

THE SHUTTLE-CRAFT COURSE IN HAND WEAVING

Section I, Lesson 1

Foreword

Weaving is a most ancient art -- as old as architecture, as old as agriculture, as old perhaps as man himself. According to Kipling, at any rate, the ability to make interlacings is one of the abilities a man has and a monkey hasn't. It is not surprising that ninety-nine out of a hundred people like to weave. What is indeed surprising is that it has -- as a popular accomplishment -- become so thoroughly mislaid during the few generations last passed. The great-great grandmothers of most of us wove, as did all the long long line of those that went before. And we look upon hand-weaving today as a new thing, - a novelty!

To be sure it became in this country almost a lost art, lingering on only in isolated regions where some of the old traditions managed to live on into our times. There were few sources of information -- among rare old books hidden away in libraries, and the treasured bits of beautiful old textiles preserved in museums or in private collections.

As these sources of information are somewhat obscure and not readily available to all, I have put into the following pages my own findings and experience in the hope of smoothing out some of the difficulties in the way of the would-be weaver.

Of weaving in general I shall not attempt to treat. The subject is a vast one about which there has grown up a whole literature of historical and technical writings, to which the student is referred. My aim is to describe certain hand-woven textiles -- particularly those characteristic of our American Colonial period -- and to provide craftsmen with directions and diagrams for the production of these weaves.

Mary M. Atwater
Mary Meigs Atwater

THE LOOM

"Weaving" is the process of interlacing strands of fine material according to some orderly plan, for the production of a "web" or fabric. Any weaving, except the braiding together of a few strands, requires the use of a loom. Reduced to its essential elements, a loom consists of a frame for holding in position one set of strands -- called the "warp" -- while another set of strands, -- called the "weft" or "woof" -- is interlaced with it. A simple frame of logs, hung in a tree or pegged out on the ground, serves as a loom to this day among savages.

We, however, are not satisfied with such a loom. We not only wish the warp held in place, we wish also to be able to separate the warp threads in such a way that a shuttle carrying the weft may be passed through the opening, back and forth, to produce the desired interlacing. Such a separation between groups of warp threads is called a "shed".

The simplest types of shedding mechanisms are designed to open a shed between alternate threads, -- lowering and raising every other thread. The shuttle in passing through goes over half and under half of the threads. By reversing the shed, the shuttle on its return passes over the threads that were up on the first shed, and under the threads it crossed before. This produces a regular under and over system of interlacing called the plain or "tabby" weave.

From this simple type of loom up to the wonderfully intricate Jacquard loom in which each thread of a wide warp may be governed independently, there are looms of all grades of elaboration.

Beautiful things may be woven on a loom with the simple shedding motion described above -- in fact tapestry looms are of this class. As a rule, however, such looms are used only for the making of the ordinary plain rag rugs. They are useless for the purpose of Colonial pattern weaving. Two-harness automatic or treadle looms, the so-called "non-harness" looms, Swedish and Colonial "garter-looms", with many of the little table looms, belong to this category.

The type of pattern weaving most commonly found among the Colonial textiles is known as "overshot" weaving. In this weave the pattern is produced by weaving "skips" or "floats" -- usually in a colored woolen yarn -- over a plain tabby foundation -- usually of white cotton or linen. To produce this result a loom is required that will open several sheds besides the two tabby sheds required for the foundation.

The loom generally used is a loom such as sketched on diagram 1. The sketch is not intended to represent any particular loom, but simply to illustrate the type.

It will be seen that the essential part of this loom consists of a warp beam on which the warp is rolled, a back beam and breast beam over which it passes, and a cloth beam on which the finished web is rolled up. The warp beam and cloth beam are equipped with ratchets by means of which the warp is held at any tension desired.

The shedding mechanism of this loom consists of four heddle-frames or "harnesses", strung with "heddles" through the eyes or "leashes" of which the warp ends are threaded. By raising or lowering these harnesses it is plain that one may raise or lower the thread threaded through the heddles, thus producing a shed. These harnesses are hung over rollers and are attached to treadles in such a way that drawing down any two by means of the treadles will raise the other two. The "lamms", or levers that are attached to the frame at one side of the loom serve merely to equalize the pull of the treadles so that the harnesses will always be drawn down straight.

The beater or "batten" is a heavy frame which holds the "reed" or "sley", -- a comb-like, slotted affair, usually of metal, through which the warp ends are drawn or "sleyed". The reed serves to space the warp evenly, and with it each "shot" or "pick" of weft is beaten back into place for the production of a firm web.

HANGING THE HARNESSSES

In setting up a loom for weaving, the first thing to do is to hang the harnesses and attach the treadles. For this about fifty yards of cord will be required. The very smallest size of woven window-sash cord answers the purpose. The manner in which the four harnesses are balanced over rollers will be clear through a study of diagram one.

For all the ties to be described use the adjustable loom-knot illustrated at (c) diagram 2. It is well to practise this knot before beginning the tie-up. The knot consists of two parts, -- a loop or "bight", and two free ends. To make the knot, turn back the top of the loop -- (x) on the diagram -- so that it makes a double loop or "clove hitch". Pass the two free ends through the double loop and tie the ends together with a simple turn. If the hitch is drawn tight, the turn will keep the two ends from slipping out. The beauty of this knot is that it is quickly and easily adjustable, and that even after much time and in spite of the strain that draws it very close, it will not bind. It is very foolish ever to tie a "hard" knot anywhere about a loom. Especially at first when the ropes are new and stretch a good deal, frequent adjustments are necessary.

Having mastered the loom-knot, begin the tie-up at the top of the loom. Take two cords each about two yards long; double them and attach by the center to either end of one of the small rollers.

Take two cords each about two feet long. Tie the ends together and attach the loops thus formed to either end of the other small roller. Hold the first little roller under and back of the large one at the top of the loom; pass the long free ends over and around the large roller and attach them by means of the loom knot to the loops on the second small roller. In exactly the same way the four harnesses are hung in pairs over the two small rollers. While making these ties it is a good idea to suspend the harnesses where they belong by a cord passing over the top of the loom. The harnesses should be adjusted at such a height that the leashes of the heddles are in an exact line between the back beam and the breast beam, (so that the warp when threaded through the heddles will not be deflected either up or down.

Having hung the harnesses, it is well to tie them together before proceeding to the tie-up of the treadles.

TIEING UP THE TREADLES

In the usual loom for hand-weaving the harnesses are drawn down by means of foot-pressure on a set of treadles under the loom. The tie-up is not made direct from the treadles to the harnesses, as this would cause the harnesses to be drawn down crooked. The harnesses are first attached each to one of the lamms, and the treadles are then tied up to the lamms. All these ties should be made with the loom knot, as described above.

To attach the lamms to the harnesses, first make four loops and fasten them to the lamms at a point under the center of the harness frames; attach a double cord to the center of each harness at the bottom; connect the loops and the free ends by means of the loom knot, drawing up the lamms till they lie at a slight upward slant.

Finally attach the treadles to the lamms.

Some four-harness looms are equipped with four treadles only, and the tie-up consists in tying the first treadle to the lamm attached to the first harness, the second treadle to the second lamm, etc. In weaving on a counter balanced loom two harnesses should be drawn down together to open each shed, wherefore this tie-up necessitates the use of both feet at once.

It is far better to make the tie-up for four-harness weaving to six treadles, -- tying each treadle to two harnesses. Six treadles are required because there are six pairs in four-harnesses, -- 1&2, 2&3, 3&4, 1&4, 1&3, 2&4. It makes no difference, of course, in the operation of the loom which pair is attached to which treadle, and different weavers use different systems. However, the tie-up as shown on the tie-up draft, Diagram 1, will be found convenient. The first treadle on the left -- treadle number 1. -- attach to the first and second lamms, numbered from front to back;

attach treadle 2 to the second and third lamms, and so on. Take care to have all the cords exactly perpendicular. Make all these ties by means of the loom knot. The height at which the treadles should be adjusted is a matter of personal convenience, -- they should be high enough to give a good shed.

"SETTING-UP" THE LOOM -- WARPING

Before beginning to weave it is, of course, necessary to provide the loom with a warp. The warp consists of a number of threads or "ends" of the requisite length, wound as evenly as possible on the warp-beam. Warping is usually accomplished in one of two ways: The proper number of threads may be measured on a warping board or drum, the warp "chained", sleyed through the reed, "drawn in" through the heddles and finally wound on the warp-beam; or it may be beamed in sections directly from spools on a creel or spool-rack. The first mentioned method is slow and difficult, and requires the combined efforts of several people. It is, in my opinion, a pure waste of time, as it adds nothing to the beauty of the woven fabric. I shall, therefore, give no detailed directions for this method of warping. To warp in the second way one must use a loom equipped with a sectional warp-beam. It is true that not all looms are so constructed, but a few hours work by a carpenter will civilize the most brutal of clumsey old solid warp-beams.

Sectional warp-beams are usually so divided that each section corresponds to two inches of weaving. The number of threads to put on each section depends on the number of warp threads to the inch in the proposed piece of work. Rugs are usually woven at 12, 13, or 15 threads to the inch. Fine cotton or linen warps may be set 30 or 40 threads to the inch.

If a fine warp is selected for the work of Lesson 2, it should be set at 30 threads to the inch, -- in other words, sixty threads at a time should be wound on each section of the warp beam. If a medium weight warp, it should be set at 24 threads to the inch and 48 threads at a time should be put on the warp beam.

To warp the loom, first arrange on the spool rack the required number of spools of warp, being careful to make them all unwind in the same direction. That is: let the thread come off the top of each spool. Set the spool-rack directly in back of the loom and a few feet away, as indicated on the sketch. Now set the guide -- the small square piece of metal punched with holes -- upright in the slot along the top of the back beam, directly over the section of the beam to be warped. It makes no difference whether one begins at the right or left hand end of the loom, or in the middle. If, however, it is proposed to warp a narrow strip only -- as suggested for lesson 2 -- the eight sections to be warped should be the eight middle sections rather than the eight on either side.

With everything set ready to begin, take the threads from the spools through the holes on the guide, beginning with the lowest spools. It is better to take one thread only through each hole, but in putting on a fine warp it is sometimes necessary to put two threads through the same hole. This causes no great difficulty. The thing to avoid is a crossing of the threads.

Now carry the strand of threads -- which constitutes one "bout" of the warp -- down inside the back beam and attach it firmly to the loop of the cord attached to the warp-beam in the section to be warped. If the loom is provided with an indicator to measure yardage, set this at zero, and turn the beam over with the crank till the indicator registers the yardage desired. If no indicator is provided it is necessary to count the number of revolutions. If the warp beam is a yard in circumference, the number of revolutions will be the number of yards; if, however, the beam is of a smaller circumference the number of revolutions necessary should be computed before beginning.

The yardage to be warped is a matter of convenience. Five yards at least should be warped for the weaving in Lesson 2, and a warp twice as long is advisable if other things are to be woven at the same time. A warp longer than 15 yards would not be wise for a first warp.

While turning on the warp it is well to hold the threads between the guide and the beam, in order to insure an even tension. They may be held between the fingers, or in the slot of the small block of wood occasionally provided for this purpose. The threads between the guide and the spools should not be allowed to become slack for any reason. Do not touch them at all unless to mend a broken one.

The first section of the warp completed, draw down the strand of threads and loop it with two half hitches around one of the pegs of the beam. Then -- and not till then -- cut the strand. Move the guide along till it is over the second section to be warped, tie the strand to the loop of the second cord, and proceed as before. In this way prepare the desired number of sections of warp, and the beaming process is complete.

Warping is to many people the most troublesome part of weaving. If a little care is exercised at the beginning, so that all the spools run easily, warping a sectional beam is really not in the least difficult. Warping an unsectioned beam, however, is very trying, -- and almost impossible for a long warp of fine threads.

THE SHUTTLE-CRAFT COURSE IN HAND WEAIVING.

Section 1. Lesson 2

To "draw in", "Sley", "Tie in" and Weave a Simple Four-Harness Pattern in "Overshot" Weaving.

The process of threading the warp ends through the eyes or "leashes" of the heddles, is called "drawing in" or "entering" the warp.

When ready to begin drawing in, untie the strand of threads that constitutes the first "bout" of the warp -- the one at the extreme left when looking at the loom from the back. Bring the threads up and over the back beam; unroll till the ends are long enough to reach over the harnesses and about 18" beyond. "Draw in" these threads before untying the second bout. The second bout cannot, of course, be unrolled. In taking it around the warp beam be careful to get it the same length as the first bout. Making it either too long or too short wastes the warp.

Drawing in may be accomplished in either of two ways:

(a) The weaver sits in front of the loom -- on the cloth-beam after removing the batten -- and, working from right to left, draws the threads through the leashes with a drawing-in hook. The hook should be held with the slot down.

(b) The weaver stands at the side of the loom, opposite the ends of the harnesses and threads the leashes without a hook by doubling the threads and putting them through the heddles much as one threads a darning needle.

When drawing in alone on a large loom the method (b) is to be preferred, as it is possible to reach the warp ends more easily from the side than from the front of the loom. However, it is entirely possible to draw in alone from the front if care is taken before beginning to arrange each bout of warp ends carefully in order -- either in a holder of some sort, or simply spread out fan-fashion over the top of the harnesses. Drawing in goes more than twice as fast if an assistant stands back of the loom to pick out the threads and hold them, one by one, ready for the hook.

Drawing in for a plain "hop sacking" or "tabby" weave on two harnesses is extremely simple: The first thread is threaded through the leash of a heddle on the front harness, the second through the leash of a heddle on the back harness, and so on -- front, back, front, back -- all the way across the loom.

Drawing in for pattern weaving is a little more complicated, but is really not difficult at all. The threading draft represents graphically the position of each thread. The horizontal rows numbered 1, 2, 3, and 4 represent the four harnesses, and

each black square represents a thread drawn through the leash of a heddle on the harness indicated by the row in which the black square occurs. The draft is to read from right to left. (Note special instruction sheet accompanying each draft before starting to draw in).

It will be noted that the first black square on the accompanying draft -- Diagram 3, the "Honeysuckle" Pattern -- occurs on the bottom row -- numbered 1 -- of the draft. Push the empty heddles toward the left out of the way, leaving an open space to work in at the right hand side of the loom. With the drawing-in hook (if threading from the front of the loom) select the first heddle on the front harness, slip it along to the right, draw thru the eye the first warp end and push the threaded heddle out of the way to the right. The second black square is in the row numbered 2. Select the first heddle on the second harness, thread it and push it along to the right. The first eight threads are to be threaded: 1, 2, 3, 4, 1, 2, 3, 4, to insure a firm selvege. It is the practise of some weavers to double the first two threads of the selvege, but this is, in my opinion, a mistake, except in rug weaving.

It is well to pay strict attention and to proceed very slowly at first with the drawing in, as mistakes are easily made and are often very troublesome to correct later. It is necessary for good results that each thread be drawn in exactly as shown in the draft.

Check over each "repeat" of the pattern after drawing it in. The simplest way to do this is to gather together the threads constituting the repeat, separating them from the rest of the heddles, and then count the heddles on each harness, comparing the results with the number of black squares shown on each line of the draft -- omitting, of course, the selvege threads. In the "Honeysuckle" pattern there are in each repeat 5 heddles on harness 1, 8 on harness 2, 8 on 3, and 5 on 4. Having made sure that the repeat is correctly threaded, knot the threads together with a loop (diagram 2d). This will keep the threads from slipping out of the leashes, and is easily untied later.

After putting in the eight selvege threads, repeat the pattern -- reading always from right to left -- as often as required, reserving eight threads for a left hand selvege. "Drawing in" -- the most difficult part of setting up a loom -- is now complete.

The next process -- drawing the threads through the slots or "dents" in the "sley" or "reed" -- is called "sleying". There is nothing complicated about this, but -- like everything in weaving -- it must be done exactly right or the results will be disappointing.

Reeds are made with various numbers of dents to the inch, as noted in Lesson 1. If a fine warp has been selected it should be double-sleyed -- two threads to each dent -- through a no. 15 reed. This will give 30 threads to the inch. A coarser warp may

be double sleyed through a no. 13 reed, to give 26 threads to the inch and a coarse warp should be sleyed either single through a no. 20 reed or double through no. 10. It is practicable, though not very good practise, to sley "double and single"; one thread through the first dent, two through the second, etc. For pattern work this is satisfactory, but it gives a ridged effect to plain weaving.

As the warp in hand is a narrow one -- less than the full width of the loom -- it is well to begin sleying in the middle. Take out the loop holding the middle repeat of the pattern and draw the middle threads through the middle dent of the reed. Work from the middle toward the left, and then from the middle toward the right. It is a little easier to sley from right to left, so when the warp is planned to fill the whole width of the loom one should begin sleying at the right.

Sleying is very simple, but must be done carefully. A missed dent, or one threaded with too many threads, make ugly streaks through the work. Also, unless the threads are drawn through the reed exactly in order as they are threaded through the heddles they will be crossed in the reed and weaving will be impossible.

After sleying each repeat of the pattern it is well to knot the threads together with the same loop used after drawing in, otherwise they may slip out of the reed again and cause confusion.

After sleying comes "tying in" the warp ends to the canvass apron attached to the cloth beam. Some looms are equipped with a rod attached to the cloth beam by cords instead of the apron. The tying in process is the same in either case. Bring the apron up around the breast beam to within a convenient distance from the heddles. Allow a sufficient length of warp to tie easily, but do not be wasteful. Begin with the middle strand of threads. Do not take too many threads at once, as they do not tie evenly, and do not take too few, as that is a waste of time. The number corresponding to about two inches of the reed is about right.

Draw the threads through the fingers a few times to make sure that there are no loose ones among them, then take them down through the middle eyelet of the apron -- or down over the middle of the rod, as the case may be -- separate the strand into two equal parts, bring one part up to the right and the other to the left of the original strand; cross on top; down; cross underneath; up; tie with a double loop as in making a bow except that the first knot is omitted. (See diagram 2e). When the last strands have been tied it will be found that the ones tied first are slack. They must be re-tied. Loose threads or soft spots in the warp make good weaving impossible. Do not be satisfied with the tying till the whole warp has the same tension.

If the harnesses have been hung, and the looms and treadles correctly tied up as described in lesson 1, everything is now ready to begin the weaving. Put the tension desired on the warp by means of the ratchet. This is a matter of experience. All one can say is

that the warp must be stretched tight, but not so tight that the sheds do not open easily. Now open one of the tabby sheds by depressing either treadle A or treadle B and put a flat lease-stick through the shed. Open the opposite tabby shed by depressing the other tabby treadle and put in another lease stick. These are not absolutely necessary, but are a great convenience. Now take a large shuttle wound with carpet rags or heavy cotton roving, and tabby back and forth several times using the A and B treadles alternately. This makes a good foundation for the weaving. Beat each shot back very firmly with the batten.

The heading comes next -- and inch or more of tabby weaving -- to be turned under and hemmed on the finished piece or to serve as a foundation for a knotted fringe. The process of tabby weaving is as follows: Open the right hand tabby shed by depressing treadle B. Throw the shuttle carrying the tabby thread -- a thread more or less like the warp -- from the right to the left through the shed, sliding it along the shuttle-race as close as possible to the reed. The little boat-shaped hand shuttles that are the most convenient to use should be thrown with the flat side against the reed. With the shed still open, beat vigorously with the batten, using the right hand. A sharp double beat is better than a heavy single beat, as there is less danger of breaking threads. Open the left hand tabby shed by depressing treadle A. Beat again with the right hand. Throw the shuttle from the left to the right hand through the shed. Beat with the left hand. Change to the B shed. Beat again with the left hand. Repeat.

In all weaving of the four harness "overshot" type the pattern is composed of "skips" -- generally of colored wool -- that "float" over a plain cotton or linen foundation. This plain weave is carried on along with the pattern weaving by using two shuttles and weaving alternate shots or "picks" of tabby and pattern. It is important to cultivate a habit of throwing the tabby shuttle from right to left on the A shed and from left to right on the B shed. If this done mistakes such as throwing two like tabbys in succession are not so likely to occur.

Before beginning the pattern weaving, however, it is advisable to examine the heading minutely for possible errors in threading or sleying. A streak where the material looks too thin indicates a missed dent in the sley. A thick streak indicates too many threads through one dent. Sometimes these two errors occur close together and one compensates the other. If not, there is no cure except to re-sley from the mistake to the nearest edge and begin the weaving all over. If there are crossed threads whole groups will refuse to come up, and it will be impossible to beat. If two or three threads fail to tabby there is probably a mistake in threading. It may be nothing but a loose thread, which can easily be corrected by breaking the thread at fault and winding it around a pin put in the heading, as is also done for broken warp ends. If not a loose thread, either (a) two threads have been drawn through the same leash; (b) a thread has

slipped out, leaving an empty heddle; or (c) a thread has been drawn through a heddle on the wrong harness. It is evident that two threads threaded either 1,3 or 2,4, will rise and fall together and will not tabby. Such mistakes sometimes necessitate re-threading a part of the warp, but often they may be corrected by less severe methods. By tracing back the thread or threads at fault find just what the mistake is. In case (a) simply suppress one of the threads. In case (b) a thread may be added; take the end from a spool of warp thread over the back beam and through the empty heddle; draw it through the proper dent in the reed and attach it to a pin inserted in the heading; then from the back of the loom draw it as tight as the other threads and secure it to the warp beam by winding it back and forth between two pegs. Such an extra thread is troublesome, as it has to be untied from the warp beam and retied each time the finished weaving is rolled up on the cloth beam. If there are many such mistakes, or if the warp is a long one it saves time to re-thread. To correct case (c), tie in a string heddle on the proper harness, break the thread that was threaded wrong and thread it through the eye of the string heddle and attach it to a pin in the heading.

It is not difficult to tie in a string heddle, but care must be taken to put it in the right place and to tie the eye exactly on a level with the eyes of the wire heddles on each side of it. Take a bit of carpet warp or stout linen thread a little more than twice as long as the distance from top to bottom of the harness frame; draw it under the rod that carries the lower end of the heddles -- see diagram 2f -- draw up the two ends and tie together in a hard "granny" knot exactly on a level with the bottom of the leashes of the heddles on either side; tie another hard knot on a level with the top of the leashes; finally tie the ends around the bar that carries the upper ends of the wire heddles.

Occasionally one discovers two double threads side by side. This is usually an easy mistake to remedy. It occurs as a rule from two correctly threaded heddles having become transposed, either in threading or slewing. For instance, in a block threaded 1,2,1,2,1,2, the second pair may have been transposed with the following result: 1,2,2,1,1,2. To correct, break the two threads at fault, transpose them and after tying a bit of warp to the ends-- so that they will be long enough -- draw them through the reed and attach by winding around a pin inserted in the heading.

Suppressing a thread or adding a thread produces, of course, a mistake in the sley. In coarse pattern weaving such mistakes show very little, but in fine work, or in plain weaving, they show very badly and re-slewing is advisable.

Now having corrected any mistakes in entering or slewing and having woven a heading of sufficient width, begin weaving the pattern. For the "Honeysuckle" pattern -- diagram 3, (a), -- the treadeling as given on the draft indicates the pattern shots only.

The tabby shots are not written in as they simply alternate with the pattern shots and are woven as already described --- the A shed from left to right and the B shed from right to left.

It is good practise to put in two tabby shots in pattern thread before beginning the pattern proper. The procedure will be as follows: having just thrown the tabby shuttle from left to right through the A shed, take the pattern shuttle and throw it from right to left through the B shed. Catch the free end of the thread around one of the selvage threads and carry it back a few threads -- perhaps a quarter of an inch -- through the shed and bring it up to the face of the web to be clipped off later when securely woven in. Never leave a loose end on the edge. Now beat, change to the A shed, beat again, and throw the pattern shuttle back. Beat, change to B and throw the tabby shuttle. It is now time for the first shot of the pattern -- in the case of the Honeysuckle pattern depress the third treadle, which is tied to harnesses three and four. Throw the shuttle carrying the pattern thread from right to left through this shed; beat; change to the A treadle, beat again and throw the tabby shuttle; beat and weave the B shed again with the pattern thread. Continue: B tabby, 2 pattern, A tabby, 1 pattern, B tabby, 4 pattern, A tabby, 3 pattern, B tabby, 3 pattern A tabby, etc., etc.

Be careful to allow the weft thread to lie loosely in the shed, as it takes up in beating. A very common mistake with beginners is to draw the weft too tight, drawing in the edges. If the edges are badly drawn in it is impossible to beat, and the selvage threads will be sawed off in the reed. A good selvage is of prime importance. Some weavers use a template to keep the web from drawing in. A template is awkward to weave over, has to be adjusted frequently and sometimes tears the cloth. It is far better to acquire from the start the trick of keeping the weft thread loose. The firmness of the material depends on the vigorous use of the batten, not on drawing the thread tight.

The number of pattern shots required for each "block" of the pattern varies greatly with the material used and the closeness of the weaving. The blocks should be woven as nearly square as possible, beginning with the first block on the right and squaring each in turn. This produces the pattern "as drawn in". A pattern woven in this fashion always has diagonal lines running through it. If the weaving is correct the diagonal will be straight and true and run at an angle of 45 degrees. By observing this it is fairly easy to avoid mistakes. If the pattern appears too long drawn out, too many shots are being used over the blocks; if on the other hand the pattern appears squatty, not enough shots are being used. It is well to weave the pattern a little longer than square to allow for shrinkage as -- on account of the tension -- the web draws up a good deal when taken out of the loom.

If a mistake has been made it should be taken out. Either "Unweave" by reversing the order of treadling, or -- if the mistake is a long way back and the value of the material is not great -- cut the weft threads very carefully with sharp scissors or a razor blade, taking the greatest possible pains not to cut any warp threads. After being cut it is fairly easy to pull out the faulty work.

If the warp thread breaks, tie to the broken end a long enough piece of thread to allow re-threading and re-sleying. Do not attempt to tie the two ends together, but insert a pin in the web and wind the warp thread around it, being careful to get the same tension as on the rest of the warp. After the thread has been firmly woven in, the pin may be removed and the loose ends of thread clipped off. Knots in the warp may usually be woven in, though in fine plain weaving it is sometimes necessary to take them back again and again till the end of the particular piece of weaving is reached. Use the weaver's knot for joining warp ends. (See (a) Lesson 1, Diagram 2.

A knot in the weft, on the other hand, should never be woven in. Weft ends should be tied together with a square knot -- (b) Diagram 2 Lesson 1 --. When this knot appears in the shed, pull it out, lap the two ends under four or five warp threads, bring them up to the face of the web, and clip them off later after they have been securely woven in.

When, as the weaving progresses, the finished web approaches so close to the reed that it is difficult to get the shuttle through the shed, the work should be wound up on the cloth beam. First release the tension by releasing the dog that holds the cloth beam, then release the warp beam, and wind up as far as desired, being careful not to bring the weaving too far back to be beaten properly. Releasing the dog on the warp beam too suddenly sometimes snaps threads in a fine warp. The first time the tension is released the lease sticks may be withdrawn. It does no harm to leave them in and wind them up on the cloth beam with the cloth except that they sometimes catch the thread from the shuttles.

Send in for criticism when completed:

(1) Square, for pillow-top or small table cover, in wool or cotton or fine and heavy cotton.

(2) Table runner or towel in plain weave with colored borders in a pattern.

(3) Sampler, yard of weaving, showing variations of pattern.

SPECIAL INSTRUCTIONS FOR USE OF DIAGRAM 3--HONEYSUCKLE PATTERN.

- (a) For fine warp, sleyed 30 threads to the inch, 458 warp ends thread eight threads for a selvage as indicated on the draft; repeat the pattern (26 threads) 17 times; put in a selvage to match right side, thus: 3,2,1,4,3,2,1.
- (b) For medium warp, sleyed 26 threads to the inch, 406 warp ends, put in selvage as above, 15 repeats of the pattern and selvage reversed, as above.
- (c) For heavy warp -- carpet warp or heavy mercerized cotton -- sleyed 20 threads to the inch, 302 warp ends, put in selvage, 11 repeats of the pattern, and selvage reversed as above.

For weft thread on (a) use Saxony or Shetland floss wool, or a single-twist hand spun yarn, or no. 5 mercerized cotton over a fine tabby -- like the warp or finer.

For weft on (b) Germantown yarn or mercerized cotton No. 3 may be used, over a tabby like the warp or finer.

For weft on (c) 8-fold Germantown, coarse home-spun yarns or light weight cotton roving or wicking may be used, over a tabby like the warp.

Problem 1, to weave a square of the pattern "as drawn in". The weaving if done correctly will appear like (a) diagram 3, and the diagonals will run from corner to corner. It is well for this problem to use only one color in pattern thread, and a white tabby. Nothing is more satisfactory than the navy blue so dear to the hearts of Colonial weavers, but any other color may be used except very light shades. This piece if worked out in wool makes a most attractive pillow-top. If desired, weave a back to it, either repeating the pattern again or putting in one of the stripes, using one pattern shed over and over; or weave a stripe broken at regular intervals with the little pattern shown at (b) diagram 3.

Problem 2: To weave a towel or a table runner in plain weave with colored borders. For towels use a linen weft thread with a heavier colored linen or a D. M. C. cotton thread for borders. Do not attempt this on anything but the fine warp (warp (a) above). Weave 6" plain tabby. Tabby back and forth once with colored thread. Four white tabby threads. Border (b) in color. Four white tabby shots, tabby back and forth with color. Eight white tabby shots. Border (c), repeat once. Repeat tabbys and border (b) in inverse order. Plain weaving, 17". Repeat borders. Plain weaving 6". The same arrangement of borders is suitable for a table-runner, but this may be woven in a colored mercerized cotton thread for the plain weave. A delft blue is very handsome, with a heavier thread in old gold "henna" or "burnt orange" for the borders. Use a white

tabby back of the borders. The plain weave between the borders may be made the length desired to fit any table. Allow three inches for shrinkage.

