

VOLUME 1 NUMBER 3

JULY 1936

THE WEAVER

PRICE 25c

Tapestry Weaving

BY EMILY N. GOODWIN

ALIKE to the experienced weaver and to the beginner, tapestry weaving offers a tempting new field for hand-weaving. I know of no single branch of weaving that offers so much to the lover of beautiful textiles. If one can design even a little, the field is, of course, immensely widened; but even if one cannot design, opportunity is still open. There are, these days, so many charming color arrangements, and so many adaptable illustrations, that we need only to keep our eyes open to find designs aplenty. Then, too, the necessary equipment is simple, and need not be expensive; a frame or simple loom, good wool, and a love of form and color are the major requirements.

Among weavers in this country the types of tapestry most used fall easily into two classes: the knot type and the flat type. To the former belong the Summak, a very old Greek weave, and the so-called "Swedish" weave. This latter makes a handsome ribbed fabric (see Figure 1), suitable for wall hangings, upholstery, and large bags. The Swedish weavers I have consulted say that they have never seen this weave used in Sweden; possibly it may have received its name from the similarity of its knot to that used in making the Swedish Rya rugs. I use the name enclosed in quotation marks, to indicate that, though this is its name, nothing is implied as to its source. It is to this weave that I wish to devote the greater part of this article.

For a first piece of "Swedish" weaving the following materials are needed:

A frame or simple loom.

Cotton twine No. 10 for warp, set 8 to the inch. This is cord such as butchers and grocers use to tie their packages. Design on tracing linen, colored as it is to be woven.

Weft, Germantown or French tapestry wool of good quality and fast color.

PREPARATION FOR WARPING

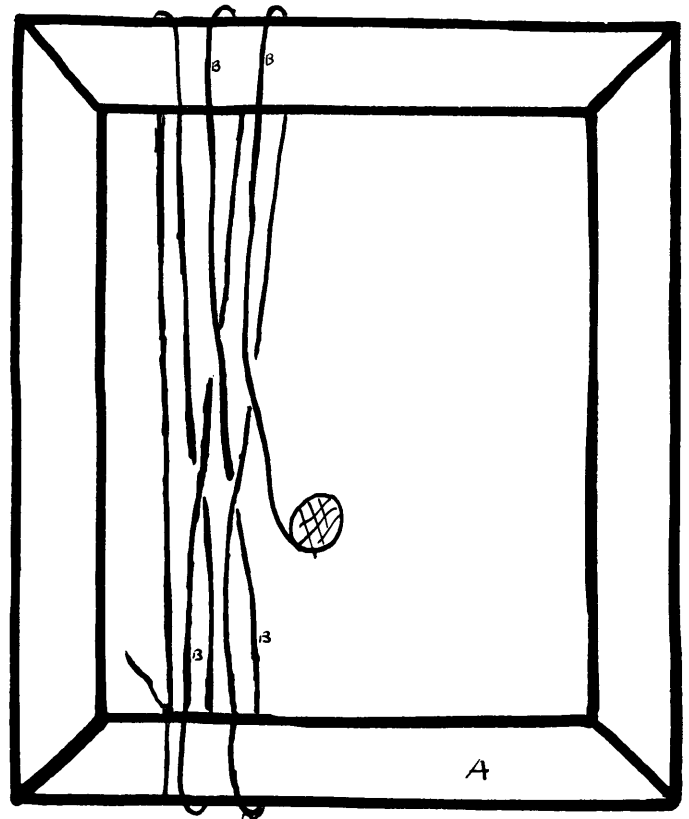
For teaching purposes, and for making small articles, I use a frame; either one made by a carpenter, or a stretcher such as artists use on which to stretch their canvas. If this latter is used, it should not be larger than 23 inches by 26 inches, outside measurement, and should be strengthened at all four corners with flat angle-irons.

Having decided on your frame, mark 1 inch spaces across the bottom strip the full width of the frame. Mark off the opposite end (top) in exactly the same way. These marks must be accurate and very distinct; they are the guides for the number and spacing of the warp threads.

WARPING

Make a hard ball of the twine, large enough to complete the warp. If a knot must be made, it must come on the wood

of the frame and not in the opening. Tie the end of the twine securely around the bottom of the frame just where the first warp thread to the left should come; and pass the ball to your helper who puts it *under* the frame, around and over it, draws the twine taut, puts her finger tightly on the twine as it lies on the frame, to prevent slipping, and hands the ball back to you. Repeat this process and hand the ball back to the helper as before. (See Diagram I.) Continue this for the full width of the warp, spacing so that there are 4 threads to the inch on *each* side of the frame — a total of 8 threads to the inch. When the warp is the desired width, tie the end securely to the bottom of the frame. This last thread must be as tight as the rest of the warp. The threads should cross at about the middle of the frame, and should be tight enough to give a humming sound when the fingernail is drawn quickly across them. If any of the threads do not cross, or if the warp is loose, undo your work and do it over. A poor warp is fatal to satisfactory weaving.



A - Wooden Frame
B-B-B - Warp Threads
Diagram I.

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PREPARING TO WEAWE

Take a piece of twine like the warp; tie it securely to the right side of the frame, close to the bottom. Carry the free end of the twine across to the other side of the frame between the two sets of warp threads above the cross in the frame opening; with an ordinary *dinner fork* (with rather blunt tines) held lightly between the thumb and first finger, at the extreme tip of the handle, and with the twine held at a tension, beat down the twine till it is close to the bottom of the frame, pull the twine very tight and tie to the left side of the frame close to the bottom. With a somewhat finer twine, make a "spool" (see Diagram II or III) by winding the twine several times around two or three fingers, then, removing the fingers, wind tightly around these threads from top to bottom several times. All "spools" for weft of whatever kind are wound in exactly the same way. They should be firm and stiff, but not bulky. Beginning at the left, put in several shots of tabby weaving, about an inch, picking up every other thread with the tip of the fork or with the fingers. This tabby weaving does not go around the frame as

the first shot did, and should be put in rather loosely. Now take a piece of warp twine and put it in close to the *top* of the frame. The back threads will have to be picked up with the fork or finger. When this thread is tied on both sides of the frame and beaten close to the top (turn the frame to do this), the warp will lie perfectly flat without any shed at all, the threads lying side by side in regular order. We are now ready for our practice rows of knots.

MAKING THE KNOTS

Make several "spools" of wool weft. Tie a free end of wool, with a single tie, around the first warp thread at the right-hand side; you are working on the wrong side of the fabric, so this end is left on this side. This tie, which is always used whenever joining a new thread or beginning a new color, is considered as a knot, so the first real knot is made on the second warp thread as follows: With the palm up, put the hand under 8 or 10 warp threads, holding the thread on which you are to make the knot a little apart with the middle finger; keep this hand as far down on the frame as possible. Hold the "spool" in the right hand, resting it vertically on the first and middle fingers and held there with the thumb. With the wool from the "spool" behind the fingers, carry the "spool" over the warp thread from right to left, and under the same thread from left to right (see Diagram II) draw the knot down close to the tabby weaving,

pulling the spool down vertically. Let the warp thread slide off the middle finger, raise the next warp thread and make a knot on it in exactly the same way; continue till only one or two threads remain on the left hand; pick up 8 or 10 more, and continue to the end of the row. Keep the wool as short as possible in making the knots.

The second row of knots is from left to right. The knot is the same as in the first row but the direction is reversed. With the spool in the right hand as before, and with the middle finger of the left hand (hand flat, palm up) holding the first warp thread apart from the others, throw the wool slightly to the left, holding it in place with the thumb of the left hand, bring the wool over the warp thread from left to right, then below and under from right to left; bring spool down vertically and draw tight. (See Diagram III.) With the middle finger of the left hand, pick up the next warp thread and make the knot exactly like the preceding knot, and so on to the end of the row. When you have so many warp threads on the left hand that working is difficult, drop the threads and start again as at the beginning. All rows

from right to left are knotted as was the first row; all rows from left to right are just like the second row.

When you are absolutely certain of the knot technique in both directions, and when the work locks even and smooth on both sides, you are ready to begin the design. For a first piece, use an enlargement of the sampler pattern (Diagram IV), about 5 inches by 10 inches.

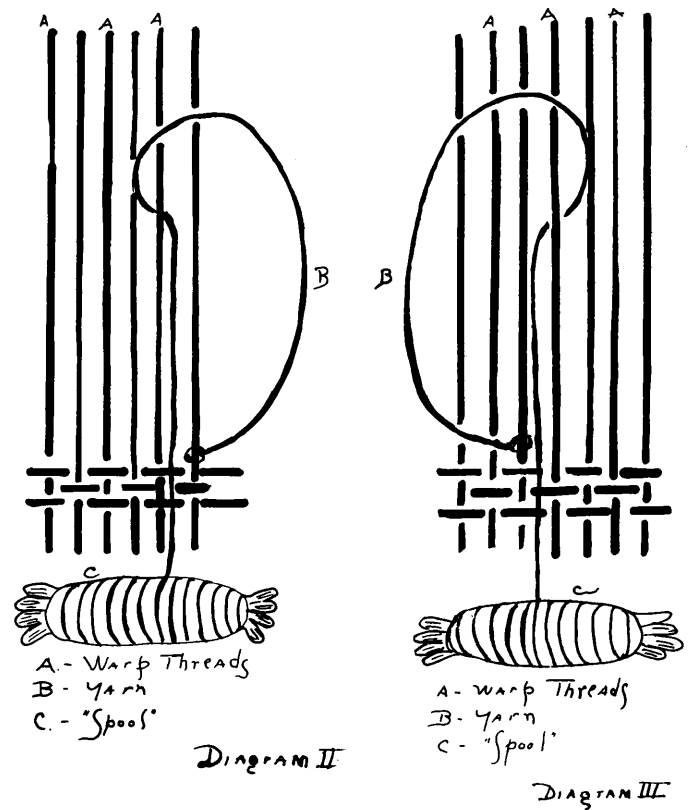
TO PUT THE DESIGN ON THE WARP

Place the design behind the warp threads, the side boundary lines of the design exactly under the outside warp threads, and the bottom of the design at the top of the last row of practice knots. Pin it carefully to position. With a fairly fine, stiff pen and *waterproof* ink, trace the outline of the design on the warp threads, not in a continuous line, but with a dot on the warp thread wherever this crosses the outline. Make the dots small and only just heavy enough to see. If the design is small, it is safe to put all of it on at one time. After the design has been dotted on the warp, turn the design back out of your way. (Do not remove it yet, as it may be necessary to turn it back again in cases of doubt.) Pick up the first warp thread (either side) between the thumb and first finger of the left hand and, with the pen held vertically against the warp thread and exactly on the first dot, twist the warp thread till the ink entirely encircles it. The encircling mark must be fine, free from blots, and should really be the path of the dot if this could be moved around the warp thread. This twisting process must be done for each and every dot on the warp. If a mistake should occur, leave it and, when the ink is thoroughly dry, correct it with ink of another color (*waterproof*). When finished, the outline on the warp should be exactly like the outline on the design. Put the frame aside till perfectly dry; remove the design, and keep it before you as a color guide.

WEAVING THE DESIGN

Look over your design and select a mass that forms a foundation for other masses. This method is not worked in horizontal rows all the way across the warp, but is one of building, and under masses must be worked before the upper ones. Referring to Diagram IV, it is obvious that one cannot begin with the yellow mass at the right since it curves over the gray; nor with the yellow mass at the left which slants over the red; the brown leans over the blue, so does the gray. Therefore, begin with the blue. Tie the free end of a blue spool at the right end of the form on the warp that is to be blue; this tie should cover the lowest right-hand dot of the blue mass; work in rows, back and forth, over the blue mass *only*, following the exact form outlined on the warp. In order to keep the slant on the right and the curve on the left, it will be necessary to make succeeding rows shorter than the beginning rows, sometimes leaving off one knot, sometimes more; the outline marked on the warp is your *only* guide. Continue with the blue till you reach the point marked x on the diagram. Leave the blue spool hanging (do not break off the thread) and start the next mass — the brown. Tie the free end of the brown spool at the point where the brown and blue masses join at the bottom of the design; also tie in the red where the red and brown come together. The line

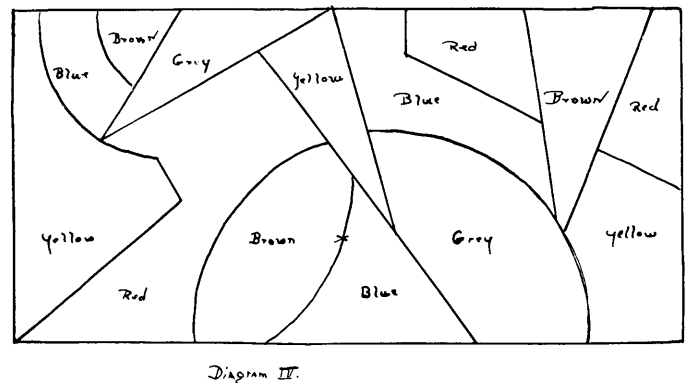
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separating the red and brown is nearly straight here and, in order to keep the outline, several rows of red and of brown will end on the same warp thread.

When more than three rows end on the same warp thread, a slit will show in the finished fabric. To avoid this, we cross the weft threads as follows: Work one row of the brown from right to left and leave the spool hanging when you reach the red tie; work one row of red from right to left and back again to where the brown was left; lay the red wool horizontally across the warp toward the right; the brown spool will hang from beneath the horizontal red; pick up the brown spool and make the knot just as you made all the others: you will find that the red wool is automatically tied in this knot, and that there is no slit in the fabric. Continue the brown row up to the blue and return. When you reach the red, lay the brown weft horizontally across the warp toward the left, and with the red make the knot tying in the brown.

This is technically called "interlocking" or "crossing,"



and must be done whenever more than three rows end on the same warp thread. The only exception is that when a new thread is tied there is no interlocking. Continue working the red and brown till the outline curves sufficiently to make interlocking unnecessary. Then continue with brown alone till x is reached; then interlock the brown and blue till the blue is finished; cut off the blue and proceed with the brown alone till completed; go back to the red, and work to the point where the left-hand yellow mass turns sharply; leave the spool hanging, work the left hand yellow to the point where interlocking becomes necessary; finish the red, and work the middle yellow till interlocking with the grey or blue is necessary. Then work the grey, and so on, keeping on with each color till forced to drop it because of changes of line direction or some other need of the design, interlocking where necessary, but always following the design. When mistakes occur, or when a form is not good, rip and correct. When the sampler is finished, put in a few rows of plain color knots, and several rows of tabby weaving in twine; cut from the loom, leaving the warp ends long enough for a fringe. Knot the warp threads, or finish with a row of machine stitching through the tabby weaving.

THE "FINISHING" PROCESS

Usually beginners' pieces are not entirely even, so have to be stretched with more than usual care. Use a smooth board larger than the finished piece. With *copper* tacks, to avoid all chance of rust, put in an inch or less apart, tack your piece,

right side up, to the board, being certain that all edges are perfectly straight, and that all corners form right angles; otherwise your piece will not be usable. When the piece is just as you want it, wet it thoroughly with cold or tepid water. Right here you have the reason why all tapestry should be made of wools that are absolutely fast color, and why all ink used must be waterproof. When the piece is *thoroughly* dry, remove it from the board. It is now ready for use.

As with needlepoint, a finished piece should be singed to give it the smooth, polished look that is so attractive. However, singeing, except in the hands of an expert, is a difficult matter and, unless you can have an expert do it for you, it is safer to omit the singeing.

SUMMAK

The Summak (Fig. 2) makes use of the same knot as does the "Swedish," but in a different way. It is done in rows all the way across the warp, with the right side of the fabric toward the weaver, and there are other differences. It is an excellent method to use in occupational therapy, and I am sorry that lack of space makes detailed explanation here impossible.

The flat tapestry methods will be discussed in a second article.

In closing, I wish to express my sincere thanks to Mr. Otto Hess of Brooklyn, N. Y., for the detailed photographs he has made for me; they show the texture so well that they add much to the value and interest of the article.



Figure 2. Summak Tapestry

Miniature Patterns for Hand Weaving

BY JOSEPHINE E. ESTES

WEAVERS who make a good many small articles always find miniature patterns very useful and frequently ask for new ones to add interest and variety to their work. To meet that demand, these ten miniature patterns have been prepared and various designs worked out from each one.

In these patterns, a simple twill border is indicated in the threading draft, as it provides sufficient finish without distracting interest from the pattern. Care should be given to the point at which the pattern and border connect. The point chosen for this connection is usually the one most satisfactory when the pattern is used as drawn in. Occasionally, a different point is used if all the weaving is to be done in free style or rose fashion. In these drafts, only the point of connection and the direction of the twill can be shown, as the number of threads to be used as twill depends on the number of warp-ends and the width of border required.

In the woven border designs given, width of result may be varied by increasing or decreasing the number of shoots on any one shed, while keeping the same succession of sheds.

The matter of tabby alternation is almost as important in miniature patterns as it is in summer and winter weaving. There are many places where the weft passes under *one* warp thread, then over several with many repeats of same in the heavier blocks of the pattern. When this sort of a pattern shoot follows one of the half-tone areas, there is sometimes a blurring of the pattern caused by the pattern-weft packing back over the preceding tabby at the point of the *one* thread. To avoid this, one should make sure that the warp-thread under which the pattern-weft is to pass comes from *under* the tabby-weft that immediately precedes. This will hold the pattern-weft in its proper place and make the pattern definite and clear-cut. It will also result in a bird's-eye effect in the solid heavy portions of the pattern which is very much like that seen in summer and winter weaving.

