Fig. 179. Cut Soumak Knot

other weft span of a 2/1 soumak. This knot has been found on a nineteenth-century Kazak rug.

B. Construction of a Knotted Rug

General Details

A knotted rug whether it has a silk pile so short it looks and feels like velvet or a thick woollen pile many inches long, always has the same basic construction. This consists of rows of knots made across the width of the rug alternating with a certain number of plain weave picks. See Fig. 180. The length of the pile, the material of the pile yarn, the amount of plain weave, and the spacing of the knots are some of the elements that can be endlessly varied to produce rugs of different thickness, resilience, texture and weight.

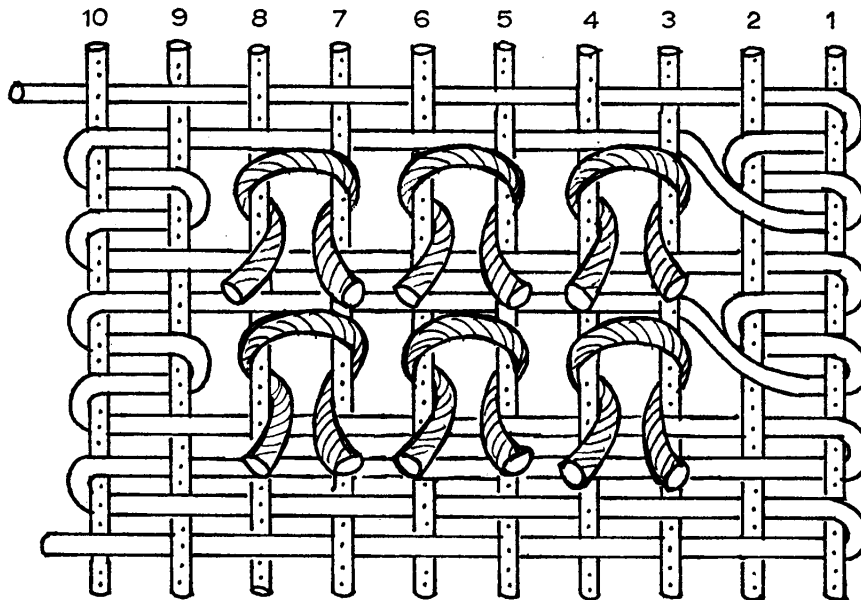


Fig. 180. General view of knotted rug

It will be seen at once from Fig. 180 that the knots stop short at both sides of the rug. So there are warp ends at each selvage which, for the whole length of the rug, never carry any knots. There are two reasons for this. One is that a carpet knotted right up to the selvage tends to curl under at the edges. The second is that carrying no knots these selvage ends can be treated in some special way, e.g., be woven or bound with a separate strong weft, and thus provide a protective edge to the rug.

This feature, the knotless selvage ends, is such a distinct concept to Eastern carpet weavers, that it has a Persian name, the *argatch*. In Fig. 180, ends 1 and 2 and ends 9 and 10 constitute the *argatch*.

There are many ways of treating the argatch, which will be described later, but as Fig. 180 shows, the simplest is to weave extra picks on these ends to make up for the thickness of the absent knots, exactly as was done for soumak.

(i) LENGTH OF PILE

Not many weavers nowadays produce a rug with a pile as short as that found in the classical Eastern carpets. Such a short pile implies very few plain weave picks, e.g., one to three, between the rows of knots and consequently a very slow technique.

A pile a little longer, say, up to half an inch, is characteristic of the type called *flossa* in Sweden. This name, together with *rya* (meaning a long pile rug), are sometimes used as if they represented quite distinct and different techniques. But this distinction only exists if the techniques are taught and used in a traditional and set way. Once it is realized that the pile can vary from $\frac{1}{2}$ inch up to, say, 6 inches, with every possible gradation in between, it will be understood there are no hard boundaries between a *flossa* and a *rya* rug. The words are, however, useful as a convenient way of referring to a short pile knotted rug and a long pile knotted rug.