Problem 3: To weave a sampler. This pattern is capable of many variations. Below are a few suggestions. These may be worked out in several colors. Do not try to produce a piece of weaving for use in any way. Make it frankly as an exercise. It will be very valuable to keep for reference.

3, 3
4, 1
1, 1
2, 1
3, 3
2, 1
1, 1
repeat;
3, 3
4, 1 etc.

1, 1
2, 1
3, 3
4, 1
1, 3
2, 5
1, 3
4, 1
3, 3
2, 1
1, 1
4, 1
3, 3
4, 1
repeat;
1, 1
2, 1 etc.

3, 3
4, 1
1, 1
2, 1
3, 3
2, 1
1, 3
2, 5
1, 3
2, 1
3, 3
2, 1
1, 1
4, 1
3, 3

SPECIAL INSTRUCTIONS FOR USE OF DIAGRAM 4 - MONKS' BEEF PATTERN.

- (a) Fine warp, sleyed 30 threads to the inch, 458 warp ends. Draw in the first eight threads as indicated on the draft, then begin again at the beginning and draw in twelve repeats of the whole pattern. Thread the rest of the threads 1,2,3,4, 1,2,3,4, to correspond with the beginning.
- (b) For medium warp, sleyed 26 to the inch, 406 warp ends, draw in 12 threads 1,2,3,4,1,2,3,4,1,2,3,4, then beginning at the beginning of the draft put in 11 repeats of the whole pattern. Thread the remaining threads 1,2,3,4,1,2,3,4, to match the right hand border.
- (c) For coarse warp sleyed 20 to the inch, 302 warp ends; draw in the first four threads, 1,2,3,4, then beginning at the beginning of the pattern draw in 8 full repeats, threading the last 12 threads 1,2,3,4 to correspond with the right hand selvage.

For suggestions as to material, see instructions for Diagram 2 above. In this pattern a coarse yarn may be used on the fine warp, but fewer shots must be put in than indicated on the draft.

Problem 1; pillow-top or table square. Weave the pattern "as drawn in" -- (a) diagram 4 -- using a dark wool or cotton for the pattern and a white tabby like the warp for finer.

Problem 2; for a towel or table runner weave 4" plain tabby then either border (b) or border (c) as indicated on the draft. These borders may be worked out in several colors if desired. For color suggestions see instruction for diagram 3, above.

Problem 3, sampler. This pattern in the greatest variety of variations. It is one of the most useful of all patterns for borders, and time spent in experiment is very valuable. A few suggestions for variations follow:

2, 1	2, 6	2, 6	1, 1
1, 1	1, 1	1, 6	2, 1
2, 1	2, 1	2, 6	1, 1
six plain tabby	1, 1	1, 6	2, 6
2, 6	2, 24	repeat as desired	1, 24
1, 6	1, 1		2, 6
2, 2	2, 1		1, 1
1, 6	1, 1		2, 1
2, 6	2, 6		1, 1
Six plain tabby			
2, 1			
1, 1			
2, 1			

SHUTTLE-CRAFT COURSE IN WEAVING

Lesson 3 - Rug Weaving.

Rug weaving is a special branch of Hand-weaving, with very interesting commercial possibilities for the woman who wishes to build up a small business. The making of ordinary rag rugs in plain tabby weave, while not very interesting, is always in demand, and with a little extra effort and knowledge this class of rugs may be made much more satisfactory and slightly than is usually the case.

MATERIALS:

Rugs may be successfully made of a variety of materials. Woolen rug yarns are by far the most satisfactory but are also, of course, the most expensive; jute rug filling makes very durable rugs for rough wear; cotton roving, or rug-filling makes excellent bed-room rugs and bath-mats; rags are in some ways the least satisfactory material, and cost more than the cotton roving when new material has to be bought for the purpose. Woolen rags make the best rug; cotton rags make a rather light rug, apt to be scuffed up; silk rags are entirely too light for a rug, but may be woven into very slightly portieres, pillow-tops and couch-covers. Burlap and the better grade of sacking -- such as a big coffee-sack -- may be dyed; cut into strips and woven into rugs. Even potato sacks may be used in this way. As a rule the better grade of sacks are available in quantity only in large institutions, but as much weaving is done in such places, mention of this material may not be amiss. In state hospitals, where much low-grade labor is available, it is worth while to ravel the heavy good grade burlap sacks and make skeins of the thread, which may then be dyed and woven into portieres, laundry bags, etc., etc.

The chief difficulty encountered by a woman who makes a business of weaving rag rugs is the difficulty of persuading her clients to prepare the rags properly. Most people prepare rags for weaving very badly -- so badly that good rugs cannot be made of them. Some, in order to obtain long strips, will cut "round and round" a piece of material. This is very poor practice, producing unsightly lumps in the rug. Neither will short pieces, sewed together every few inches make a smooth rug. The usual "hit and miss" method of putting colors together -- often with the greatest variation in width of strips and thickness of material -- produces very unsatisfactory results. It is better business to refuse to weave badly prepared rags, than to weave them and be blamed for poor work

later. Rags if cut or torn evenly, and properly sewed together, or lapped in weaving without sewing, may be made into very attractive rugs -- especially when done in solid colors and woven in patterns. When two or three colors have to be used it is usually unwise to attempt pattern work. Borders and "set in" figures are the best for such material. The material for a rug should all be of the same general type. Woolen rags should not be used with cotton rags, nor very heavy materials with very light.

When making a business of rag rug weaving it is advisable to buy unbleached cotton in ten or fifteen yard lengths and dye it one's self in good fast colors. Pellew's "Dyes and Dying", mentioned in a previous lesson, is a safe-guard. It is not necessary to get a perfectly even color -- in fact, the finished rug is more attractive if there are slight variations in tone. Blue is by far the most popular color and is usually satisfactory. A dark navy blue and a lighter blue should be kept on hand. White and black are always required for borders. A small quantity of material in very bright colors, to use as accents in borders and for "set in" figures should be kept on hand to use with other material. Strips cut or torn the whole length of a ten or fifteen yard piece of material need not be sewed. In winding the strips on the shuttle the ends of such strips may be knotted together; when the knot appears in the web it should be taken out and the ends lapped under four or five warp ends, as described in Lesson 2. For a heavy rug the strips should be torn 1 1/2 to 2" wide; for pattern work not more than 1" wide.

If the rags are in short lengths and have to be sewed, lay the two strips together lapping them about two inches, fold lengthwise and sew with a sewing machine, or by hand, with a firm back-stitch back and forth as close as possible to the folded edge; then with the scissors, hollow out the other edge so that there will not be humps over the seams.

In putting the rags on the shuttles and in weaving avoid twisting the rags.

Rugs in Plain Tabby Weave.

Though the most attractive rugs are those woven in Colonial patterns, as described later, many interesting possibilities are open to a weaver who uses a simple rug-loom equipped with two harnesses only. Threading a two-harness loom -- as at (a) Diagram 6 -- is, of course, simpler than threading for pattern work; the weaving, however, is a good deal more difficult and requires more practise and ingenuity. For this reason the subject is treated of here instead of in the second lesson.

For plain rugs, carpet warp sleyed twelve threads to the inch is the most satisfactory. Rugs are sometimes made ten threads to the inch, but this is not advisable as the sav-

ing in warp does not balance the lowering of weaving qualities. Thirteen or even fifteen threads to the inch may be used, but in this case the threading should be done after the method shown at (b), Diagram 6, which is, in effect, threading double. It is, however, better practise to draw each thread through a separate heddle as indicated than to thread each heddle with two threads. The effect of this threading is to allow closer packing of the filling with less warp showing on the surface of the web than when the threading is done as at (a).

Colored stripes may be introduced in the warp, but in my experience are not very effective. The "Seersucker" weave, sometimes introduced into portieres made of silk rags, is produced by skipping a number of dents in the sley, as illustrated at (c) on the Diagram. This is a very loose weave and not satisfactory for rugs as it wears very badly. A rather interesting checked effect is produced by threading a warp in two colors as shown at (d) and weaving with two colors as indicated.

Threading, slewing and tying in a rug warp should present no difficulties. These processes have been fully described. Put lease sticks and a shot or two of rags through the sheds to bring the threads together and then weave a "heading" for the rug in weave with carpet warp. This heading should be beaten up as firmly as possible and should be an inch and a half wide if intended to be turned under and hemmed. A somewhat narrower heading suffices for a rug that is to be finished with a knotted fringe. The heading complete, the weaving of the rug may begin.

Rug material, unlike woolen yarns, should be drawn in a little in weaving to insure a good edge. After passing the shuttle through the shed, draw the weft tight enough to prevent a hump on the edge. With a finger through the shed, push the weft into place if necessary; then allow it to lie loosely in a diagonal across the shed and beat it up close with the batten. The "take up" is chiefly in the warp in this type of weaving, because the filling is so much the heavier material.

At (e) Diagram 6, is shown a simple method of decoration often used in the borders of plain rugs. Two strips of material in contrasting colors are twisted together and then woven in the usual manner. This simple motif may be varied in a number of ways, a few of which are indicated in the borders of the three rugs at the extreme right of the group sketched at (i) Diagram 6. Other ways will suggest themselves to the weaver. Care must be taken to twist the rags evenly and rather firmly. It is well to cut the strips for this work a little narrower than for the plain weaving. Cotton roving may be used to produce these patterns, but it is wise to use a lighter weight material for the twists than for the body of the rug or to unravel out one strand from each cord before twisting, otherwise the pattern will be so much thicker than the rest of the rug that the effect will not be good.

In a warp threaded as at (b) Diagram 6 a small lengthwise striped effect results from weaving alternate shots in different colors. Crosswise stripes may be woven in the greatest variety. It is impossible to give detailed directions for these. They must be left to the ingenuity and good taste of the weaver.

At (f) is illustrated the method of producing "set in" figures. After the shot, or "pick" of rags has been thrown across the shed, but before it is beaten up it is wrapped with a rag of contrasting color at the place desired, and the whole then battened into place. Quite elaborate figures may be produced by this method, but as a rule simple diamond shaped figures or diagonal lozanges, as illustrated on the sketch are the most satisfactory. It is best to cut the rags for the pattern in the desired lengths before beginning the figure. Another method is to measure the lengths very carefully and sew the rags so that when woven the desired figure will be produced. This is a good deal more difficult and no better than the method described, if care is taken in wrapping to cover the ground shot completed with the pattern rag. Rags for the pattern should be cut wider than for the ground, and may be in lighter material.

Another way of introducing figures into a rug in tabby weave is illustrated at (i) and (h). This is a tapestry weave, and is somewhat troublesome, but gives a good result. It is not absolutely necessary to interlock the shots of different colors along the line of junction as illustrated, but a much firmer and more satisfactory weave results when this is done. If not interlocked in this way it is sometimes necessary to sew up slits on the wrong side after the work is complete, as is done in fine tapestry. This method may be used for rags and cotton roving, but is best in woolen rug yarns. It is, in fact, the method of much of the ancient Peruvian weaving. Navajo rugs, though similar are not interlocked as a rule, the diagonal lines of most of the patterns and the firm battening making this unnecessary. The subject of tapestry weaving in its different aspects is entirely too large a one to enter into here.

"LINSFY-WOOLSEY"

The "linsey-woolsey" material of our great-grandmothers which is at present being used so much for sport clothes is no more than a plain tabby weave striped in colors according to the fancy of the weaver, in fine wool on a fine cotton warp. A soft, loosely twisted cotton warp looks best for this weave, though such a warp is more troublesome in the loom than a hard thread. It should be quite fine and sleyed about 24 or 26 to the inch -- not as close as the same warp would be set for over-shot pattern weaving. The weft should be a single-twist yarn.

Hand-spun yarn is, of course, the best, but cannot always be obtained. A very good single-twist yarn may be had from the Fergus Falls Woolen Mills, Fergus Falls, Minn., and, undoubtedly from any other woolen mill that spins yarns to order. It is impossible to give directions for the striping. The best method is to experiment with the colors at hand until a satisfactory stripe is obtained. In weaving do not beat hard. This material should not be stiff. Take care to get the stripes as uniform as possible. It is a good idea to cut a paper gauge and measure each stripe -- at least until the process has become almost automatic.

It is very much more difficult to weave a good, even tabby material than a material in overshot pattern work. It requires uniformity in throwing the shuttle and in beating. Any mistakes in sleying -- as a missed dent or an extra thread through a dent -- are glaringly apparent. However, when once attained, the plain weave goes very fast. It is possible to produce in one day's hard work -- even with a narrow striped effect -- a linsey-woolsey skirt-pattern that sells for a good price. This type of weaving is recommended to anyone who wishes to make money at the loom.

RUGS IN OVERSHOT PATTERN WEAVE.

Rug rugs woven in overshot patterns take rather less material and very little more time than plain tabby rugs -- less time than rugs with elaborate "set in" or tapestry patterns. Such rugs are not produced commercially, are more beautiful and interesting, and may be sold for double the price of plain rugs. Almost all of the Colonial patterns may be adapted to rug-weaving. The only exceptions are those that depend for their effect on a very long overshot. This is impractical in rug-weaving.

The pattern illustrated at Diagram 7 is a variation of the always popular "Whig Rose" pattern. The blue-print shows a corner of the proposed rug. The large rose figure forms the corners, while the small rose figures are to be repeated for the body of the rug. A good idea of the whole rug may be obtained by laying a strip of mirror along the left hand edge of the drawing at right angles to the paper. The warp should be set 15 threads to the inch -- 16 to the inch -- if one wishes to double sley an 8-dent reed, is not too much.

For a rug in this pattern that will be 36 inches wide when finished, warp 572 threads. For a wider rug, 620 or 668 threads. Beginning at the right of the draft thread the first eight threads, which constitute the selvage and the next eight thread which are necessary to complete the little diamond figure along the edge. The first thread of the pattern proper is the thread indicated by a black square on the lowest line of the draft immediately to the left of the "A"

With the pattern () 1 x 1 1/2 inches, 2 1/2 inches.

and the line marked "O". This is the center of the small diamond figure. The draft from "A" to "B" -- (o) to 150 -- gives the large rose figure. The 48 threads from "B" to "C" give the small rose figure -- beginning each time at the center of the diamond. This will be clear by observing the letters on the diagram of the pattern as developed, which gives the whole repeat from the edge to "C". For our 36 inch rug, thread the draft from the beginning to the end at "C" and then repeat from "B" to "C" four times, giving in all five repeats of the small rose figure. Then begin at "A" and thread to "E" to repeat the large rose for the left hand corner; and finally make the left hand edge and selvage by threading the last 16 threads as from "A" to "X" of the draft. For the wider rugs, simply repeat the small rose figure -- from "B" to "C" of the draft -- once more for 620 threads or twice more for 668 threads. In other respects the threading is exactly the same.

The diagram shows the pattern the exact size it will be if woven at 16 threads to the inch.

It will be noted that this pattern shows no diagonal. When woven on a diagonal in the usual fashion -- "as drawn in" -- a pattern known as "Lover's Knot" results. This is an excellent pattern, too, so that this threading allows the production of two dissimilar rugs.

The weaving should be done exactly after the fashion of overshot pattern work in yarn or thread, as described in Lesson 2. Carpet warp should be used for tabby, and a tabby shot should precede each pattern shot. The carpet warp for tabby may be used in a small hand-shuttle, though the bobbins will have to be filled very often. The rug material, of course, has to be wound on a large rug shuttle.

Begin the rug by weaving a "heading" of carpet warp in tabby weave, as described for plain rugs. This should be about an inch and a half wide if to be turned under and hemmed. A narrower heading will do if the rug is to be finished with a knotted fringe.

The treadeling for the pattern as shown on the diagram, and also for the "Lover's Knot" pattern, are given on a separate sheet so that this sheet may be taken out of the folder and pinned conveniently to the loom when in use. The treadelings are written for the tie-up shown on the draft, which is the tie-up used for all four-harness overshot weaving in this course. If the weaver prefers a different tie-up it will be necessary to transpose the treadeling directions accordingly.

If used for table-runners with a fine warp more shots will be required for each block than noted on the treadeling sheet. Weave to reproduce the pattern as shown on the diagram.

When weaving a number of rugs one after the other, if fringes are desired it is, of course, necessary to leave sufficient warp between headings for the fringes. Otherwise all that is necessary is a shot of rags to separate the two headings.

Fringes may be knotted in a variety of ways. For most rugs the simplest possible way is the best -- about ten warp ends to the knot.

OTHER WAYS OF USING THE "WREATH-ROSE" THREADING

The "Wreath-Rose" threading, just as given, makes an excellent table-runner when set up in a fine warp. At 30 threads to the inch a 572 thread warp will weave about 18 inches wide.

The small figure -- the 48 threads from "B" to "C" on the draft -- may be used as a repeat for the weaving of small articles of all sorts. By varying the treadeling a great variety of borders may be woven on it.

The large figure -- the 150 threads from "A" to "B" of the draft -- repeated again and again gives a very good "Whig Rose" pattern for coverlets. The figure if woven on a fine warp sleyed 30 threads to the inch will weave about half the size shown on the Diagram.

For coverlets the "Wreath-Rose" pattern is usually threaded as follows: "A" to "B" to "C", "B" to "C" and repeat. This gives groups of four small roses separated by large rose figures. The whole repeat of the pattern is therefore of 246 threads. The "Diamond" figure -- the 18 threads from "Y" to "Z" on the draft -- may be repeated over and over as many times as desired for a border. The center of the coverlet should fall in the center of the diamond figure between the top small figures -- at the point "C" before repeating from "B" to "C". A seam along this line will show very little if the coverlet is carefully woven so that the figures match.

In arranging a coverlet using the large "Whig Rose" figure alone, the center of the coverlet should not come in the middle of the diamond -- which in this case would be the point "B" on the draft -- but through the center of the large rose -- at thread 76 on the draft.

As a rule coverlets are woven in two strips, and are threaded into the loom with the border along one side and the middle line of the coverlet along the opposite edge. Some weavers thread the border on the right and some prefer to thread on the left. This makes, of course, no difference. It is a little more convenient in threading, perhaps,

TREADELING

"Breath Rose" Pattern
(As illustrated)

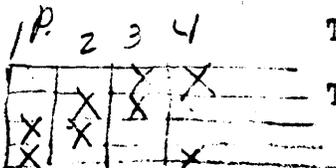
"Lover's Knot" Pattern
(Not illustrated)

Tabby heading, as described

Tabby heading as described

Tabby back and forth with
rug material

Tabby back and forth
with rug material



EDGE

EDGE

(X) 4, 1
3, 1
2, 1
1, 1

(X) 3, 1
4, 1
1, 1
2, 1

Large Rose Figure

Large Figure

(A) 2, 1 - Center of Diamond
1, 1
2, 1
3, 1
4, 1

(A) 1, 1
2, 1
1, 1
4, 1
3, 1

Small Rose { 1, 2 or 3 times 4
2, 2 or 3 times 4
1, 2
2, 2 or 3 4
1, 2 or 3 4

Small Star { 2, 2 or 3 4
1, 2 or 3 4
2, 1
1, 2 or 3 4
2, 2 or 3 4

Large Rose { 4, 5 6
3, 1
4, 1
3, 5 6
4, 1
3, 1
4, 1
3, 5 6

Large Star { 3, 5 6
4, 1
3, 1
4, 5 7
3, 1
4, 1
3, 1
4, 1
3, 5 6

Small Rose { 1, 2 or 3 4
2, 2 or 3 4
1, 2
2, 2 or 3 4
1, 2 or 3 4

Small Star { 2, 2 or 3 4
1, 2 or 3 4
2, 1
1, 2 or 3 4
2, 2 or 3 4

Diamond (B) { 4, 1
3, 1
2, 1
1, 1
2, 1
3, 1
4, 1

Diamond (B) { 3, 1
4, 1
1, 1
2, 1
1, 1
4, 1
3, 1

Small Rose { 1, 2 or 3 4
2, 2 or 3 4
1, 2
2, 2 or 3 4
1, 2 or 3 4

Small Star { 2, 2 or 3 4
1, 2 or 3 4
2, 1
1, 2 or 3 4
2, 2 or 3 4

Small Rose { 4, 1
3, 1
2, 1
1, 1

Small Star { 3, 1
4, 1
1, 1
2, 1

Repeat from "B" to "C" as often as desired for center of rug.

(C)

to put it on the left.

A coverlet should always have a border. Without one it has an unfinished look. The width of border depends a good deal on the size of the coverlet, the size of the bed it is to cover, and the proportions of the figures. The diamond threading, as will be further explained in the next lesson, makes a good border for most patterns. Many patterns -- like the one accompanying this lesson -- have a "diamond" feature that usually makes the best border to be devised to accompany that pattern.

In arranging a rug to go with a coverlet it is often good practise to thread the center of the rug with this "diamond" figure, and use the main figure of the pattern for corners and border. Rugs look best as a rule with a small figure in the middle and a bold border, while a coverlet is most attractive with a fine border and a bold figure.

Anyone wishing to use this pattern in any of the ways suggested may work out the arithmetic involved and send it in for criticism.

Copyright, 1922.
Mary M. Atwater,
Seattle, Wash.

SHUTTLE-CRAFT COURSE IN HAND WEAVING

- - - - -

Section II Lesson 4.

Draft writing for overshot weaving.

The subject of textile design is a large one, and highly technical. Whole libraries are devoted to it. No attempt will be made here to treat of textile design in general. Anyone interested in the various cloth-weaves for clothing is referred to the technical works, such as Roberts and Beaumont's "Woolen and Worsted". The weaving of brocades, velvets, and elaborate weaves of that order is well explained in Loother Hooper's excellent book on hand weaving. The Scandinavian types of hand weaving, beautiful and interesting as they are, will be touched on very lightly, as there are many Scandinavian books to be had that describe these weaves in detail.

The Colonial types of weaving, developed in the early days in our own country, are naturally of particular interest to Americans. Many of the patterns for this weaving are very plainly of Scandinavian origin, but the working out is distinctive -- particularly in the "overshot" weaving of linsey-woolsey materials, such as the treasured "coverlids" of our great grandmothers. Of literature on this particular type of weaving there is very little. Eliza Calvert Hall's "Book of Hand Woven Coverlets", though written from the historic sentimental point of view and entirely lacking in technical information, is very useful to the handicraft worker by reason of the many good illustrations. Anyone following the present lessons in draft-writing will be able to reproduce at will the patterns illustrated and will find the book a mine of suggestions. Mr. Worst's "Foot Power Loom Weaving" also has some good pictures, though his drafts need to be taken with a good deal of caution. Besides these two books there are occasional magazine articles of more or less value, and an occasional chapter in a book dealing with the general subject of Colonial furniture. This is really all the current literature. There is a very rare old book by one Benson, -- the "Home Manufacturer's Handbook", if I remember the title correctly, that is of very great interest, but is unfortunately not generally available.

The following pages will be devoted to the subject of pattern drafts for four, six and eight harnesses overshot weaving. Draft writing for double-face, double warp-face and other types of pattern weaving of the Colonial sort will be reserved for the third section of this course.

The four harness overshot pattern weaving is the most characteristic development of the art of weaving as practised by our great grandmothers. The more elaborate weaves, though often very beautiful, were usually the work of professional weavers and do not have the same charm -- a charm not wholly one of sentiment. Other things being equal, simplicity of means in production always makes for beauty. There is no lack of variety in four harness weaving.

Overshot patterns, as has already been explained in lessons 2 and 3, are produced by weaving "skips" in a heavy thread -- often of colored wool -- over a plain tabby foundation in a finer thread, either white or a contrasting color.

The usual four harness loom is constructed on the counter balance principal. In operating it two harnesses are drawn down together which causes the other two to rise thus opening a "shed", or separation between two sets of threads. Our six treadles are "tied up" to the six possible pairs: 1&2, 2&3, 3&4, 1&4, 1&3. Reserving two "opposite" pairs -- including all four harnesses, -- for the tabby weave, we have four pairs - or four possible changes of shed - for the pattern. For this reason patterns of this type are limited to two, three, or four "blocks", or changes.

It makes no difference, theoretically, which of the three possible combinations of pairs is reserved for the tabby -- 1&2 against 3&4, 1&4 against 2&3, or 1&3 against 2&4. As a matter of fact, drafts are sometimes written in any one of all three ways. It is a good plan, however, to adopt some one of these systems and adhere to it. One becomes accustomed to find the tabby and pattern treadles in a certain position on the loom and it is inconvenient to teach the feet a new set of signals for each pattern, and it is also inconvenient to change the "tie-up". It is far easier to transpose to the system adopted, any draft written differently that may chance to come to hand. I have for all my work adopted the 1&3, 2&4 tabby -- odds against evens -- for a number of practical considerations it is not necessary to enter into here. This system is already familiar to the student of this course. The pattern sheds, as we have already learned, are -- in this system -- 1&2, 2&3, 3&4, 1&4, tied to the first, second, third and fourth treadles, numbering from left to right.

The pattern possibilities, limited to four blocks, by the number of harnesses in the loom, are still further limited by the practicable length of skips. Skips that are too long make loops of thread that catch and pull, ruining the fabric. As a general rule, it is unwise to write more than thirteen or fourteen threads under a block. Where large figures are desired, a combination of two or three blocks must be used. As a matter of fact, most four-block patterns consist of two two-block figures.

Diagram 8 gives at (a) the threading and weaving of a plain diagonal twill. No tabby is necessary, as the skips are so short. It will be seen that each pattern block -- 1&2, 2&3, etc., consists of two threads only, and that each block overlaps the one before and the one after by one thread. This is an important point, as all overshot patterns -- except one group to be discussed later -- are constructed to "twill". This overlapping not only binds the blocks more firmly together, but produces a characteristic arrangement of the "half-tone" blocks -- those across which the pattern thread tabbys.

Diagram 8 (b) shows the same diagonal pattern as at (a) with each block increased to four threads. The skips are longer, and it will be apparant at a glance that a tabby will be required in weaving to hold the fabric together.

(c), Diagram 8, shows the diagonal with the blocks increased to six threads. It will be observed that in weaving (b) three pattern shots, or picks, are woven over each block, while (c) requires five shots for each block. Woven in this way the blocks are square and the diagonal runs true at an angle of 45 degrees. It will be noted that one pick less than the number of warp threads under the block has been used in each case. This is to allow for the overlapping thread. In actual weaving the number of picks varies with the weight of the yarn used and the closeness of the weaving. The aim should always be -- as noted in Lesson 2 -- to weave a true diagonal.

At (d), Diagram 8, is given the threading for a herringbone weave, and at (d') is given a different weaving of the same threading. The latter weaving is known as "Goose Eye", and was used a great deal in the weaving of linens -- towels, napkins, etc. At (e), Diagram 8, is a small all-over pattern produced from a herringbone threading by enlarging the blocks on which the pattern "returns". A study of the diagram will make this abundantly clear.

Diagram 9, gives the structure of the various "Diamond" patterns in their simplest form. The threading at (a) is sometimes used, without a tabby, in the weaving of blankets. Woven with a tabby and on "opposites" as will be explained in Lesson 5, it is the foundation of some of the most elaborate borders characteristic of the Scandinavian weaving. The name "Rosengang" is sometimes translated as "Rose-Path". At (b) is shown the same pattern with the blocks increased to four threads -- all but the 1&2 and 1&4 blocks on which the pattern "returns" which are of five threads. The blocks on which a pattern returns are always composed of an odd number of threads -- either one more or one less than the others. The reason for this is, of course, to preserve the proper tabby alternation. The Goose Eye and "Rosengang" threadings show the same thing. In weaving, it follows that one more or one less pick should be woven over these blocks, to correspond with the threading.

Weaving (b), Diagram 9, "as drawn in", -- that is, by squaring the blocks in succession as they appear on the threading draft, as has been explained in Lesson 2 -- produces a Diamond pattern that differs from "Russian Diaper" (as illustrated on diagram 5, Lesson 2, and also at (f) diagram 9), in the lack of a pattern block in the middle of the diamond. This is because the pattern has two "returns" -- on 1&2 and 1&4 -- while "Russian Diaper" has only one return. The threadings given at (c), (d), and (e) are the same pattern as (b) -- a diamond with two returns -- while (g), (h), and (i) are the same as (f). All these threadings are given for easy reference. The diamond pattern is used a great deal as a border for larger patterns and must, of course, conform to the pattern with which it is used in the matter of returns. (See Diagram 7, Lesson 3).

As a first exercise, set off one of these threadings across the top of a piece of cross-section paper -- the kind divided 16 to the inch both ways is the most convenient to use for this purpose -- and with a lettering pen work out the pattern by squaring the blocks just as is done in weaving. If (c), (d), or (e) is chosen the resulting drawing should be identical with (b); if (g), (h) or (i) is used, the Russian Diaper pattern, identical with (f) should result.

Having done this, work out the threadings given at (j) and (k). "Solomon's Delight", (k), is not always woven "as drawn in". The usual treadeling is given on the diagram. Work out the pattern with this treadeling and also "as drawn in", and note the difference in effect.

"Weaving" a pattern on paper is, after all, a very simple process, and takes much less time than threading a draft into a loom in order to find out what it looks like. It is very unwise ever to thread a draft without having first worked it out on paper. Any mistakes in the draft may be corrected, changes may be made in the pattern, borders planned, variations worked out, etc., with great success. A few hours at the drawing board saves many hours at the loom and prevents the disappointment of poor results as a consequence of defective threading and treadeling.