1. The miniature after RINGS AND CHAINS, shown in Illustration No. 1, is very decided in its character and makes a good effect even though the proportion between the two main figures changes a bit in reducing. If the second design, in free style, is to be used exclusively, one may prefer to reverse the twill of the border and continue threading it until the first large block of the pattern is reached when it will connect in such a way that the block has 6 threads instead of 5. This will eliminate the half-figures seen next to the border in the illustration. For a warp of 600 ends, one may use a twill border of 48 threads, then 9 repeats of the pattern, then 48 threads in reverse twill.

2. The PERIWINKLE is good for large or small pieces. Either all-over design shown in Illustration No. 2 is good either side up. It will be noticed that in the illustration of the border designs the threaded border is omitted, allowing a more complete showing of the pattern. For 120 warp-ends, thread 12 to twill, 4 repeats of the pattern, 12 to reverse twill.

3. The RAMBLER ROSE, shown in Illustration No. 3, is suitable

for very small or narrow articles such as pincushions, small coin purses, bookmarks, etc. For a warp of 120 ends, use twill border of 12 threads, then 6 patterns, then reverse twill of 12 threads.

4. The pattern given in Illustration No. 4 is not a true miniature of POND LILY, but is an approximate reduction of the old pattern. Note the unusual position of the twill border. The pattern on each side is not carried to its center before connecting with the twill. Extreme care must be used in threading at the sides but, if done correctly, the result is good. For a warp of 420 ends, thread 3-4, then 1-2-3-4 twice, then the first 20 threads of the draft given in the illustration, then 10 repeats of the rest of the draft as given, then the 20 threads in reverse and continue the twill for the remaining 10 threads.

5. SINGLE ROSE is a very useful pattern and is rather dainty in its character. For small pieces with 120 warp-ends, one may use either 3 patterns with twill of 21 threads each side or 4 patterns with twill of 8 each side. Many designs besides those shown in Illustration No. 5 can easily be developed from this simple pattern.

6. ROSEBUDS, shown in Illustration No. 6, is a pattern of the familiar style having a table alternating with a figure of different form, — in this case, a group of tiny flower forms resembling buds. The threading of the pattern must end, as it begins, with this group of buds. For instance, for 420 warp-ends, thread 26 to twill, 9 repeats of the pattern, first 25 threads of pattern and remaining 27 threads to twill.

7. YOUNG LOVER'S KNOT, shown in Illustration No. 7, is a pattern of true Colonial style, — perhaps a bit more delicate than some of that period. There is a wide variety of border designs which can be developed from different parts of the pattern. For a warp of 600 threads, use 50 to twill border, then 10 patterns, then 50 to reverse twill.

8. CAMBRIDGE BEAUTY speaks for itself. It has no heavy table, yet is a pattern of considerable decision and consistency. It is good for runners, pillow-tops, table squares, screen panels, etc. For 600 warp ends, use 7 repeats of pattern with borders of 55 threads in twill. A great variety of border designs is possible in addition to the 4 which are shown in Illustration No. 8.

9. SINGLE SNOWBALL is a very definite pattern. Woven as drawn in, it is equally as good as the all-over design given in Illustration No. 9, and can be used with more than one color with good effect. This pattern is so similar to the well-known honeysuckle that designs made from that pattern can be worked out from this one. For 420 warp-ends, thread 42 to twill, 7 repeats of pattern and 42 to twill.

10. SUSAN ROSS is an old pattern and very good for general use and for multicolor effects. For the sake of variety, it may be used in an irregular arrangement as follows: Thread width of border desired in twill as indicated in Illustration No. 10, then 2 repeats of the pattern, then fill entire center with the small diamond detail with which the pattern begins and ends. For instance, for 600 warp-ends, thread 43 to twill, 2 repeats of pattern, 37 repeats of the 10 threads of the diamond, 2 repeats of pattern and 43 to twill. Weave as drawn in. This should give a good result in linen pieces.

In the above patterns, the threadings given are only suggestions. They may be changed to fit any number of warp-ends, or any pattern may be used without a threaded border. In each illustration the pattern itself is bracketed, though half a repeat is usually added to show the intervening figure which develops with repetition of the draft.

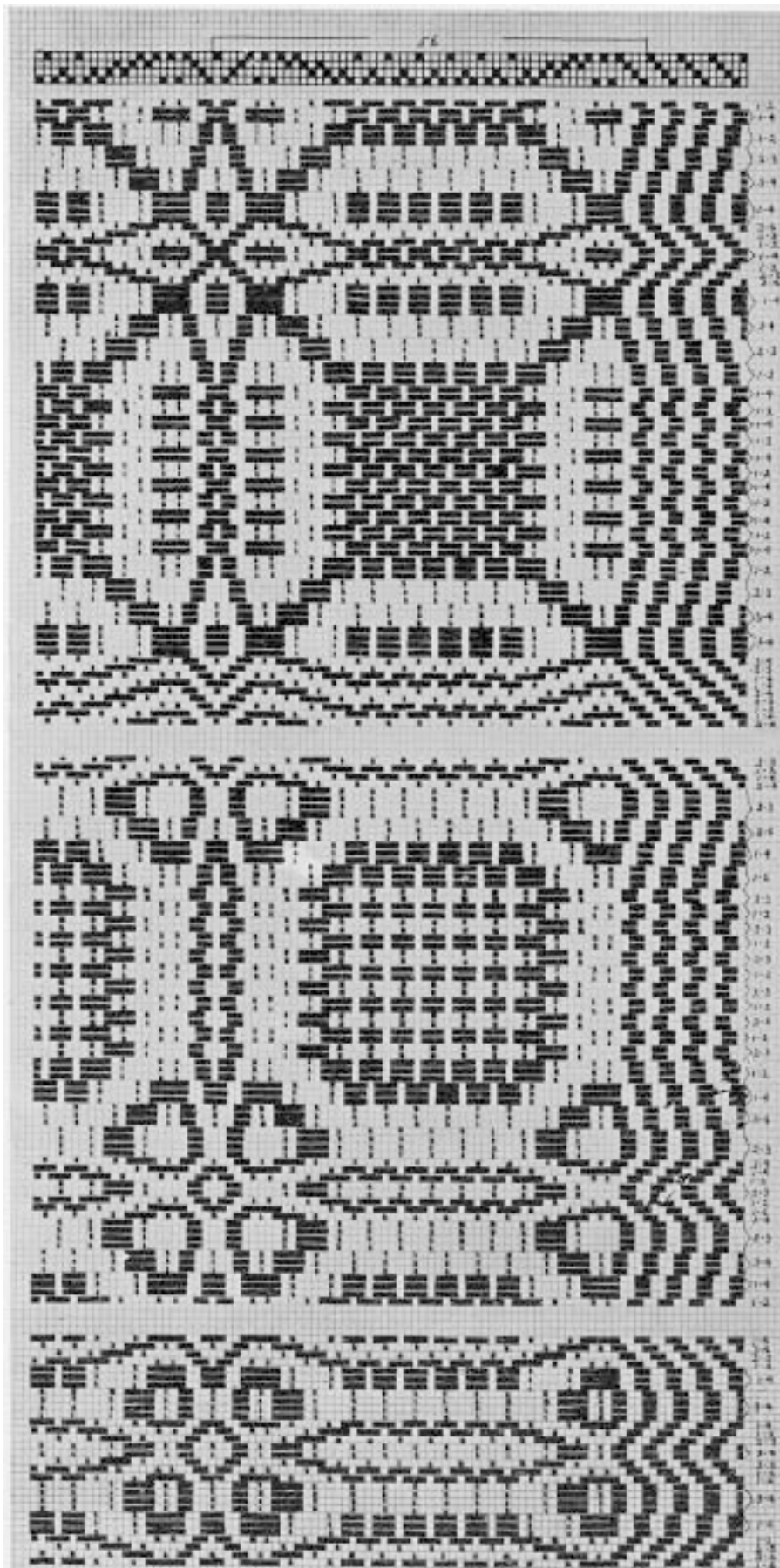


Illustration No. 1
Miniature after Rings and Chains

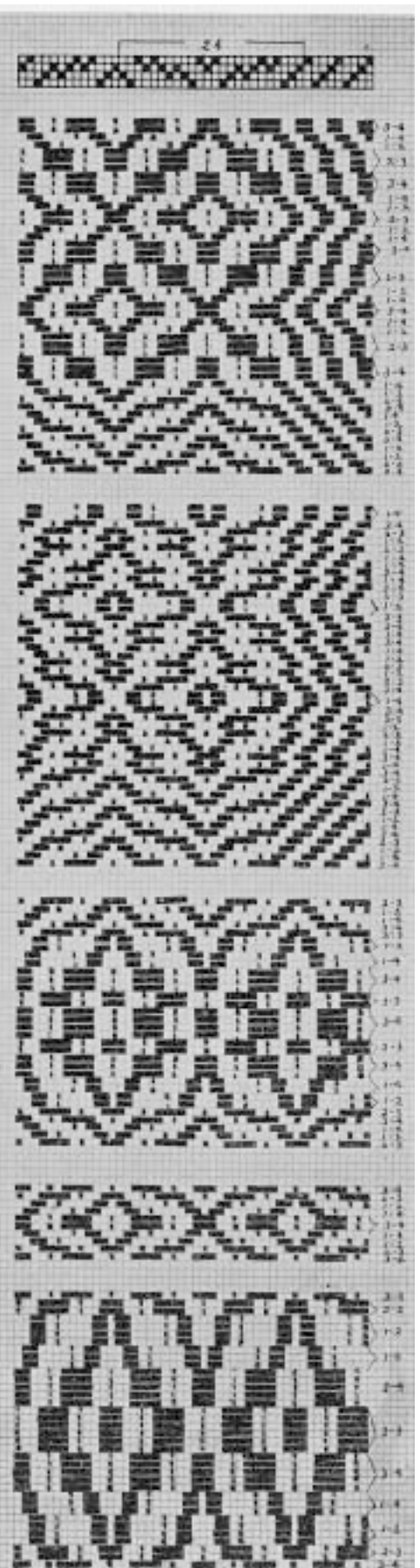
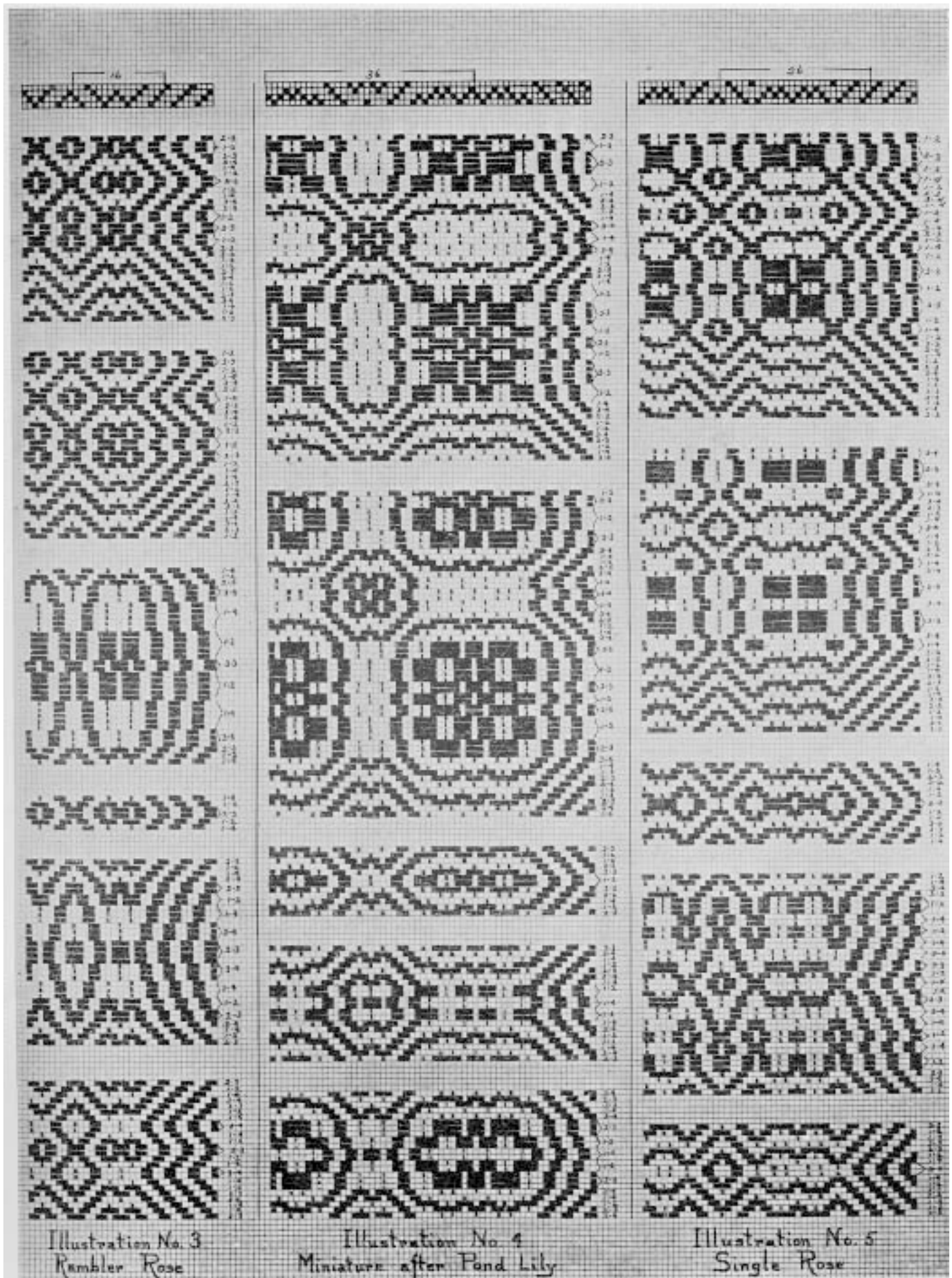
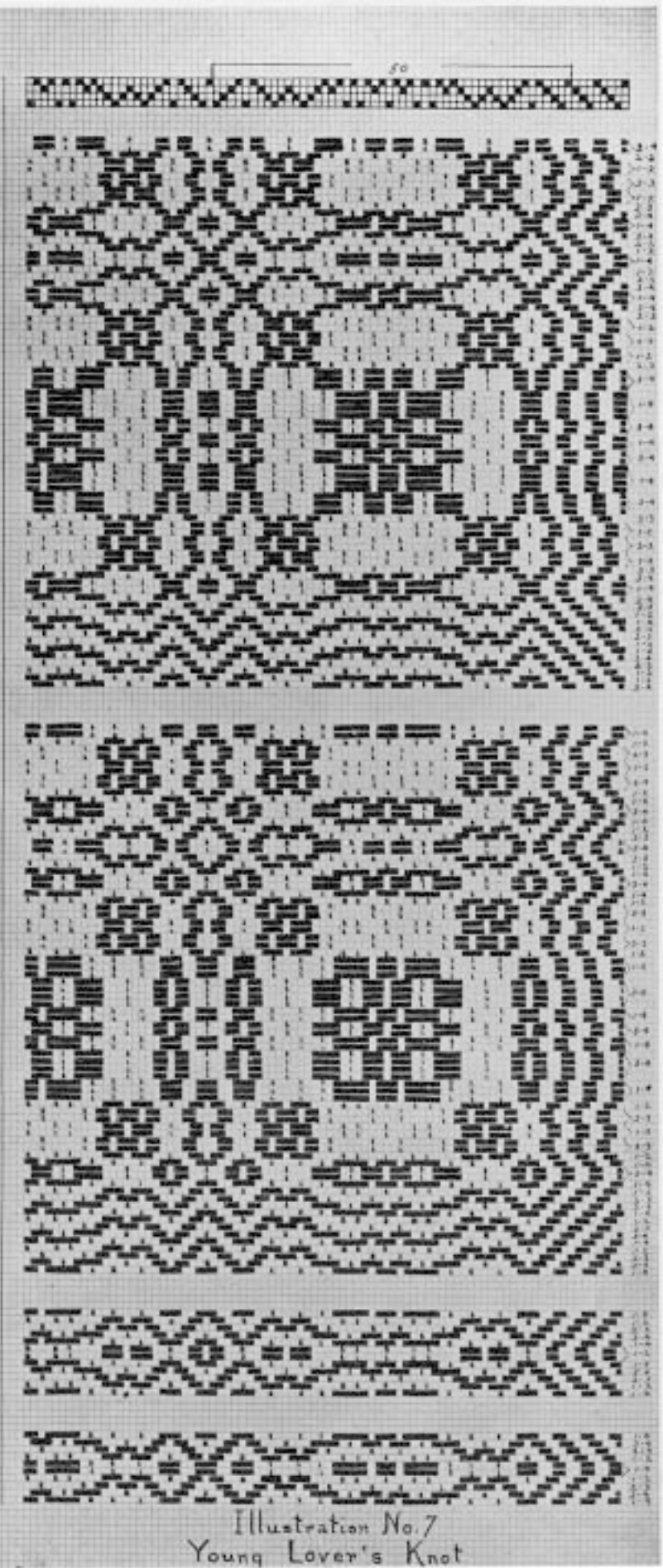
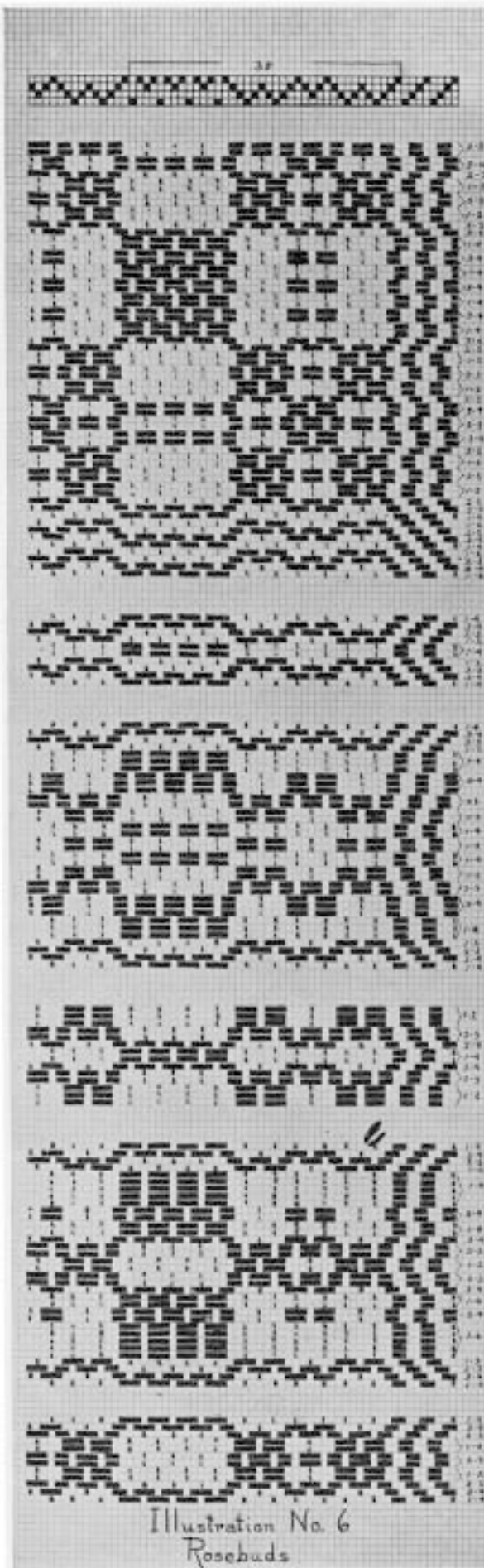