Especially with a *flossa* rug, the knots as cut will have to be trimmed to produce a smooth even pile. This is best done every few rows on the loom. Bang the rug to make the pile stand up, then trim any long ends with a pair of long-bladed scissors.

The large scissors used for Eastern rugs are usually curved along their long axis. The finger holes are wrapped with fur for the comfort of the right hand and there may also be finger grips projecting from the pointed end of each blade so the left hand can assist in managing this heavy tool.

Some rugs, e.g., Chinese and Tibetan, have another cutting operation when they are completed and off the loom. This is 'outlining', the cutting of a groove in the pile around some of the motifs. It is done with a smaller pair of scissors and gives a sculptured surface to the rug.

In rugs of the *rya* type, with much weaving in between each row of knots, the latter appear in definite stripes across the rug. If not wanted, this effect can be mitigated by tying each knot so that one end is longer than the other.

(ii) MATERIAL OF PILE YARN

Rugs have been made with a knotted pile of almost every material, e.g., cotton, linen, mohair, raffia, jute, hemp and nylon, but the traditional material, wool, is still most used.

Old Eastern rugs used a yarn of a lustre and quality not obtainable commercially today. They may well have been spun from wool plucked selectively from certain parts of the sheep and not from a whole fleece. It is essential that the yarn be worsted-spun (i.e., with the fibres running lengthwise) from a long staple wool. The cut end of

such a yarn wears so that it has a tapered tip rather like a paint brush. This feature is very obvious in old ryas.

Materials which, due to their differing elasticity, are difficult to combine as wefts, e.g., wool and linen, can be easily combined in a knotted pile, where this characteristic does not matter. Also materials of differing texture or lustre or resilience can be used to add variety to the pile of a rug.

(iii) AMOUNT OF WEAVING BETWEEN KNOT ROWS

The number of picks of plain weave between rows of knots is related to two factors, the length of the pile and whether this pile is required to lie flat or stand upright. The longer the pile, the more picks are needed; but this number is increased to allow the pile to lie flat and is reduced to force the pile to stand upright. So with a medium length pile, say, 2 inches, there should be about $1\frac{1}{2}$ inches of plain weave, if this pile is to lie flat and in obvious rows. But if the pile is to stand upright, this amount could be reduced to as little as $\frac{1}{2}$ inch.

A very short pile is generally required to stand upright so the minimum of plain weave is used. In Eastern rugs, only one row was used on the fine rugs from Sehna and Tabriz and four rows on coarser rugs, such as Kazaks, but the average was two rows.

Where very few picks are used, the majority of the body of the rug is made up of the knots themselves. If they were removed, a very open and loose plain weave textile would be left. Where more picks are used, they constitute a definite stripe of weft-face weaving between each knot row. The greater the number of picks, the more nearly the textile becomes a weft-face rug embellished with occasional rows of knots. So in the first case, the weft yarn is not very important, and in fact is often found to be of rather poor quality in Eastern rugs. But in the latter case the weft yarn's quality is of great importance.

In Eastern rugs, the plain weave weft often consists of two single ply yarns run in together as they beat down better than a 2-ply yarn. Sometimes these two yarns are spun in opposite directions to prevent any tendency of the rug to curl up. Where there is considerable space between the knot rows, use the thickness of weft appropriate to the warp setting, i.e., that which will give a firm weft-face weave.

There is, of course, no necessity for the picks between the knot rows to be in plain weave, though where the knot rows are close together it obviously provides the safest method of interlacement. Where the rows are not so close together, a twill or hopsack or simple fancy weave can equally well be used. This can be done either to provide increased firmness to the woven part of the rug, or from a decorative point of view. The latter must have been the reason for the two colour weaves seen on the backs of Swedish eighteenth and nineteenth-century ryas. Such weaves are effective if combined with a sparse pile through which the intricate designs can be half seen.

(iv) SPACING OF THE KNOTS

So far, it has been assumed that the knots (except for the single warp type) are tied around every available warp end between the right and left argatch, but this is by no means necessary. There are many other ways in which the knots can be disposed over the warp.