Diagram 10 gives drafts of a number of interesting patterns. The "Single Chariot Wheel" at (a) is a simple one. Dot off across the top of a sheet of cross-section paper two repeats of the pattern. It would be well to begin about the middle of the sheet, leaving room to put in a border on the right hand side. A good border for this pattern may be made by threading the width desired on two blocks -- the 1&2 and the 2&3 repeated over and over again, five threads under each block. The pattern returns on 2&3 and 3&4. The diamond threading suitable for use with it is (d), Diagram 9. "North Carolina Beauty" returns on 3&4. Which diamond threading should be used as a border for this? (c), the Jacob's Ladder pattern, and (e), the Orange Peel pattern should be transposed to the accepted tabby combination as is illustrated on Diagram II. The Sunrise Pattern might look well with a border of two blocks -- 1&4 and 3&4 -- as suggested for Single Chariot Wheels. A simple twill border -- (b) diagram 8 -- would also be suitable. More will be said later on the subject of borders.

Diagram 11 shows a short way of writing drafts that is much in use. It is very convenient for making notes, but it is most unwise to thread such a draft into the loom without first developing it graphically. The system itself is simple, and will be understood at a glance. The draft is read from right to left like the graphic drafts: each horizontal row represents a harness, as in drafts, but each perpendicular row represents not one thread but a whole block. Thus, the first block is a 2&4 block of 12 threads six on each harness; the second is a six-thread 2&3 block, etc., etc. At (b) Diagram 11, is shown the graphic working out of this draft. It will be seen that the draft is not on the familiar tabby, and will have to be transposed. To do this write all 2&4 blocks shown at (b) on the 3&4 shed and 1&3 blocks on 1&2. (Note "Orange Peel" is not written with the same tabby as "Jacob's Ladder") This operation is illustrated at (c). An examination of the draft will show certain incongruities. Blocks on one side of the center -- of "return" of the pattern are larger or smaller than corresponding blocks on the other side. It will be apparent how this has happened, and we can readily understand the curious errors in some of the old weaving -- as well as in some pattern drafts. Such variations deform the pattern and destroy its symmetry. It is simple enough to

correct them. The part of the draft marked xx, etc. appears particularly faulty. Some of the blocks are two-thread blocks and some four-thread blocks. Taking a pair of threads (inclosed in an oval) out of each of the blocks that appears longer than its corresponding block, the draft appears as at (d). The same pattern in a larger figure is given at (f). For this exercise use 10x10 cross-section paper.

The short way of writing drafts is, then, useful because it takes up less space than the graphic way. It is ambiguous at times owing to the fact that it gives no hint as to which thread of a given block should be threaded first, and in that it ignores the overlapping thread. It is this peculiarity that causes blocks on the ascending side of the return to be either two threads larger or two threads smaller than corresponding blocks on the descending side.

There are several other systems, in occasional use for writing drafts. The following, for instance, which has very little to recommend it except that it may be written on the typewriter: A "Blooming Leaf" pattern: 1,4/3; 1,2/1; 1,4/3; 1,2/3; 2,2/1; 1,4/1; 2,4/3; 4,2/3; 5,2/1; 4,4/1; 5,4/3; 1,2/3; 2,2/1; 1,4/1; 2,4/3; 1,3/1; 1,4/3; 1,2/3; 1,4/1; 1,3/3; 1,4/3; 2,4/1; 1,2/1; 2,2/3; 4,4/3; 5,4/1; 4,2/1; 5,2/3; 1,4/3; 2,4/1; 1,2/1; 2,2/3; 1,4/1; 1,2/3; Repeat. It is safe to thread from such a draft if it happens to be written correctly, but it is very confusing. Such a draft should be expanded graphically and examined for errors before being used. The system though obvious is not logical. Each of the peculiar mixed fractions represents a block of the pattern thus: 4&3 once 2&1 once, etc. The numerator of the fraction indicates the thread to be threaded first. Thus the first few threads of this pattern are to be threaded in the following order: 4,3,2,1,4,3,2,3,2,1,2,1, etc. The same system a little differently expressed as follows: 1(4-3), 1(2-1), 1(4-3), 1(2-3), 2(2-1), etc. etc., is sometimes encountered. These drafts are read from left to right, though threaded from right to left. All these puzzles should be expanded to the graphic form and transposed to the 1&3, 2&4 tabby if necessary.

As exercises it would be well for the sake of practise to make most, if not all, of the drawings suggested; moreover, present quite unusual patterns, that there will be plenty of occasion to use on the loom.

For making graphic drafts, cross-section paper divided 10 to the inch both ways is the best paper to use.

It is not much more difficult to write drafts from a diagram of a pattern, sample of weaving or a clear photograph than it is to develop a pattern on paper when the draft is given. Diagram 12 gives a drawing of a simple form of the "Lover's Knot" pattern. The limits of the paper do not allow showing two repeats of the pattern at the scale of 16 threads to the inch, but it is clear enough. The repeat is marked on the drawing by ruled lines. Of course the repeat may be arranged differently -- to begin, say, in the center of the large star and run to the center of the next

large star. It makes no difference, except in convenience in arranging the pattern on the loom, where one begins and ends the draft, providing the entire series of blocks composing the pattern is included. It is usually a good plan to begin the draft with one of the "returns" of the pattern. However, in that large group of patterns consisting of a plain square composed of two alternating blocks, in a checker-board effect, together with a freer figure -- of wheels, roses, or what not -- it is best to begin the draft with the plain square rather than in the middle of the other figure. To return to the "Lover's Knot" problem: the place suggested to begin the draft is the "return" in the center of the small star at the upper right hand corner of the repeat as laid off by the ruled square. It will be apparant at a glance that this must be a block of three threads. It makes absolutely no difference on which of the pattern blocks these three threads are written. Suppose we decide to begin with 1&3; then the first three threads will be either 1,2,1, or 2,1,2. Suppose we write them 2,1,2 -- 1 being the middle thread of the return -- then the next block will have to be written on the 2&3 block to allow the last thread -- 2 -- of the first block to become the first thread of the second block. This second block following the diagonal appears to be a seven thread block. It will, then, be written: 2 (already down) 3,2,3,2,3,2. The third block is a six-threads-block on the same shed as the first, as it weaves when the first block does -- 1&2 -- it will be written 2 (already down) 1,2,1,2,1. The next is a six-thread block that is neither 2&3 nor 1&2. As the last thread of the third block was 1, and this must be the first thread of the next block, it is plain that the block must be written 1 (already down) 4,1,4,1,4. In the same way the next block will be found to be a 3&4 block of six threads, and the next a 2&3 block. Follow the diagonal that starts with the first block in the upper right hand corner of the repeat down to the same block in the lower left hand corner, taking each block in succession. It is really very easy. After putting the first block on a particular pair of harnesses the rest follows logically. Remember always that the blocks overlap by one thread. The blocks follow one another in regular succession except where they "return". Thus after writing 1&2 followed by 2&3 the third block must be either 1&2 again or 3&4. After 3&4 comes either 2&3 again or 1&4. After 1&4 comes either 3&4 again or 1&2 -- and the circle is complete. With these suggestions, work out the entire draft of the "Lover's Knot" pattern, and "prove" your results by working out the pattern on cross-section paper, using your draft, and compare it with the drawing on Diagram 13.

Writing a draft from a sample is just as easy. Decide on which block to begin your draft, count the number of threads under it and write these threads on any one of the four pattern sheds; write the next block on an overlapping block, etc., until the pattern finishes, and is ready to start over. There is no more to it than that.

Writing drafts from photographs is a little more difficult as the pictures are rarely large and clear enough to permit counting the threads. If it is remembered that the smallest possible block consists of two threads -- or three on returns -- and

that the largest are rarely more than fourteen threads, it will not be difficult to arrive at a fairly accurate result, by writing two or three threads under the smallest block in the pattern and making the others in proportion -- twice, three times, four times, as large as the case may be.

The first rough draft should be developed on squared paper and any changes made that appear necessary. Two photographs are inclosed. Anyone wishing more exercise in this part of the work may try writing drafts of any of the four harness patterns in Mrs. Hall's book; those opposite pages 68, 110, 150 and 250 are suggested to begin on.

Nothing much has yet been said about the patterns that are not woven "as drawn in". Most of these belong to the "Whig Rose" or to the "Snow Ball" families of patterns. These patterns though still written to twill are woven in such a way that the diagonal does not appear. Diagram 13 show a simple star figure commonly found as an element in a large pattern. The same threading, woven in a different order produces the rose pattern at (b). The "Single Chariot Wheel" draft given at (a), Diagram 9, may be woven rose fashion for the large star figure that forms the center of the circle weave: 4, 7 times, 3,8; 4,2; 3,8; 4,7; 1,3; 2,4; 1,3; 4,3; 3,3; 2,3; 2,3; 2,3; 3,3; 4,3; 1,3; 2,4; 2,3; This will produce a quite different pattern from the one resulting from following the threading draft. Several of the weavings suggested in connection with the "Honeysuckle" pattern, Diagram 3, are on this order. Such patterns are a little more difficult for a beginner in draft writing, but are simple enough when one understands how they are produced. A small pattern of this order is given at (c) diagram 13. By following the diagonal line drawn through the pattern, quite as was done with the "Lover's Knot" pattern, it should not prove difficult. The first block of the draft is the small three thread block under the center of the rose figure, the second is a five thread block under the half-tone space numbered 2, and so on.

The "Whig Rose" coverlet pictured in Mrs. Hall's book is a very poor example of this famous pattern, and Mr. Worst's, though better, is not this pattern at its best, either. It will, however, be a good exercise to write the draft of the one in the coverlet book. This pattern is often encountered.

There is another special type of pattern that requires further explanation -- the type of pattern that is not written to twill. The "Monk's Belt" pattern -- Diagram 4, lesson 2, belongs to this group. The pattern consists of two blocks only, so that the pattern thread makes skips either over or under the tabby foundation and does not tabby at all. There are no half-tone blocks. The effect of the pattern is very distinctive -- much sharper and clearer than in the type of pattern previously described. A great many two-block patterns in this manner are in use. "Window Sash", "Youth and Beauty", etc. A small pattern of this sort is illustrated on diagram 14. The two sheds used for the pattern are 1&2 and

3&4 -- opposite shed, 1&2 is 3&4 reversed These blocks, of course, do not overlap. In writing such a draft care must be taken to preserve the tabby. Four treadles only are required in the tie-up.

These patterns in their pure form are usually of Scandinavian origin, though some of them appear quite frequently in the old American weaving. There is also a type of pattern in which the two blocks composing one figure in a four-block pattern -- such as a star, a rose, or a checker-board square -- are written on opposites. The effect of such a pattern is extremely beautiful -- more subtle and at the same time more brilliant than in the usual writing. The figure stands out clear and sharp against a plain tabby background on a half-tone foundation. Four-block patterns in this kind of weaving are usually written for eight harnesses, though they may be produced on six by a system of my own devising. (See Diagram 16). They are sometimes attempted on four harnesses. This is always a make-shift, though often a clever one. A very large number of the old patterns are written either entirely or in part in this fashion. In some of them the "accidentals" resulting from jumping from one block to its opposite are very disfiguring, while in others they are so cleverly arranged that they add to the interest of the pattern. Diagram 14 illustrates several patterns written on opposites. At (a) is shown a Scandinavian two-block pattern, sometimes called "Window Sash". The tie-up, it will be noted, is for four treadles only. At (b) is shown a simple star pattern -- the same as (a), Diagram 13, written with each of the two small figures of which it is composed on opposites. By comparing this with Diagram 13 the difference in effect is plain. At (d) is given a Scandinavian two-block pattern and at (e) a simple four-block pattern sometimes called "Doors and Windows". No drafts are given for these. By examining carefully the draft of (b) diagram 14 the reason for the accidentals will be clear. Note also the extra thread necessary (at thread 13, marked by an arrow) in order to preserve the tabby when changing from one figure to the other. This happens regularly when patterns are written in this way. It may be avoided by making the center of each figure a three thread block instead of a two-thread block as is done at (b). The draft at (b') is the usual way of writing such a draft, and the pattern is developed from this one. It would be well to develop the (b) draft and note the difference. The pattern illustrated at (d) might be corrected in the same way.

A great many patterns that consist of two-block figures show one figure written on opposite and the other figure written to twill. The effect is often very charming, though never logical. Such a pattern is "Lee's Surrender", a draft of which is given at (a), Diagram 15. In this pattern the plain checker-board square is written on opposites, while the rest of the pattern -- the "Sunrise" feature and the square composed of stars -- is written in the usual way. Its peculiar effect to the same arrangement, except that in this pattern the center of the diamond figures is also put on opposites. The Honeysuckle pattern is like the diamond figure in Pine Bloom except that "Honeysuckle" is written strictly to twill.

By comparing Diagram 3 with "Pine Bloom" as illustrated opposite Page 76 in Mrs. Hall's book the difference in effect will be made plain. The writing of drafts with this element should now be easy enough. And also the treadeling of such a pattern from the draft. "Old South County" and "Gentleman's Fancy", Diagram 15 show the same feature.

Diagram 16 illustrates the method of writing four-block patterns "on opposites" for six or eight harnesses. The eight harness drafts for the two diamond patterns (illustrated at (b) and (f) Diagram 9) are given at (a) and (b), Diagram 16. At a' and B' are given six-harness drafts of the same patterns. It will be noted that the eight harness drafts are written with an even number of threads under each block, while the six-harness drafts have an odd number of threads. Thus the six-harness pattern will always be either a little larger or a little smaller than the corresponding eight-harness draft. The effect of the weaving is entirely similar, as may be proved by developing the drafts on cross-section paper. An eight harness and a six-harness draft of the "Single Chariot Wheel" pattern are given at (c) and (c'), while (d) and (d') give eight and six harness drafts of the little star figure illustrated at (a) Diagram 13 and at (b') Diagram 14. The pattern is shown developed from the eight harness draft.

Any of the four-block overshot patterns may be written in this fashion. The effect is very beautiful.

- - - - -

The designing of borders is a part of weaving often neglected even by experienced weavers. A good border adds very greatly to the effect of a coverlet, table-cover, couch cover, or what not that is to be woven. A diagonal threading like (a), (b) or (c), Diagram 8, makes a monotonous and rather stupid border. For some very large patterns, however, it adds the necessary stability. Which of these threadings to use depends on the size of the blocks of the pattern. As a rule the border should consist of blocks the same size as the smallest blocks of the main pattern. The diamond threading is probably the most useful threading for borders. It fits appropriately with almost all patterns. In using it -- or in fact any border threading -- with patterns woven rose-fashion instead of as drawn in, care must be taken to weave the bottom and top borders to conform with the borders on the sides. A study of Mr. Worst's book will demonstrate the poor results consequent on overlooking this point.

For some of the wheel patterns a border threaded on two blocks is often excellent. Unless some part of the pattern is written on opposites these two blocks should not be on opposites either, but in the other case, may very well be written so. The very pleasing border shown at figure 121 of Mr. Worst's book in connection with a pattern which he does not appear to have recognized as "Pine Bloom" is such a border. His figure 119 shows the twill threading in a very uncompromising form -- and incorrectly

woven besides.

Small, simple patterns need an elaborate border. The "Dog Tracks" coverlet shown on Page 60 of Mrs. Hall's coverlet book is a good example. The corner shows a "Sunrise" feature, often used for elaborate borders. "Sunrise" figure that forms a part of the "Lee's Surrender" draft at (a) Diagram 15, may be enlarged and used as a border in the same way. Of course for use as a border care must be taken to make the draft conform to the particular pattern with which it is to be used in the matter of "return". The "Double Bow Knot" threading may also be used as a border, or the large wheel figure out of "Lover's Knot" -- either alone or repeated to form a group of four large wheels in the corners. For table-runners and rugs such a border, forming a large and interesting figure in the corners, with a small, simple figure across the center is particularly attractive. For coverlets, on the other hand, a more interesting treatment of the main body and a compact and simple border is to be preferred. Something has already been said on this point in Lesson 3.

It becomes apparant that with no limitation -- except that some effects may be unpleasing -- any pattern may be used with any other pattern as a border, provided both are to be woven as drawn in, and they are made to conform in the matter of points of "return". Of course the two patterns selected to be used together should be one a large pattern and one a small, otherwise there will be no contrast and the effect will be confusing. Weaving the border as drawn in till the corner is square carries the bottom border across the pattern; the side border -- altogether similar -- follows from weaving the pattern as drawn in.

- - - - -

Altering patterns to fit the requirements of the moment is sometimes a trying bit of business. In increasing or decreasing a pattern the proportions of the figures must be preserved or the effect may be quite different from the effect desired. It is never safe to thread a doctored draft into the loom without first trying it out on paper to see if it is right.

In arranging a pattern for a coverlet it is wise to choose the center of the smallest figure for the center of the coverlet. A seam is then almost invisible, while it shows up very badly if it runs across a large block. Coverlet borders may vary a good deal in width, but should rarely be less than 12" wide. For table-runners a border should never be more, though it can be less, than one-fourth of the entire width. These are not hard and fast rules, of course. The only real rule is that anything that looks well is right, and that anything that looks displeasing is wrong. The foregoing are merely hints, the result of experience.

Diagram 16 gives at (a) and (b) the eight harness threading and tie-up of the four block diamond patterns illustrated on Diagram 9. (a) is the diamond with one return -- "Russian Diaper" -- and (b) is the diamond with two returns. (a') and (b') give the six-harness threading and tie-up for the same patterns. It will be seen that the six-harness patterns will be either longer or shorter than the eight-harness drafts as the blocks are composed of an odd number of threads. The effect of the weaving will, however, be entirely similar. The drafts at (c) and (c') are the "Single Chariot Wheel" pattern given for four-harnesses at (a), Diagram 10 and exhibit the same peculiarity. The draft at (d) is the small star figure illustrated at (a) diagram 13 and at (b'), Diagram 14, written on eight-harnesses. The difference will be plain on study. At (d') is given the sixharness draft on the same number of threads as (d) -- obtained by making some blocks of the pattern one thread less and some one thread more than at (d). Any four block pattern may be written in this fashion.

One sees occasionally old pieces of weaving composed of six blocks that twill as in ordinary four harness patterns. These were probably produced on six harnesses, the blocks as follows: 1&2, 2&3, 3&4, 4&5, 5&6, 1&6 -- tabby 1&3&5, 2&4&6. No detailed description of this process is necessary as it is in all respects similar to four-harness weaving. The tie-up is as follows: first treadle 1&2&5, second treadle 2&3&6, third treadle 3&4&1, fourth treadle 4&5&2, fifth treadle 5&6&3, sixth treadle 1&6&4, tabby as noted above. Try designing a six-block diamond or diaper pattern on this system and work it out on squared paper. The effect is quite unusual and pleasing. A pattern on the "Lover's Knot" variety composed of three instead of two stars -- a large one, a middle sized one and a small one -- using two blocks for each star -- makes an interesting pattern. Write the draft for such a pattern.

Eight harnesses might, of course, be used to produce overshot patterns of eight blocks in the same way. I do not happen ever to have come across one in the old weaving. They would probably be uninteresting, as there would be an undue amount of half-tone and not enough overshot for effective results.

Copyright, 1922.
 Mary M. Atwater,
 Seattle, Wash.

SHUTTLE CRAFT COURSE IN HAND-WEAVING

Section III

Lessons: 5-6-7-8

Copyright 1922,
Mary M. Atwater
Seattle, Wash.

SHUTTLE-CRAFT COURSE IN WEAVING

Section III Lesson 5.

The lessons in this course have, so far, dealt with two weaves only -- the plain weave, and the four-harness "overshot" weave. It is entirely possible to confine oneself to these two weaves and produce a great variety of woven articles. The pattern possibilities in four-harness overshot weaving are -- practically -- unlimited; and plain tabby weaving, if one includes tapestry work, offers opportunities for a life-time of study. It may seem unnecessary to adventure further. However, there are many textiles -- such as linen toweling, loosely woven all-wool blankets and scarfs, material for clothing, etc., etc. -- for which neither the tabby nor the overshot method of weaving are ideal.

The variations in patterns produced in overshot weaving depend on the elaborately varied threadings. The tie-up is the same throughout and the treadeling follows from the threading. The weaves presented in the present lesson are of an entirely different character. The threadings are very simple -- repeats of eight, sixteen, even of only four threads. The great variety of effect depends in the first place on the changes in tie-up to the treadles, and in the second place, treadeling. Many of the threadings given are similar, and some are identical, but the effects of the various weavings are very different.

It is, of course, not possible in the limits of this lesson to cover more than a very small part of the subject of this type of weaving. The "Rose-path" threading, for instance, given at (a) diagram 9 and in slightly modified forms at (n) Diagram 8, at (a), (b), (c) and (f) Diagram 19, at (d) and (e) Diagram 20, etc., may be woven in so many different ways that a whole book could easily be devoted to it. This and the "Monk's Belt" threading given with Lesson 2 are the foundations of a very large part of the Scandinavian weaving.

There are a number of excellent Scandinavian books on weaving that may be obtained in this country. The best of these that has come to my notice is "Haandbok i Vaevning" by Caroline Halvorsen, J. W. Cappelens, Kristiania, publisher. The excellent diagrams and illustrations are perfectly clear to a weaver even though the language may not be.

The weaves selected for this lesson are largely threadings -- possibly of Scandinavian origin -- found among Colonial linens and Colonial all-wool blankets.

DIAGRAM 17.

The method of hanging three harnesses in a counter-balanced loom, and also the method of hanging more than four harnesses are illustrated at (a), (b), (c), (d), and (e). The doing should present no difficulties. In taking one harness out of a loom arranged for four harness work it may be simpler to leave the small front roller in place, and attach to the front harness both ends of the cord that pass around the roller.

A heavy warp, sleyed far apart -- about 8 threads to the inch -- is best for the weave given at (f). If a fine warp is used, thread it double and sley it 20 to the inch. The carpet warp left on the loom after completing lesson 3 will do very well for this exercise.

In this weave the warp should be entirely hidden. On carpet warp sleyed 8 to the inch as suggested a three-ply woolen yarn or four-fold Germantown yarn works very well, with a very heavy mercerized cotton for tabby. On a fine warp, threaded double and sleyed 20 to the inch, fine woolen yarns or heavy silks may be used. For hand-bags this is very beautiful.

If desired to use this weave for borders on smocks of any material where a fine tabby is desired, the threading given at (f'') should be used, -- in fine thread, sleyed 20 or 24 to the inch. The weaving with the tie-up given and the A,B, tabby will be exactly the same as the weaving done on (f) threaded double. For fine tabby use the C. and D, treadles. A study of the Diagram will make this clear.

The threading at (f') is the same as (f) except that the skips are shorter. This pattern on the six-treadle system may be produced by using the eight middle threads -- from 4 to 12, as indicated -- of threading (f''). For curtain borders this is charming.

The threading and weaving as given at (f) is extremely good for portieres. It is also good for long, round pillows -- square pillows are better in some other weave. Rugs may be woven on it in rug yarn -- rags or cotton roving do not weave well in this fashion. Portieres in silk rags might be successful. For a rug, in order to get a sufficient strength of warp, thread double and sley 12 to the inch.

The treadeling as given on the draft is intended to be used with a tabby in the usual way. But this threading may also be woven on opposites, without a tabby, in the same way as indicated in the treadeling of (g), thus the treadeling for the first little border -- (f) (1) would be as follows:

Treadle 1,	dark	thread	3	times,	treadle 3,	light	thread,	between
"	2	"	"	3	"	4,	"	"
"	3	"	"	3	"	1,	"	"
"	4	"	"	3	"	2,	"	"

This method of weaving produces a heavier and more gorgeous effect than results from weaving with a tabby. It is, however, somewhat difficult to manage. The yarn must be allowed to lie very loose indeed in the shed or the edges will be drawn in, and it is necessary to be very careful to pass the shuttles over each other in the proper order along the selvage or the picks will pull back from the edge as there is no tabby to hold them. Four or eight selvage threads should be sleyed twice as close together as the rest of the warp, or the edges will be very bad.

In weaving a long stripe on the same pair of shed -- as between (5) and (6) on the diagram -- it is sometimes advisable to put in a tabby shot after each four or six pattern shots, simply to keep the warp threads from drawing together too much under the long skips. Of course when using threading (f') this is unnecessary.

The three harness weave offers an opportunity to use a great number of colors in the same piece of work. Most striking and gorgeous effects are possible. No weave -- except, perhaps, "Rosengang, which it resembles -- depends so much on the artistic ability of the weaver. The following suggestions are intended, not to be followed closely but simply to indicate the method.

A Girdle or a Hat-Band, to be woven in strips and sewed together
 Tabby heading to roll or hem -- 1" or 1-1/2"

treadle 1,	light	blue,	3	times,	tabby	between
"	2	"	"	3	"	"
"	3	"	"	3	times 1,	black, between
"	4	"	"	3	"	2
"	3	black	3	"	1	orange, "
"	4	"	3	"	2	"
"	3	orange	3	"	1	dark blue between
"	4	orange	3	"	2	"
"	3	dark blue	3	"	1	dark blue "
"	3	"	"	3	"	1 yellow "
"	3	"	"	3	"	1 dark blue "

center, weave back to the beginning.

A Hand-Bag

From 4" to 6" plain tabby for, top of bag.
 (X) Treadle 1, blue, 2 times, tabby between
 Tabby eight times
 Treadle 4, orange 2 times, tabby between
 " A, green once,
 " B, " 2 times, A, tabby thread, between
 " A, " once
 " 4, orange, 2 times, tabby between
 tabby eight times
 treadle 1, blue 2 times " "
 tabby four times.
 treadle 3, brown 2 " treadle 1, brown, between
 " 2, " once, " 4, orange
 " 2 " " " 4 green
 Center of small border. Weave back to (X)

(Y) Tabby eight times.
 treadle 4, blue, 2 times. tabby between
 tabby eight times.
 treadle 1, brown 2 times, tabby between
 Repeat from (Y) four or five times.

Tabby eight times after last row of dots, then
 treadle 4, brown 3 times, tabby between
 " 3, " 3 " " "
 " 2, " 3 " treadle 4 brown, between
 " 2 brown 2 " " 4 orange, "
 " 2 " 3 " " 4 brown "
 " 3 " 25 " " 1 blue "
 " 2 " 3 " " 4 brown "
 " 2 " 3 " " 4 orange "

(Z) " 3 " 3 " " 1 green "
 " 2 " 3 " " 4 " "

Repeat from (Z) as often as desired for bottom of bag.

The threading at (g) is clear enough as shown on the Diagram.

For a Portiere weave about 3" tabby for heading, a small border as at (3) tabby eight shots three rows of dots with tabby between using treadle 1 for first row, treadle 4 for second row, treadle 1 for third row, tabby eight shots, then a broad border as follows:

Border (1) of the draft, border (7), border (2) omitting the final "1, 3 times", border (5), a long stripe for the center and repeat borders as above in reverse order.

Above this broad border weave the main part of the portiere in plain tabby weave, with a narrow border every twelve inches or so, or else in a plain tabby weave, relieved at intervals with three rows of dots -- other ways will suggest themselves -- ending with a border similar to but narrower than the wide border made for the bottom. If it is desired to have the top of the portiere hang over a rod on the right side of the curtain this border should be woven wrong side up, which may be done by weaving the opposite of the first border.

This matter of "opposites" is, perhaps, not perfectly clear. If treadle 1 is down the second harness will be depressed and harnesses 1 and 3 will be up. It is obvious that when the first and third harnesses are depressed 2 will be raised and we will have the "opposite" shed. In this tie-up 1 and 3, 2 and four and A and B are "opposites".

NOTES ON DIAGRAM 18

The threadings given from (a) to (k), inclusive are chiefly useful for all-wool tweeds or simple scarfs or baby blankets. Threading (a) indicates a warp arranged with two dark and two light threads, threaded for a simple tabby weave. When woven two dark picks or weft shots and two light picks -- the same number of picks to the inch as of warp ends -- a simple little checked pattern is produced. The threading at (b) -- three dark and one light, woven in the same order, produces a very different effect. Threading (c) is similar to the threading given at (d) diagram 6. If woven in the same order as warped -- one dark and one light shot alternately for ten shots, one light and one dark for the next ten, and repeat -- a pattern is produced of squares composed of horizontal and perpendicular stripes alternately. A rather interesting blanket might be woven in this fashion, but it is unsuitable for one of the loosely woven effect. The threading at (d) should be woven in the same order as warped. A little pattern of squares in three tones will result. If (e) is woven in the same order as warped, a plaid will result. The three symbols used -- Os, Xs and solid black squares -- are intended to represent threads of three different colors. Each repeat of the pattern will require ten threads of color O, six threads of color X and twenty-four threads of the third color. The threading at (f) may appear a little confusing. It consists of a series of groups of two threads -- lettered A -- a light stripe of six threads lettered B -- a broader stripe of dark threads of which the first and last are threaded double, a six-thread stripe like B -- lettered D -- and a broad stripe of dark threads, the first and last threads doubled -- lettered E. To complete

the repeat, follow E with B, repeat C. repeat D. This finishes the pattern. It is better to weave so large a pattern in one color. The effect will be a series of stripes. Woven as warped it would produce a very large plaid.

Any of these two and three colored warp arrangements may be threaded 1,2,3,4,1,2,3,4 etc., as shown at (i) and woven to twill by treadeling 1,2,3,4,1,2,3,4, on the tie-up indicated. The twill weave has been shown -- at (a), diagram 8 -- and needs no further description. It is worth while to note, however, that a tweed woven in a twill weave is a heavier and firmer cloth than the same material woven on the tabby or "hop-sacking" weave.