Illustration No. 2
Periwinkle





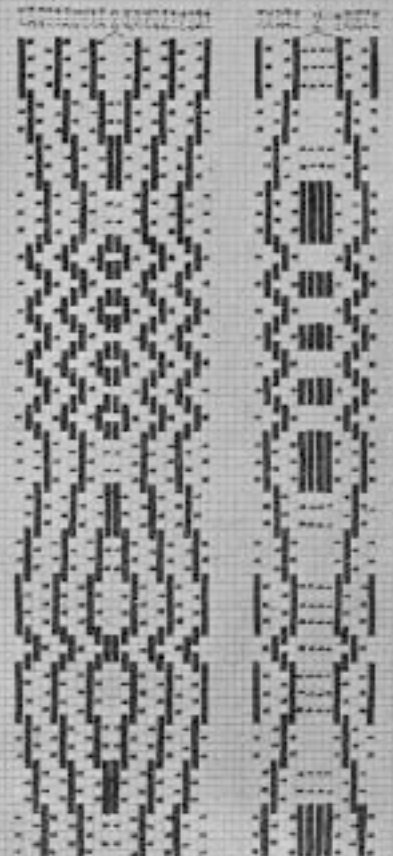
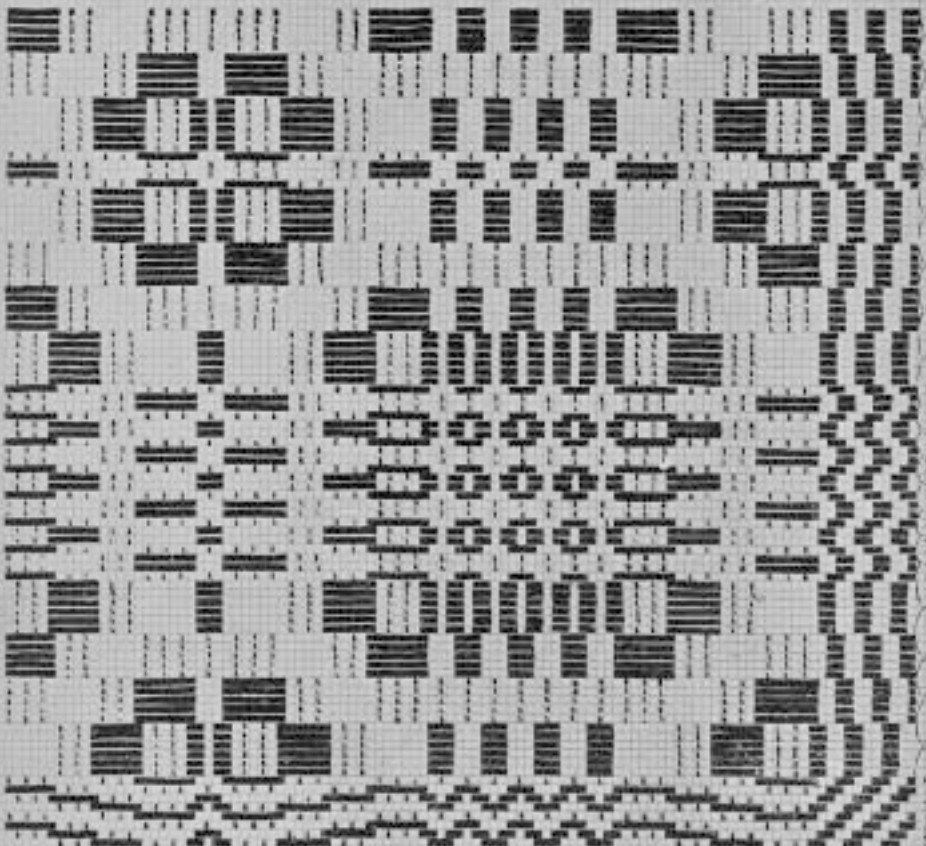
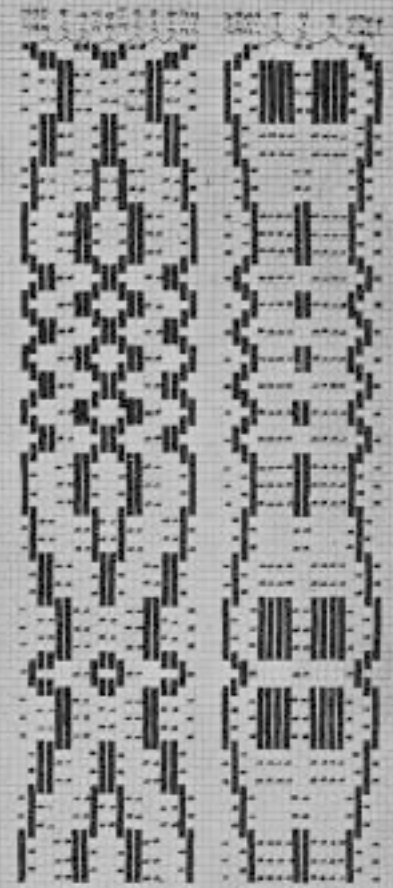
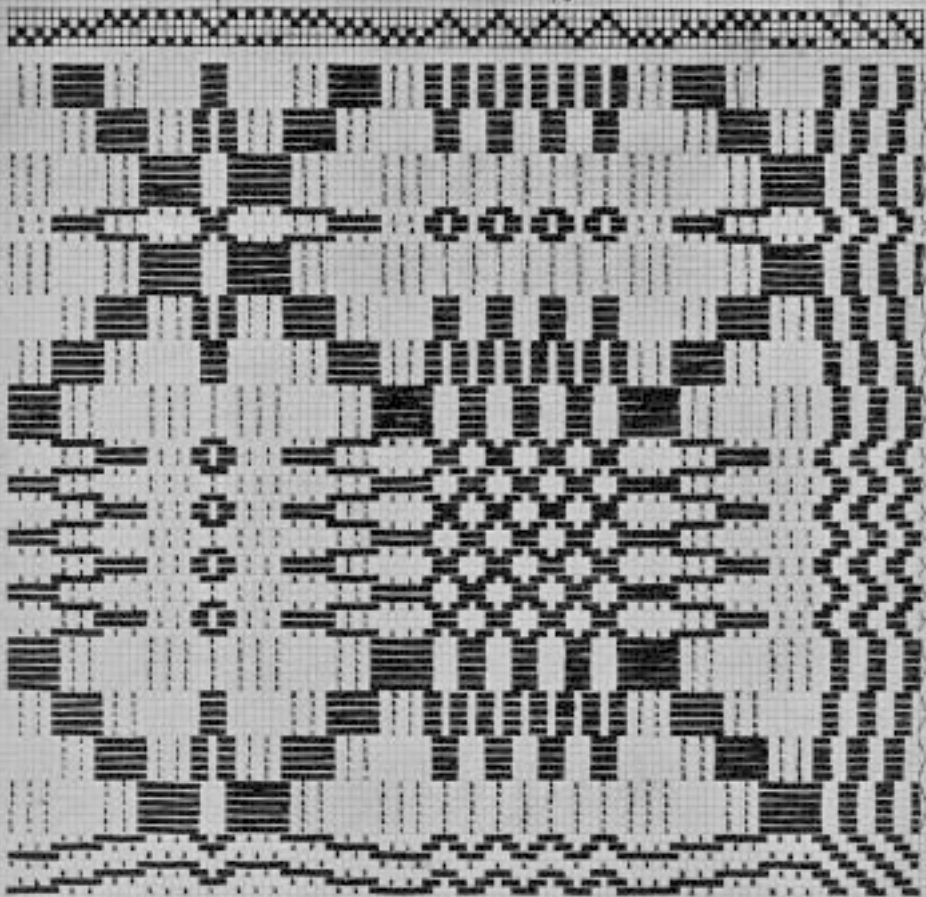


Illustration No. 8
 Miniature after Cambridge Beauty

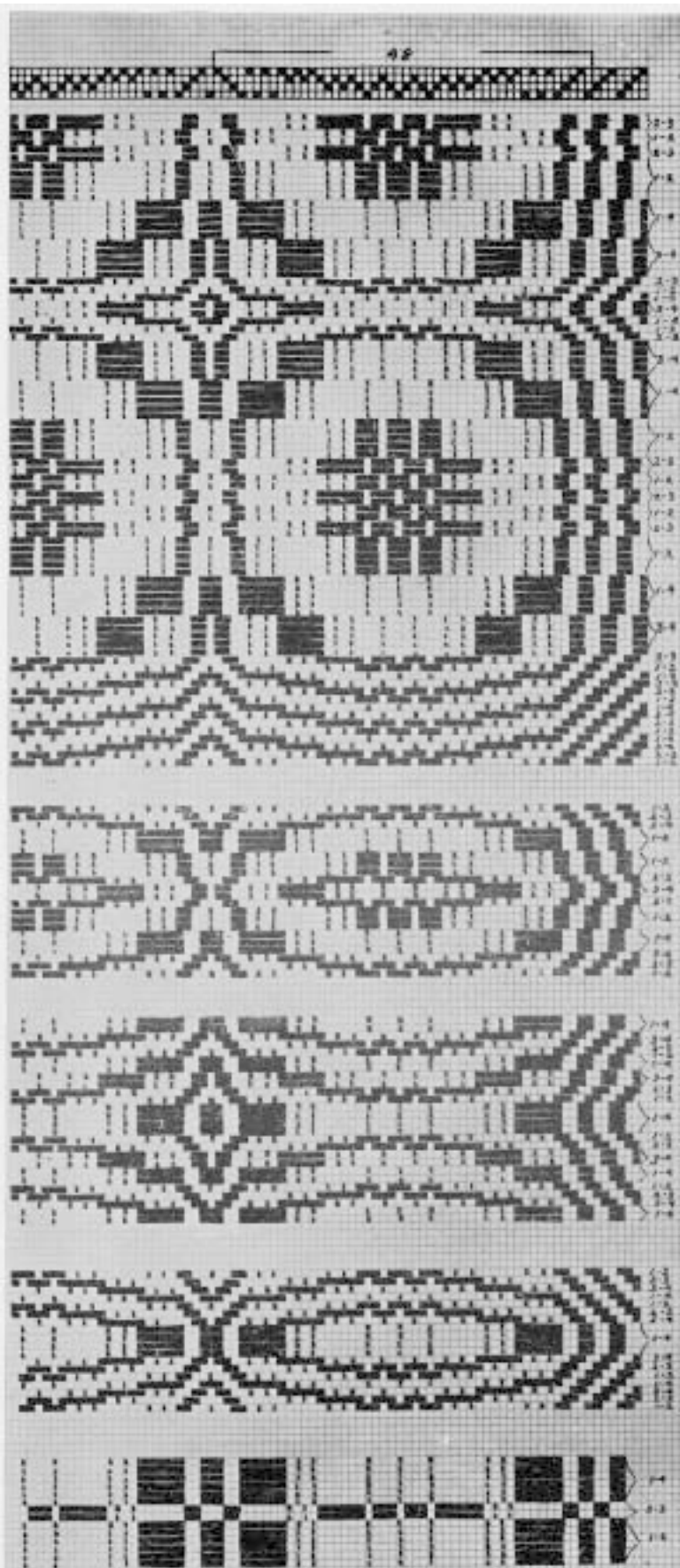


Illustration No. 9
Miniature after Single Snowball (a)

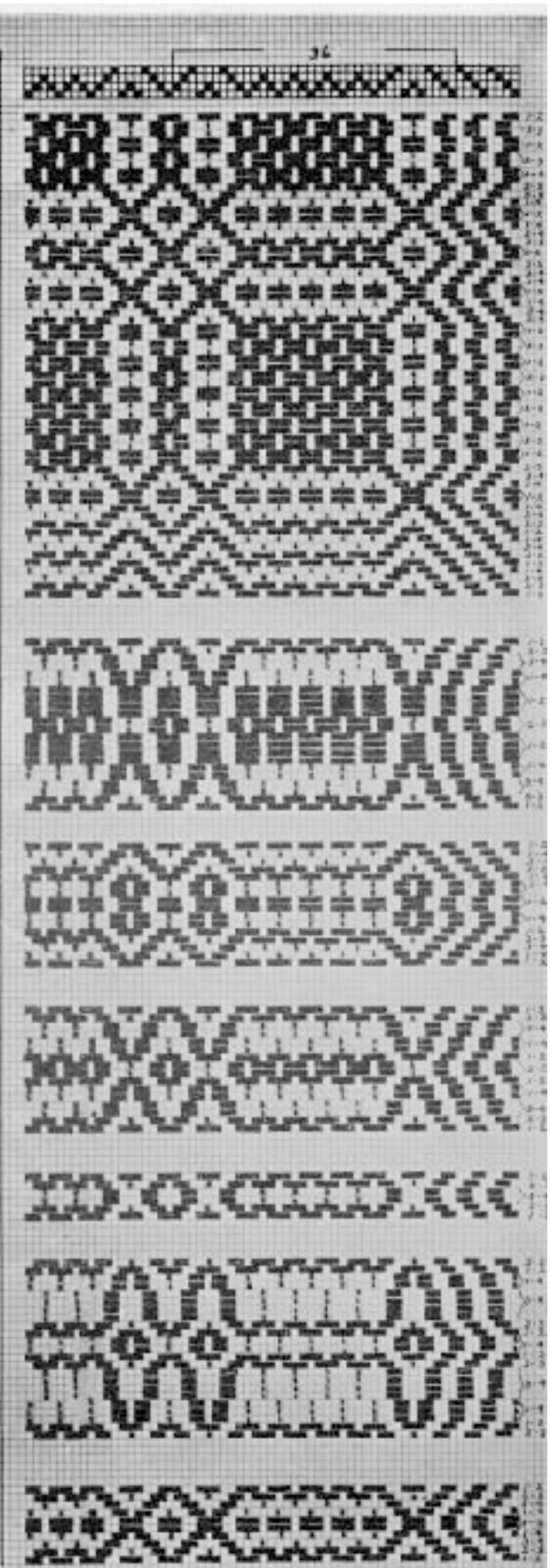
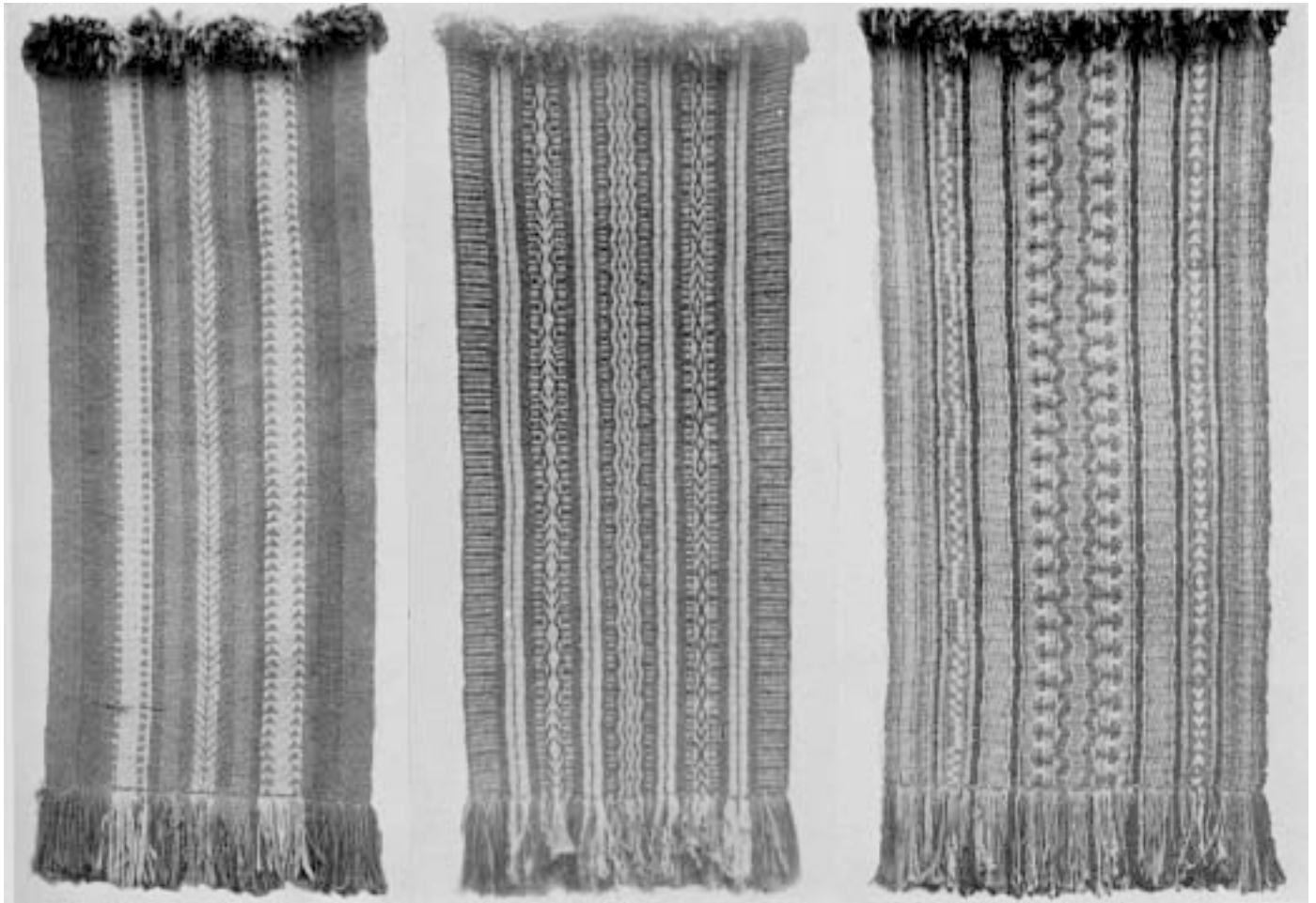


Illustration No. 10
Miniature after Susan Ross

New Ideas for Tablet Woven Rugs

SPUN AND WOVEN BY HAND

BY BEATRICE A. SHEPHARD



1. Weight — $9\frac{1}{4}$ lbs.
 Length — 1 yd. 33 in., not including fringes.
 Width — $30\frac{1}{2}$ in.
 Colors — Medium and dark blue.
 Natural, brown, black.
 Natural, gray (medium).
 Green.
 First attempt.
 Fringes — Starting end, 5 in., double (loops).
 Other end, 10-in. fringe.
2. Weight — $12\frac{3}{4}$ lbs.
 Length — 2 yds. 5 in., not including fringes.