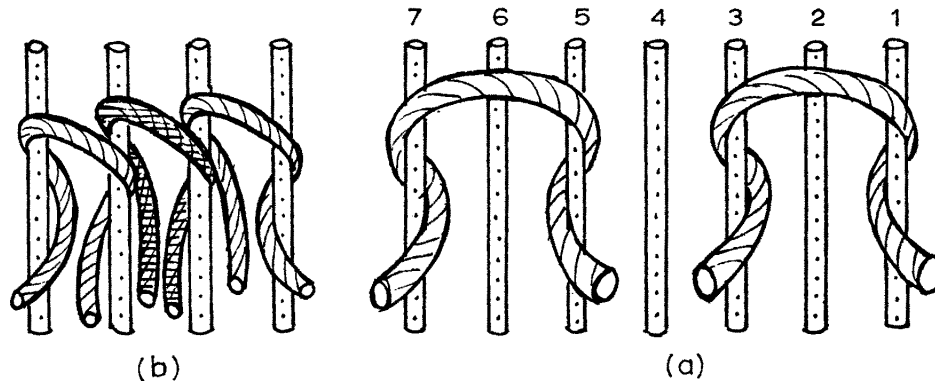


Fig. 181. Spacing of knots. (a) Knotting on open shed (b) Close spacing

For instance, as in Fig. 181 (a), the knots can be tied around every other warp end and this is obviously done by knotting on an open shed, i.e., with the odd-numbered ends raised. One advantage of this method is that the knots slide down in front of the plain weave weft, so at the argatch no extra picks are needed to make up for the absent thickness of the knots. It is, therefore, the method to use in a rug with alternating areas of ground weave and pile, as the time-consuming, zigzag course of the weft is avoided.

Fig. 181 (b) shows the closest that Ghiordes knots can be tied, each warp end being wrapped round by two adjacent knots. Fig. 182 (a) shows knots on two adjacent ends with an intervening missed end. As shown, this lends itself to a twill arrangement of the knots. In Fig 182 (b) two ends have been missed between the knots, and

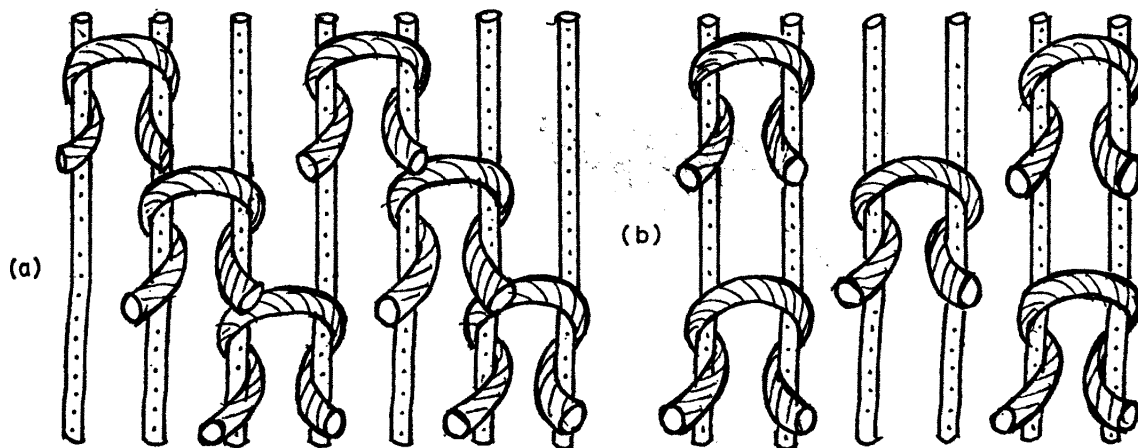


Fig. 182. Spacing of knots. (a) Giving arrangement in twill lines (b) Giving counterchange arrangement

