



THE BOOK OF
SCHOOL
WEAVING

THE BOOK OF SCHOOL WEAVING

BY N. A. REED

LECTURER FOR THE BOARD OF
EDUCATION AND THE LONDON
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WITH A FOREWORD BY
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FOREWORD

THE cultural value of craft as a school subject is at last fully realised, but as to the choice of a suitable one there is yet much debate, and many so-called "Arty-Crafts" still find a place in the curriculum. Of all the basic crafts I know of none more suitable for, and acceptable to, girls of all ages than that of weaving.

The author of this book is a teacher of exceptionally wide experience—she has taught both child and teacher—but what is perhaps more important, she can spin and weave in an accomplished manner. This happy combination of experience has enabled her to explain in a simple yet exhaustive manner the whole range of the craft as it can be practised in schools, and also to guide the teacher in the method of imparting this information to children.

The weaving craft lends itself less to abuse than most crafts. The very process leads naturally to pattern-making. A teacher with an appreciation of texture and colour value has in this craft a most valuable means of cultivating in children their desire to express themselves and to develop their finer instincts.

The author has briefly but helpfully called attention to the possibilities of colour combinations. I should like to stress the importance of this in the weaving craft. While it might be truly said that there is no such thing as bad colour, there is such a thing as bad proportion. Teachers cannot do better than refer to nature as a guide to good proportion, but they should also study the many works dealing with the scientific aspect of the subject, particularly proportion and harmony. Unfortunately the colours offered in cheap machine-spun thread are often crude, monotonous and difficult to combine in satisfying colour arrangements. Children should, therefore, be taught when possible both to spin and to dye. They will then become more fully acquainted with the craft and its possibilities, and thus be able to recognise and appreciate the genuine hand-spun and hand-woven work of the artist-craftsman which can, fortunately, still be obtained.

We, unlike other countries, pay little attention to our traditional patterns. It is gratifying to find that many of them and their lovely names are included in this book. What happier source of inspiration could one desire than such names as "The honeysuckle," "The blooming flower" and "The rose path"?

With confidence I commend this book to all lovers of the craft, and to the many teachers whose aim it is to cultivate in children the full appreciation of beauty and fitness that is so closely associated with good craftsmanship.

R. R. TOMLINSON, A.R.C.A., R.B.A.

INTRODUCTION

SO much has been said or written in recent times regarding the value of craft-work that it seems unnecessary here to stress the point further, but rather to provide the means of translating words into practice.

For a number of years small children in the infant school have been doing, amongst other things, elementary forms of weaving on the simplest of looms ; while at the other end of the scale the craftsman and craftswoman have been preparing their thread and weaving it into patterns on highly mechanised looms. Between these two forms of the craft the gap has been wide, and it is in an attempt to bridge this, by showing how the weaving of material from the infant stage to the craftsman's artistry can be intelligently followed step by step, that the following pages are offered to teachers and others interested in the craft.

The writer would have preferred to plan a book on broader and deeper lines and to dwell upon historical and literary associations of the craft, but the number of letters received from all over the country shows that teachers are anxious to know what to do when faced with a class of children to train. Their appeal is for practical guidance and of necessity, in order to be brief but clear, and to give all possible help, this book may seem to err on the side of producing a formal scheme and may appear somewhat dogmatic.

The main principles of spinning and weaving are shown from the beginning, the work being grouped according to looms, from the simple cardboard loom to the four shaft loom, following the progressive stages of using a needle, shuttle, shed, stick and leashes.

An appeal is made to those who use this book to work the various articles first, before asking the children to do them, as it is only in this way that the difficulties can be understood and overcome.

My grateful thanks are due to Mr. R. R. Tomlinson, R.B.A., Chief Inspector of Art to the London County Council, for his Foreword to this book ; to Mr. H. S. Jude, Inspector of Handicraft to the London County Council, for kindly reading the manuscript ; but perhaps most of all to Mrs. Adams, Mrs. Kemp and the girls of Gifford Street L.C.C. School, whose enthusiasm and help have been an inspiration.

N. A. REED.

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A SPINNING WHEEL.

(See Chapter Seven.)