- Width — 1 yd.
 Colors — Natural, brown, black.
 Royal blue (dark), indigo.
 Green.
 Orange
 and Tea dye.
 Has an Egyptian look about it.
 Fringes — Starting end, 5 in., double (loops).
 Other end, 10 in.
3. Weight — $12\frac{3}{4}$ lbs.
 Length — 2 yds., not including fringes.
 Width — 1 yd. 2 in.
 Colors — Natural, black, brown.

- Colors — Natural, fawn.
 “ gray (dark).
 “ gray (looks white).
 Medium indigo blue.
 Light green.
 Greenish yellow } Very little
 Rose pink } of these
 Mauve } colors.
 Ginger brown }
- The whole effect is good.
 Centre pattern mostly blue.
 Fringes — Starting end, 5 in., double (loops).
 Other end, 10-in. fringe.

Towels

BY ELEANOR ROPES

TOWELS are pleasant, restful things to weave between exciting interludes of gayer things if you are weaving-minded — and many people are these days. Whether they be big, little or medium, of fine or coarse threads, with gay or subdued borders, with one or many colors as one's mood may be or fancy dictates, handwoven towels of fine workmanship and good coloring always are a coveted possession to the discriminating.

If one weaves for profit as well as pleasure, there seems always a market for good towels, so many buy them for a gift to the person "who has everything," feeling that a bit of handwoven linen can hold up its head anywhere and in any company. What could be a more fitting gift to one's weekend hostess than a pair of gay guest towels or a half-dozen little finger tips done in dashing colors? Perhaps for use, more likely to hang on the rack to impress company or to lay away in tissue paper as an heirloom for one's own.

There is something exciting and stimulating about the smell and feel of linen, a pure, wholesome, clean feel and smell that makes one think of green fields with wind and rain and sun, blue flowers of the flax and the dews of heaven.

So, when the loom stands ready, warped and threaded, the shuttles filled waiting to begin, there is much more before one's eyes than the mere machine, its wooden shuttles, and one weaves many things besides the thread.

The first group of towels illustrated is woven from the threading of the Pine Cone, Draft B, Fig. I, by Mr. Heartz in the July-August *HANDICRAFTER*, 1930.

The beam was warped with a medium fine linen set 30 ends to the inch, 19 inches wide, the weft being a softer linen in white.

Illustration I: The towel at the bottom was worked out in Italian cottons, red and purple in the same intensity of tone, making a very colorful, peasantry sort of border. The hem is 2 inches deep and the towel 36 inches long, finished, 2 extra inches having been allowed for shrinkage.

The towel at the top is a rather gorgeous affair, woven also of Italian threads, in red, purple and blue. The small borders at the top and bottom are purple and red, the rose-shaped figure between being done in red and blue. The towel is 36 inches long and has a 2-inch hem.

Illustration II shows three more towels woven from the

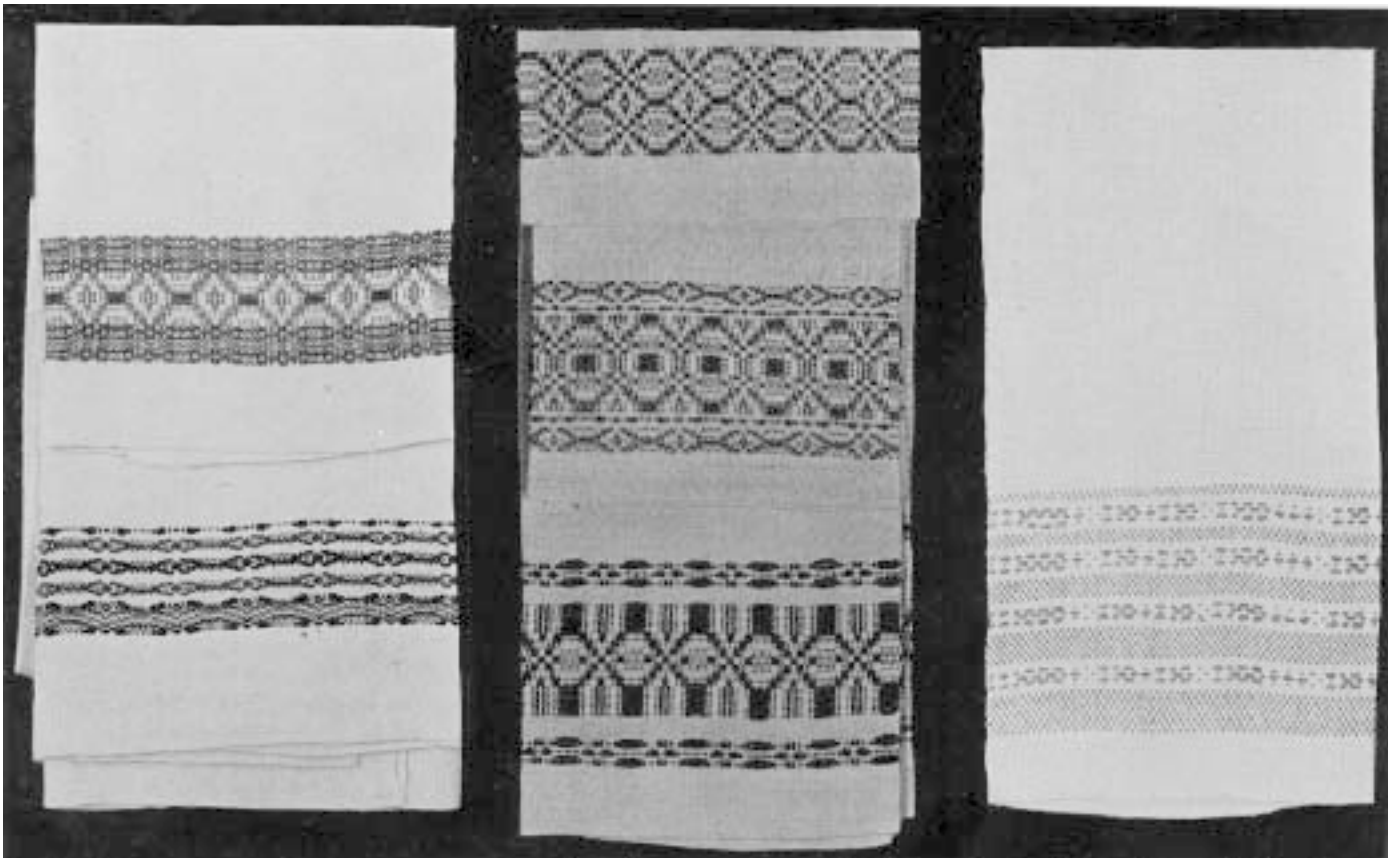


Illustration No. 1

(left) Red and blue Italian Cottons in Pine Cone patterns; (center) Two top pieces in blue cotton perle, bottom piece in blue linen floss in Pine Cone pattern; (right) Blue linen floss

same Pine Cone draft, but with more elaborate treadling. The upper one, which has a border a little over 2 inches wide, is woven in a soft shade of delft blue, using the same thread of which the towel is woven for the tabby. This pattern seems particularly fitted for blues, so I wove the border of the next towel in blue but of a different shade. Between the small borders, top and bottom, is woven one thread of burnt orange; through the center of the large figure are four threads of burnt orange. This makes a rather striking border, the burnt orange livening up the blue, which is rather dull.

The border of the lower — last — towel of this group is woven of heavy Gobelin Art thread in a bright blue and is very handsome, the border being much coarser than the body of the towel proper, which makes the star-like figures quite bold and distinctive.

The towels in the following groups are woven in a heavy coarse linen corresponding to Barbour's No. 18 Art needlework thread. The pattern is Mrs. Atwater's "Drifting Shadows" published in a recent Bulletin, also in the Weaving Supplement of THE HANDICRAFTER.

This pattern has unlimited possibilities for borders as well as in other articles, and is equally adapted to fine or coarse threads. The setting is 15 threads to the inch, 19 inches wide, with warp and woof the same.

The border of the first piece is a beautiful contrast to the oyster white of the towel it adorns, being in color a brick

red of heavy linen thread, with tabby of finer linen. No heddling is given, as the illustrations are plain.

The second towel is woven of the same heavy thread in a soft yellow. The border is put in with 6-strand cotton in a delicate salmon pink, the whole 6-strand being used, the color blending graciously with the yellows of the towel body.

The hems of both these towels are 2 inches and the towels are 36 inches, finished, 2 inches having been allowed for shrinkage.

The third towel of this group also is woven of yellow linen, the border being a golden brown floss, giving a very pleasing effect. Another border was worked out using robin's egg blue with a touch of brown, which was good.

The first towel of the second group, in coarse linen, is oyster white with a wide hem of 3 inches. The border, starting at the top, is worked out in a strong yellow, a bright green and a brown in Perle cotton No. 3. It sounds fantastic but is very effective.

The second towel is woven in two shades of rust, in heavy linen thread which makes an attractive border.

Some object to fringe, nevertheless it makes a lovely, old-timey finish, and rests one from a multiplicity of hems of various widths and, if cared for properly, lasts as long as a hem. The fringe on the towel shown is hand-knotted and the border is woven with a heavy linen floss, in a strong blue. The other towel is woven with a blue floss in graduated

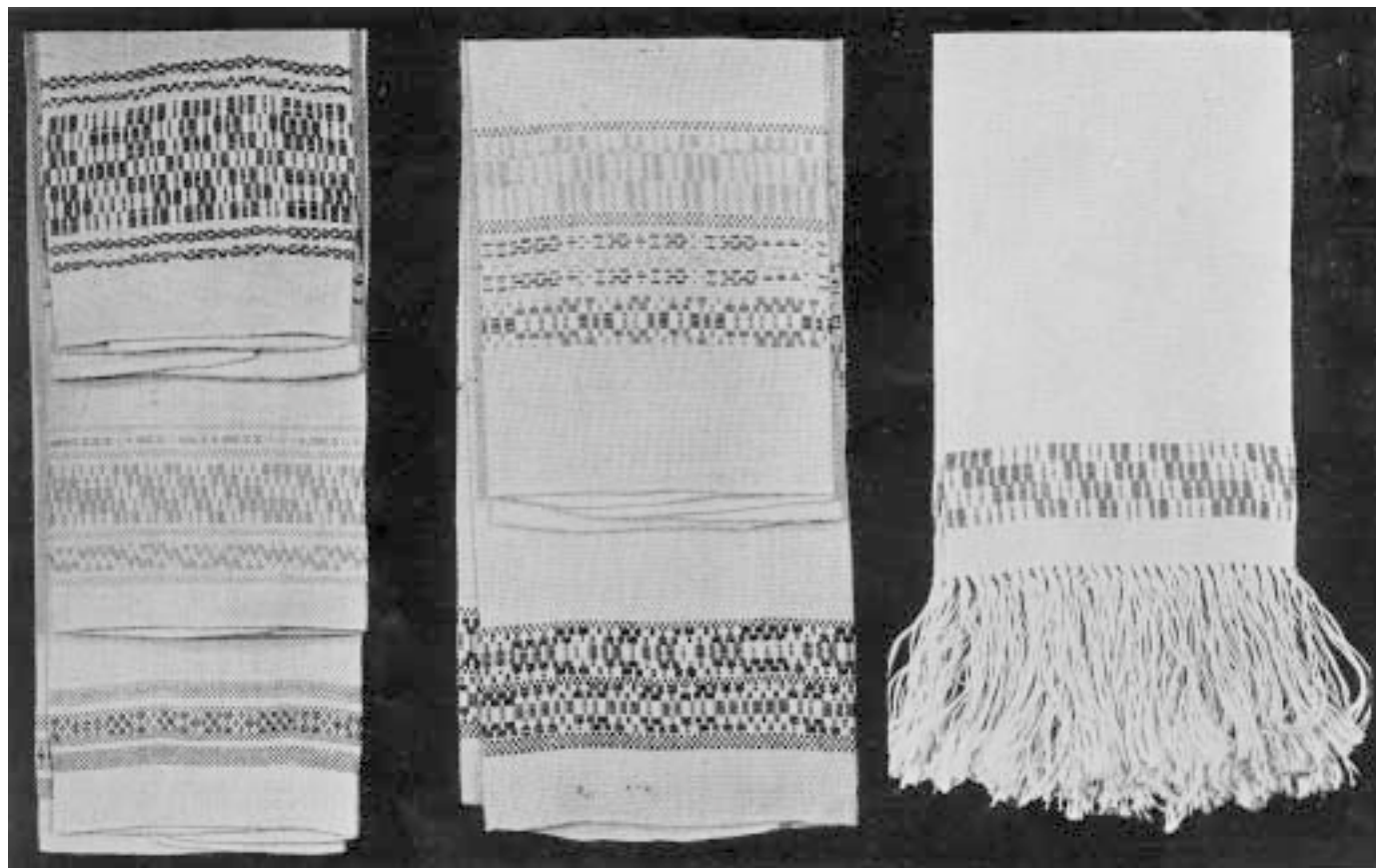


Illustration No. 2

(left) Top in brick red, center in henna, bottom in yellow, brown; (center) Top in yellow, green and brown, bottom in 2 shades rust; (right) Blue linen floss

stripes with a pattern in the same floss between, using the coarse, white linen thread as a tabby.

These striped towels are good worked up in almost any color combination and have the added merit of being very quickly done, if time happens to be a consideration.

There are many ways of making attractive towels, variety being the spice of life. Do not model them all after the same general pattern. Sometime try weaving guest towels with colored hems — say an old rose — and every 3 inches weave in a tiny pattern of 3 or 5 threads the same color as the hem. They are quaint and different, and very attractive. Hemstitch hems once in a while, or roll them.

Try weaving finger tips by the half dozen, all in different shades, leave a 1-inch fringe and hemstitch it; they are dainty. Unbleached linen makes marvelously attractive towels, especially if the borders are done in peasant colors, reds, blues and purples in many shades. With washing they take on a silvery sheen most pleasing to the eye and a feel alluring to the touch.

I call to mind two ancient Turkish towels found in the rag box at a church rummage sale. Realizing that they were handmade, but not then recognizing them for what they were, I took them home. Months after I ran across a description, with illustrations, in a magazine article, one of which might have been my own towel so very like was it — Old Turkish Towels they were called. They lie before me now.

The silvery gray is 62 inches long, with a tiny, rolled hem whipped over and over. Above this is a half inch of weaving, an inch of open space and another half inch of weaving, made up of 6 threads, unbleached, 4 threads of much heavier white. Then is woven 8½ inches of gray upon which three large fruit-like figures with leaves are embroidered by hand. The body of the towel is woven in stripes, gray, 1 inch wide alternating with a stripe 1¾ inches wide made up of 4 coarse, white threads, 6 gray, 2 white, 6 gray, 2 white, 6 gray, 4 white. This gives a very uniform and beautiful piece of weaving. I intend to make one as nearly like it as I can.

The other towel is of a much finer, harder twisted linen,

old ivory now, whatever it was originally. This, also, is embroidered but with pots of curious flowers. The ends are finished with a 2-inch fringe, 6 threads being twisted together in a hard, little cord. The body of the towel is woven in stripes of ½ inch, 3 heavy threads of the same color being used to divide them. The whole is so old, so mellow with age — like a precious jewel. I often wonder how they came to this far-away place, and who had so little appreciation as to throw them away, but always am glad that they fell into my hands, to cherish.