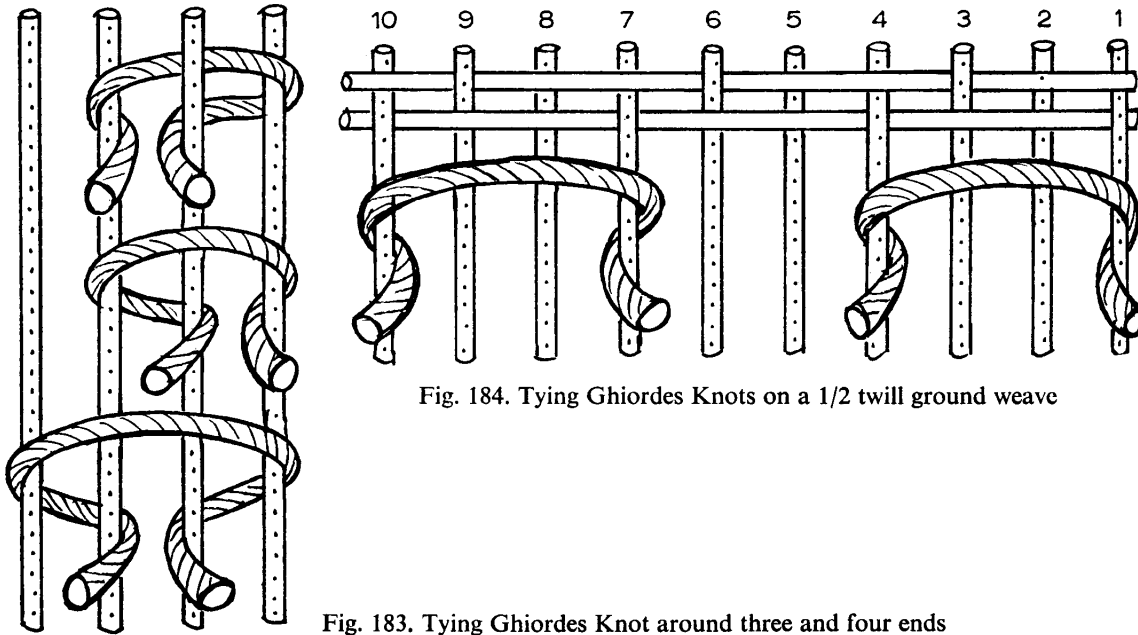


Fig. 184. Tying Ghiordes Knots on a 1/2 twill ground weave

Fig. 183. Tying Ghiordes Knot around three and four ends

here the latter could be arranged in vertical or angled rows or in the counter-change sequence as shown. Fig. 183 shows ways that a Ghiordes knot can be tied around three and four ends.

When a twill weave is used between the knot rows, the knots are tied around the ends raised for one of the twill sheds. Fig. 184 shows the knots tied when ends 1, 4, 7, 10, are raised with a 1/2 twill weave. Figs. 185 (a) and (b) show ways knots can be tied on an open shed of a 2/2 twill weave, with ends 3 and 4, and 7 and 8 raised.

When tying knots on every adjacent pair of warp ends, and using plain weave between knot rows, it saves time to have two extra pedals tied up to raise the ends in these pairs, i.e., to raise shafts 1 and 2, and shafts 3 and 4. These pedals are used alternately to present the warp in pairs to the weaver's hands.

There is no need for the knots to be evenly spaced all over a rug. The combination of areas of close and of sparse pile is another source of variety in a knotted rug, and can give it a sculptured look.

These are only a few examples; there are obviously endless variations in the spacing of knots.