The (j) threading is a herring-bone -- shown before at (D') diagram 8 -- and repeated here for convenience. The tie-up and treadeling are the same as for the twill. This threading woven as shown at (d') Diagram 8 is the "Goose-Eye" pattern of so much ancient linen.

At (k) is given a six-harness threading which when woven: 1, 2, 3, 4, 1, 2, 3, 4, etc., on the tie-up indicated produces alternate twill and tabby stripes. These stripes may be warped in different colors if desired.

For tweeds a firm single-twist yarn is advisable. The different yarns vary so much in weight that it is impossible to say how close the warp should be sleyed -- from 24 to 30 threads to the inch. It is often necessary to experiment with a given material a little before deciding. For the checked and plaid effects in tabby weave there should be exactly the same number of weft threads to the inch as there are warp ends to the inch. In the twill weave the weft is set closer than the warp.

The threading at (l) is for an entirely different kind of weaving. Weave the first block: 1, 2, 1, 2, 1, 2, etc., as many times as desired -- 16 or 20 times -- in a very fine thread, packed close, so that the warp over the 1-2 block is entirely covered. Then tabby back and forth with a very heavy thread. Weave the second block: 3,4,3,4, 3,4, etc., to match the first block and tabby back and forth again with heavy thread. This may be woven one color. Some old white bed spreads were woven so. Or it may be woven in two colors -- the dark color usually in the fine thread and the heavy thread in white if the warp is white. The effect is of small ovals separated by wavy lines in the heavy thread.

The threading at (m) is intended to be woven in the same way. The first block woven: 1, 2, 1, 2, etc., -- the second block: 2, 3, 2, 3, etc. -- third block: 3, 4, 3, 4, etc., -- fourth block 4, 1, 4, 1, 4, 1, etc., with a tabby back and forth in heavy thread between blocks. Any pattern may be woven in this fashion, but patterns including many

small blocks are not effective. The pattern given is, of course, a "Diamond" threading with blocks of ten threads.

The effect of this weave is very curious -- a sort of lace-work. The fabric is, however faulty in that there are many long skips on the wrong side of the material, which can be used only for such things as pillow-tops or lined bags, where the wrong side will not be in evidence.

For this weave a fine warp should be threaded double, or a coarse warp set quite far apart, as otherwise the filling cannot be packed close enough.

The threading at (n) is the "Rose-path" threading again -- used this time in the production of tufted work. This is not, in my opinion, a very attractive method of decorating hand-woven textiles. There are so many less laborious and more beautiful methods. This diagram is included merely for the sake of completeness. One sees a good deal of tufted hand weaving made in Canada.

NOTES ON DIAGRAM 19

All the weaves given on Diagram 19 are intended to be woven with warp and weft of the same material. A wool warp may be used for any of these threadings, though (d) and (d') are not recommended for weaving in wool. All the threadings may be used for weaving linen. A linen weft may even be used on a cotton warp if care is taken to have the threads of the same weight. A fine linen warp should be sleyed 40 threads to the inch. For heavy blankets the wool warp should be set close, but for the soft scarfs so fashionable at present, and for the always useful and attractive baby blankets, or light blankets for a couch or chaise lounge, the warp should be set far apart. Four-fold Germantown yarn sleyed 10 threads to the inch and woven 10 "picks" to the inch makes an ideal light blanket. In this weaving it is necessary to be very careful not to beat too hard. A loose open weave is aimed at.

The threading at (a) diagram 19, is taken from an interesting old all-wool blanket in the Metropolitan Museum. This blanket was warped in many colors and woven in the same order producing an interesting effect. It was woven in the unusual manner noted on the draft. This threading may, of course, be woven in many other ways. No plain tabby is possible, but treadles 2 and 4 used alternately will give a double tabby -- two up and two down.

By weaving a double thread a coarse tabby effect can be produced.

Warping of Blanket in the Metropolitan Museum

Border:	8	threads	blue
	12	"	tan
	12	"	red
	12	"	blue
	12	"	red
	12	"	tan
	8	"	blue
	4	"	tan
	8	"	red
	12	"	tan
	8	"	red
	8	"	tan

(X)	32	threads	black
	8	"	blue
	48	"	red
	8	"	blue
	32	"	black
	8	"	tan
	8	"	red
	12	"	tan
	8	"	red
	8	"	tan

Repeat from (X) as often as desired.

In weaving follow the same order of threads.
Treadle as indicated on the draft.

The threading, tie-up and treadeling given at (b) produce an interesting open-work weave. Note the missed dents in the reed.

(c) woven in pink or blue on a white warp makes a charming baby blanket. Or it may be warped:

48	threads	--	3	repeats	--	white
48	"		3	"		pink or blue
160	"		10	"		white
48	"		3	"		pink or blue
48	"		3	"		white.

and woven in the same order.

Threadings (d) and (d') are intended for toweling. The diagram gives very little idea of the effect, which is characterized by long floats of warp on the surface. The treadeling for (d') is not given. It may very easily be worked out from the draft. The threading is sometimes called "Rain Drops".

At (e) is given a simple threading that may be woven in a great many ways. The tie-up indicated corresponds to the weaving shown at (3).

Threading (f) is an elaborate 10-harness blanket weave similar to the blanket illustrated in colors in the "Book of Hand Woven Coverlets", Page 138. The one in the book appears to be a 12-harness weave, but is very similar. Ten harnesses may be hung in a counter balanced loom by arranging them in two sets of five as shown at (c), diagram 17, the two top rollers hung from an additional large roller at the top of the loom. This is, however, somewhat awkward, and for more than eight harnesses a loom fitted with "Jacks" is advisable. In fact, this type of loom is the most satisfactory for all but the simplest weaving.

The "Goose-Eye" weaving shown at (d') diagram 8, and the simple weaving of "Rose-path" shown at (a), diagram 9 belong to this group of weaves, but are not repeated here.

Notes on Diagram 20.

All these weaves are to be woven with warp and weft of the same thread or yarn.

The weaves illustrated at (a) and (b) are very similar. They are intended for linen toweling, but may be used for baby blankets, as described above. The diagram gives very little idea of the effect of these weaves. The warp threads draw together under the skips, so that the effect is of rounded tabby areas separated by smaller solid areas. For blankets these threadings may be warped in one color and woven with another, or warped and woven in one color with borders in another color as previously noted.

The simple little threading and tie-up given at (d) has some interesting possibilities. Woven with a tabby and ornamented with the little border along the top and a broad band of other little figures illustrated for the bottom a very attractive hand-bag may be produced. This is a useful threading for curtains. A fine, firm warp should be chosen, sleyed about 24 threads to the inch and woven in plain tabby weave for the plain scrim part of the curtain. The borders should be woven on opposites without a tabby, using only the 1 and 2 treadles, either in one color, or in combinations of color. A band of this weave in tabby thread should be woven on each side of the colored border. Nothing could be simpler, and the effect is excellent.

The threading at (e) weaves a honeycomb effect, not in the least indicated by the diagram. It should be woven, as a rule, in the same color both ways but a plaid effect is sometimes nice.

The threading at (f), though an eight harness weave, is extremely simple, and is one of the best for baby blankets. For linens and toweling it is also excellent. Two additional treadles tied 1, 4, 6, 7 and 2, 3, 5, 8 respectively will give a plain tabby weave on this threading.

Articles to be submitted for criticism:

- (1) A sample of three-harness weave C— a runner, portiere or bag — using threading (f), (f') or (f'') as desired.
- (2) Sample of tweed, or a woolen scarf, on one of the threadings (a) - (k), Diagram 18, or a bag in lace-weave.
- (3) Article woven on one of the threadings given on Diagram 19 — runner, towel or table-cover in linen or linen and cotton, or a woolen scarf or baby blanket.
- (4) Article as in (3), or a curtain using one of the threadings on Diagram 20.

Copyright, 1922
Mary M. Atwater
Seattle, Wash.

SHUTTLE-CRAFT COURSE IN WEAVING

Section III Lesson 6

Of all the old Colonial weaves, none is to my mind as satisfactory for the weaving of coverlets and rugs as the so-called "Summer and "Winter", or "Doubleface" weave.

It is by no means as commonly understood as the more usual "overshot" type of weaving -- perhaps because all but the simple two-block patterns require more than four harnesses. However, the hanging of an additional pair of harnesses should present no great difficulty to anyone, provided the loom used has sufficient head-room to allow of the additional roller. In other respects the "Summer and Winter" weave is really easier to manage than "overshot" weaving. It is more logical, for one thing, and therefore far easier to thread into the loom and to check up. Moreover it is a close weave. There are no long "skips" to catch and pull, so that the wearing qualities of the fabric are much greater than in overshot weaving; also there is much greater freedom in the matter of design, as there is no limit to the practicable size of the blocks; solid borders all around, and detached figures are possible; any of the patterns for "double" weaving may be followed in "doubleface" -- for instance, the various forms of the celebrated "Pine Tree" border; finally the wrong side being the exact reverse of the right side, is just as beautiful. In fact, there is some difference of opinion as to which is the right side of this weave.

MATERIALS

Less material is required for this weave than for over-shot weaving, and the resulting fabric is -- of course -- just so much lighter. This is an advantage or a disadvantage, as one chooses to regard it. Three pounds of woolen yarn are sufficient, as a rule, for a coverlet in this weave. The warp should be heavier, and the woolen yarn finer than usually selected for overshot weaving; in fact, the yarn should be of about the same size as the warp, and the tabby thread a good deal finer than either.

The old coverlets in this weave were usually woven in a "single-twist" or a fine two-ply yarn on a fairly heavy warp, sleyed 24 or 26 to the inch. Shetland and fine Saxony yarns do very well in lieu of hand-spun single-twist yarn. Heavy warps -- carpet warp, or mercerized warps of about the same weight as carpet warp -- should be sleyed 20 threads to the inch and woven in fine yarns, -- or -- sleyed 16 to the inch -- woven in heavy knitting yarns or four-fold Germantown. For rugs in rags or rug-

material of any sort the warp may be threaded double and sleyed double -- eight or ten double threads to the inch.

STRUCTURE OF THE "SUMMER AND WINTER" WEAVE

The "Summer and Winter" weave differs from the weaves so far studied -- as mentioned above -- in that there are no long skips. The pattern thread is closely tied in the fabric. Across the blocks of the pattern the pattern thread passes over thread warp threads and under the fourth all the way. Across the half-tone or background spaces it passes under three and over the fourth. Expressed differently, the pattern thread simply passes over and under the tabby foundation, being tied in every fourth thread. It will be plain that the smallest block in this weave consists of four threads, and that there is no other limit to the size of the blocks except the width of the web.

In order to produce the effect described above, half the warp threads are threaded alternately through the first and second harnesses. These threads constitute the ties. For any pattern in this weave they are threaded the same way -- 1, 2, 1, 2, 1, 2, etc., alternating with threads threaded through the other harnesses to produce the pattern.

There must be a separate harness for each block of the pattern. It follows that only two-block patterns may be woven on a four-harness loom. A three-block pattern requires five harnesses, a four-block pattern six, and a five-block pattern seven, etc. etc. Two ties -- a 1 and a 2 -- and two threads on one of the pattern harnesses constitute the smallest possible block -- the unit for this weave.

At (a), Diagram 21, is given the threading draft for the simplest possible pattern in this weave, two blocks or units, of four threads each. The first thread of each block is threaded through the number 1 harness. This is true for all blocks of all sizes in this weave. I have lettered the units (x) and (y).

The tie-up is made to six treadles but the system is different from that used in overshot weaving. Treadles 1 and 2 in the tie-up draft are used for weaving block (x), and treadles 3 and 4 for weaving block (y). The tabby treadles are shown at the right, and lettered A and B as in the overshot drafts, but the A treadle is tied to draw down harnesses three and four while treadle B is tied to draw down harnesses one and two.

- - - - -

Many of the patterns in this weave are very large, involving several hundred threads. A graphic draft written in the manner used so far -- a black dot for each warp-end -- is sometimes unwieldy and confusing. I have adopted a simplified system in which each dot represents, not a single warp-end, but

a unit of the weave -- four threads. At (a'), Diagram 21, is given the same pattern as at (a), written the shorter way, with one dot for unit (x) and one dot for unit (y). A study of the diagram should make this perfectly clear. At (b) of the same diagram is given the draft of a more elaborate two-block pattern, written the long way, and below it at (b') the same pattern written in the short way. Below (b') is the pattern as developed from this draft. It is shown at the scale of 32 threads to the inch -- a good deal smaller than it would be as usually woven. At (c) and (c') are given the same pattern-- or rather a part of it -- developed at the scale of 16 threads to the inch, showing the half-tone effect of the back-ground. This is the exact size the figure would appear if woven on a heavy warp, as described above.

All the remaining drafts in this lesson are written in the short method. The figures above the draft give the number of units in each block. To arrive at the number of threads required for each repeat of the pattern, add the number of units and multiply by four.

It is very easy to do the work of "drawing-in" from one of these short drafts and it is easy to check up the threading. In a block of one unit there are, as we have seen, four threads: a 1, a 2, and two threads on the indicated pattern harness. A six-unit block consists of six 1's, six 2's, and 12 on the pattern harness. Each block begins on 1 and ends on a pattern harness, while the next to the last thread is always a 2.

The drafts given on Diagram 22 are all two-block patterns and may be woven on four harnesses. The student is advised before threading a draft into the loom to develop it on cross-section paper as shown below (b'), Diagram 21 -- ignoring the half-tone effect, as this is always the same.

WEAVING

At (c) and (c'), Diagram 21, are given the two treadlings possible in this weave. It will be seen that each unit of the pattern is woven with four shots -- or "picks" of pattern thread -- and, of course, four of tabby. The weaving at (c) is the correct way of weaving, but unless the yarns are exactly the right relative weights for the spacing of the warp the figures of the pattern will be distorted -- either drawn out unduly long or else not long enough. Each block of the pattern should be woven as nearly square as possible. In case of difficulty, the pattern may be woven in the manner shown at (c'), and more or fewer than four pattern shots may be woven over each unit. By this method it is possible to use a heavy yarn on a fine warp, using two pattern shots instead of four.

The method shown at (c) is called weaving the pattern "in pairs", and the (c') method is called weaving "one and one".

It is impossible to show on the diagram the textures of the half-tone backgrounds. Two very different textures are possible when weaving "in pairs", depending on which tabby is used between pairs. In my opinion, the right side of the weave is the side showing the pattern in wool, and the background effect of a little diamond diaper weave should be on that side. Most of the ancient coverlets in this weave that I have examined have been done in this way. To produce this effect the "A" tabby should be used between pairs. Remembering that it is always best to let the tabby run ahead of the pattern in weaving, we would, then, begin weaving (c) as follows:-

Tabby heading as usual -- the last shot of the heading being an "A" shot, from left to right.

First Block (x):

treadle 1, pattern thread, from left to right
 tabby "B"
 Treadle 2, pattern thread, right to left
 tabby "A"
 treadle 2, pattern
 tabby "B"
 treadle 1, pattern
 tabby "A"

Second Block (y):

treadle 3, pattern
 tabby "B"
 treadle 4, pattern
 tabby "A"
 treadle 4, pattern
 tabby "B"
 treadle 3, pattern
 tabby "A"

These two blocks are units (x) and (y) as shown on the draft.

I have entered into this matter in such detail because it is on getting this sequence exactly right that the success of the weave depends. All patterns are woven in exactly the same way.

As each unit in the weaving begins and ends with the same treadle, it is apparant that on repeating the unit for a large block the pattern shots will follow each other in pairs:

(x) doubled will be as follows:-

treadle 1, once
 " 2, twice
 " 1, "
 " 1, "
 " 2, "
 " 1, once

Each block begins and ends with a single shot which

pairs with the last shot of the preceding and the first shot of the following block.

In the tie-ups as given, each block is woven on two treadles -- the treadles with the odd numbers, 1, 3, 5, being the ones to begin and end on. It will be seen by an examination of the weave that each unit produces a little x-shaped figure and that the first and last shots extend one thread on each side beyond the middle shots. The long shots are on the 1, 3, 5, sheds and the short ones are on the 2, 4, 6, sheds. It is well to remember this in case of becoming confused as to which shot comes next.

DIAGRAM 22

All the drafts given on Diagram 22 are two-block patterns and may be woven on four harnesses. The student is advised not to thread a pattern into the loom without first developing it on cross-section paper as shown under (b'), Diagram 21. The half-tone effect may be omitted because it is entirely regular, and the same in all patterns in this weave. At (a) is repeated for convenience the threading given at (a), Diagram 21. Used by itself it would produce a small diamond effect -- not very interesting -- but it makes a suitable border for any pattern in this weave. (c) is the familiar "Monks Belt" pattern, drafted for this weave. (d) and (g) are large patterns that are very nice for large pieces of work. They will be referred to again later.

DIAGRAM 23

Diagram 23 was designed to show how a simple pattern motif may be used in different ways. Any pattern motif may be varied thus. Any of the drafts given on Diagram 22 might be used for striped borders, as the pattern at (a) Diagram 23 is used at (b1) and (b2). Some of them, of course, are too large to be used so, but there is no other difficulty. Any of the drafts on Diagram 22 may also be used as striped borders for any other pattern after the fashion shown at (a) Diagram 23.

At (a) is shown a small two-block threading that repeated, will produce a pattern like the middle figures of the two patterns as worked out below. The tie-up, repeated for convenience, is the same as the tie-up at (a), Diagram 21, which is the tie-up for all two-block patterns in this weave.

At (b) is given the same pattern with the first little figure of seven units repeated on each side of the large block. This may be used for the weaving of borders in a solid stripe all around. Two entirely different stripes may be woven -- as illustrated -- by making the tie-up as shown at (b1) or (b2). If the (b1) stripe is chosen the center of the warp, between the borders, should be threaded as a long block on the third harness. If the (b2) stripe is chosen, the center should be threaded on the fourth harness. The stripes across the top and bottom of the work should be woven in either case, on the 3 and 4 treadles, and the

stripes along the sides on the 1 and 2 treadles, as follows:-

Border (b 1)

treadle 1, once	(continued)
2, twice	1, once
1, "	2, twice
2, "	1, "
	2, "
3, once	1, once
4, twice	X-----
3, once	3, once
	4, twice
1, once	3, "
2, twice	4, "
1, once	3, "
	4, "
3, once	3, "
4, twice	4, "
3, once	3, "
	4, "
	3, "
	4, "
	3, once

Repeat from beginning to X---

This finishes the corner and the bottom border. For the center, weave:

1, once
 2, twice) Repeat as desired, - till it is time to put
 1, twice) in the top border.

The treadeling for (b 2) is similar, but not exactly the same, of course, because the stripe is different. The student is left to work it out, which should be simple enough with the notes given.

At (c) the same pattern motif is shown with a border threaded on an added harness. If woven "as drawn in" on tie-up (c 1), the result will be a solid square in the corners and the little two-block pattern in the middle with an open border on all sides.

The draft at (d) shows this threading simply doubled, and a border added. The tie-up is the same as (c 1). This pattern - developed - is shown at the bottom of the diagram. It is a very beautiful pattern for coverlets, pillow-tops, portieres, etc. Pattern (c) woven on the tie-up (c2) gives a solid border all around as illustrated. A solid border may in this way be added to any pattern by threading the border on an additional harness which must be tied to sink with each pattern shot.

The solid border across the bottom might be tied to a separate pair of treadles, but this is hardly worth while. It is woven: 1 and "A" once, 2 and "A" twice, etc.

Draft (e) gives the same small two-block pattern motif set off by a rather elaborate border. The tie-up is given with two treadles -- 7 and 8 -- tied for the solid lines across the top and bottom. These two treadles may be omitted and the stripes woven as suggested above by weaving "A" and 1 together once, "A" and 2 together twice, etc. A border of this kind requires, as is plain, two harnesses added to those required for the figure, and may in this way be added to any figure of any number of blocks. As shown on the diagram - with a little two-block figure - six harnesses will be required.

That there may be no confusion, the complete treadling for (d) and (e) is given below.

The pattern at (d) is of three blocks which we will call (x) -- harness 3 -- (y) -- harness 4 -- and (z) -- harness 5, on tie-up (c 1). Each unit of the weave is therefore like this:

(x) 1 once, 2 twice, 1 once
 (y) 3 once, 4 twice, 3 once
 (z) 5 once, 6 twice, 5 once

The border is woven:

{ (z), (y), (x), } repeated five times.

Large block:-

(z) 12 times

Cross:

(y) once
 (x) "
 (z) "
 (x) "
 (y) "

Large Block:

(z) 12 times

Two-block figure:

(x) twice
 (y) once
 (x) "
 (y) "
 (x) twice
 (y) six times
 (x) twice
 (y) once
 (x) "
 (y) "

(continued)

(x) twice
 (y) six times
 (x) twice
 (y) once
 (x) "
 (y) "
 (x) twice.

Repeat: large block, cross, etc.

Pattern (e) and (x) and (y) blocks are as in (d). The (z) block weaves the stripe along the sides. The stripe across the bottom may be woven on treadles 7 and 8 or --with these treadles omitted - on 1 and "A" and 2 and "A", as noted above. Unit of striped border (s) 7, once, 8 twice, 7 once, or 1 and "A" once 2 and "A" twice, 1 and "A" once.

Weave border as follows:

(z) 3 times
 (s) once
 (z) "
 (s) 5 times
 (z) once
 (s) once
 (z) once
 (y) once
 (x) twice
 (y) once
 (z) "
 (s) "
 (z) "
 (s) 5 times
 (z) once
 (s) "
 (z) 20 times

The two-block figure should be repeated as often as desired for the center of the work and the border repeated -- beginning at the bottom and weaving up -- for the top of the work.

The two-block figure is woven as in all the other patterns on the diagram. The treadeling is repeated here for convenience.

Two-block figure

(x) twice
 (y) once
 (x) "
 (y) "
 (x) twice
 (y) six times
 Repeat

The patterns are worked out on this diagram on a very small scale -- 64 threads to the inch -- about one third or one quarter the size when woven.

Diagram 24 is designed to show the variety that may be produced with a simple pattern motif through varying the tie-up, without changing the threading. The motif chosen -- a three-block figure set off by a group of squares -- is one found in a number of old coverlets. It is sometimes called

"Stars and Squares" but this seems to me a stupid name for it. It somewhat resembles a pattern called "Fish in the Pond".

The tie-up given at (a) is what one might call the "normal" tie-up -- each block of the pattern tied separately to two treadles is in most of the drafts studied so far. This requires ten treadles -- two for each of the four pattern blocks, and two for the tabby. Ten treadles are sometimes difficult to manage, and many looms are not equipped with more than eight. I have devised another tie-up -- given at (a') -- which may be made to eight treadles. With this tie-up it is necessary to use both feet in weaving the pattern. The first six treadles are tied to one harness each. The tabby is the same as in the regular tie-up and one foot only is required. The two treadles on the left, tied to the two front harnesses, govern the "ties" and are lettered X and Y. It will be apparent that by drawing down treadles X and 1 together the same effect will be produced as by drawing down treadle 1 of the (a) tie-up. Treadles Y and 1 produce the same effect as treadle 2 above, etc. etc. A unit of the first block of this pattern -- which happens to be written on the No. 6 harness would be woven as follows:-

<u>Tie-Up (a)</u>	<u>Tie-Up (a')</u>
Treadle 7, once	Treadles X & 4, once
" 8, twice	" Y & 4, twice
" 7, once	" X & 4, once

This tie-up woven "rose-fashion", as this pattern is usually woven produces the effect illustrated as at (a). The same threading and tie-up woven "Star-fashion" produces the figure -- (a 2) -- directly below.

The tie-up at (b) and (b') weave the heavier rose figure illustrated at (b). The third and fourth harnesses and the fourth and fifth, are tied to weave at the same time. The change in tie-up does not, of course, affect the square blocks.

At (c) and (c') are given a further modification of tie-up on which the figure shown at (c) and also the one at (c 2) may be woven. The treadelings for (a), (b) and (c) are exactly the same, as follows:

Treadeling (a), (b) and (c), Diagram 24

Large Square

Unit (s), as follows, 12 times
treadle 7, once
" 8, twice
" 7, once

Small Rose:

Unit (x) as follows, once
treadle 1, once
" 2, twice
" 1, once

Unit (y) as follows, once

treadle 3, once
" 4, twice
" 3, once

Unit (z) as follows, 2 times

treadle 5, once
" 6, twice
" 5, once

Repeat (y) once
" (x) once

Small Square

(s) 4 times

Small Rose:

(x) once
(y) "
(z) twice
(y) once
(x) "

Large Square :

(s) 12 times

Large Rose:

(x) 4 times
(y) 4 times
(z) 4 "
(x) once
(y) "
(z) twice
(y) once
(x) "
(z) 4 times
(y) 4 "
(x) 4 "

Treadeling for (a 2):

Large Square:

(s) 12 times

Small Star:

(z) once
(y) "
(x) twice
(y) once
(z) once

Small Square:

(s) 4 times

Repeat small star
" large square

Large Star:

(z) 4 times
(y) 4 "
(x) 4 times
(z) once
(y) "
(x) twice
(y) once
(z) "
(x) 4 times
(y) 4 times
(z) 4 times

The treadeling for (c 2) is not given. It should be easy for the student to work it out. Neither are the tie-up nor the treadeling given for the figure illustrated at (e). Many variations may be woven on the threading given on this diagram. A few only are shown.

Of course if using the (a'), (b') or (c') tie-ups,-- what I call the "XY" tie-ups -- the treadeling should be worked out to conform. The result of weaving will be the same.

Diagram 25 gives threadings and tie-ups for a number of patterns, some of them very unusual. The "Stars and Circles" pattern at (a) is a three-block pattern to be woven on 5 harnesses. A solid border all around may be added if desired by threading the proper number of units on a sixth harness, which should be tied to sink with each of the pattern sheds, as described in the notes on Diagram 23. The tie-up is a "normal" one. The pattern is to be woven as "drawn in" and it is unnecessary to note the treadeling.

The patterns at (b) and (c) are also to be woven "as drawn in" with a "normal" tie-up.

The pattern at (d) is to be woven "rose-fashion". It was drafted for weaving from an old book of designs that is preserved in the collection of Colonial relics in the Pennsylvania Museum. The designer was a certain "John Landes" who appears to have been a professional weaver of the Revolutionary period. Part of the effect of this pattern depends on the tie-up which is not the "normal" tie-up for this threading. The treadeling for this and the other two drafts on this diagram is given on the following page.

Draft (e) is the celebrated "Pine Tree" border, so often found on old coverlets in the double or the doubleface weaves. This border may be woven with any pattern, in which one of the motifs is a three-block figure. It could, therefore, be woven with the "Sunflower" pattern above, or with the pattern at (f) below. It could also be used with the pattern given on Diagram 24, but would have to be transposed to use with that draft, as the trunk of the tree -- the long block of 16 units -- must come on the same shed as the outer blocks of the figure. Simply interchange the blocks on harness 3 with the blocks on harness 5, either in the "Pine Tree" draft or in the rose figure of the other draft. I could have written them to match, but wrote them as I did to serve as an exercise. No tie-up is given for draft (e). It is woven, of course, on the tie-up of the pattern with which it is used. There are several forms of the pine tree, the one given is a simple form. The tree may be made taller or shorter by adding or subtracting from the trunk or taking out or adding a branch. Before using it with a particular pattern it is wise to develop it on paper to make sure that the proportions are pleasing. When using it with a six-harness pattern simply omit the blocks shown on the seventh harness and the ones on the sixth harness that follow. The border as written is the left hand border. If desired on the right, reverse it.

Treadeling for the "Sunflower"
Draft (d), Diagram 25

Large Square:
(s) 12 times

"Sunflower:
(z) 4 times
(y) 4 "
(x) 4 "
(y) once
(z) "
(y) "
(x) 4 times
(y) once
(z) "
(y) "
(x) 4 times
(y) once
(z) "
(y) "
(x) 4 times
(y) once
(z) "
(y) "
(x) 4 times
(y) once
(z) "
(y) "
(x) 4 times
(y) 4 "
(z) 4 "

Large Square:
(s) 12 times

Bars:
(z) once
(y) "
(x) "
(s) "
Repeat four times

Wide Bar:
(x) 6 times

Repeat narrow bars
This treadeling does not begin and end at the same points as the draft. In weaving, of course, it is necessary to treadle the figures as they are arranged in the loom.

Line Tree" Border - tie-up "normal"

Block (v):

9 once
10, twice
9, once

(z) once)
(y) " :
(x) ")
(s) " : --2 times
(v) ")
(s) " :
(x) ")
(y) " :

(z) once
(y) "
(x) "
(s) "
(v) "
(s) "
(x) twice
(y) "

Trunk of tree:

(z) 16 times

Branches:

(y) once)
(x) " :
(y) ") 10 times
(z) " :

(x) once
(y) "
(z) 3 times (top of tree)

This is the bottom border. Reverse for the top of coverlet.

The coverlet is the crowning achievement of the Colonial weaver. Students who have followed this course of lessons in weaving as far as this point are amply prepared to undertake the weaving of a coverlet. That is the problem proposed for this lesson.

The "Summer and Winter" weave as described in this lesson is, in my mind, the most satisfactory coverlet weave. Anyone who so desires, however, may make a coverlet on one of the "overshot" patterns, so many of which have been provided in earlier lessons. In this event, however, it will be necessary to submit also a piece of weaving done in the "Summer and Winter" weave. This may be a pillow-top, a table-runner, or a rug.