The pattern for Mrs. Atwater's "Drifting Shadows" may be treadled as drawn in.

Treadling for the first towel at top, Group IV:

1 and 2, once; 2 and 3 once; 1 and 2 once

Weave 3 plain tabby threads in white, repeat small border; repeat tabby.

The large border, weave with tabby:

1 and 2, 5 times	1 and 4, 5 times
2 and 3, 5 "	3 and 4, 5 "
3 and 4, 5 "	2 and 3, 5 "

Repeat plain tabby and small border.

The large towels take approximately 7½ ounces each of coarse linen thread.

The following is a copy of Mr. Heartz's draft of the "Pine Cone":

A to B is one repeat of the border, B to C, one repeat of the pattern. Repeat B to C several times for the central motif. Draw D to A in the reverse order for the opposite border.

Treadling for the towel at the bottom of Group II follows:

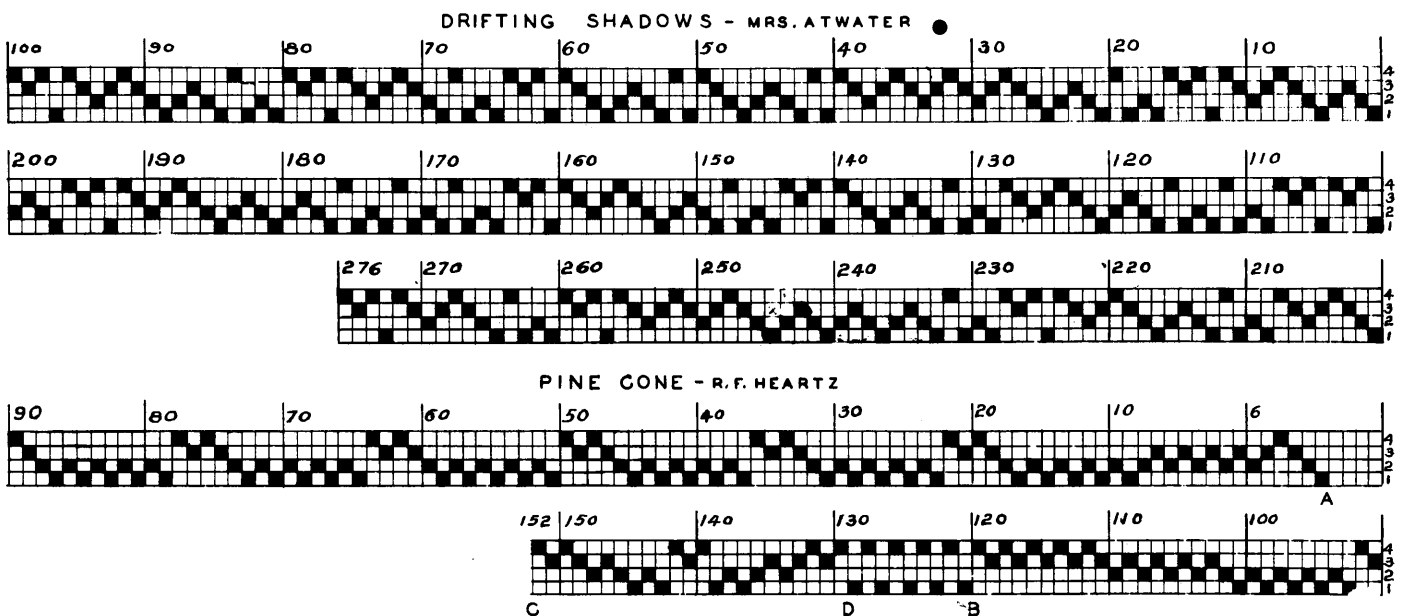
1 and 4, twice

3 and 4, "

1 and 4, " with tabby between. Weave 7 threads of tabby, then weave large border with tabby between pattern shots as follows:

1 and 4, 10 times	1 and 2, twice
3 and 4, twice	2 and 3, "
2 and 3, "	3 and 4, 10 times

Repeat 7 threads plain weaving and the small border.



Simplifying the Tie-up

BY MARJORIE CRANMER

ABOUT six months ago I decided to change my loom from a four-harness counterbalanced loom to an eight-harness jack-type loom. After studying the diagrams given in the Shuttlecraft Guild Bulletins of December 1932 and December 1934, I had a carpenter rebuild the loom for me. It seemed to me, however, that the rebuilt loom should have an easier method of tie-up, so while the carpenter was changing the framework of the loom, my father and I worked out a method of tying up the lamms and treadles which dispensed with a wrench and plyers to loosen nuts and open eye-bolts. This method could be used on any treadle loom. Any man at all handy with tools could do the work, or a carpenter could be called upon to do it. Once the loom is equipped, the most complicated tie-up can be made in a few minutes.

The rebuilt loom had only one set of lamms, the raising lamms, and ten treadles, so we bored ten holes in each of the eight lamms. Each hole was directly in line with a treadle; $1\frac{3}{4}$ " 8-32 eye-bolts were cut off to $1\frac{1}{4}$ ", the thickness of the lamms, and fitted in these holes with a nut to hold each eye-bolt in place. Then we bored four holes in each treadle. Two holes would be sufficient for a four-harness loom. Each hole was centered between two lamms; in other words, the first hole was bored so that it was in line with the space between the first and second lamms, the second hole in line with the third and fourth lamms, etc. In these holes which were bored in the treadles, we put $\frac{1}{4}$ " x $4\frac{1}{2}$ " carriage bolts. We cut the heads off these bolts and bent them to form a hook. The equipment described so far is permanent, and a nut once tightened never has to be loosened.

Our next step was to make what we shall term a locking device to put on the top side of each treadle. A piece of soft steel $\frac{1}{16}$ " x $\frac{7}{8}$ " x $8\frac{3}{4}$ " long was used, but the width would depend upon the treadles which, in this case, were $1\frac{1}{4}$ " wide. A slot was cut in each end of this piece of steel. The slot was cut $\frac{3}{8}$ " from the edge, $\frac{1}{8}$ " wide and $1\frac{1}{8}$ " long. Notches were cut $\frac{1}{2}$ " from one edge. The first notch was $1\frac{3}{8}$ " from the end and $1\frac{1}{8}$ " long. The second notch was $\frac{1}{2}$ " from the first. There were four of these notches, as shown in the photograph. The locking device was placed on top of the treadle so that each notch was under a bolt. With the locking device held in position, we marked on the treadle the location of two holes to be bored in the treadle. One hole was at the inner end of one slot and the other hole was at the outer end of the other slot. The photograph will show the location of these holes. A machine screw was put in one hole and a thumb nut put on. In the other hole we put a round head wood screw just tight enough to allow the locking device to move. This means that by loosening the thumb screw the locking device can be moved the length of the slot. Moved in one direction, the solid part of the locking device closes the opening under the bolt, and moved in the opposite

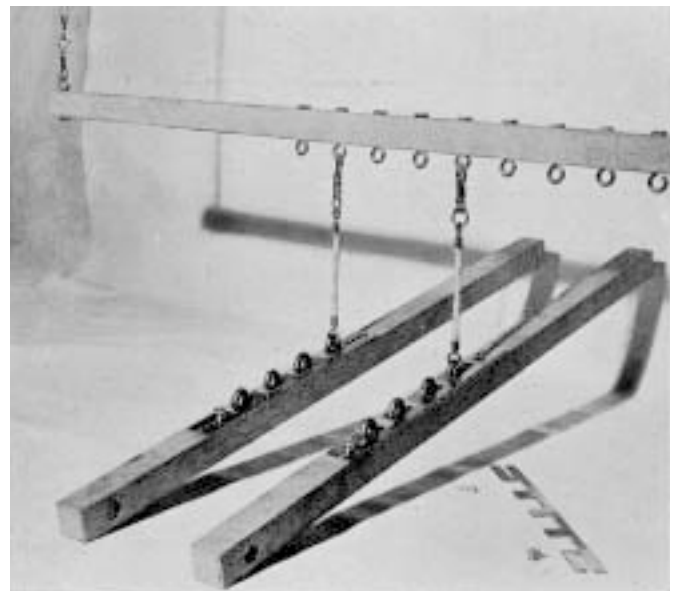
direction the notches are under the carriage bolt and the locking device is open or in a position to allow a tie to be inserted.

We were now ready to make the ties. These were made up of what is known as a swivel-eye nickel-plated baby snap 337 $\frac{3}{8}$ attached to a piece of No. 6 Samson cord. The Samson cord was fitted with ferrules at each end and a No. 111 screw eye was fastened into each ferrule. We opened one screw eye, inserted the swivel end of the baby snap and closed the screw eye. We made thirty-two of these connections to cover practically every tie-up possible with eight harnesses and ten treadles. Of course, for a four-harness overshot pattern only twelve would be used, but with a special eight-harness summer and winter tie-up or the Bronson weave, for instance, more would be needed.

To connect the ties, we opened the snaps with the thumb and snapped them on the eye-bolts on the under side of the lamms, the lamms chosen depending on the tie-up necessary for the pattern to be woven. The locking device on the treadle directly beneath was opened and the screw eye on the tie inserted and the locking device closed. We made sure that the tie was connected in a straight line with the lamm. The bolt on the treadle will accommodate two ties, if necessary.

In buying snaps, make sure that the snaps fit the eye-bolt on the lamms. If the snap fits too tightly, it can be snapped on, but it is hard to release. We found the 337 $\frac{3}{8}$ size was the right size for the $1\frac{3}{4}$ " 8-32 eye-bolt we used on the lamms, but there was not enough leeway if a smaller baby snap was used, because the tongue of the snap would be in the way when we tried to open the snap. It is important, therefore, to have the baby snap large enough.

Precision in boring holes and in cutting the lengths of Samson cord is also essential.





"A Renaissance Procession" designed and woven by Grace L. Brumbaugh under the supervision of Lillian Glaser

A Wall Hanging in a New Technique

BY GRACE L. BRUMBAUGH

HANDWOVEN wall hangings of a pictorial character are ordinarily spoken of as tapestries and one automatically thinks of them as being woven in the tapestry technique. By using a four-harness instead of a two-harness threading for the warp, unique possibilities present themselves to the weaver. While it is obviously true that none but the tapestry

technique can give so much freedom to the designer and weaver, nevertheless the limitations of a four-harness threading have a decided charm and character of their own. It is necessary, however, to choose simple drafts with short overshots such as the twill and rosepath (rosengang).

The accompanying illustration shows an over-mantel decoration 36 inches wide by 72 inches long which I designed and wove under the direction of the late Lillian Glaser of the Saint Louis School of Fine Arts. Entitled "A Renaissance Procession," the design for it was suggested by "Il Palio," an elaborate procession and horse race which is held in Siena, Italy, twice a year. The participants in this five-hundred-year-old custom all wear gorgeous Renaissance costumes of fine fabrics and brilliant colors. The rider on horseback will be readily recognized as a woven adaptation of one of the kings in "The Journey of the Magi" by Benozzo Gozzoli in the Medici Palace. In the four corners are represented four Italian buildings which especially impressed me. They are, from left to right, above: the Gonzaga Palace at Mantua and Saint Mark's in Venice; below: the Palazzo Pubblico in Siena and the Duomo of Florence. Heraldic emblems fill up the spaces between.

The technique was Miss Glaser's original adaptation on one extensively used by the Russians for geometric patterns in linen and, so far as I know, there is no other piece in existence in which this particular technique has been used for a

(Continued on page 19)

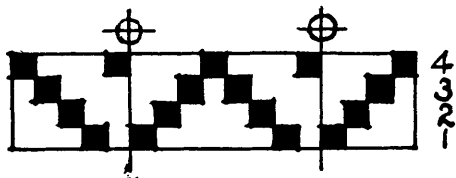


Diagram No. 1

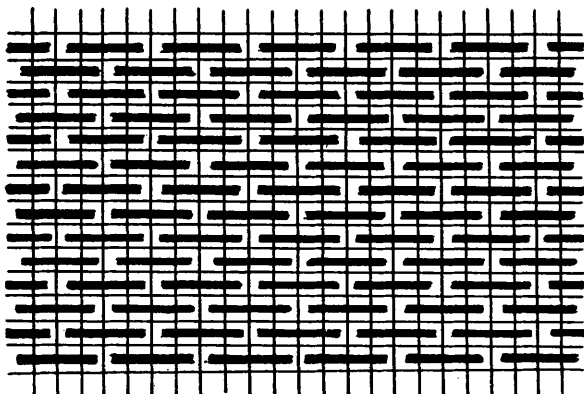


Diagram No. 2

Questions and Answers

ADDRESS YOUR QUESTIONS TO MRS. MARY M. ATWATER, BASIN, MONTANA

Question No. 1. How can I calculate the quantities of material required for a given piece of weaving?

Answer: To make this calculation it is necessary to know the yardage per pound of the yarn you intend to use. These yardages are indicated by the "count" of the yarn. Linen yarns are numbered differently from cotton and wool yarns, and the system in use in this country is the ancient English system which has little to recommend it except custom.

The base for calculating linen yarns is 300 — the number of yards in a "cut." A linen that runs, say, 20 cuts to the pound is called a No. 20 yarn and runs 20 times 300 yards — or 6,000 yards — to the pound. A 40/2 linen has the same yardage, as it is composed of 2 threads of No. 40 yarn. A 40/3 linen is composed of 3 ends of No. 40 yarn and runs 4,000 yards to the pound — 300 multiplied by 40 and divided by 3.

The counts for wool and cotton are based on 840, the number of yards in a hank. A 20/2 cotton would, therefore, run $840 \times 20 \div 2$, or 8,400 yards to the pound. A 24/3 yarn $840 \times 24 \div 3$, or 6,720 yards to the pound. Wool yarns follow the same system as cotton.

In the case of yarns listed by a trade-name instead of a count it is impossible to know the yardage unless it is stated on the price-list. If not stated the count can be determined by a special instrument made for the purpose, but this is as a rule not available to hand-weavers. An approximate yardage can be determined by weighing a skein and counting the yards in the skein.

The yardage to the pound of the warp-material being known, to calculate the quantity of material required for a warp: calculate the total yardage in the warp, which can be done by multiplying the width of the warp (in inches) by the number of warp-ends to the inch, and multiplying the product by the length of the desired warp (in yards). For instance, a warp 20 inches wide, at 30 ends to the inch and 10 yards long would have a total yardage of $20 \times 30 \times 10$ or 6,000. Divide this result by the yardage to the pound of the yarn to be used and the result is the weight, in pounds, required for the warp.

It is a simple matter to calculate the warp quite exactly, and if the weft is to be of the same material as the warp, woven with the same number of shots to the inch as there are warp-ends in the setting, of course the quantity of weft required will be the same as the quantity of warp. When, however, it is a question of a piece of pattern weaving, the thing is more difficult, for the quantity of weft depends on the weight of the yarns used and also on the beat. A hard-beaten fabric, of course, takes more yarn than a loosely woven one. The only way to calculate exactly for such a fabric is from a sample woven in the materials and with the beat you intend to use. From this sample count the number of pattern shots and tabby shots to the inch and calculate the total yardage of each material. To do this multiply the length of the weaving (in inches) by the number of shots to the inch, and multiply this result by the width (in yards).

It is inadvisable to order from a very close calculation, and a generous allowance should be made for wastage. It is far less costly to have a little yarn left over than to run a little short, as this may mean a tedious wait and also involves the danger of being unable to match color shades exactly.

Question No. 2. How should warp-dressing be applied?

Answer: If the yarn is in the skein, soak the skeins in the dressing

and permit them to dry before making the warp. Or, if a chained warp is made, soak the chain before beaming. If the warp is on spools and sectional warping is done, the warp-dressing can be applied to the warp from time to time during the weaving, simply by dabbing it on with a sponge or cloth.

Question No. 3. Where can gauge-bars and knives for cutting the pile of knotted rugs be obtained?

Answer: This equipment is supplied by Mr. F. W. Hoose, 9190 Lane Street, Detroit, Michigan.

A WALL HANGING IN A NEW TECHNIQUE

(Continued from page 18)

pictorial design. It differs from a true tapestry in that the warp was threaded according to a four-harness draft — rosepath (Diagram No. 1); and also in that a binder was used throughout. In addition to the usual 1-3, 2-4 tie-up of the treadles for the tabby, only two other treadles were used — harnesses 1, 3, and 4 were tied on one treadle and 1, 2, and 3 were tied on another. The treadling is a simple alternation of these two treadles with a binder between, and the resulting texture is illustrated in Diagram No. 2. The contrast between the figures woven in bright wools on the two pattern treadles silhouetted against the golden mercerized tabby almost suggests a relief. Variety was achieved in the background by laying in a rich orange-tan Shetland yarn along with the binder in stripes, to suggest the alternating layers of contrasting colored stone frequently found in the walls of Italian buildings.

The yarns chosen were: for the gold color warp — Bernat's mercerized Perle cotton No. 10 alternating with No. 20 and threaded 24 ends to the inch; the binder was No. 20 in the same gold color which was selected because of its warm neutral tone which would harmonize well with a wide variety of bright colors; the figures were woven of Bernat's Shetland wool in colors selected for their brilliance and intensity. The bright color scheme was deliberately chosen for several reasons: first, personal preference; second, sunlight and dust will tone the yarns in time; and third, it would afford a better opportunity to learn about the combination of colors, since it is my conviction that bright ones are usually more difficult to combine successfully than dull ones.