Warp Setting and Knot Counts

The closer the warp is set, the closer the knots can lie in the horizontal direction and thus the more intricate and finely drawn are the designs that can be rendered. In the

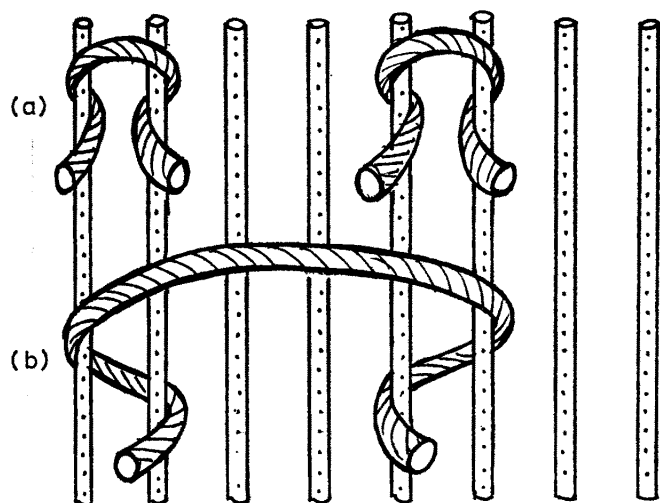


Fig. 185. Two ways of tying Ghiordes knots on an open shed of a 2/2 twill

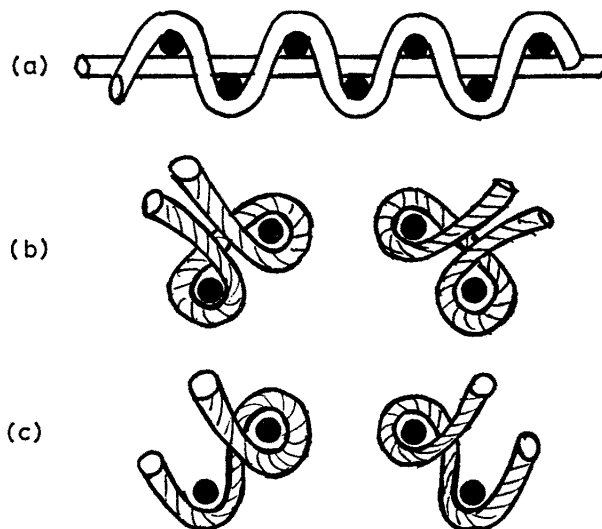


Fig. 186. (a) Cross-section to show two levels of warp
(b) Effect of Ghiordes knot
(c) Effect on Sehna knot

sixteenth and seventeenth century, when Persian rugs probably reached their peak, warp settings as high as 54 e.p.i. were used, which implies twenty-seven knots for every inch width of the rug. Such settings are exceptional, but 10 to 20 e.p.i. are quite common on Eastern rugs produced today.

With settings of this order, it is difficult to accommodate the warp threads side by side in one plane, so they are generally woven on two levels. As the cross-section in Fig. 186 (a) shows, the picks of weft take a straight and sinuous course alternately, and only half the total number of warp ends are visible on the back of the rug. The two levels of warp affect the knots, e.g., the Ghiordes knot is tilted to one or other side, see Fig. 186 (b), and the Sehna knot (whose wrapping loop is always made round the upper warp end) has its pile still further angled towards right or left, see Fig. 186 (c).

Knotted rugs today are generally made with warp settings between 4 and 10 e.p.i., i.e., between two and five knots per inch width of the rug. Short pile rugs are often woven so that there are the same number of knots in the warp and in the weft direction. This makes it easy to translate a design made on squared paper as one square represents one knot. Thus a rug set at 10 e.p.i. will have $5 \times 5 = 25$ knots per square inch. The latter figure, the knot count, is obviously an expression of the closeness of the knotting and so the fineness of the rug. In Eastern rugs, where there are often more knots in the warp direction than in the weft, as many as one thousand knots per square inch have been counted. In such a rug, the knot has to be tied with the yarn threaded on a needle. The average knot count of Eastern rugs is between fifty and a hundred, and of ryas between one and twenty.

(v) TREATMENT OF THE ARGATCH

The many ways of treating the argatch (the knotless warp ends at either selvage) were developed by the weavers of Eastern short-pile rugs but they can all be adapted to the selvages of long-pile rugs or even of weft-face rugs.

Two things are being aimed at, one is to make up for the thickness of the absent knots, the other is to add strength and weight to the rug's edge, if possible in a decorative way. With a close-pile rug, these aims are achieved together, but when much weaving separates the knot rows, the case is different.