There are several possible ways of arranging a coverlet in the loom. Which one to choose depends first on the width of the loom and the width of the coverlet desired. A coverlet should always be ample. For the usual three quarter size bed, two yards wide is sufficient, but for a full sized double bed from $2\frac{1}{4}$ to $2\frac{1}{2}$ yards is better. On the largest sized hand-loom such a coverlet may be woven in two strips, which will give a coverlet with a seam up the middle. Most of the old coverlets were woven in this manner. A coverlet in three strips is better in some ways but is a good deal more work, not only in the weaving of a third strip but in the re-threading necessary to make the border on the sides.

A coverlet should always have a border. This should as a rule, be made not less than ten inches nor more than fourteen inches wide. The width of border depends to a certain extent on the size and shape of the bed on which it is to be used. A high old-fashioned four-post bed looks best with a deep border. In making a coverlet in two strips, the border is, of course, threaded on one side only, as the other side of the strip is the center of the coverlet. It makes no difference, except in convenience, on which side one threads the border. I have noticed that most weavers keep a better edge along the right hand side of their weaving. Now as one cannot thread a selvage for the center, and as this edge must be very closely watched in weaving, it is best to put it where it will get the most attention. This is sometimes a matter of lighting. A weaver who sees the left hand edge of the work better than the right, should thread the center of the Coverlet on the left. It is, however, somewhat easier to thread the border on the left because of the way the heddle frames are constructed in most looms, especially if re-threading the border later is part of the plan. This discussion may seem trifling, but it is such details that comfort and success in weaving largely depends upon.

Most coverlet patterns are composed of two figures each with a center. The seam of the coverlet must pass through one or the other of these centers. The seam shows less where it runs through a small block than through a large one. A coverlet should never be centered on a large plain square. In a pattern

such as (d), Diagram 23, the coverlet may be centered either on the small one unit block of the group of five such blocks between the large 12-unit squares, or on the one-unit block, the middle one of the group of three such blocks between the two 6-unit squares. Which place to choose would then depend on how the repeats work out in the number of threads in the warp.

It is often quite difficult to arrange the draft -- particularly for a large pattern involving a great number of threads -- so that the figures come out properly in the width desired. The border allows a certain give and take, as it may vary in width between the limits named above.

The arithmetic is often troublesome. A concrete example will perhaps help to make the thing clear:

Suppose we decide to weave a coverlet using the threading shown at (c), Diagram 25. There are in each repeat of this pattern 66 units, or 264 threads. Suppose we decide to weave our coverlet in two strips each 42 inches wide, and suppose we decide to sley our warp 24 threads to the inch. This will give us a warp of 1008 threads. Subtracting 248 threads -- for a ten-inch border and a selvage -- we have 760 threads for the pattern. Three repeats of the pattern, however, demand 792 threads. What shall we do? Of course there are a number of things we might do -- make the border thirty threads narrower -- make the warp thirty threads greater, which would add a little more than an inch in width to each strip of the coverlet -- sley the warp 26 threads to the inch which for 42 inches will make 1092 threads, in which case we can increase the border 300 threads, making about 11-1/2 wide, etc. etc. There are plenty of other things one might do. Which alternative to select depends on the special conditions of the job. If the warp is a shade finer than it should be for 24 to the inch, the last alternative mentioned is the one to choose. A border 11 or 12 inches wide is not by any means too wide. If the warp is very coarse, and should not be set any closer, then one of the other expedients will serve.

The center of the coverlet should fall either on the middle block of the group of 15 one-unit blocks, or on the middle one of the group of 3 one-unit blocks. Which to choose is in this case entirely a matter of taste. One could not decide intelligently without first developing the pattern on squared paper to see what it looks like. My choice would be the center of the large group. Three repeats of the pattern would, of course end at the same point -- a unit on the No. 6 harness.

A suitable border for this pattern is either a diamond in one-unit blocks: first on 6, second on 5, and in succession 4, 3, 4, 5, 6, 5, 4, 3, etc., etc. -- a repeat of 6 units or 24 threads -- or a twill arrangement such as is shown to the left of the 6-unit block in pattern (d), below -- a repeat of 4 units or 16 threads.

It is suggested that the student use some other pattern than this for the weaving of the coverlet proposed as a practical problem with this lesson.

Test the arithmetic carefully, or send it in for criticism, before drawing in.

Begin the weaving with a tabby heading, as in beginning a rug. Fringes may or may not be allowed for, as desired. After the heading, tabby back and forth with the pattern thread. Then begin weaving the border, weaving the blocks in succession as threaded, beginning with the edge -- of course -- and working toward the center.

This will produce a plain square of some sort -- a diamond or alternating blocks -- in the corner and a border across the bottom to match the border that will be produced along the side by weaving the pattern. Then weave as many repeats of the pattern as desired for the length of the coverlet, repeat the border for the top, and end with a tabby heading. If fringes are desired, allow for them before starting the second strip, which should be woven exactly the same way. It is well while weaving to measure the figures in an effort to keep them as nearly as possible the same size, so that when the coverlet is sewed together the figures will match properly.

A coverlet may be woven square, that is, if there are three repeats of the pattern in the threading, six repeats should be woven, to make the length twice the width of the one strip. Sometimes it is well to weave one more repeat. A coverlet three yards long is none too long. If not long enough, it is necessary to weave an additional strip to cover the pillows. I much prefer a long coverlet, and always make mine so. It is, however, a matter of taste.

The strips of the coverlet should be sewed together with a bit of tabby thread, matching the figures as one goes along. They never match exactly. Small inequalities disappear on pressing with a hot iron and a damp cloth.

SHUTTLE-CRAFT COURSE IN WEAVING

SECTION III

Lesson 7.

A large number of the old coverlets that have come down to us from Colonial times are in a curious and interesting weave known as "double weaving". The material consists of two entirely distinct and separate tabby webs -- one usually in white cotton and the other in blue wool -- that lie one on top of the other. The figures of the pattern are produced by interchanging the relative positions of these two webs, so that the pattern will appear on one side of the coverlet in blue wool on a white ground and on the other side in white cotton on a blue ground.

In this weave the figures stand out with a clear-cut distinction quite unlike the effect of any of the other weaves. I myself prefer the softer effects of the "Summer and Winter" weave, and of the twill weave to be described in this lesson.

For some reason the double weave has been invested with the mystery of a lost art. There is no need of mystery on the subject. The Scandinavian books on weaving describe it abundantly, and the Luther Hooper handbook, which most weavers know shows a different system than the Scandinavian for producing the same result. The double weave is difficult only in the matter of machinery. A more complicated loom with more harnesses and a double warp-beam is required. However, eight harnesses are really as easy to manage as four and may be hung in any properly constructed hand-loom. Many patterns in double weaving may be made with eight harnesses, so that no one who wants to need hesitate about undertaking this weave.

A good many of the old double woven coverlets were undoubtedly woven at home, but most of them were, I think, the work of professional weavers, and are therefore not as interesting from the historic-sentimental point of view as the "overshot" weavings and the "Summer and Winter" weaves that were produced in the home-places.

One sees an occasional old piece of weaving in an interesting twill weave, this and the "four heddle damask" or "broken twill" used for table linen and such things are produced on the same threadings as the double weave. These three weaves are therefore grouped together.

The pattern given at (a), Diagram 26 is the same pattern shown at (b'), Diagram 21. By comparing the effect of the "Summer

and Winter" weave, as illustrated at (c) and (c') Diagram 21 with the three weavings shown at (d'), (e') and (f'), Diagram 26 one should get a fairly clear idea of the differences between these four ways of weaving a two-block pattern. Any of the drafts given on Diagram 22 may be threaded and woven in damask, twill or "double" weave in the same way as the pattern illustrated.

It will be apparant that each "unit" of the draft as threaded for these weaves consists of four threads -- an "A" unit is threaded 1,2,3,4, and a "B" unit is threaded 5,6,7,8. The expanded draft given at (b), Diagram 26 will make this abundantly clear. The threading is the same for all three weaves, the difference lies in the tie-up and treadeling.

The tie-up shown at (d) produces the twill weave illustrated at (d'). This weave, and the "broken twill" or "four-heddle damask" tie-up shown at (e) and illustrated below at (e') are suitable for the weaving of table-linen, toweling, etc. For such purposes the warp and weft should be of the same or similar material. As noted above, one finds an occasional old coverlet woven in the twill weave, but I do not remember ever having seen one done in the damask weave. These old twill coverlets are woven of a fine woolen yarn on a fairly coarse cotton or linen warp set very closely in the reed. No tabby is used in weaving. The treadeling is exactly as in weaving a linen material.

Treadeling for the pattern illustrated, is a follows:

1, 2, 3, 4, 5, 6, 7, 8, - 1, 2, 3, 4, 5, 6, 7, 8, - 1, 2, 3, 4, 1, 2, 3, 4, - 5, 6, 7, 8, 5, 6, 7, 8, - 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, - 5, 6, 7, 8, 5, 6, 7, 8, 1, 2, 3, 4, 1, 2, 3, 4, etc., etc.

This is, as will be observed, exactly the order of threading, and may be followed more easily from the threading draft than from written figures. Each unit is woven as threaded, treadles 1, 2, 3, 4, weaving the "A" blocks and treadles 5, 6, 7, 8 weaving the "B" blocks.

Double weaving may be made on an ordinary warp, threaded and tied up as shown. The weaving should be done in two colors, treadles 1, 3, 5, 7, being woven in one color and treadles 2, 4, 6, 8, being woven in the opposite color. This produces two separate tabby webs that interlace along the edges of the blocks of the pattern. There may be old examples of this style of weaving done on an ordinary cotton warp all of one color, but I have never seen such a piece. In double weaving as usually seen the warp is half cotton and half wool -- the cotton being white and the wool usually dark blue, though sometimes a number of colors -- and the weft is exactly like the warp -- half of it white cotton and the other half wool in colors. The wool warp and weft weave together to make a wool tabby material and the cotton warp and weft to make a cotton tabby material.

These two webs lie one above the other as described above.

To produce exactly this effect it is necessary to provide the loom with two warp-beams. The cotton half of the warp must be warped on one beam and the wool half of the warp on the other. This is necessary because of the different tension required for woolen and cotton threads. A coverlet would probably be satisfactory with the warp all cotton -- in two colors -- and the weft all wool -- likewise in two colors, and it could be woven in this way without a second warp-beam. The material would not, however, wear as well and the effect would be somewhat different.

Part of an expanded draft, showing how the two-colored warp should be threaded, is shown at (c), Diagram 26. The first, third, fifth and seventh harnesses carry the dark woolen threads and the second, fourth, sixth and eighth harnesses carry the white threads.

The treadeling is the same as for the damask weave-- treadles 1,2, 3, and 4, weave block "A" and treadles 5,6,7 and 8 weave block "B". The first, third, fifth and seventh treadles open the sheds for the dark woolen picks, and the second, fourth, sixth and eighth treadles for the white picks. This is simple as possible.

Of course for the weaving of four-block and five-block patterns by this system, a great many harnesses are required.

A threading and tie-up such as shown at (a), (b), (c) and (h), Diagram 27, is only possible on a rather elaborate loom. For patterns of more than two blocks it is better to adopt a different system. The threading at (d) with tie-up (f) is for damask and twill weave and tie-up (e) for double weaving. It will be seen that by this method a four-block pattern may be woven on eight harnesses. The tie-up should properly be made to 16 treadles but probably for most weavers the eight-treadle tie-up as shown is easier to manage, though the weaving will have to be done with both feet.

It is necessary for this type of weaving to have two sets of harnesses - one for the pattern and one for the weave -- and each thread has to be drawn through two heddles, one on a pattern harness and one on a "weave" harness. As a rule the four harnesses that control the weave are hung in front of the others and are provided with heddles with long eyes. It will be seen that each unit of the pattern is composed of four threads. All four may be threaded through a heddle on one of the pattern harnesses, but must be threaded separately through the front group in the order 1, 2, 3, and 4.

Diagram 28 gives at (a) and (b) a few units of the pattern as threaded for five-heddle damask. This is a better weave for linen than the broken twill weave just described, but involves more harnesses. It is probably unnecessary to explain this further.

At (c), (d), (e) and (f) are given four drafts that may be produced in "Summer and Winter" weave as described in Lesson 6 and in the twill, damask and double weaves just described. The first three are intended to be woven as drawn in. The last one, however, is not so woven, therefore, a diagram of the pattern, drawn at a small scale -- 64 threads to the inch -- is given also. The tie-up and treadeling should be obvious from this diagram. I know no name for this pattern. It belongs, however, to the very varied "Snow-Ball" family of patterns. A Pine tree border may be woven with this pattern. As drafted, the trunk of the trees should be woven on the E block for the top and bottom borders and threaded on the C block for the side borders.

Diagram 29 illustrates the method of threading a pattern in the warp and weaving it in the weft to make a border all around a plain center -- at (a) a "Monk's Belt" pattern, and at (b) a simple arrangement of stripes. These patterns are useful for table-linen, baby-blankets, curtains, etc. etc. Pattern (a) was taken from a sample of hand-woven Russian Linen. In the sample three colors are used: the narrow stripes are in blue and yellow, the outer shots in blue and middle ones in yellow. The broad stripe is in turkey red. The effect is excellent. In the draft as given the first 44 threads constitute the repeat of the pattern for the weft. A little more than one and a half repeats are shown before the border. This margin may -- of course -- be increased or diminished as desired. For a broad margin repeat the first 44 threads two or three times before proceeding. For a narrow margin begin threading at thread 45. For the middle of the table-cover, or what not that is to be woven, repeat these first 44 threads as often as desired, allowing for the left hand border and the left hand margin, to match the right.

Treadle as follows:

Lower Margin

with tabby thread

C,D,A,B,C,D,A,B,C,D,A,B,

C,D,C,D,C,D,

A,B,A,B,A,B,

C,D,C,D,C,D,

A,B,A,B,A,B,

(X) C,D,C,D,C,D,

A,B,

. Repeat to (X).

Small Stripe

Pattern thread, 2

Tabby thread C

Pattern 2

Tabby D

Pattern 1

Tabby C

Pattern 1

Tabby D

Pattern 2

Tabby C

Pattern 2

Tabby D.

Interval

Tabby: A,B,C,D --Repeat 3 time

Shuttle-Craft Course in Hand Weaving, Section I

Lesson 1

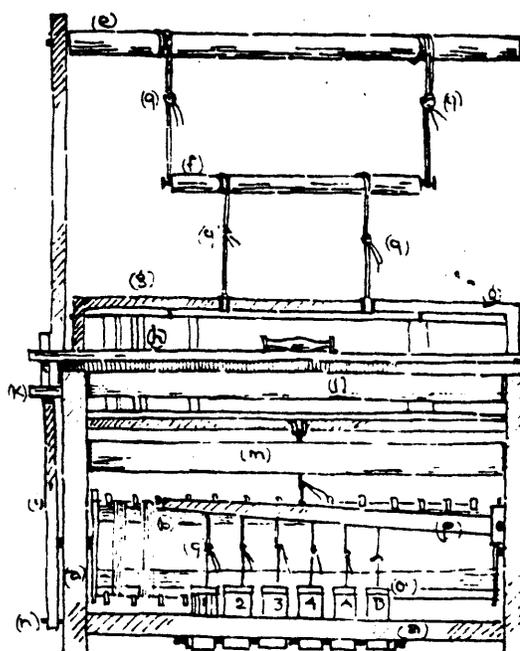
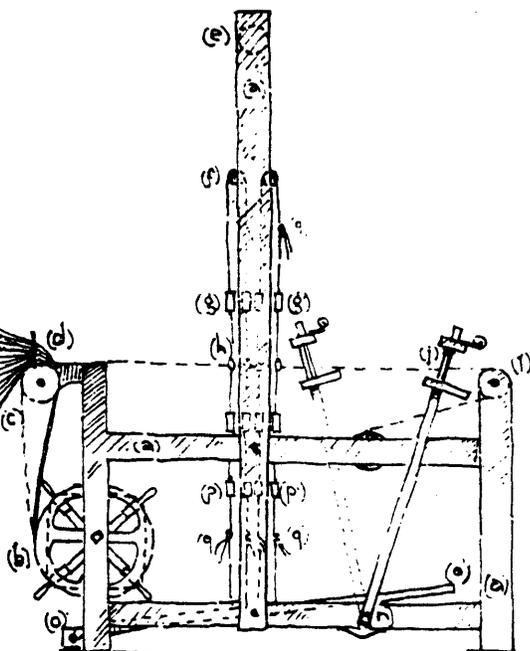
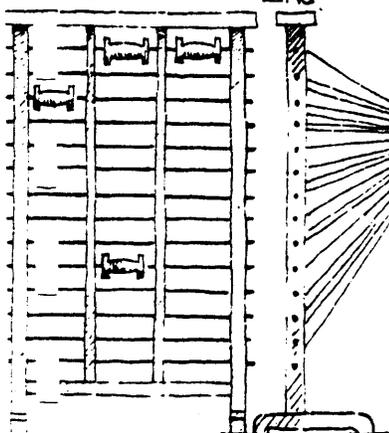
Diagram I

Scale 3/4" - 1"

End of Spool Rack

Front

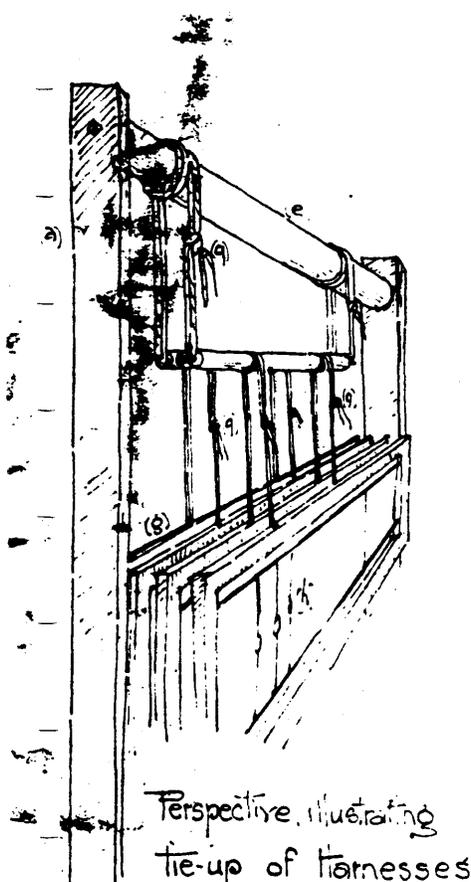
End



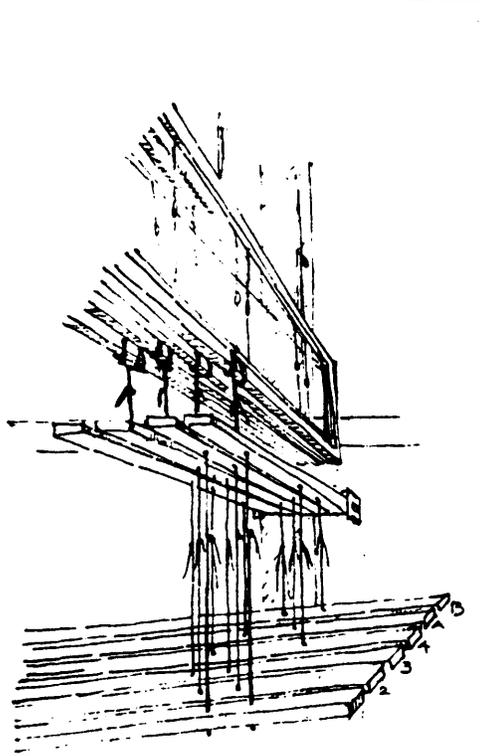
- (a) Frame of Loom
- (b) Warp beam
- (c) Back beam
- (d) Guide
- (e) Large roller
- (f) Small rollers

- (g) Heddle frames, or harnesses
- (h) Heddles
- (i) Batten
- (j) Reed
- (k) Shuttle-Race
- (l) Breast Beam

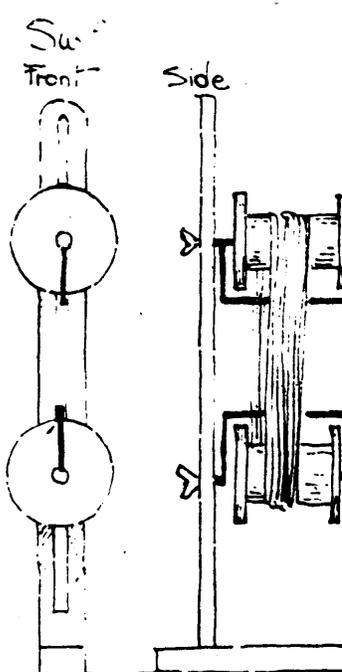
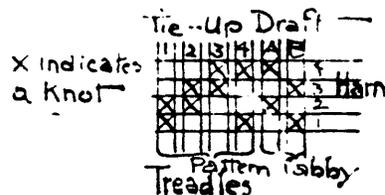
- (m) Cloth Beam
- (n) Pivot of Batten
- (o) Treadles
- (p) Lamms
- (q) Adjustable Loom Knot



Perspective illustrating tie-up of harnesses

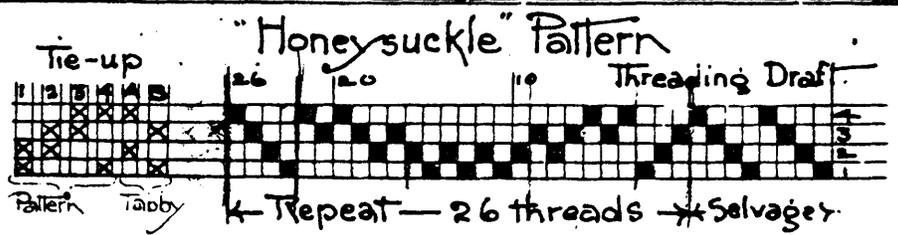


Perspective illustrating tie-up to treadles



Scale 1" - 1"

~~GAT~~
 Shuttle-Graft Course in Weaving
 Section I., Lesson 2
 Diagram 3.



Treadeling— (a)

3, 2 times

2, 1
 1, 1
 4, 1
 3, 2-or 3
 2, 2 " 3
 1, 4 " 6
 2, 2 " 3
 3, 2 " 3
 4, 1
 1, 1
 2, 1

Repeat:

3, 2,
 2, 1, etc.

(b)

1, 2
 2, 1
 3, 1
 4, 1
 1, 2
 4, 1
 3, 1
 2, 1
 1, 1

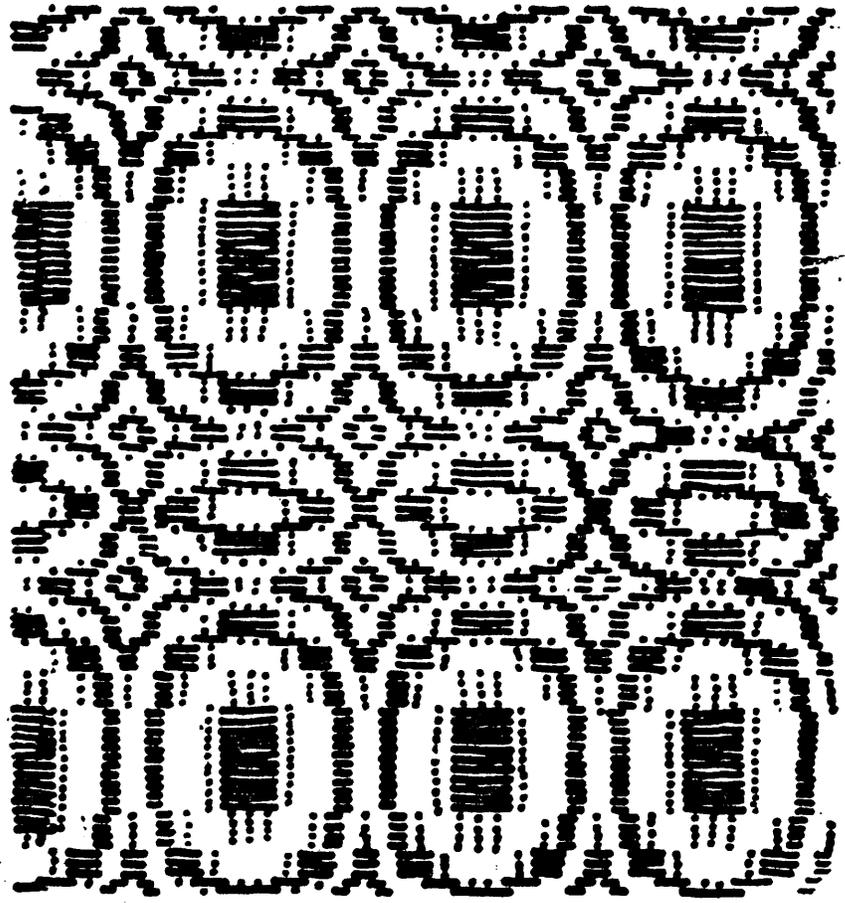
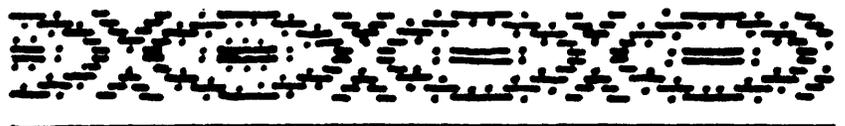
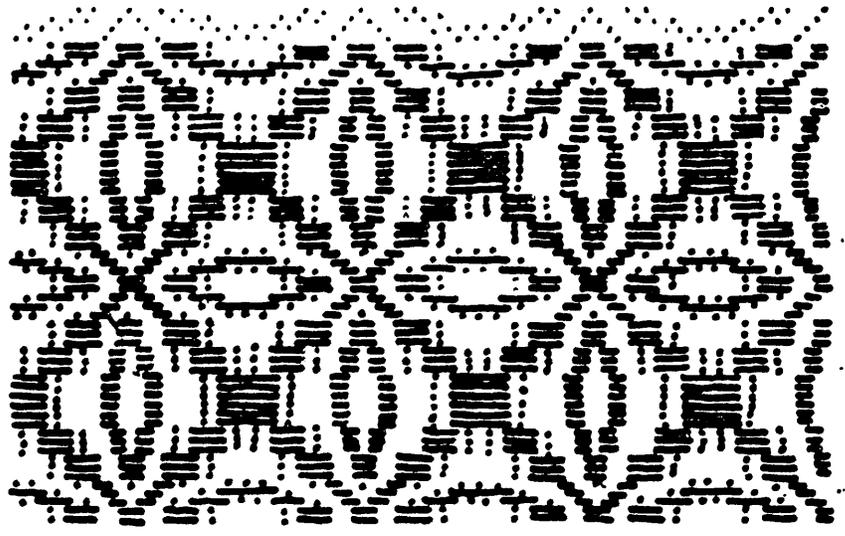
(c)

3, 3
 2, 1 3
 1, 3
 4, 1
 3, 1
 2, 2
 3, 1
 1, 3
 2, 1
 3, 3
 4, 4
 1, 12
 4, 4
 3, 3
 2, 1
 1, 3
 4, 1
 3, 1
 2, 2
 3, 1
 4, 1
 1, 3
 2, 1

Repeat:

3, 3
 2, 1, etc.

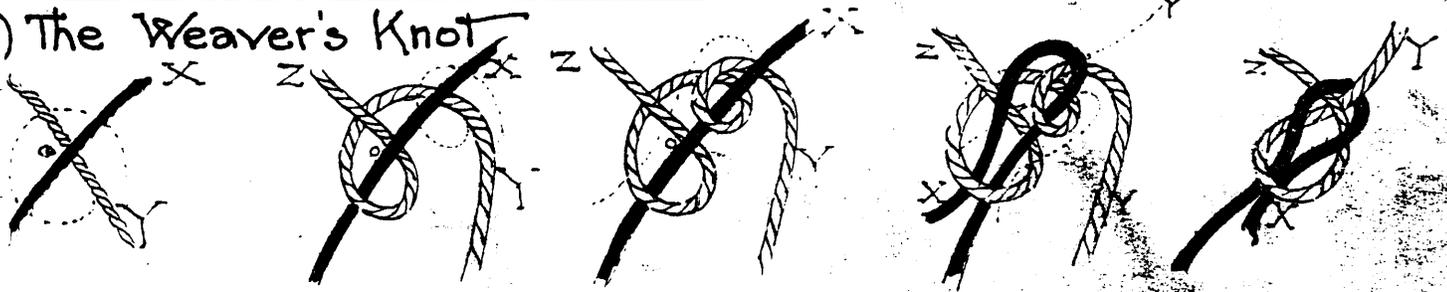
Weave with
 a tabby.



Four different plain
 stripes may be woven on
 this threading by using
 one or another pattern
 treadle over and over again.
 Treadle 3 gives the most
 pleasing one.