A full-size cartoon on detail paper with the design worked out in colored crayon served as a guide for the general effect, and tracings were made from time to time to serve as guides for the weaving. The binder, of course, was put in with the shuttle, but the colored wool yarns were woven in with bobbins and the right side of the finished cloth was on top.

In working out the design a flat effect was striven for, and all suggestion of perspective and depth was deliberately avoided. The chief aim was to achieve a decoration, and there was never any idea to create an illusion which can be done so much more effectively in paint. I tried, however, to give a feeling of movement to the procession.

To make it hang well and also to serve as a protection, it was lined with cotton material.

A Studio Chair

BY VEVA N. CARR

IN MY studio is a chair which I had made just the right height for comfortable weaving at my loom, and for which I made a piece of upholstery which proved, I thought, very satisfactory and in keeping with what I hope to have eventually — entirely hand-made textiles about my place.

For a pattern I used Mary M. Atwater's Draft No. 112 from her "Crackle-Weave Pamphlet," — the same pattern used by W. Clyde Dunbar for some rugs described in Vol. 1, Number 1 of THE WEAVER.

Color to me being far more interesting than patterns, I find myself rather content to let someone else do the experimenting with patterns while I get my thrill from the enormous variety to be found in changing my materials, color combinations, etc.

For my chair I used a peculiar shade of 20/2 cotton warp set at 30 to the inch. It was neither a brown nor a red, but a dull color which might possibly be found somewhere between the two and with a rose cast at that. I thought it was about the most unattractive shade I had ever seen, but since I had it and did not want to put too much expense on a home-made chair, I decided to see what I could do with it.

My pattern weft was Bernat's Shetland wool in brown No. 627; green No. 616; burnt orange No. 14 and henna No. 16. For tabby I used a black rayon.

Thread as follows:

Selvage 1, 2, 3, 4, 1, 2, 3, 4	8 threads
Pattern 13 Repeats of draft	1,196 "
1st Block of draft	25 "
Selvage 3, 2, 1, 4, 3, 2, 1	7 "
	<hr/>
	1,237 "

(X)

Treadle: 2, 12 times, green
" 4, 6 " brown
" 3, 6 " "
" 4, 6 " "
" 2, 2 " green
" 3, 6 " henna
" 4, 6 " "
" 3, 6 " "
" 2, 2 " green
" 4, 6 " brown
" 3, 6 " "
" 4, 6 " "
" 2, 12 " green

(Y)

Treadle: 4, 6 times, burnt orange
" 3, 6 " " "
" 4, 6 " " "
" 2, 2 " green
" 3, 6 " brown
" 4, 6 " "
" 3, 6 " "
" 2, 2 " green
" 4, 6 " burnt orange
" 3, 6 " " "
" 4, 6 " " "

Repeat from beginning

A second piece on the same stringing I made on a fine tussah silk warp set 60 threads to the inch (threaded two threads to the heddle), and again used Bernat's Shetland for my pattern weft with a copper tinsel in this case for my tabby.

The threading was exactly the same, and I treadled the brown No. 527 and henna No. 14 in the "X" group, and Henna No. 16 and No. 13 in the "Y" group. This proved to be a very handsome piece indeed, and has been one of the most admired pieces of weaving I have ever done. (Illustration No. 1.) Green No. 616 was used on Treadle 2.

My tussah silk warp turned out to be a very satisfactory thing for many different articles which I made on the long warp I put on the machine, such as some bags, knee blankets, etc.

A KNEE BLANKET

The blanket shown in Illustration No. 2 was done in a plain tabby weave throughout, save for an occasional stripe in which I used pattern shots of no particular plan, except that they were done on opposites. The colors I used were materials I had on hand and were really very nice, though it does "sound" rather queer in this case, but the unbleached raw silk seemed to pull and blend all the bright shades of the Fabri wools I used for weft into a piece of pleasing if unusual coloring.

The first stripe — a dark red — color No. 566 was made 6 inches wide and all shots were in the plain tabby except where otherwise specified. (This shade will hereafter be designated as "dark red.")

2 shots green No. 612	2 shot green
2 " dark red	4 " dark red
1 shot green & 1 dark red	2 shots brown No. 527
(repeat)	2 " green
6 shot green	2 " dark red
2 " dark red	6 " green

1 shot tan No. 137	10 shots green	½ inch jade	4 shots dark red
1 “ jade No. 820	6 “ jade	2 shots brown } center	4 “ green
2 shots brown	½ inch green	4 “ yellow }	4 “ dark red
6 “ green	(b)	2 “ brown	½ inch green
2 “ red	2 shots brown	Reverse to (c)	1 shot black
2 “ green	2 “ tan	(d) red stripe	4 shots green
2 “ jade	6 “ green	12 shots dark red	1 shot black
2 “ tan	4 “ jade (center)	4 “ tan	10 shots green
2 “ brown	Reverse to (b)	4 “ dark red	4 “ black
½ inch green	8 shots green	4 “ green	10 “ green
2 shots jade	2 “ brown	4 “ dark red	2 “ black
2 “ brown	2 inches dark red	2 inches red No. 564 (center)	10 “ green
8 “ green	(c) jade stripe	Reverse to (d)	2 “ black
2 “ jade	2 shots brown	(e) tan stripe	8 “ green (center)
4 “ green	4 “ jade	2 shots brown	Reverse to (e)
2 “ jade	2 “ brown	2 inches tan	(f) wide yellow stripe
(a)	4 “ yellow	12 shots dark red	8 shots yellow
2 shots brown	2 “ brown	4 “ tan	2 “ tan
2 “ yellow No. 111	2 “ brown		5 “ yellow
4 “ dark red (center)	Reverse to (a)		

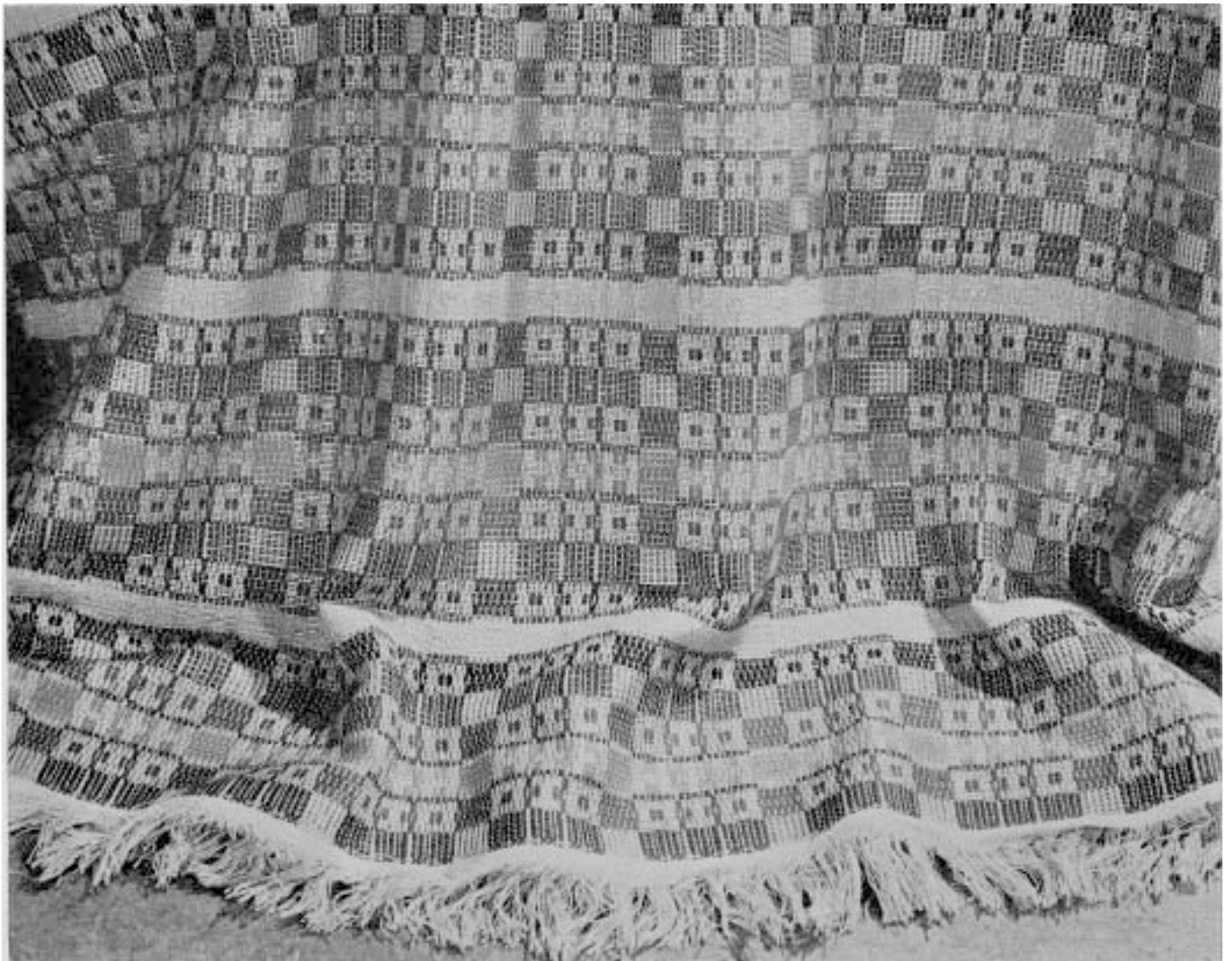


Illustration No. 1

- 1 pattern shot tan } (g)
 4 shots yellow } 4 times
 2 " tan
 3/4 inches yellow
- (g) in jade
- (h) yellow
- (g) dark red (using 6 pattern shots) (center)
- Reverse to beginning of yellow stripe (f)
- (i)
 2 shots black
 4 " tan
 1 shot black
 2 shots jade
 1 shot black
 4 shots tan
 1 shot black
 2 shots jade
 1 shot black
 2 shots yellow (center)
 Reverse to (i)
- (j) wide green stripe
 1 inch green
 (1 shot yellow pattern
 15 shots green)
 Repeat () until you have
 5 pattern shots 1 inch
 green
- (k) heliotrope
 1 pattern shot No. 715
 5 shots green
 2 yellow pattern shots on
 same peddle (tabby
 between)
 1 heliotrope pattern shot
- 2 yellow pattern shots
 (same as above) (center)
- Reverse to (k)
- 4 shots black
 1 shot tan; 1 shot black
 2 shots tan; 2 shots black
 (3 times)
 4 " tan
 4 " black
- (l) red
 1/2 inch dark red
 { 4 shots light red }
 { 2 " dark red } 3 times
 Ending with 1/2 inch of
 dark
- (m) tan and jade stripe
 *1 shot black
 4 shots yellow
 4 " jade
 2 " yellow
 2 " jade
 2 " yellow (center)
 Reverse to *
- 1/2 inch tan
 6 shots yellow
 2 " jade
 2 " yellow
 2 " jade
 2 " yellow
 10 " jade (center) (m)
 Reverse to (m)
- 6 inches of dark red with
 occasional 2 shots of
 tan at irregular intervals.

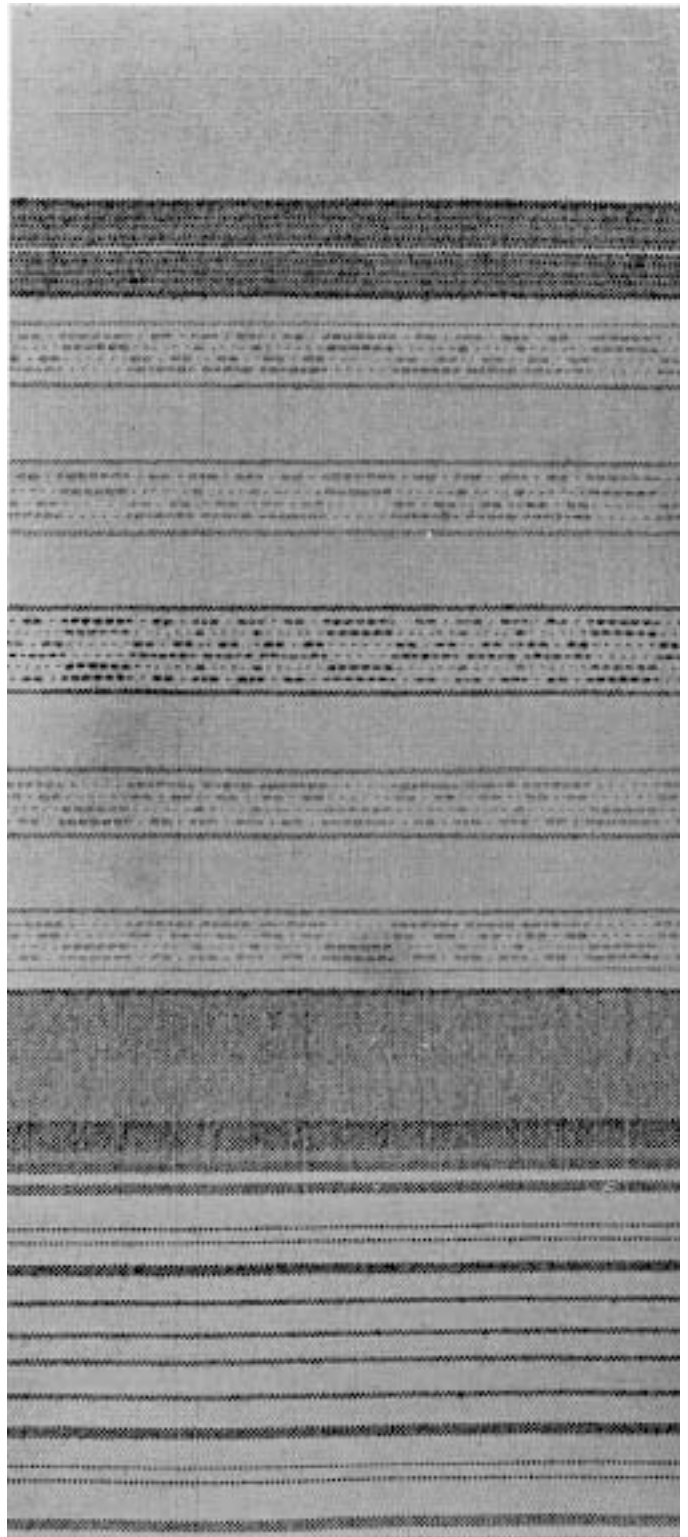
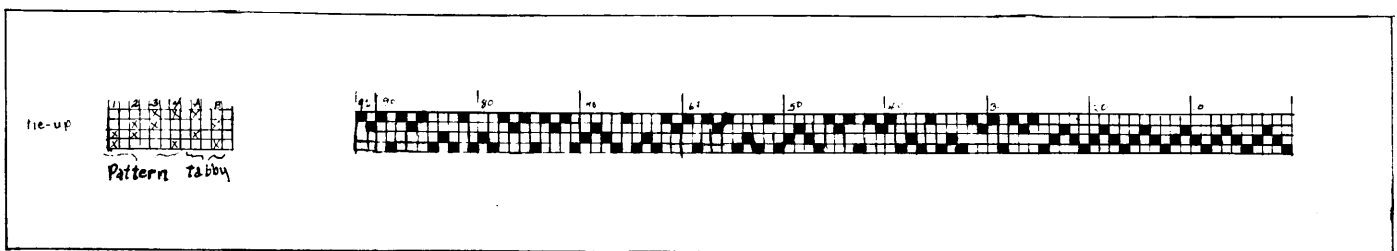


Illustration No. 2
 Showing detail of yellow stripe (f)

Upon removing the blanket from the loom, it was washed in warm soap suds, well rinsed and pressed in the usual manner. A heavy tan grosgrain ribbon about 1 1/4 to 1 1/2 inches wide which was doubled, folded over the edges, the corners mitered and carefully stitched, completed the tailored appearance of the blanket, which measured about 40 x 60 inches when completed.



Mexican Indian Belts as Design Sources

BY NELLIE SARGENT JOHNSON

SIMPLE primitive Mexican belts offer rich sources for designs which may be used in many ways," said Miss Helen Allen, Assistant Professor of Related Arts, University of Wisconsin, Madison, Wisconsin.

"This belt," she continued as she picked up a wide belt three yards long, "is the first belt of my large collection. It may interest you to know where I found it, and how it was made.

"A small village in Mexico, on the side of a mountain, is the setting," she said. "The houses are made of stones set one on top of another without mortar. In a doorway squats a woman, on a rush mat, weaving a belt. Her warp-threads are attached to a nail in the post of the door-frame, and the other end is fastened to a belt around her waist. This is her loom.

"The threads on this loom," continued Miss Allen, "are manipulated by an intricate system of strings and sticks put in the warp. The weaver picks out her patterns surely and swiftly, not from any picture or paper, but from designs she keeps in her head. These designs were taught her by her mother and grandmother, handed down to them for generations with but little variation.

"I asked her if she had a belt she would sell me. She replied that she had none.

"But what about that belt out there on the bush?" asked Miss Allen.

"That was hers, but it was still wet. She could make herself another, and it would dry as well for me as it would on the bush, and so I attained the first belt of my collection," said Miss Allen smiling.

"Examples of these belts are found all over Mexico, but are seldom alike in two places. Patterns, coloring, even weaves and materials differ in different localities, and each region has a specialty of its own found nowhere else."

As she talked, she ran the belt through her hands displaying the many different designs which were worked out on it, here a little figure of a woman, a fountain, some queer birds and flowers, and no two alike all along the center of the belt. Even the side border of blue stopped near the center of one side, and changed entirely in design as it finished the other half of the length. There was no deadly monotony about that belt, it was just alive with the imagination of the simple woman who wove it.

"These long belts," continued Miss Allen as she took up another one from the table on which they were piled, "are wound in layers around the waists of the women, and serve as support, and to hold up their skirts.