In Eastern rugs, the argatch always consists of threads thicker and more widely spaced than those in the body of the rug. There may be up to six such thickened ends.

Some of the many ways of treating the argatch are described below.

(a) *Using One Weft*, see Fig. 187

- (1) Weaving extra picks at argatch, see Fig. 187 (a).
- (2) Overcasting or wrapping round the argatch, see Fig. 187 (b).
- (3) Figure-of-eight wrapping round argatch, see Fig. 187 (c).

Any of these can be used to make up for the thickness of the absent knots and repeated according to the thickness of the knots.

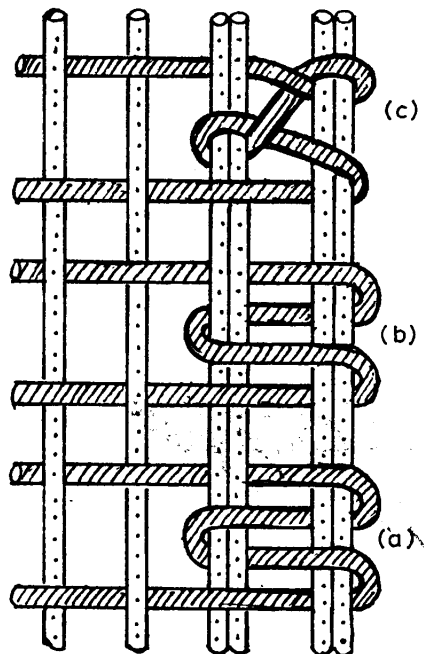


Fig. 187
Argatch. Using one weft.
(a) To weave extra picks
(b) To overcast the selvage
(c) To wrap the selvage in figure-of-eight manner

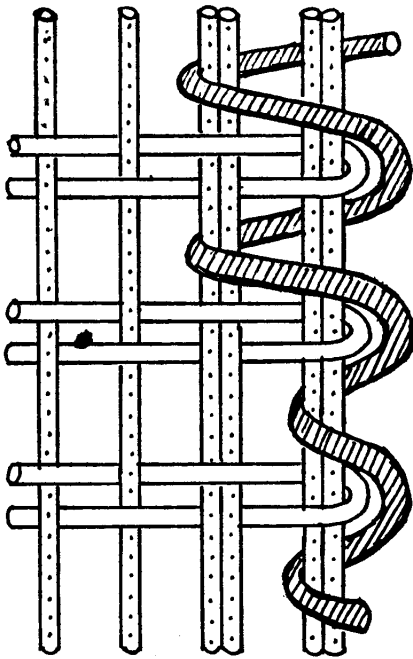


Fig. 188. Argatch. Using extra weft to overcast the selvage

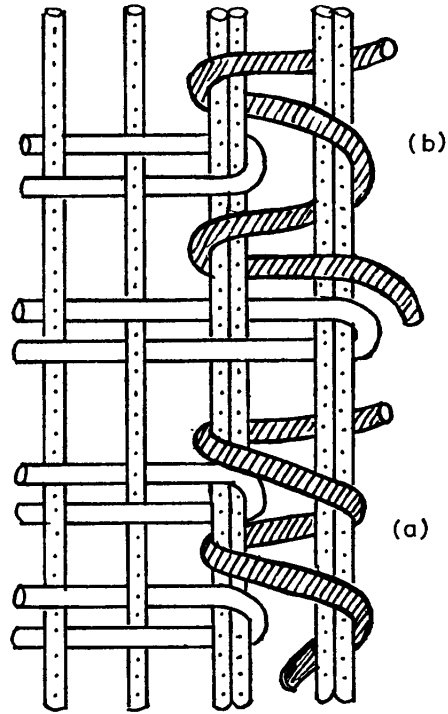


Fig. 189. Argatch using extra weft.
(a) To overcast the selvage
(b) To weave with it

(b) *Using an Extra Weft*, see Figs. 188 and 189.