Shulle-Craft Course in Hand Weaving.
Section I. Lesson 1. Diagram 2. The Knots.

a) The Weaver's Knot



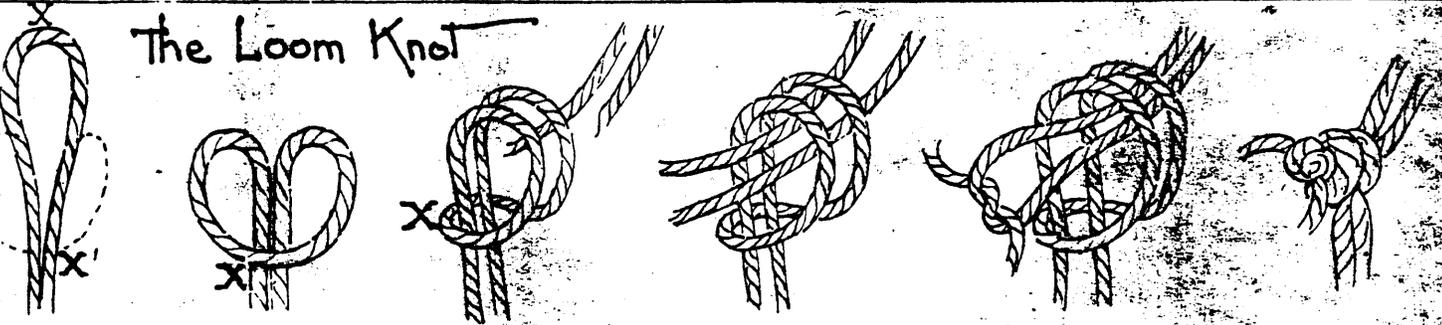
b) Grammy Knot

Square Knot



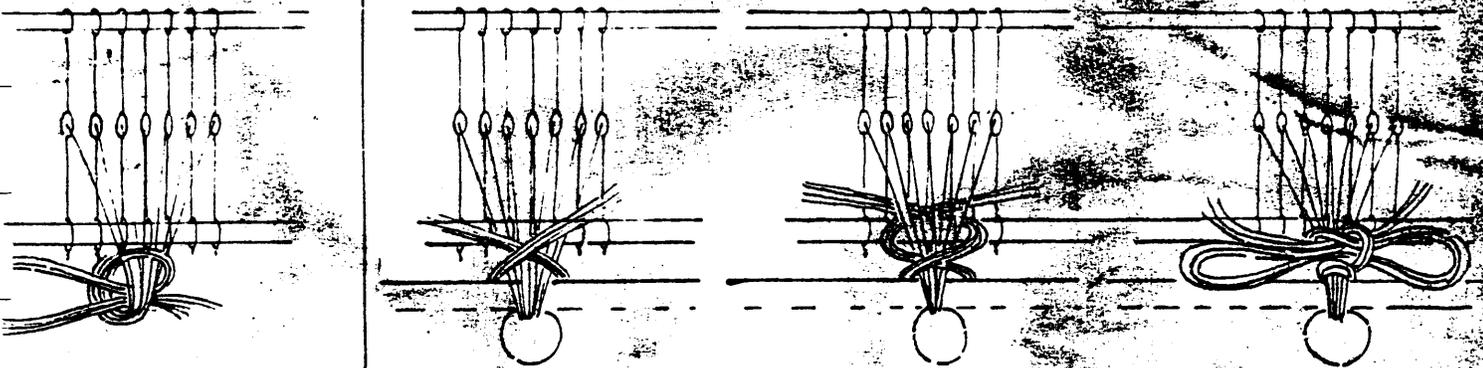
To untie, pull X-Y out straight and slip loops off

The Loom Knot

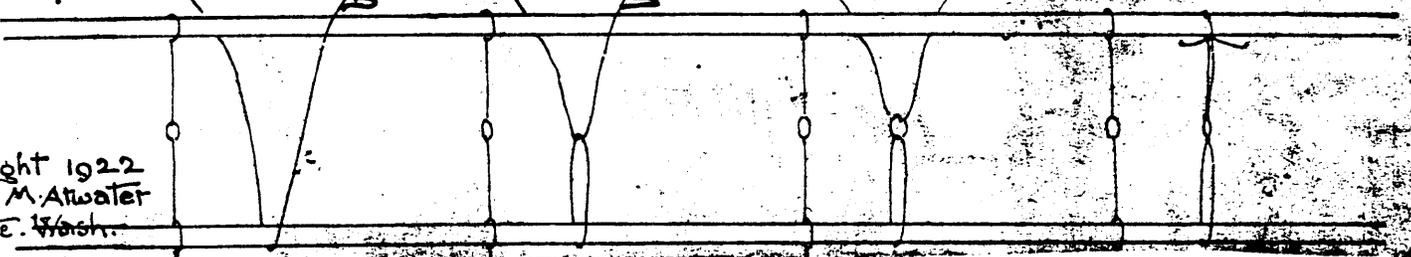


Loop Knot

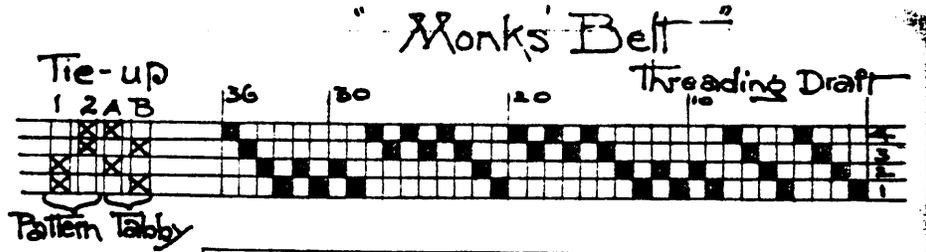
(e) Method of tying in Warp Ends.



Method of tying in a string heddle

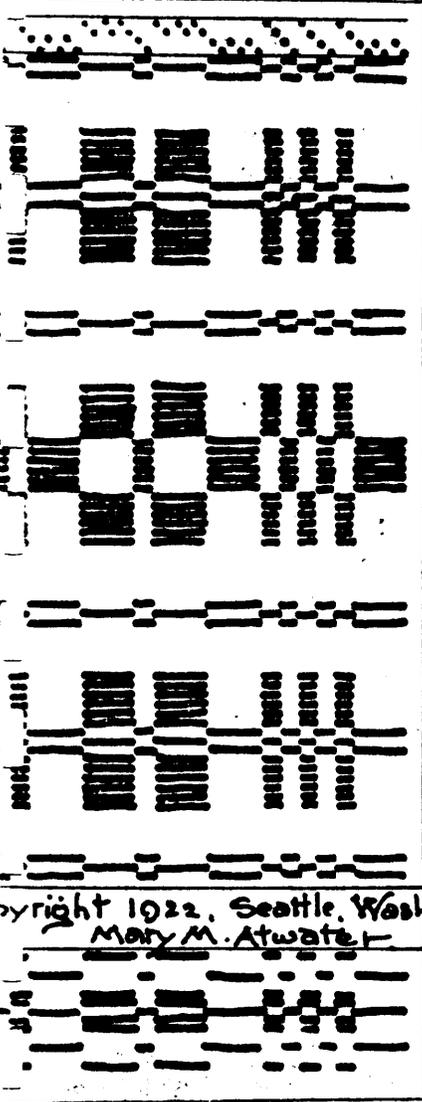
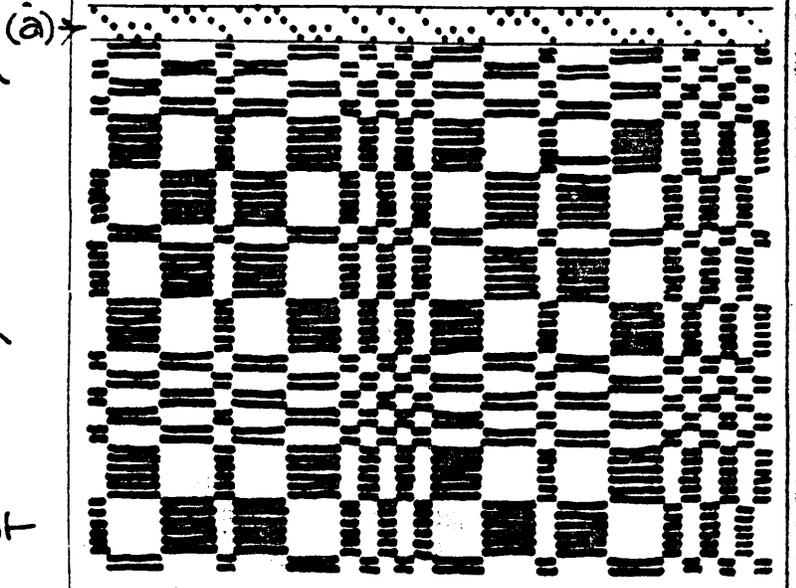


~~Shuttle~~
 Shuttle-Craft Course in Weaving
 Section I, Lesson 2
 Diagram 4

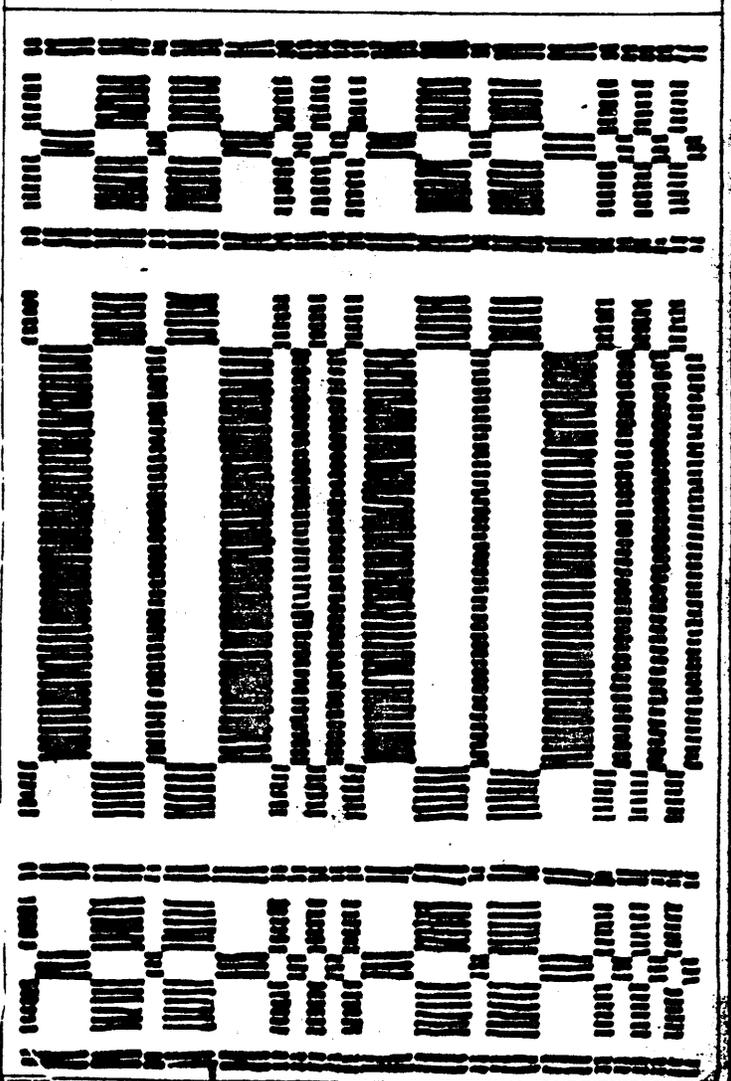


Identifying - (a)
 2
 2
 2
 2
 6
 6
 2
 6
 6
 2
 2
 2 etc.

(b)
 1. 1 no tabby between
 2. 1
 - 1 plain tabby shots
 2. 6
 1. 3
 2. 6
 1 plain tabby
 1. 1 no tabby between
 2. 1
 x 10 plain tabby
 2. 6
 1. 40
 2. 6
 10 plain tabby. Repeat to "x"



(c)
 1. 1
 2. 1
 1. 1
 2. 6
 - 8 plain tabby
 1. 1
 2. 1
 1. 1
 2. 6
 - 8 plain tabby (b)
 1. 1
 2. 1
 x 6 1
 - 8 plain tabby
 2. 6
 1. 6
 2. 6
 - 8 plain tabby
 Repeat to "x"
 (d)
 - 2 plain tabby
 2. 2
 - 2 plain tabby
 1. 1
 - 2 plain tabby
 2. 2
 1. 1
 2. 2
 Repeat

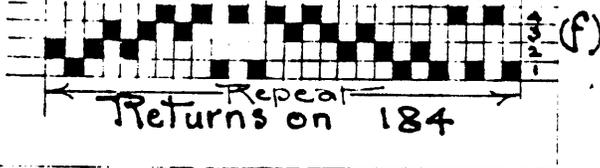


Diagrams 6 and 7 presently are missing. If they can be obtained this document will be updated and notice posted.

Shuttle-Craft Course in Weaving, Section II

Lesson 4. Diagram 9

Russian Diaper Threading



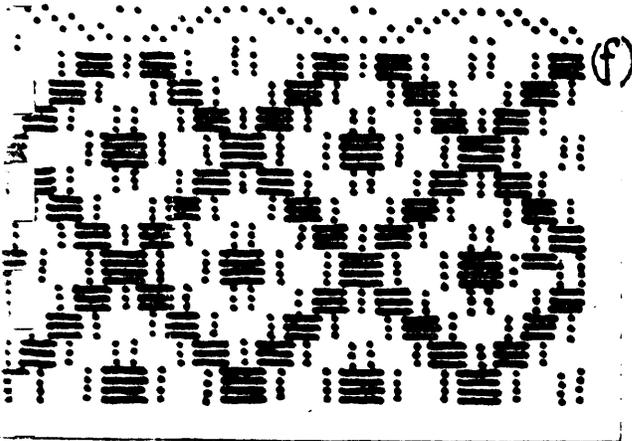
Tie-Up



(a) "Rosengang" Threading

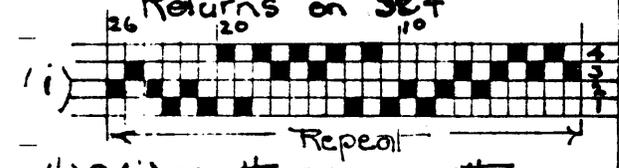
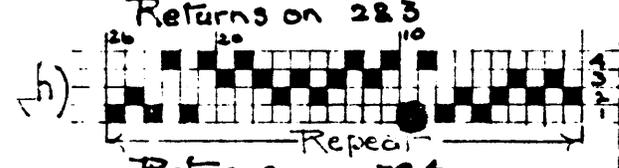
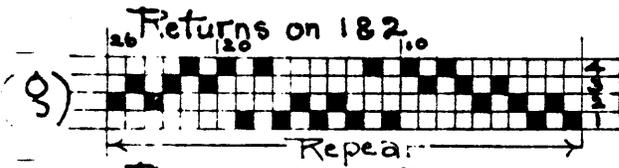
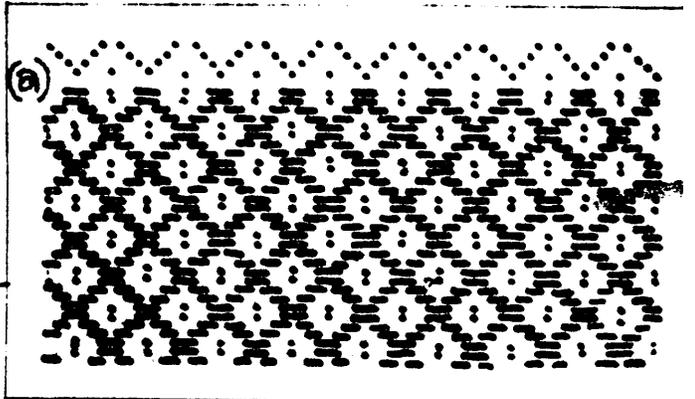


(b) A Diamond with 2 returns

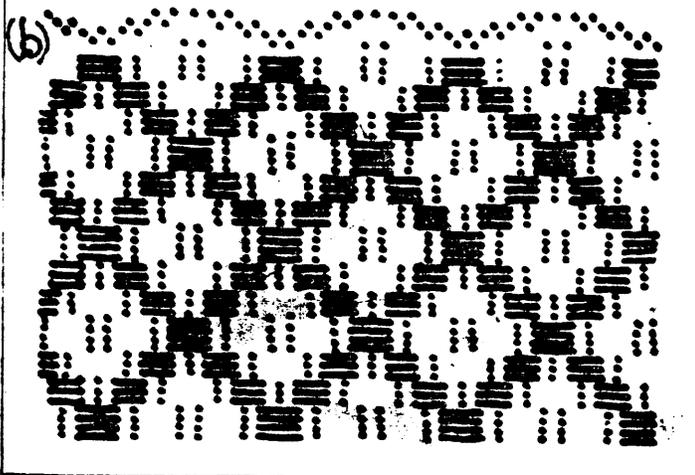


Treadling:

(a)	(b)
1, 2	1, 4
2, 1	2, 3
3, 1	3, 3
4, 2	4, 4
3, 1	3, 3
2, 1	2, 3
Repeat	Repeat

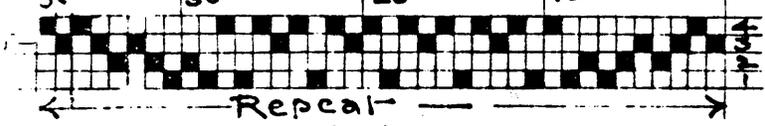


(f)
1, 3
2, 3
3, 3
4, 4
3, 3
2, 3
1, 3
4, 4
Repeat



(g)(h)(i) are the same pattern as (f)

Butternut Threading



"Solomon's Delight"

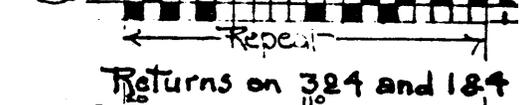


(k)
1, 3
2, 3
3, 14
2, 3
1, 3
4, 14
Repeat

Returns on 182 and 283



Returns on 283 and 384



Returns on 384 and 184

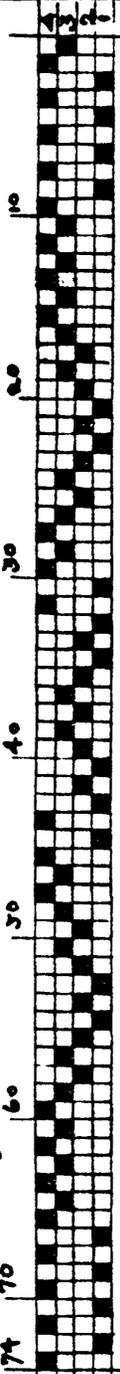
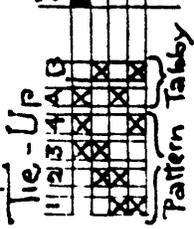


(c)(d) & (e) are the same as (b)

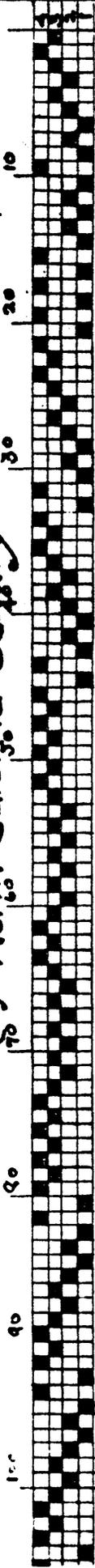
Shuttle-Craft Course in Weaving. Section II.

Lesson 4. Diagram 10

(a) "Single Chariot Wheels"



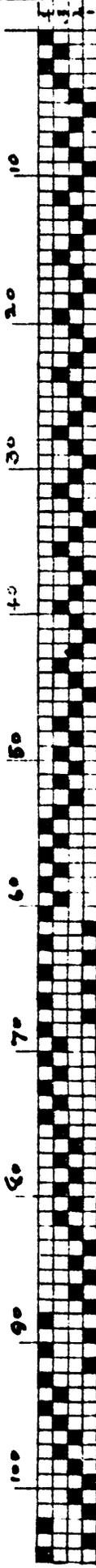
(b) "North Carolina Beauty"



(c) "Jacob's Ladder"



(d) An Unusual "Sunrise" Pattern

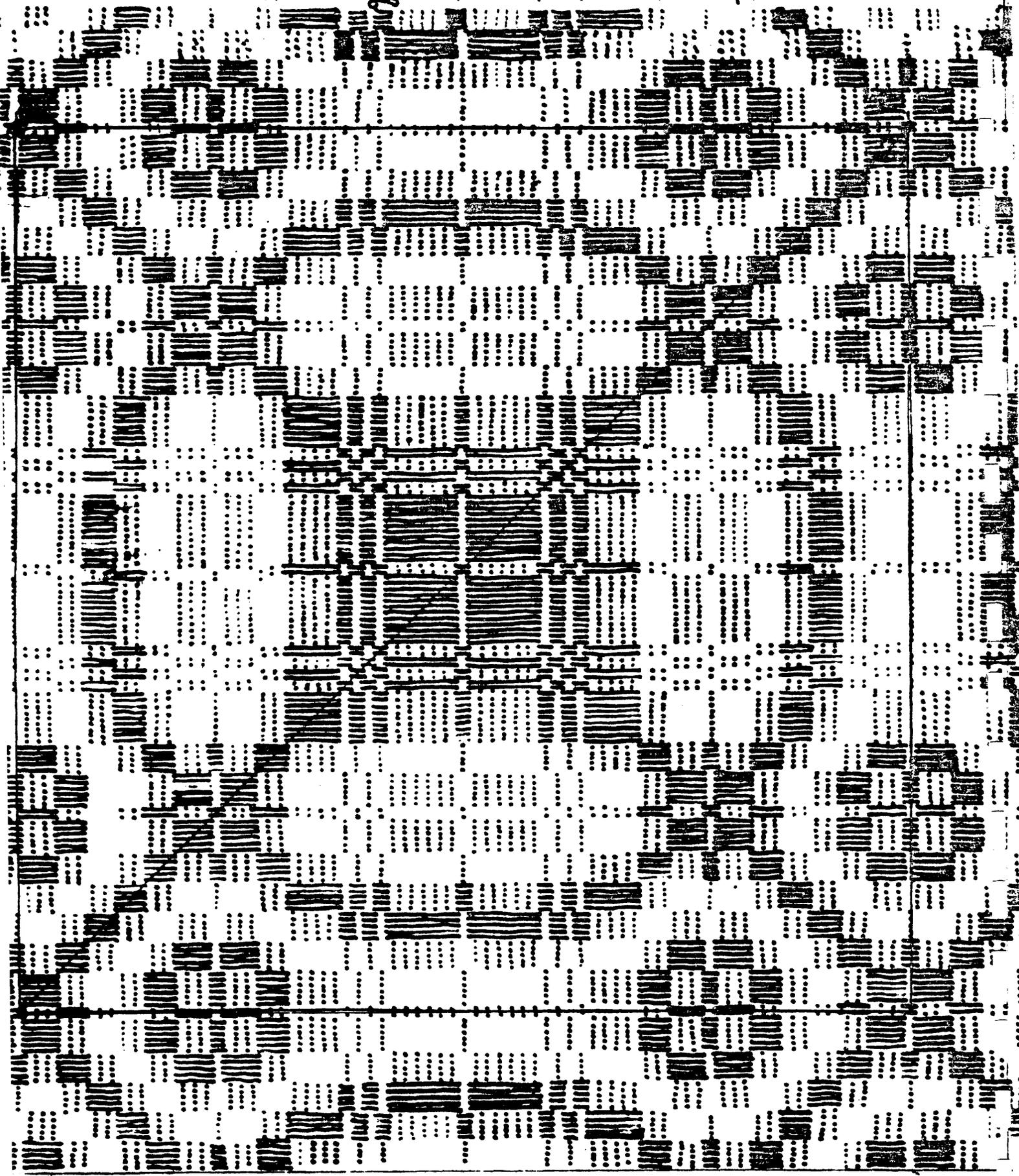


(e) "Orange Peel"



Threading Drafts.

~~Shuttle-Loft~~ Shuttle-Loft Course in Weaving, Section II
Lesson 4. Diagram 12. "Lover's Knot" Pattern





Shuttle-Craft Course in Weaving

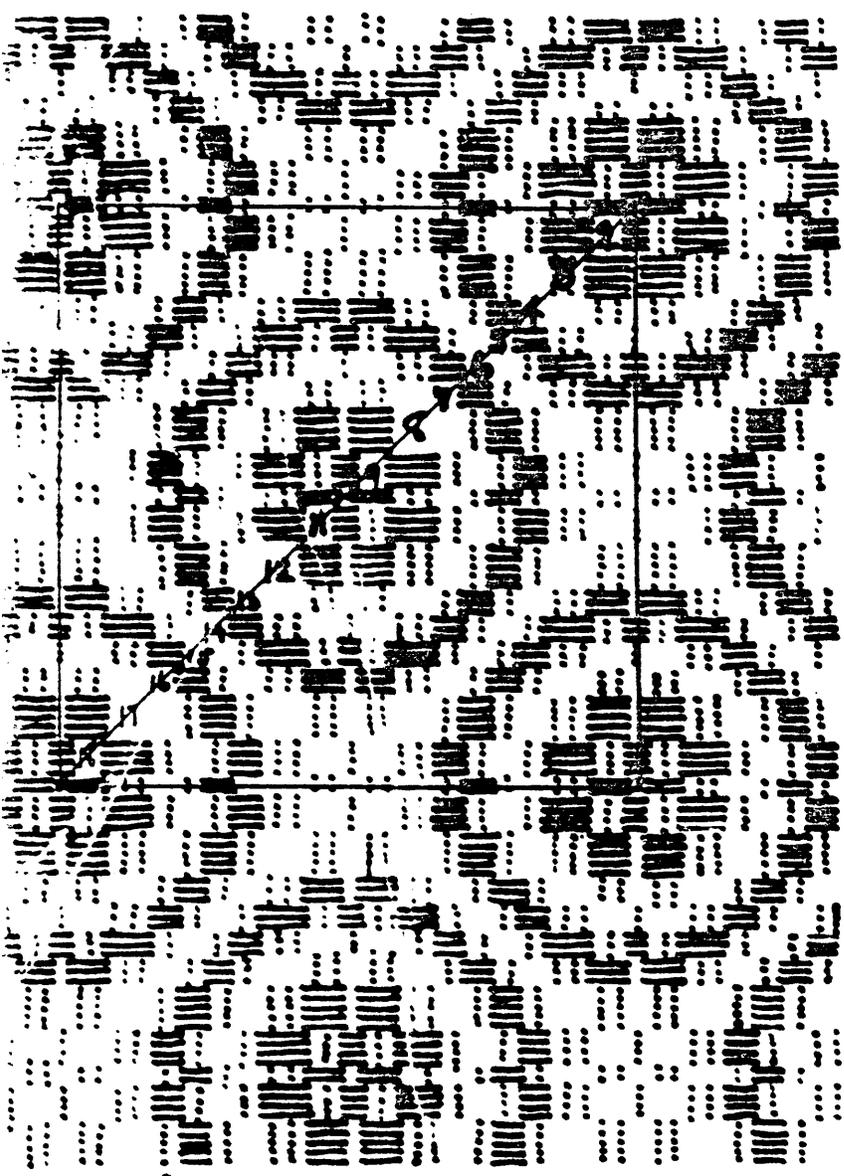
Section II
Lesson 4
Diagram 13



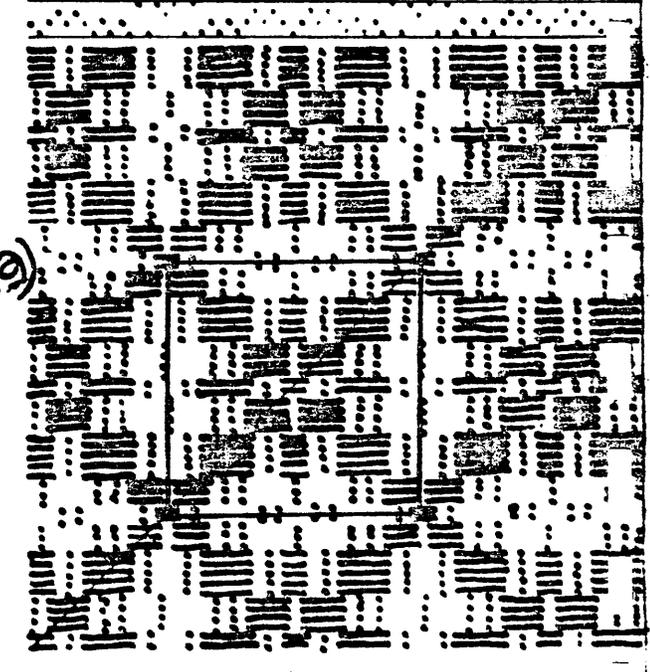
Pattern, Tabby

Threading Draft for (a) and (b)

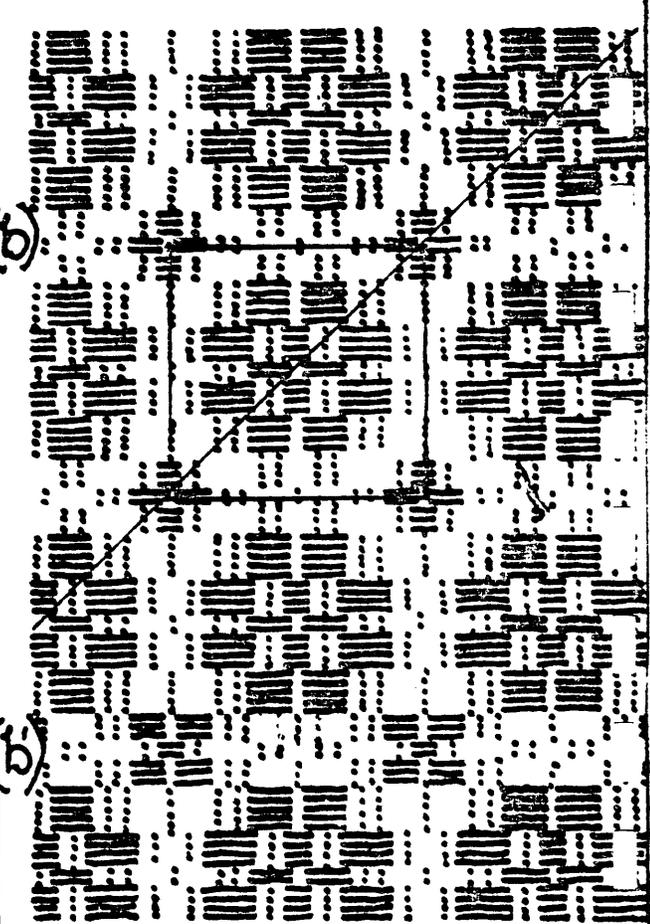
(c)



(a)



(b)



Treadling

- a) Star Fashion
- 1. 5
 - 2. 4
 - 1. 2
 - 2. 4
 - 1. 5
 - 4. 3
 - 4. 3
 - 4. 3

(b) Rose Fashion

- 2. 5
- 1. 4
- 2. 2
- 1. 4
- 1. 5
- 2. 3
- 3. 3
- 4. 3

Copyright 1922
Mary M. Atwater
Seattle Wash.