"Here is another one which is most unusual with its queer animals and dancing women. One day at market, I saw this on a woman who was wearing it. I pointed to her belt, and asked if she had any for sale. She replied that her belt had come from a town much further south, and nearer the

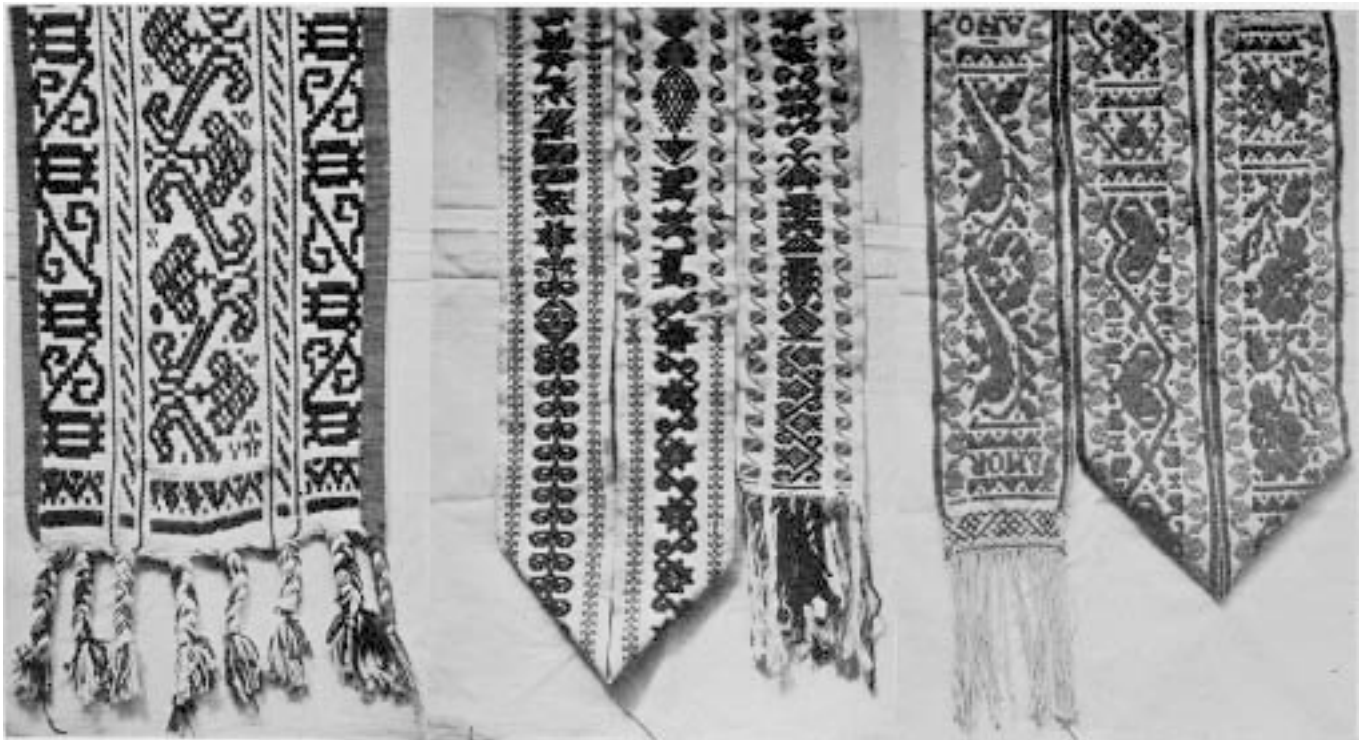
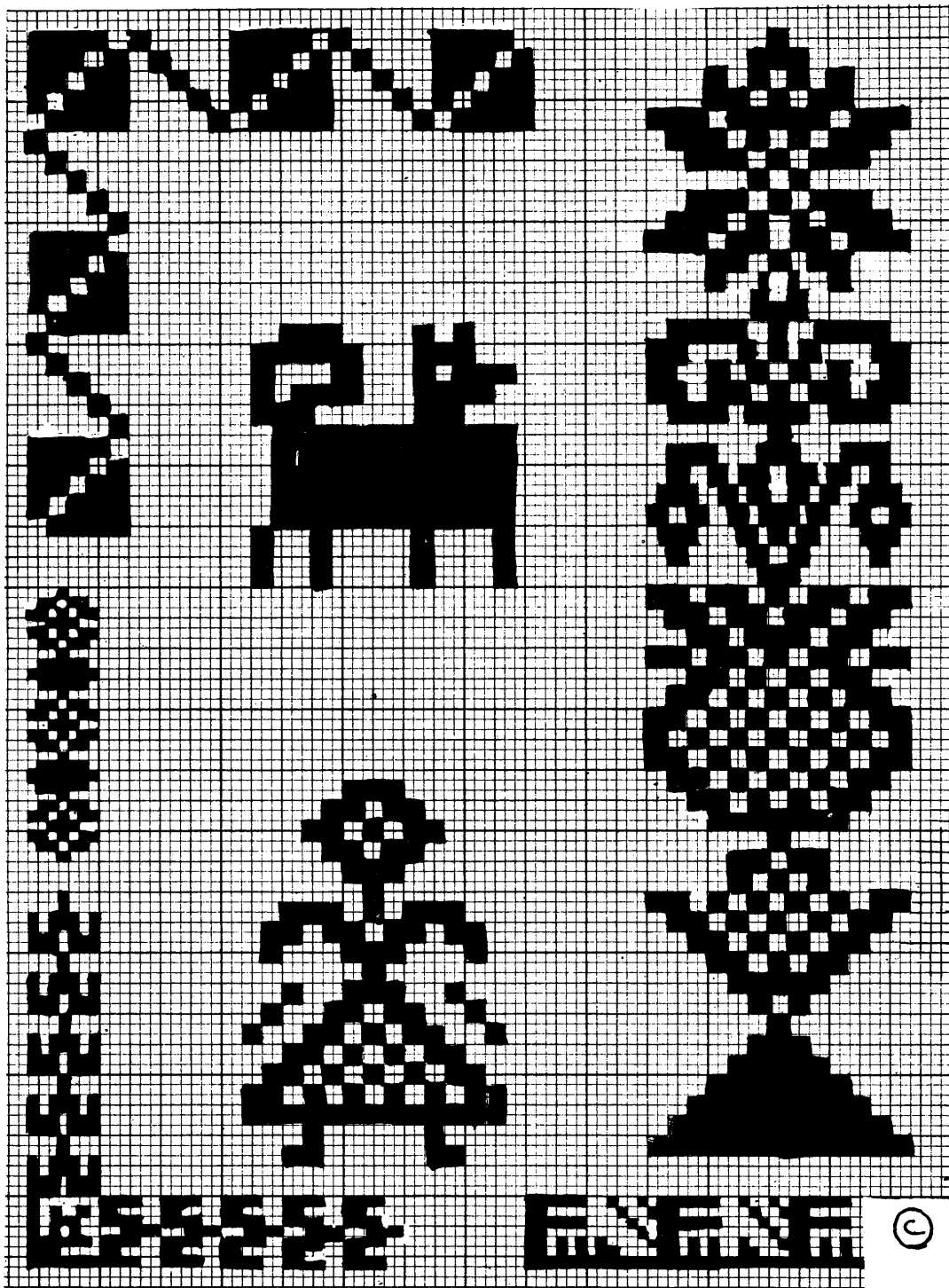


Illustration No. 1. Mexican Indian belts used as Sources of Design



January 1936.

Nellie Sargent Johnson.

Pacific, and that she was the only woman in the village who had one like it. I asked her if I might see it. She laughingly slipped behind a wall, and in some way managed to fasten up her very full skirt, and brought back her belt for me to examine. After some bargaining she sold me her belt, and was soon going toward her home at a dog trot, the money in one hand, and her fast slipping skirt bunched up in the other."

These simple primitive textile designs have many different uses in weaving. They can be used as patterns for embroidery

weaving for luncheon sets, table runners, or towels. Some of the smaller figures such as that of the little woman, or the small animal figure, could easily be adapted to children's bibs. The large design would make a good motif for a chair-back set. It is also possible to use them for the simple drawloom weaving technique, such as was described in a recent number of *THE WEAVER*. In these ways, and many others, these interesting designs, which are an expression of the lives of our Mexican neighbors, can be adapted to our own woven fabrics.

Simple "Cross" Weaving

BY MARY M. ATWATER

ONE of the delightful things about hand-weaving is that it is so "various." There is always something new and untried, that gives one all the thrill of discovery and the fun of experiment. No one person lives long enough to know all the ways of weaving.

Apparently few hand-weavers in this country are familiar with "cross" weaving, which — like so many of the important kinds of weaving — is a whole world in itself.

The following notes make no pretense of being an exhaustive exposition of the subject, but merely give directions for the simplest form of the weave, in a technique that is practical on our looms.

But first to explain what is meant by "cross" weaving. In old times the weave went by the name of "gauze," but in our day an open tabby weave is sometimes called gauze and the cross-weave goes by the technical name of "leno." The plain leno is the weave known as "marquissette," with which we are more or less familiar in commercial fabrics. The characteristic of the weave is that instead of running straight through the web each pair of warp-ends is twisted together. This twist holds the weft very firmly and permits the making of an extremely open fabric that will still have stability and wearing qualities. A tabby fabric in which the warp is set very far apart and the weft very lightly beaten may be soft and attractive when made, but is apt to become very unsightly with even moderate wear, as the threads pull apart in places and pull together in others so that the texture is ruined. The twist in leno weaving prevents this pulling.

The leno weave is excellent for curtains, but this is not its only use. Light-weight dress fabrics, lacy blouses and scarves are particularly charming when done in this weave. It is also an interesting weave for bags when done on a coarse cotton warp such as carpet warp in a heavy, stiff weft such as "art silk," cellophane, or coarse linen or jute. Runners and table pieces in leno, enriched with tapestry figures in the Peruvian manner are handsome and unusual.

Simple marquissette can be woven on an ordinary four-harness loom, though of course a special set-up is required. There is a patented leno heddle on the market, developed for use in commercial weaving on power looms, but that can be used on any hand-loom equipped with standard heddle frames and 12-inch heddles. The manufacturers are the Steel Heddle Manufacturing Company, 2100 West Allegheny Avenue, Philadelphia, Pa. These heddles are, however, quite expensive. They are quoted at \$60 a thousand or, in small quantities, at 15 cents each. Each of these heddles, to be sure, takes care of two warp-ends, but even so the cost is huge unless one plans to do a great deal of weaving in this style. For most hand-weavers it is more practical, and much less expensive, to go back to the methods of the

old-time weavers, before the day of power machinery.

The method I shall describe is the one that in my experiments appears to be the best suited to our looms. It involves no expense except for a little time, is not at all difficult, and does not require any structural change in the loom.

By this method the cross is produced by a set of string "doupes," or half-heddles. The classic method is to use two sets of these doupes — an upper and a lower set — but as the weave is far more interesting if varied with plain weaving — and this requires two harnesses with ordinary heddles — those who are limited to four harnesses must content themselves with a single set of doupes. As this works in a practical manner it seems to me perfectly satisfactory, though a wider shed can be produced by the double method.

The single set of doupes may be either the upper set or the lower set. It makes no particular difference, though of course the tie-up must be made to suit the system chosen. The tie-ups as given on the diagram are for the lower set of doupes.

As a good deal of extra strain is put on the warp in cross-weaving, it is advisable to choose a strong and elastic warp-material — a good cotton, silk or worsted yarn. Linen behaves badly as warp, though of course is entirely satisfactory as weft.

The setting of the warp can be very open indeed. A good rough rule is to use about two thirds the number of threads to the inch that one would ordinarily set. For instance, carpet warp set at 10 to the inch makes a good mesh and, for finer work, 24/3 Egyptian cotton at 20 ends to the inch. For work in wool Fabri yarn set at 15 or 16 ends to the inch would work well.

The first step in making the leno set-up is, of course, the making of the doupes. These can be of carpet warp, though a hard linen cord wears better. They are simple loops of cord of such a length that when attached to the heddle-bar of a harness they will reach a trifle beyond the eye of the heddle. This length can be determined by the "trial and error" method, and one can then make a gauge by setting two dowels or large nails in a block of wood at the correct distance apart so that the doupes can be tied around them. An entirely practical method is to look for a book of just the right size and tie the doupes over this. I like to attach the doupes to the bar with a double hitch as shown on the diagram, but the hitch takes up some space on the bar, and for fine work — with the doupes set close together — it would be better simply to thread the loops on the bar. Of course the length to make the doupe would be different for these two methods. It is important to get the length exactly right and to tie all the doupes accurately.

In the set-up I am about to describe the two front har-

nesses are used for the cross. The front harness, strung with ordinary heddles, is called the "standard." The second harness, bare of heddles, is used for the doupes. The two back harnesses of a four-harness loom carry the weave. On a loom of more than four harnesses the back harnesses may be threaded to a fancy weave, but on four harnesses only plain tabby and leno are possible.

In threading, first thread the warp through the back harnesses, as indicated on the threading draft. When this part of the drawing-in is complete proceed to threading the doupes. This may be done either from the right or the left side of the loom, and the doupes may be attached to the lower heddle bar of harness No. 2 before beginning, or — if put on with the hitch — may be hung on the bar one by one as required.

Raise harness No. 2 slightly, as indicated on the diagram. This permits the loop of the doupe to extend well through the eye of the heddle on the standard and makes threading the doupes easy. Holding the first pair of warp-threads to the left of the first heddle on the standard, attach a doupe to the right of the heddle, on the bottom heddle-bar of harness No. 2, and insert the loop through the eye of the heddle on harness No. 1 as indicated on the diagram. Thread the left-hand thread of the first pair through the loop of the doupe and carry the other thread over the loop. Thread each pair of warp-threads in the same manner.

In sleying, draw each pair of warp-ends through the same dent of the reed, no matter what the setting or the dentage

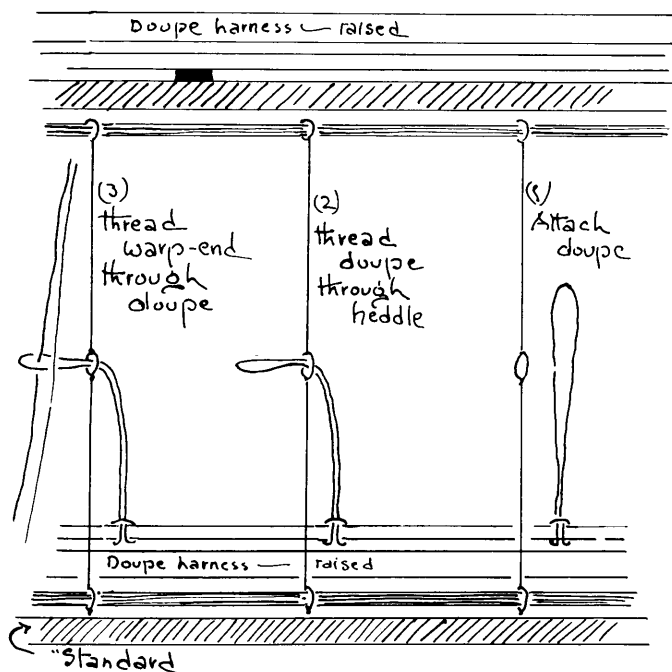
of the reed. If sleyed through different dents the twist will not pass the reed. A coarse reed is best, but the ordinary 15-dent reed, that is standard equipment with us, can be used for various settings. For instance, to sley carpet-warp set at 10 ends to the inch, sley the first pair of warp-threads through the first dent, skip two dents, and sley the second pair through the fourth dent, skip two dents, and so on. For a setting of 15 to the inch, skip one dent between pairs. A coarser reed, however, is better if available.

On the four-harness set-up described, one can weave only tabby and marquisette, but by combining these weaves in various proportions, and by the use of several colors, very amusing effects can be produced.

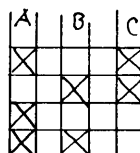
Illustration No. 1 shows an ancient native "huipel" from lower Vera Paz, woven in leno and tabby in alternating bands. The tabby bands are ornamented with figures in coarse material in embroidery weaving. The piece is in dark blue cotton with the figures in red. As this piece is interesting and might well be the inspiration for a summer blouse, I am giving on Diagram II the plan and arrangement of the piece and also a detail of the figures used for ornament. The piece is made of three strips sewed together, as indicated. On a large loom it might, of course, be woven full width, though in that case the stripes would carry all the way and would not be different for the body and sleeve portion of the garment. The thing could be made in fine worsted yarn instead of in cotton if preferred.

In a previous article in THE WEAVER, on the subject of

Diagram I. Method of attaching and threading "doupes."