(1) Overcasting or wrapping round the argatch. This can be done in several ways. The normal weft can extend right to the selvage and the extra weft wrap around one or more of the argatch threads, see Fig. 188. Or the normal weft can stop short of the outermost thread and the wrapping weft include this thread with the last one woven on, see Fig. 189 (a). The proportion of plain weave picks to the number of wrapping turns is, of course, infinitely variable.

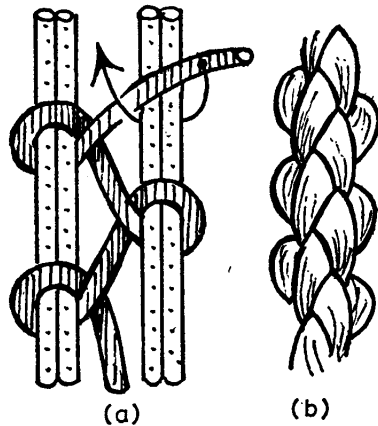


Fig. 190
Argatch. Figure-of-eight
wrapping.
(a) Method
(b) Appearance

(2) Weaving with the argatch

The normal weft either weaves up to the selvage or stops short of it, and the extra weft weaves the required number of picks with the argatch threads, see Fig. 189 (b).

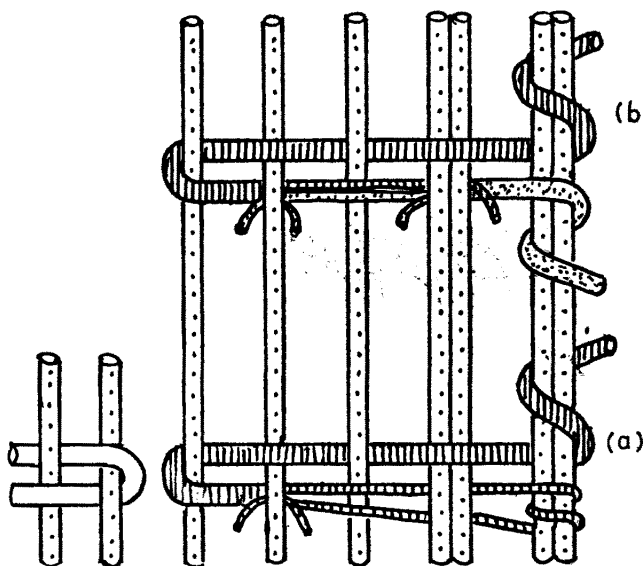
(3) Figure-of-eight wrapping with the argatch

The normal weft (not shown for clarity in Fig. 190 (a)) weaves up to the selvage; between each two picks of it, either one or two figure-of-eight wrappings are made, see Fig. 190 (a). This is the technique already described as vertical double soumak. It gives a very handsome cord-like ridge, as shown in Fig. 190 (b).

Any of the above three methods can be used as selvage strengtheners in a rya, combined with method (a), (1) at the end of each knot row.

Method (b), (1) is the most frequently used and is often applied to weft-face rugs. The yarn should be lustrous and worsted-spun, for instance, long staple wool, or alpaca, goat hair or horsehair. It is best to use several fine threads together, as they spread out and cover the normal weft better than a single thick yarn. This type can be carried out during weaving using a finger hank for each side of the rug, or after weaving using a coarse needle threaded with the yarn. One advantage of the latter method is that, as the work proceeds, it can be seen if the extra weft is going to prevent the rug from lying flat and its thickness be adjusted accordingly. That this cannot be seen when the rug is stretched tight on the loom is shown by the buckled argatch often seen on Eastern rugs.

Such a wrapping yarn can be started by weaving two picks a short distance into the body of the rug, as shown in Fig. 191 (a). The normal weft (white) stops short of the selvage by the same distance. In the same way the wrapping weft can be finished off at the end of a rug. Fig. 191 (b) shows how a join between two wrapping yarns can be made.



(b) Fig. 191
Argatch.
(a) Starting and (b) Joining
an extra wrapping weft