- (b')
- 4. 3
 - 3. 2
 - 4. 3
 - 4. 3

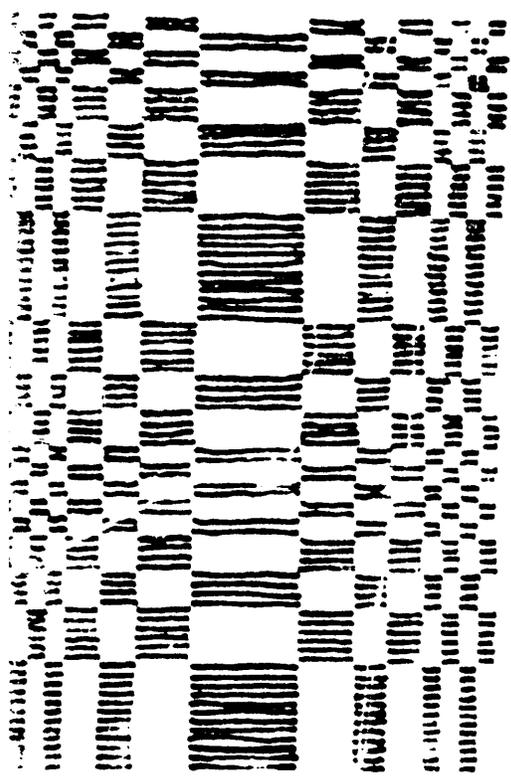
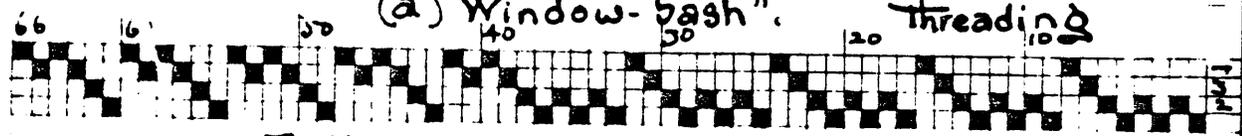
or

Lesson 4

Shuttle-Craft Course in Weaving. Section II

(a) Window-Sash Threading

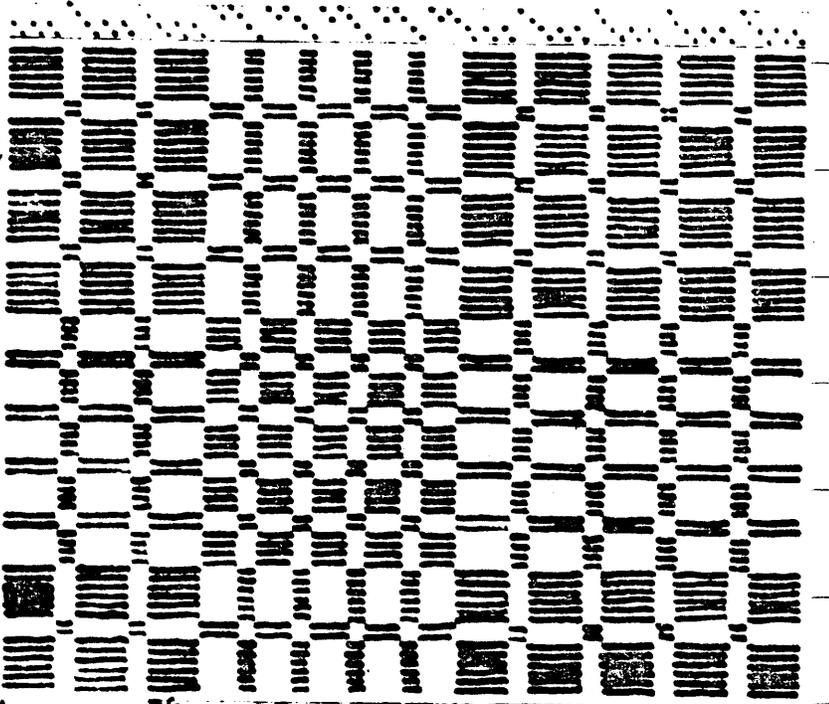
Diagram 14



Tie-Up
 1 2 A B
 X X X X
 X X X X
 X X X X

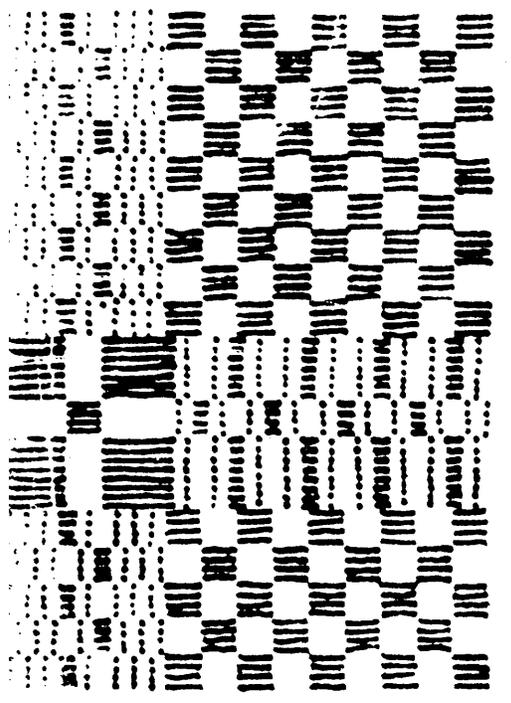
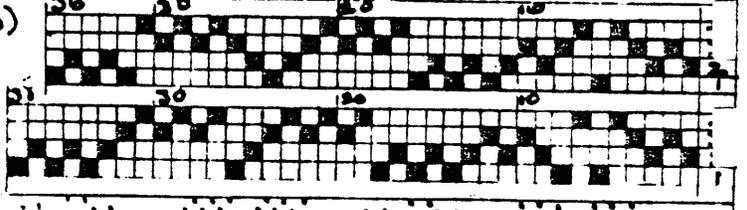
Pattern 1 (a)

Treading
 1. 6
 2. 2
 1. 6
 2. 6
 1. 2
 2. 6
 1. 2
 2. 6
 1. 2
 2. 6
 1. 2
 2. 6
 1. 4
 2. 4
 1. 2
 2. 4
 1. 2
 2. 4
 1. 2
 2. 4
 1. 2
 2. 4



Tie-Up (b)
 1 2 A B
 X X X X
 X X X X
 X X X X

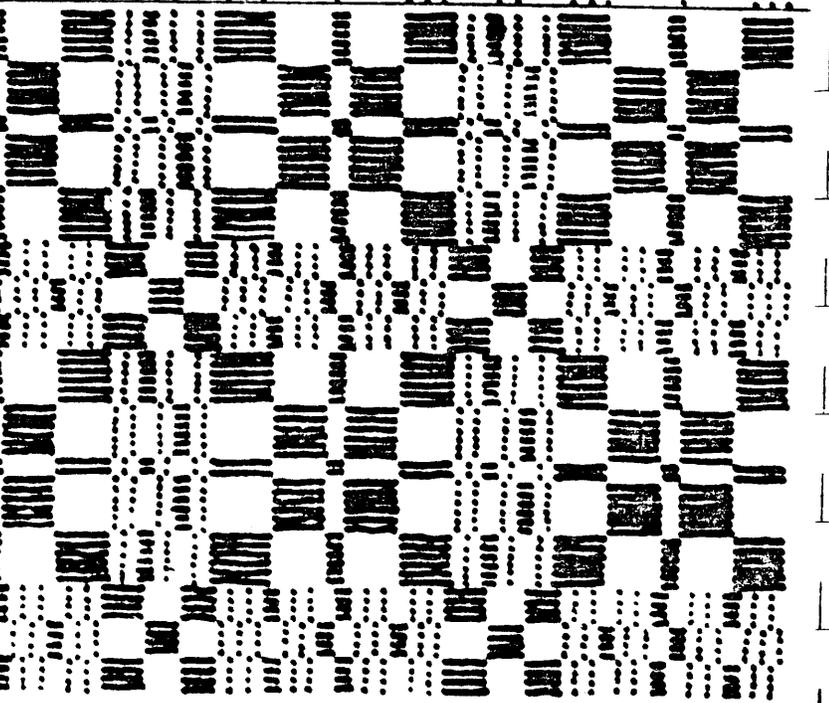
Pattern 1 (b)



Treading (b)

1. 6
 2. 6
 1. 2
 2. 6
 1. 2
 2. 6
 1. 4
 2. 4
 1. 2
 2. 4

Repeat.

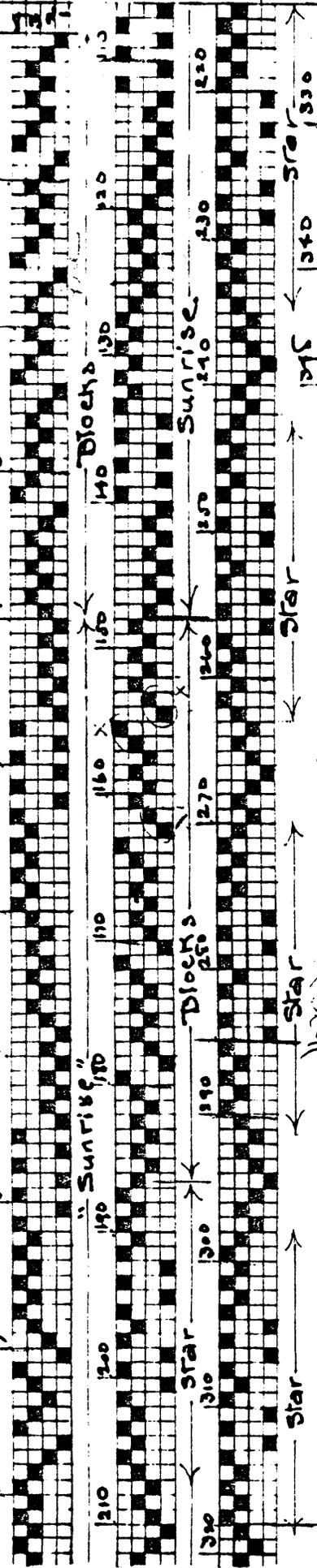


See Book
76-74
Nov 24

Section II

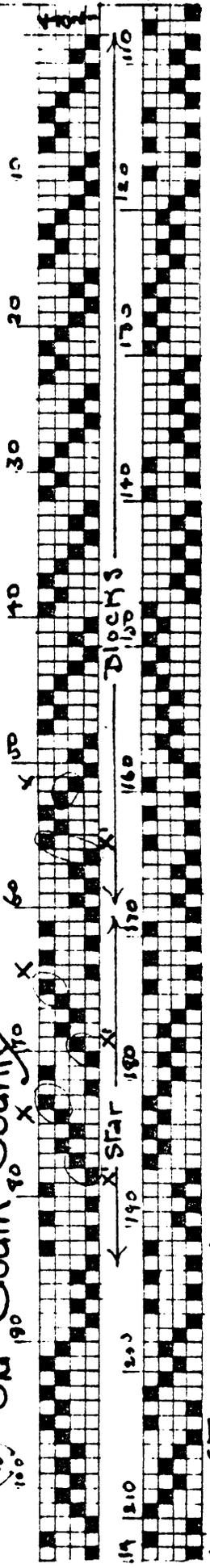
Shuttle-Craft Course in Weaving.

Lesson 4. Diagram 15 (a) "Lee's Surrender" Threading

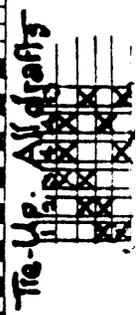
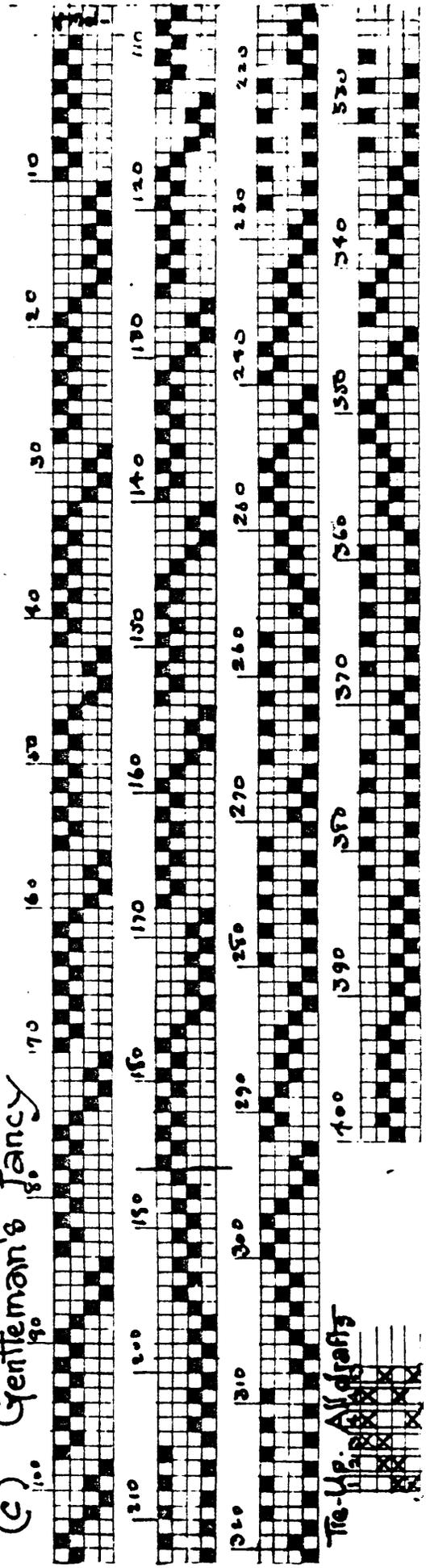


Weave these patterns "as drawn in," except that the small accidental blocks — as at x, x' etc. — should be omitted.

(b) "Old South County" Treadle "blocks" above: 2, 6; 4, 2; 2, 6; etc.



(c) "Gentleman's Fancy" Treadle "blocks," above, 1, 4, 3, 4; 1, 4, etc.

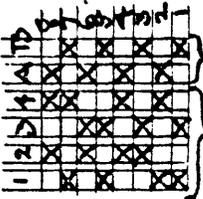


Shuttle-Craft Course in Weaving Section II

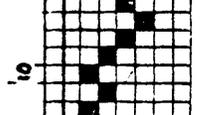
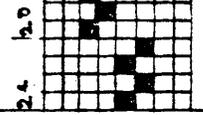
Lesson 4,
Diagram 16

"Diamond"

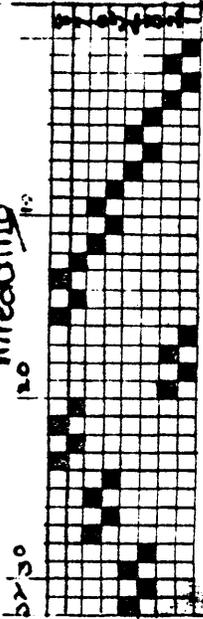
Tie-Up



(a)



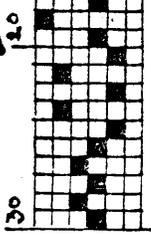
Threading



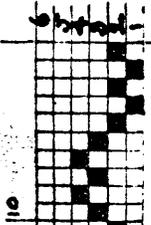
Tie-Up



Pattern Tabby

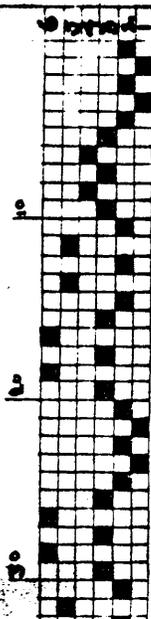


(b)



40

(a)



Pattern Tabby

(c) Single Chariot Wheel

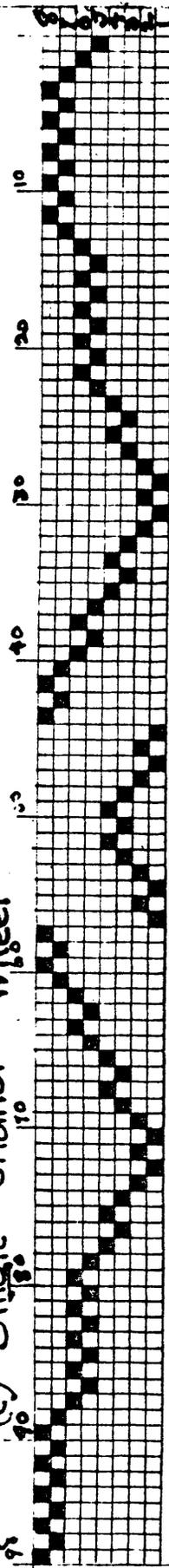
10

10

40

30

10



90

150

70

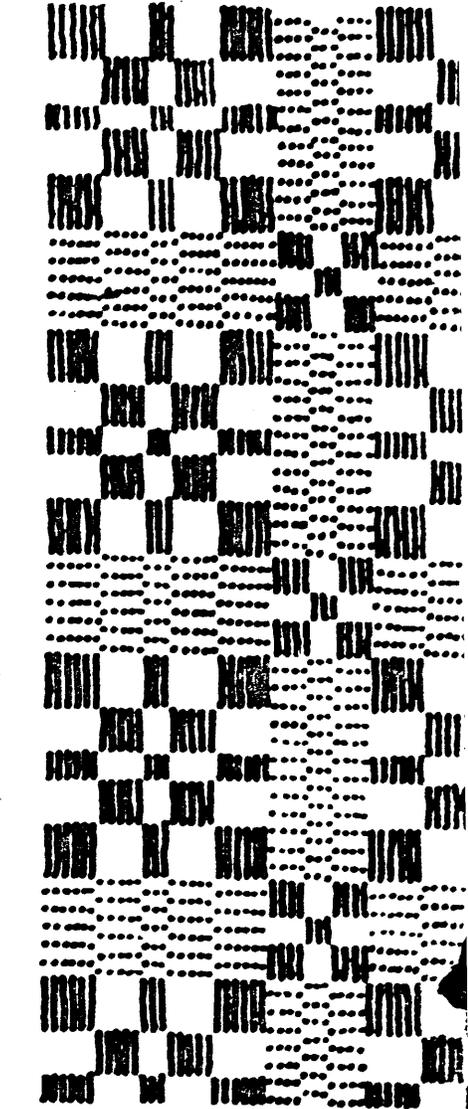
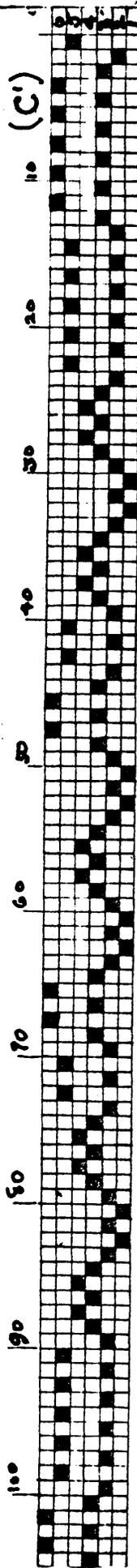
60

50

40

30

10

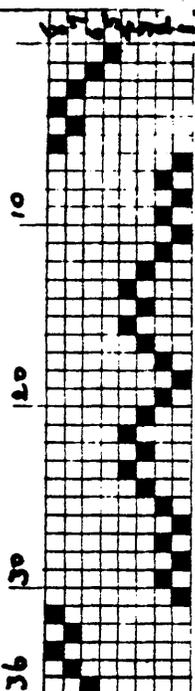


(d)

10

30

20



(a')

10

20

30



Shuttle-Craft Course in Weaving, Section III, Lesson 5

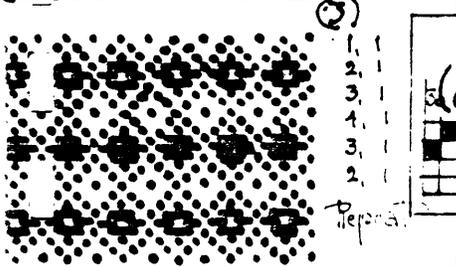
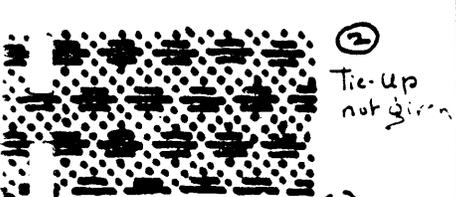
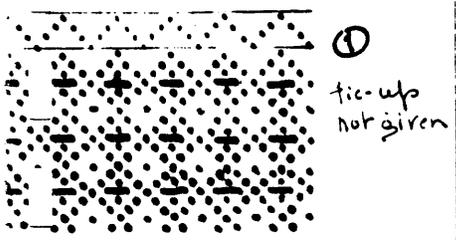
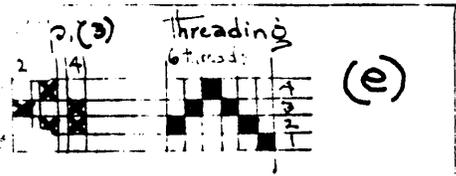
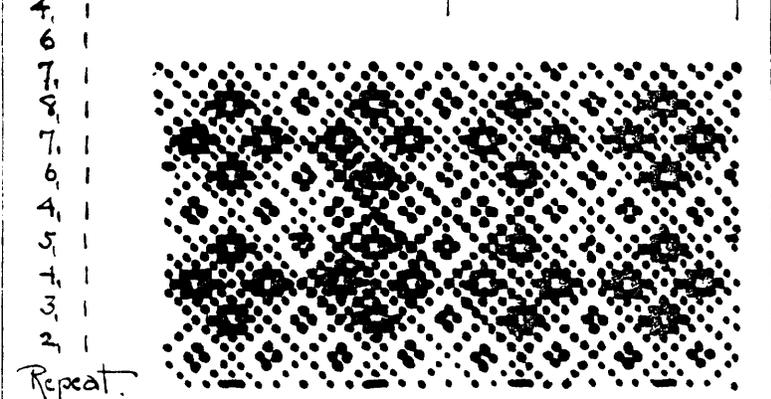
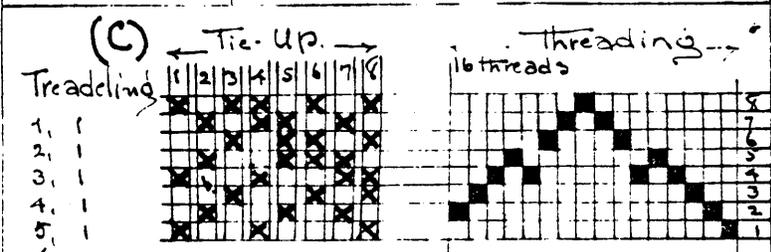
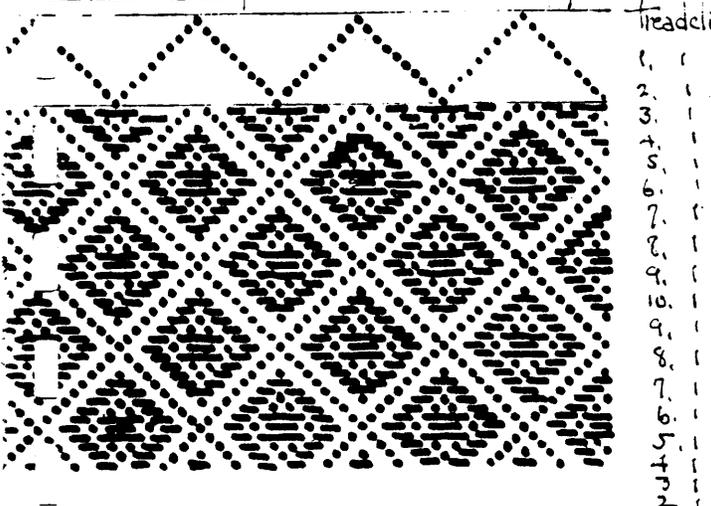
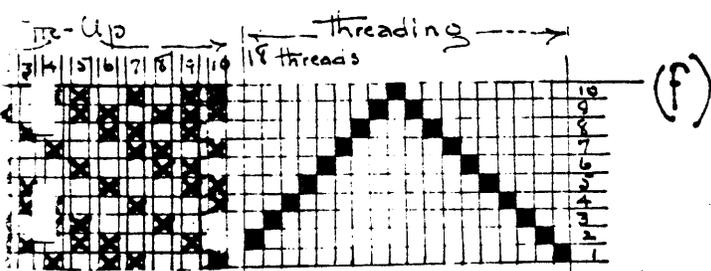
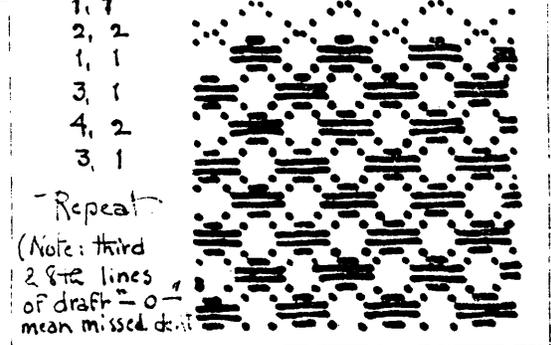
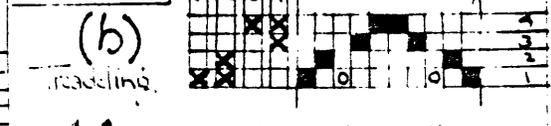
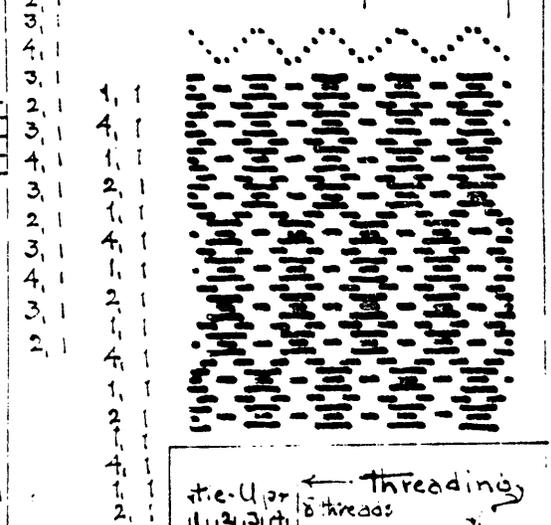
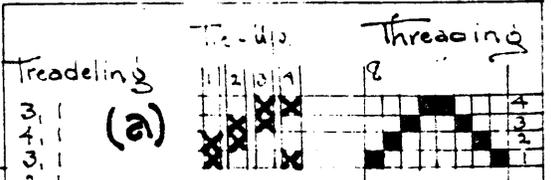
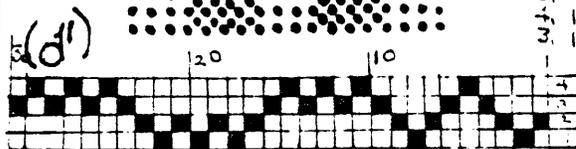
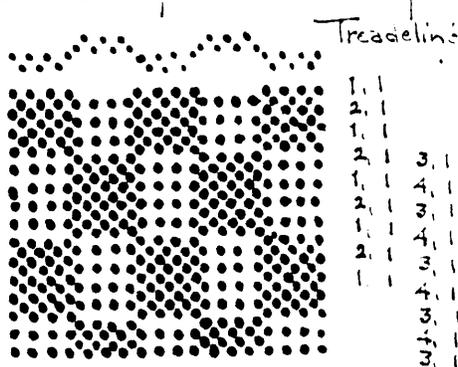
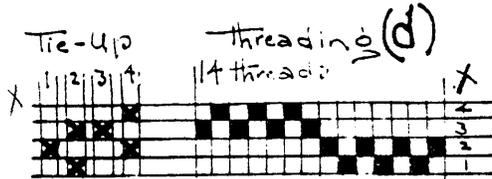


Diagram 19
Small weaves - for linen
or all wool blankets, etc.