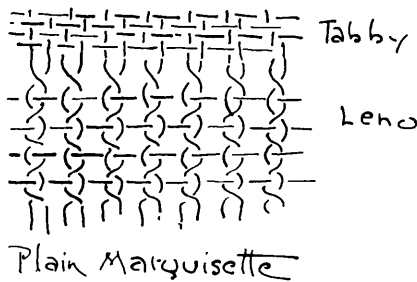
Tie-Up



Threading



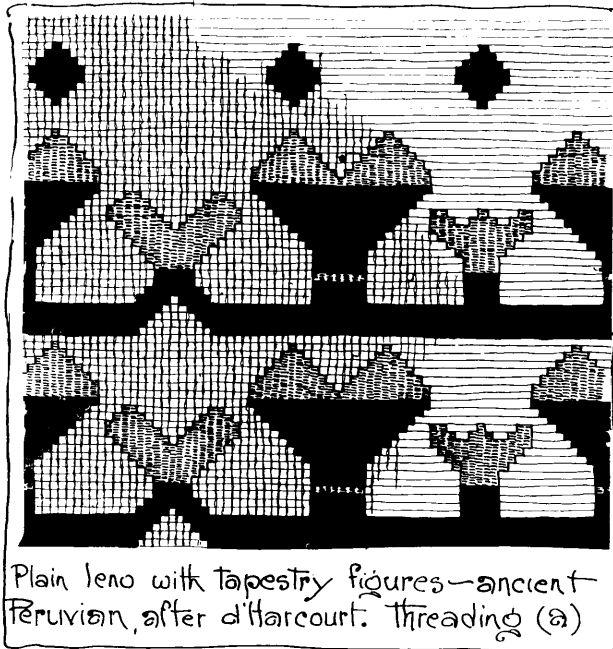
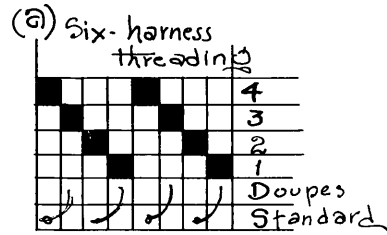
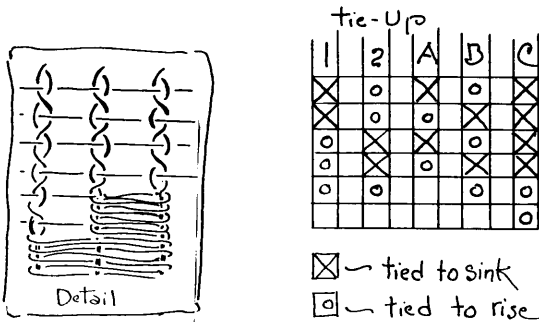
Weave tabby on A & B
" Leno on B & C



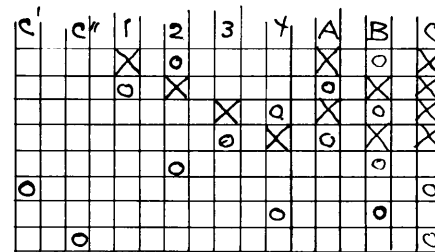
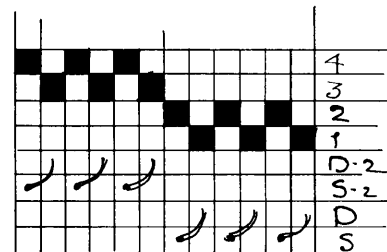
Four-Harness Set-Up

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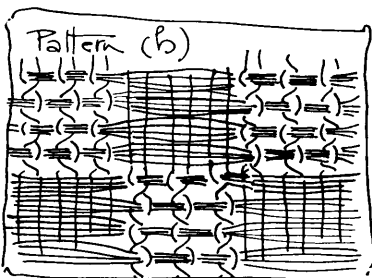
Diagram II. Six-harness and Eight-harness Set-ups



(b) Eight Harness



(A complete tie-up could be made to 11 treadles)



M.M.A. 1936

Weave (b) as follows:

Two treadles used for each shed
 One shot on each shed

{ treadles c'2-3, c'24, c'23, c'24 } Repeat for first block
 " 223, 224, 223, 224 }
 " c"21, c"22, c"21, c"22 } Repeat for second block
 " 421, 422, 421, 422 }

For plain tabby, treadles A and B

" " leno, " B " C

(the blocks may be threaded and woven as large as desired)

ancient Peruvian textiles, mention was made of the interesting Peruvian pieces in plain leno with tapestry figures introduced. These figures are made over pairs of warp-ends, as indicated in the detail on Diagram III. For this type of weaving a six-harness set-up is required. This is given on Diagram III.

If this set-up is made on an eight-harness loom, use the

two front harnesses for standard and doupes and the four back harnesses for the weave, allowing the two unused harnesses to stand between the doupes and the weave. A space is an advantage as it permits the twist to run further back and gives one a better shed. The pattern on Diagram III is ancient Peruvian. It is a simple but effective figure and, done in coarse materials, would make a handsome cur-

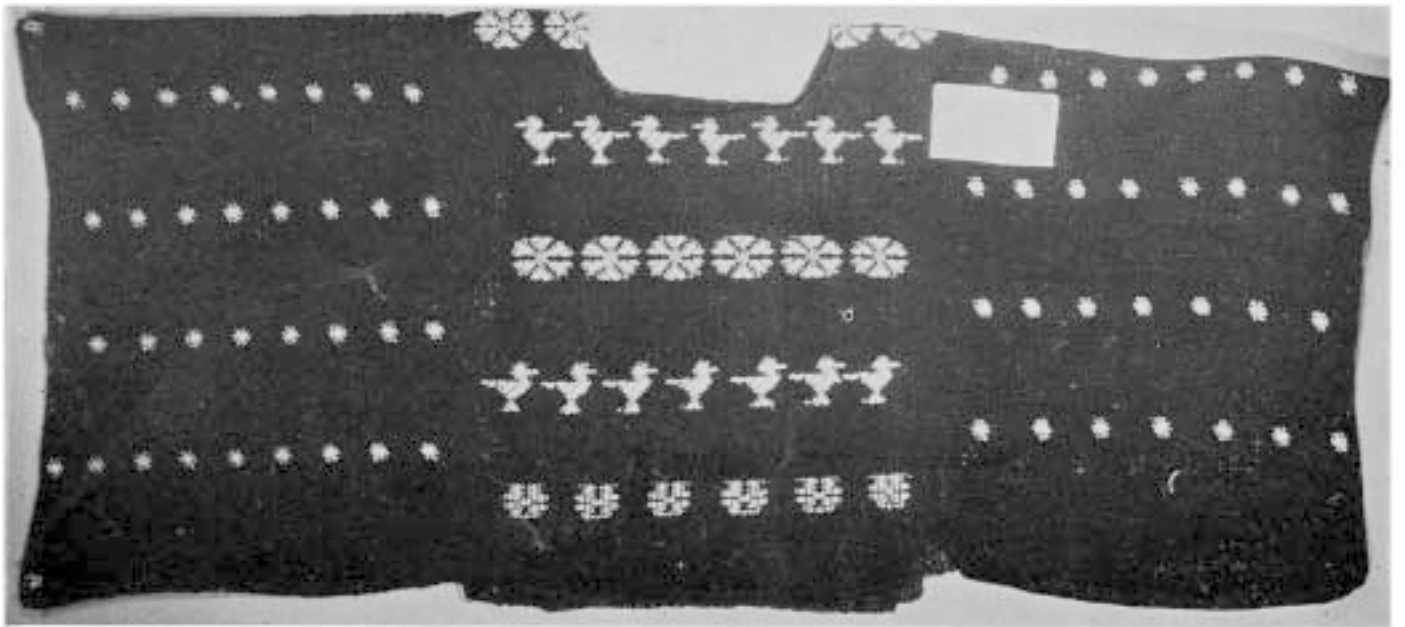


Illustration No. 1 (a)

tain. A more elaborate pattern was given in the previous article in *THE WEAVER*.

The six-harness threading is useful, even if not to be used for tapestry patterns. The two treadles that make a shed between alternate pairs of warp-threads can be used for

many interesting little figures, when done in two colors. The curtain in Illustration No. 2 was woven on this threading. It was done on carpet warp set at 10 threads to the inch, and the weft used was celophane in a variety of bright colors. The effect is extremely lively and attractive. Of course the

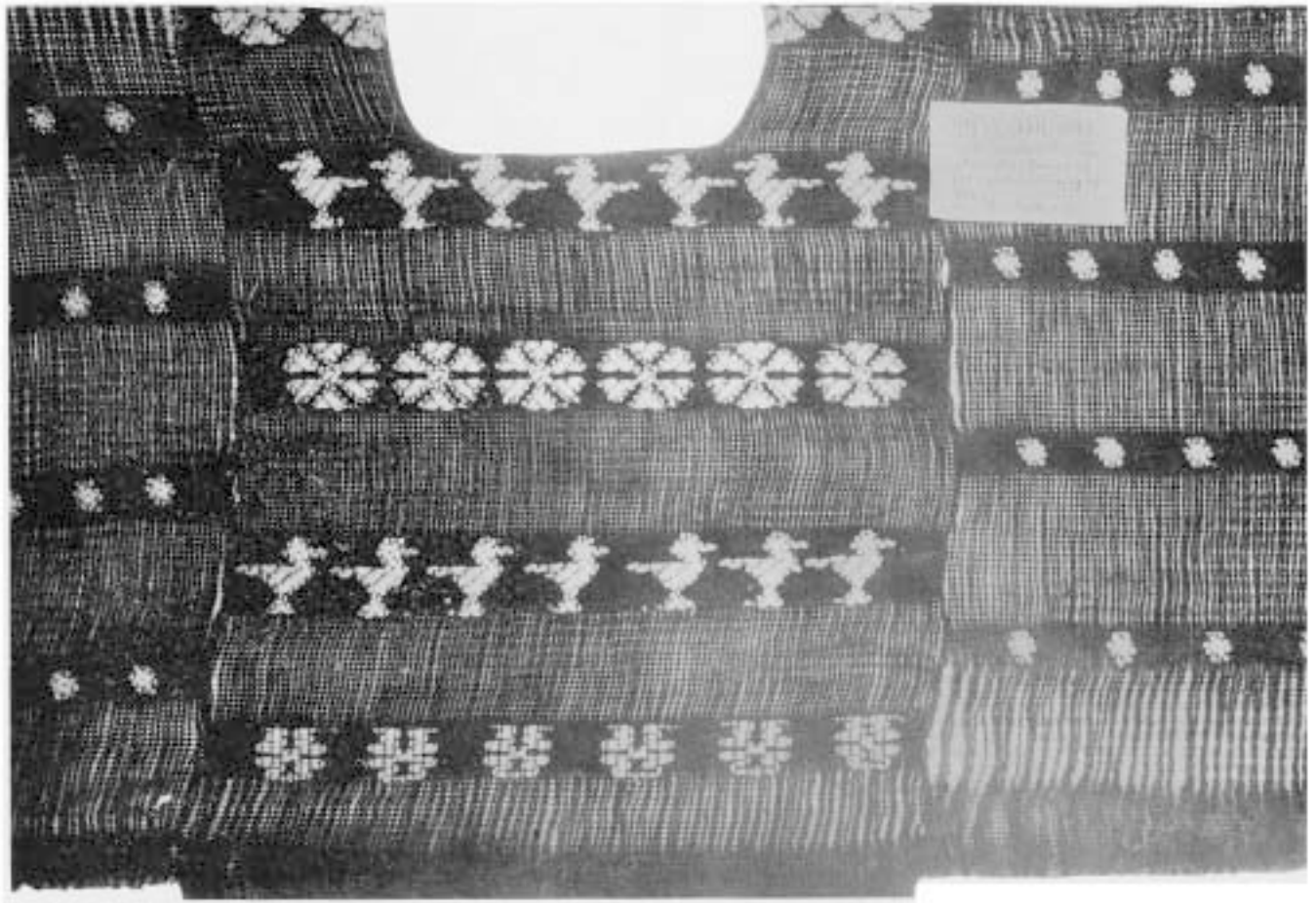


Illustration No. 1 (b) detail

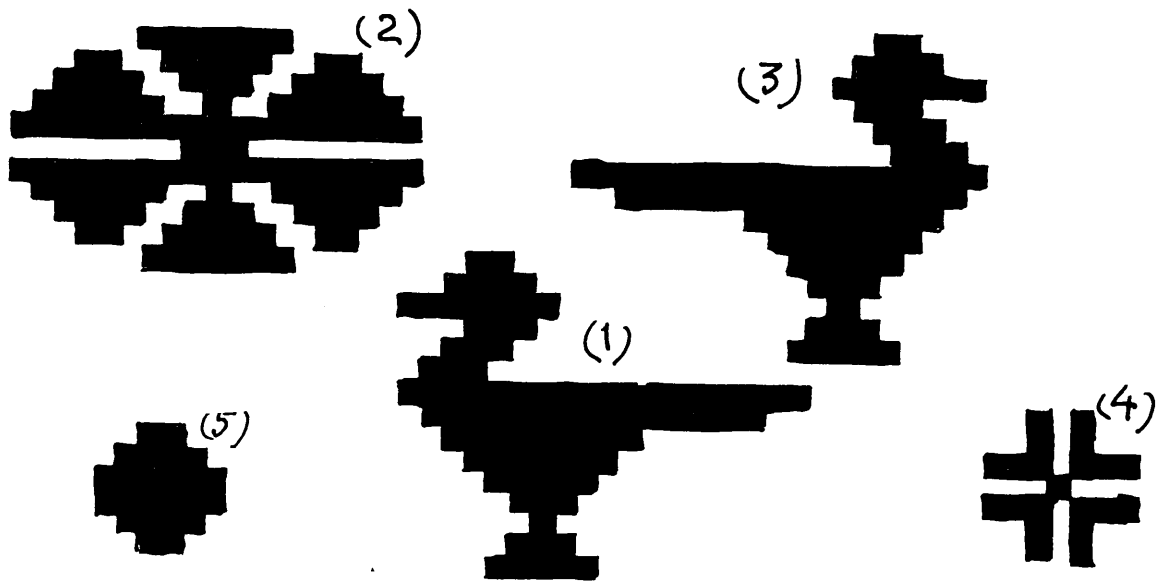
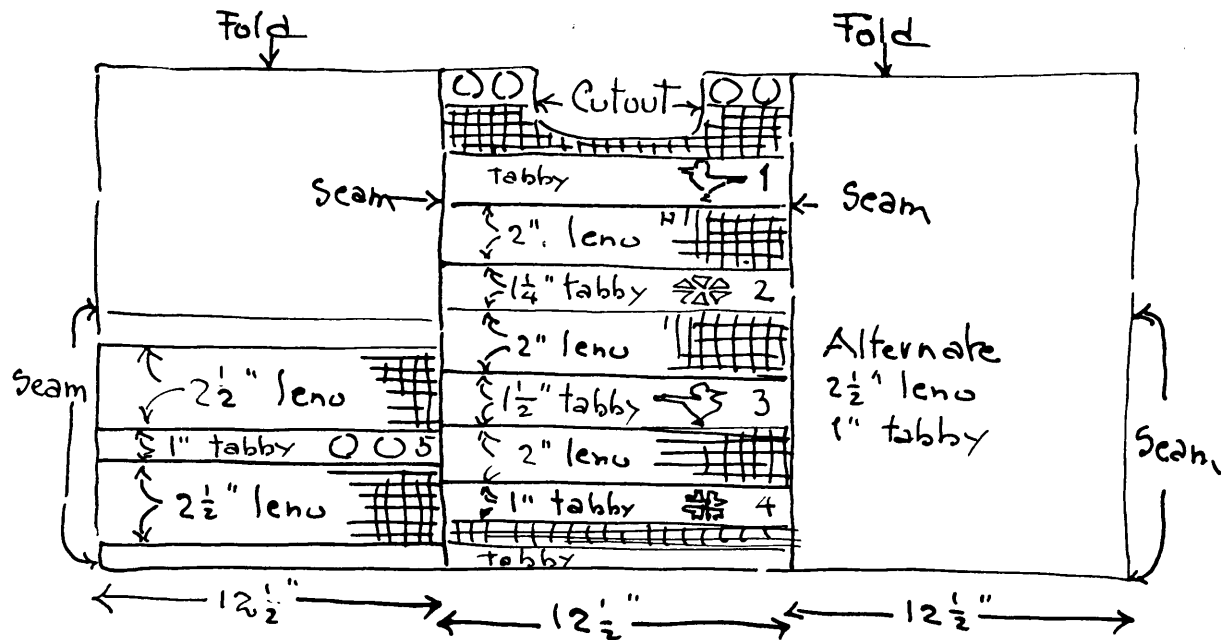


Diagram III. "HUPEL" and Detail of figures

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same method of weaving could be carried out in a different weft material — Perle cotton No. 3 or coarse linen floss, rayon "art silk," strand cottons, heavy silks, and so on.

The bag shown in Illustration No. 3 was also woven on this six-harness set-up. The material is the same as in the curtain. The fabric has a stiffness that makes it excellent for bags, and no lining is required. The open mesh gives an unusual and

attractive appearance. Bags of this type cost very little to make, and take very little time to weave or to mount. They would, I believe, make a very saleable specialty. They could be sold at a moderate price and still return a good profit. For large knitting bags, shopping bags and the like they are ideal.

If, instead of the double tabby, for the tapestry work, one



Illustration No. 2

prefers an ordinary pattern weave, this can be threaded on the back harnesses instead of the twill threading as shown. On an eight-harness loom a six-harness pattern-weave could be used. The doupes do not interfere with the weave if, in making the tie-up, the doupe harness is tied to rise with each shed that raises any of the threads threaded through the doupes; and any combination of pattern weaving and plain leno can be woven on the set-up.

The eight-harness set-up given on Diagram III produces the effect sketched — alternating squares of leno and tabby. The weave is threaded on the four back harnesses, and two sets of standard and doupe are used. This is clear enough from a study of the diagram.

While the more elaborate forms of leno weaving are im-



Illustration No. 3

possible on our ordinary weaving equipment, there are many interesting variations of the weave that are within our limits — three-end leno, seamless leno bags, etc., etc. The Steel Heddle Manufacturing Company, whose address was given at the beginning of this article, issues an interesting pamphlet on leno weaving that, though intended for power loom weaving, still has much information of value to a hand-weaver. An old book, long out of print, "Treatise on the Art of Weaving" by John Murphy, gives much information and many charts. This book may be available in local libraries and might be obtainable through dealers in old books. It may be possible at a later date to give additional notes in *THE WEAVER*. However, the simple set-up described will supply plenty of variety for a great deal of weaving

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