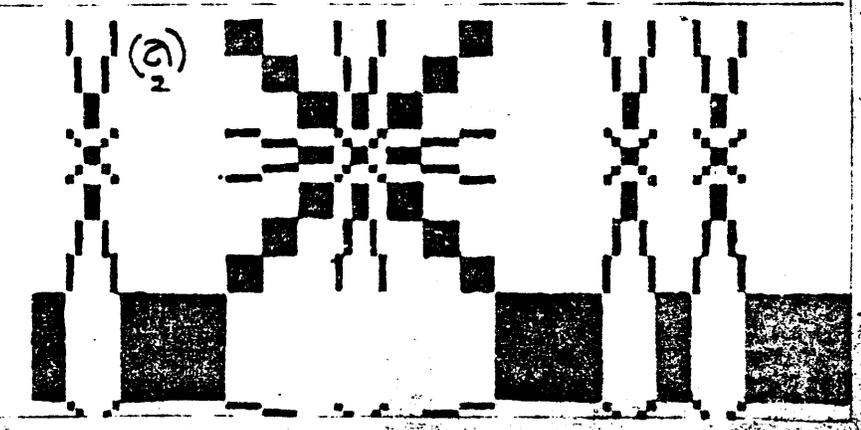
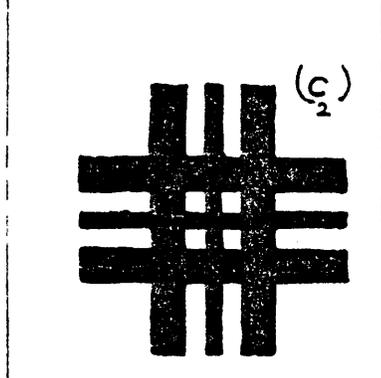
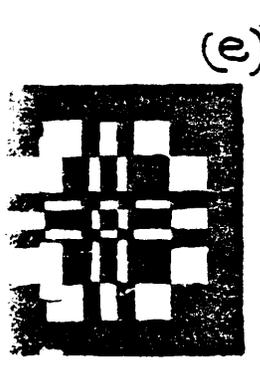
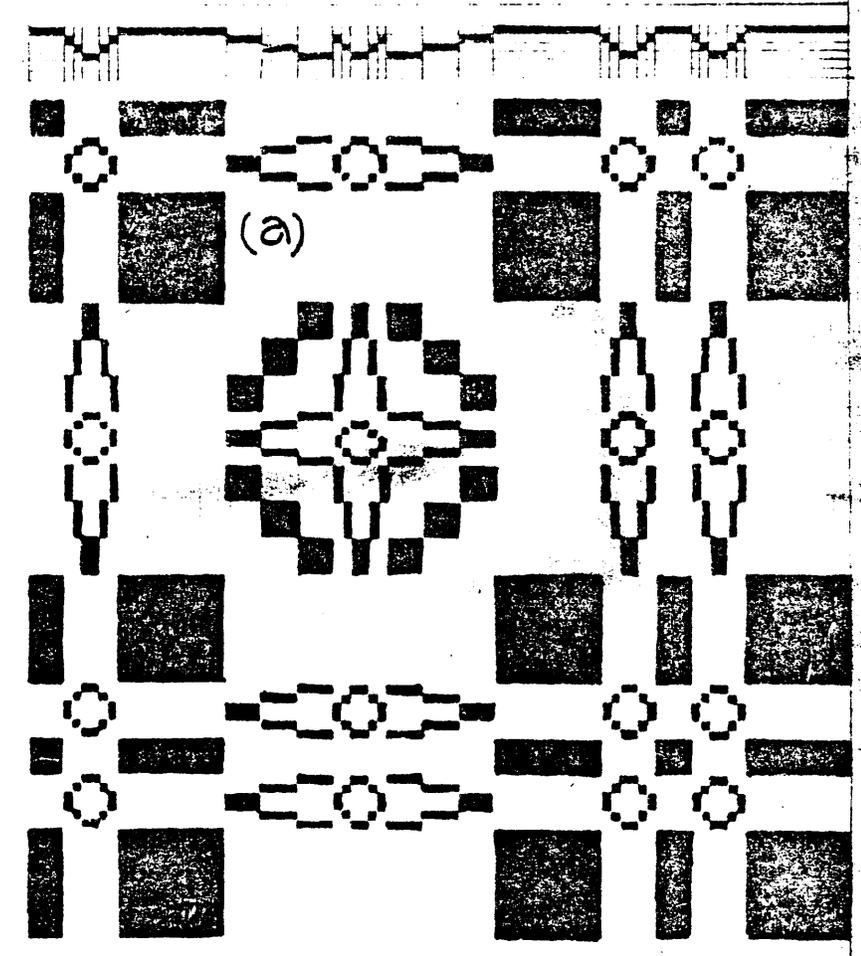
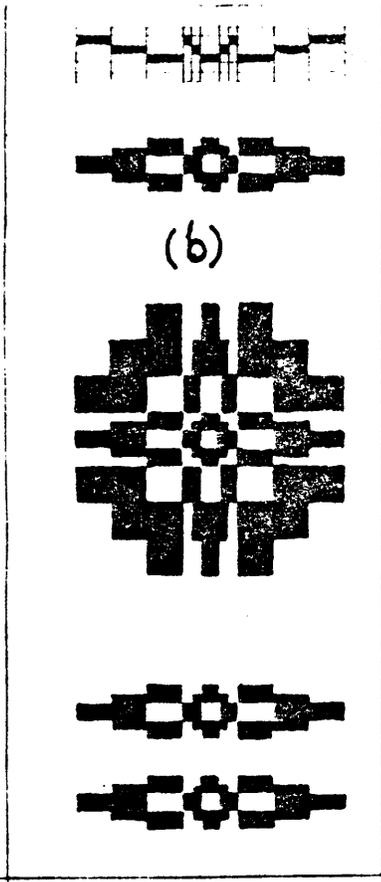
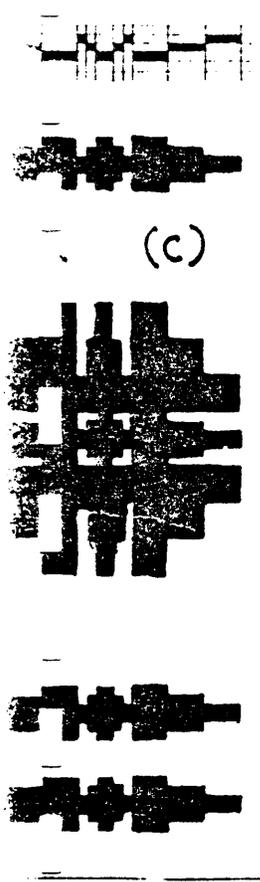
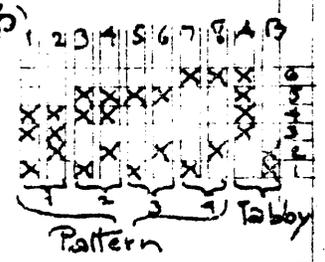
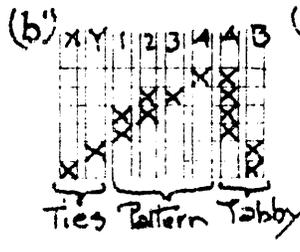
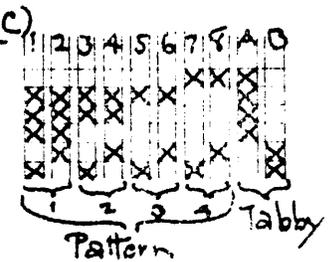
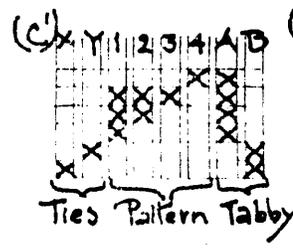
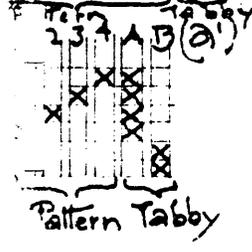
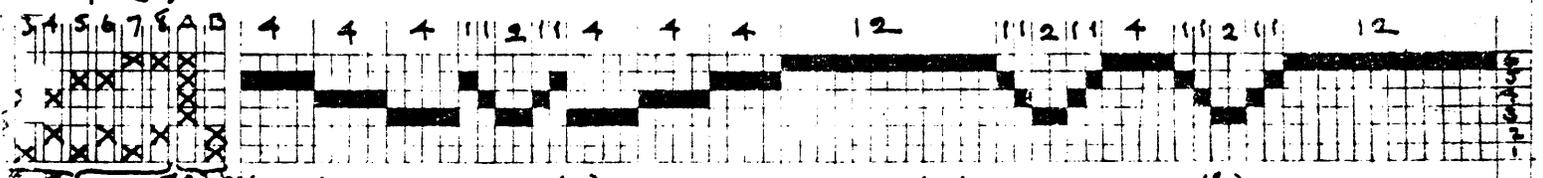
Copyright 1922
Mury M. Atwater
Seattle Washington

Pattern similar to
blanket illustrated
p. 131 of the "Book of
Handwoven Coverlets"

Shuttle-Craft Course in Weaving, Section III, Lesson 6

Diagram 24

Up (a)



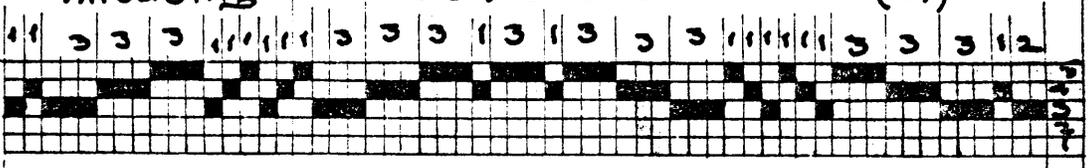
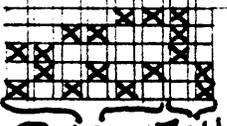
Shuttle-Craft Course in Weaving, Section III, Lesson 6

Diagram 25

tie-up
1 2 3 4 5 6 A B

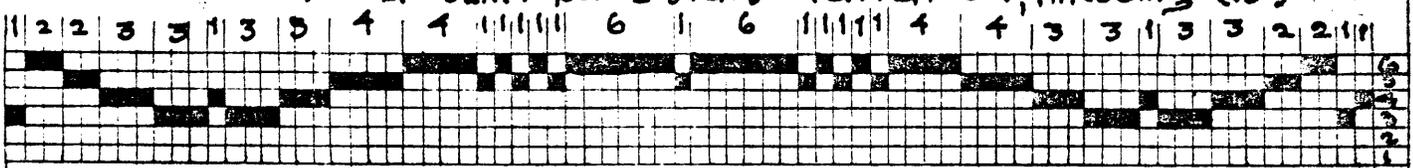
threading

"Stars & Circles" (a)



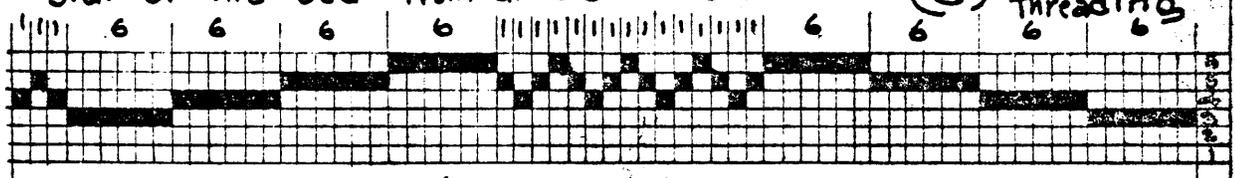
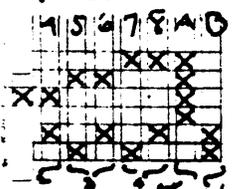
Pattern Tabby

A "Sun, Moon & Stars" Variation, threading (b)



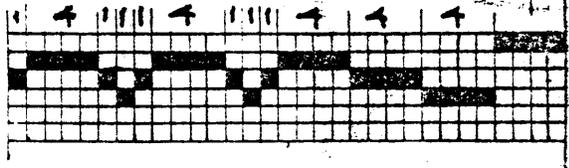
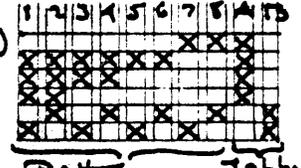
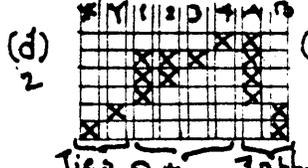
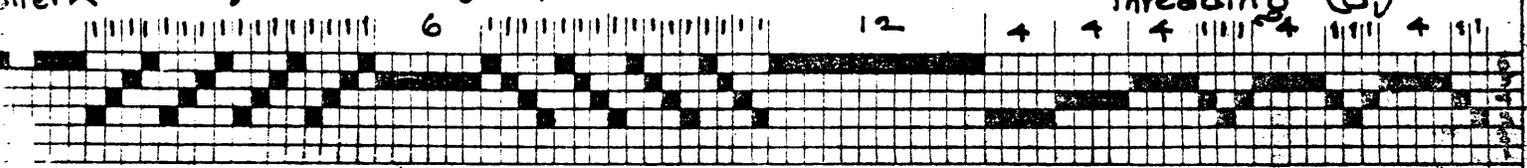
up (b) & (c)

"Star of the Sea" from an old Coverlet (c) threading



Pattern Tabby

"Sunflower" - after John Landes threading (d)

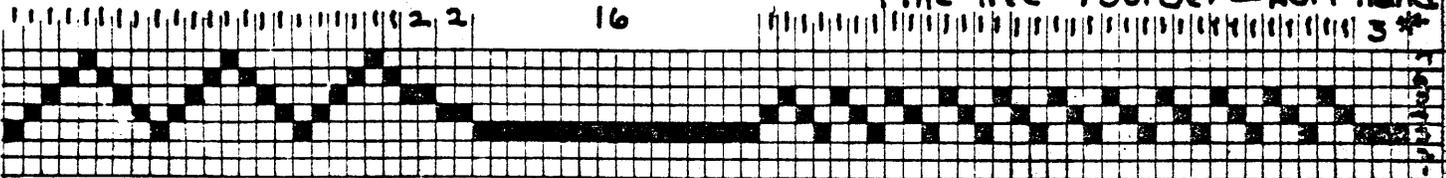


(e)

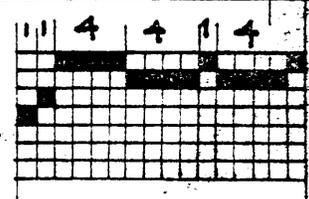
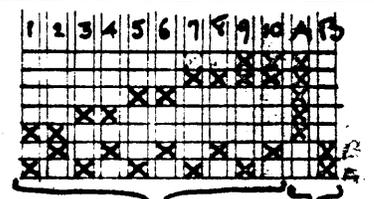
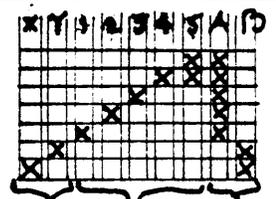
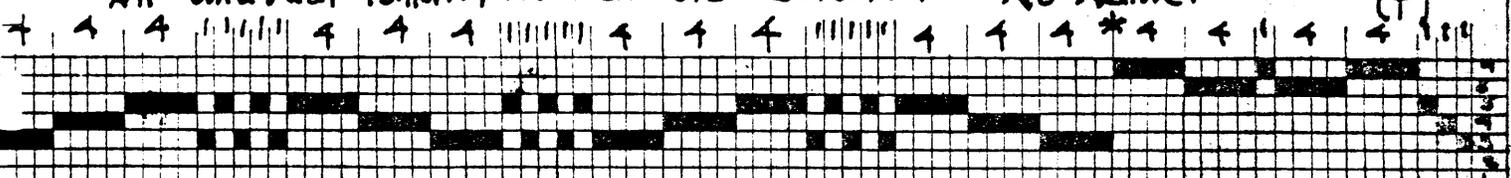
Ties Pattern Tabby

Pattern Tabby

"Pine-Tree" Border - Left Hand



An Unusual Pattern, from an old Coverlet. No Name.



Ties Pattern Tabby

Pattern Tabby

Shuttle-Craft Course in Weaving. Section III

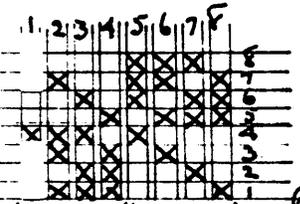
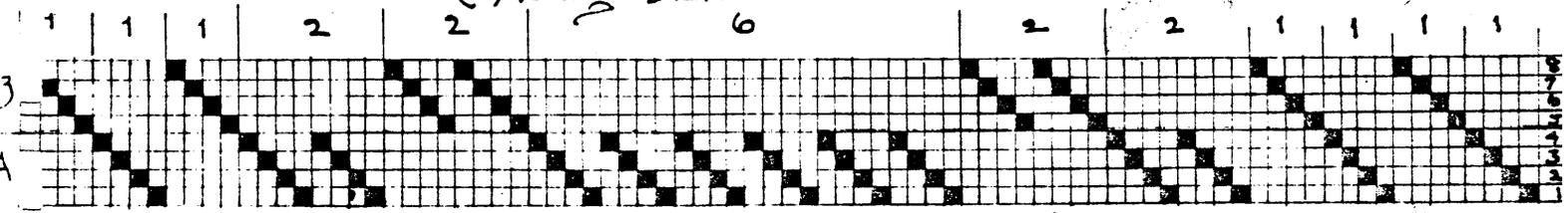
Lesson 7

Diagram 26

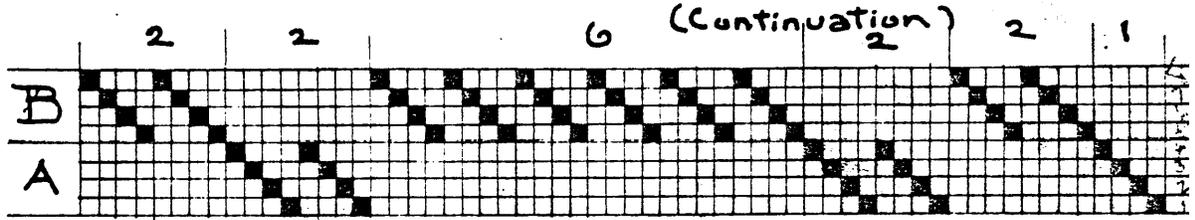
(a) Short Draft



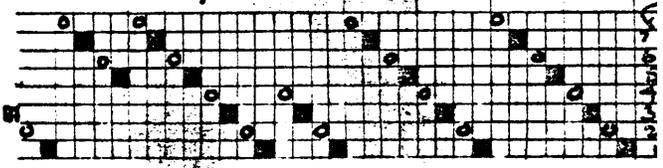
(b) Long Draft



(d) Tie-Up for Twill weave



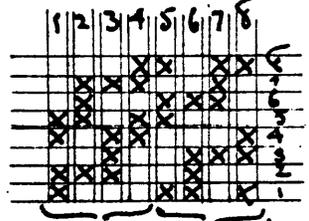
(c) Method of threading for "Double" Weave



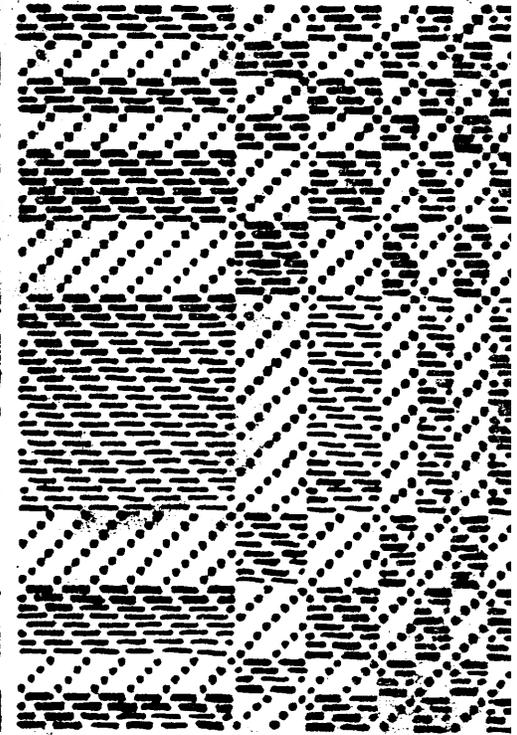
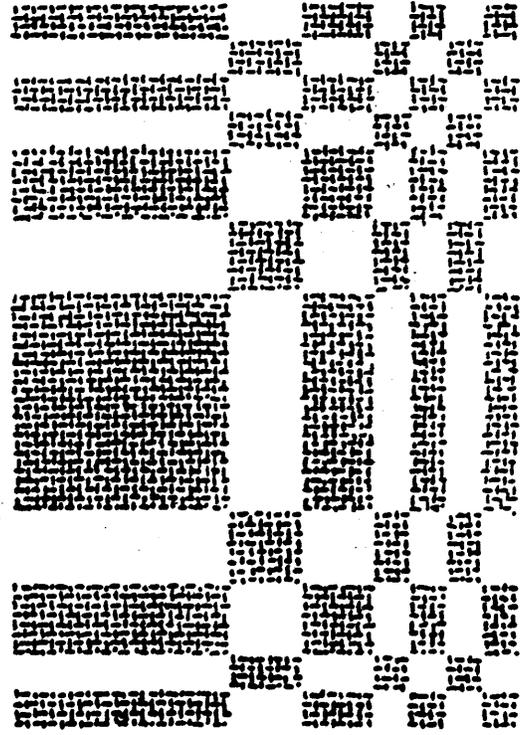
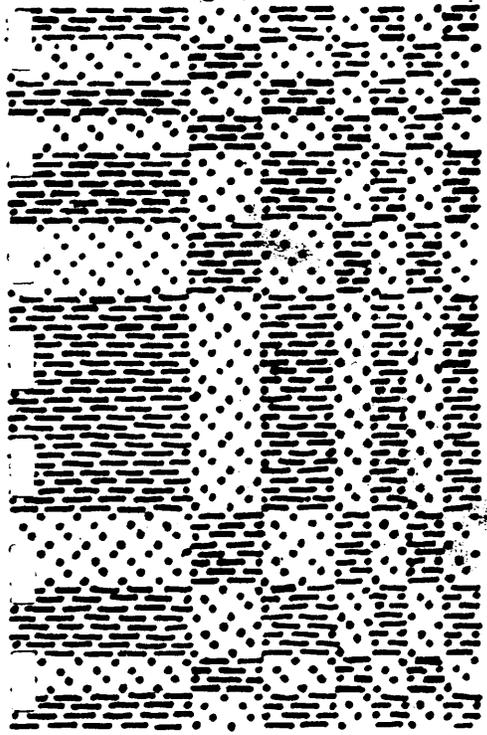
■ Blue threads ○ White threads



(e) Tie-Up for "Broken twill" or "4-heddle Damask"



(f) Tie-Up for "Double" Weaving



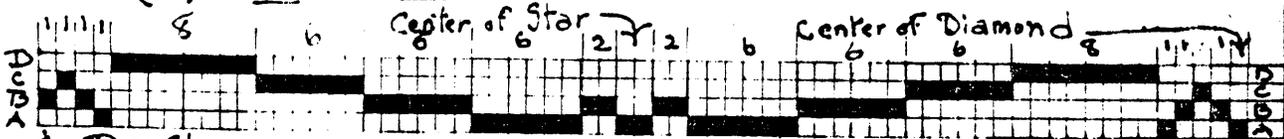


Shuttle-Craft Course in Weaving: Section III

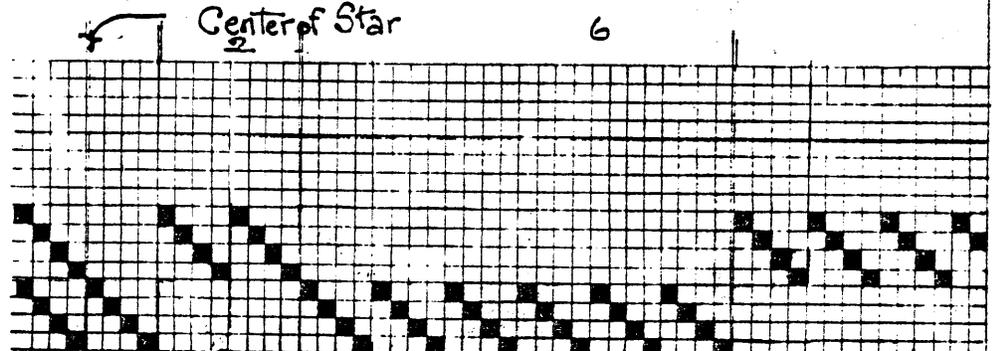
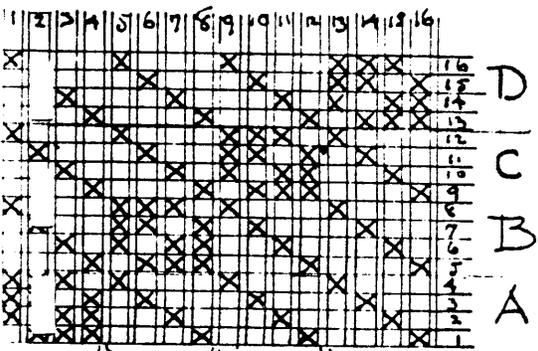
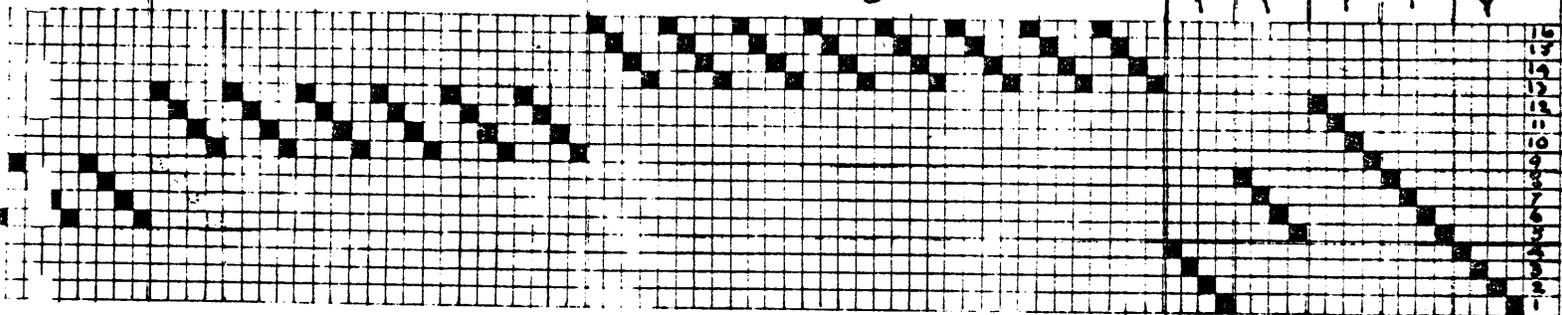
Lesson 7

(a) Short Draft

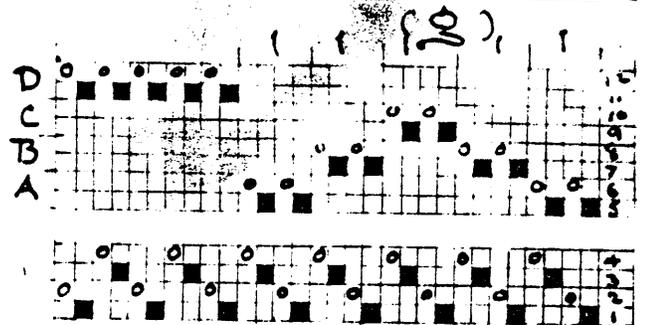
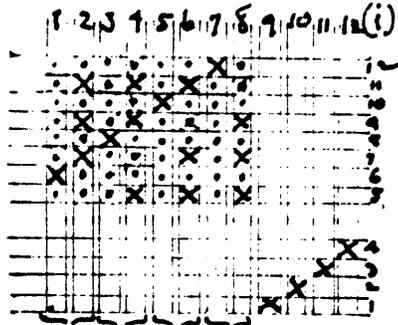
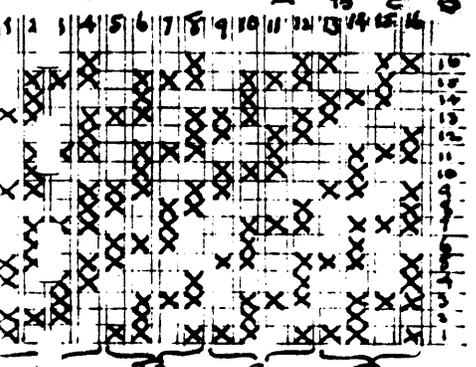
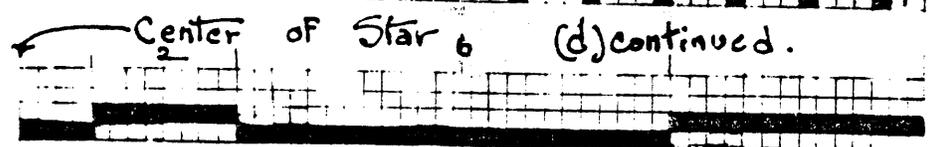
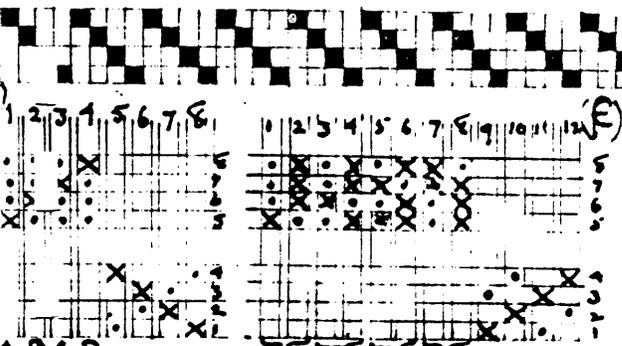
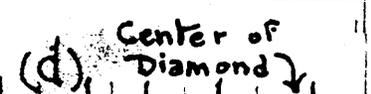
Diagram 27



(b) Long Draft



Tie-Up for Twill Weave

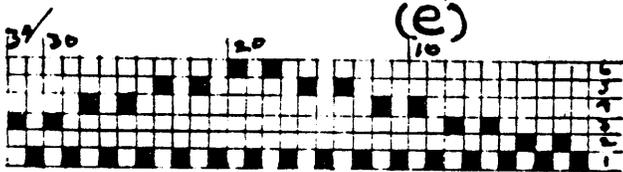
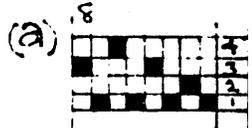
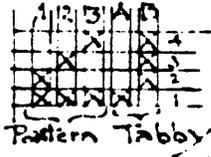


Shuttle-Craft Course in Weaving, Section III

Lesson 7

Diagram 30

Tie-Up



tie-up.