CHAPTER ONE

GENERAL HINTS ON WEAVING

FOR the benefit of those to whom weaving is, as yet, an unknown subject, it will be advisable in this first chapter to define briefly the terms in common usage in, and to give a few general elementary hints on, this fascinating and eminently practicable school craft.

Terms used in Weaving

Warp.—The simplest form of weaving is needle darning, in which threads are crossed alternately by others lying at right angles to them. The threads first handled in a piece of weaving are called warp threads.

Weft.—The cross threads used to darn or bind the warp together form the weft or woof.

Loom.—Any piece of apparatus on which warp threads are stretched is a loom.

Shuttle.—The simple piece of wood and the boat-shaped spool holder which carry the weft across the warp are alike known as shuttles.

Shed.—When working on a braid loom or a frame loom where a shuttle is used, an opening or shed must be made through which it can be quickly passed. This can be done by placing a stick under every alternate thread by means of which one set of threads is lifted at one time. The others or “in-between” threads are connected to a second stick by short lengths of string called leashes, which, in turn, lift the second group of threads. The lifting of either of these sets of threads will make a shed.

Leash.—This is a piece of cord or thin string which is placed under a warp thread and then tied over a stick or leash rod, which stretches right across the warp.

Tabby.—The making of the simplest piece of weaving is just darning or going over and under alternate single threads. It is referred to as the **WEB** and is the foundation of all forms of weaving.

Materials

It should be borne in mind that it is not economical to buy cheap thread, which is often

badly skeined and has a general tendency to break when stretched tightly on account of the short ends from which it is spun. In addition to this, the colours are sometimes very crude and the results when two or more colours are used are very unsatisfactory. Cheap wool is as a rule very hairy, and this gives a lot of trouble in weaving. On the other hand, it is not suggested that children should be discouraged from experimenting with their own small contributions of materials.

The best and most frequently used threads are wool, coloured cottons, mercerised cottons and linen thread. They can be used for warp and weft, and a warp of one kind can be crossed with that of another, according to the article to be made.

The most useful combinations are :—

<i>Warp</i>	<i>Weft</i>
1. Three-ply unbleached or coloured cotton.	Coloured mercerised cotton.
2. Two-ply wool.	Wool, 2-, 3- or 4-ply.
3. Two-ply wool.	Mercerised cotton.
4. Linen.	Weaving cotton.
5. Weaving cotton.	Mercerised cotton.

The children should be encouraged to use their own spinning first for the weft and later on for both warp and weft.

Colour

The question of colour is most important, requiring much more attention than is usually paid to it. It is not always realised that if what is regarded as a natural order is followed a harmony of colour will be obtained. A book such as this cannot deal at all adequately with the subject, but a few brief notes will serve as a guide to beginners.

The chart in Diagram 1 is divided into 14 parts, and the colours are arranged in a natural order, Nos. 1, 8 and 11 being the three primary colours—yellow, red and blue. The worker will be more or less on sure ground if the colours which come within

90 degrees of each other are combined, but at the same time the addition of complemen-

green-blue weft lead to an inch of all green-blue on grey. This is followed by alternate

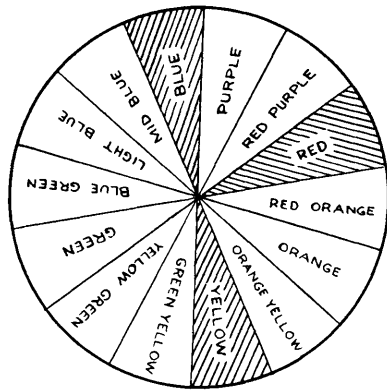


DIAGRAM 1.

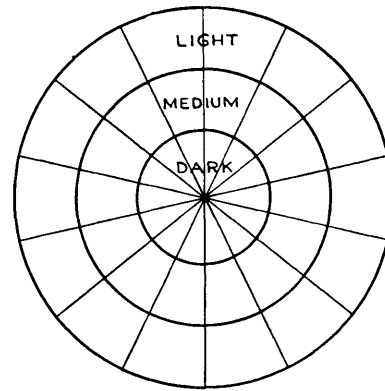


DIAGRAM 2.

tary or opposite colours can add a note of interest and brightness provided that they are used sparingly and in the right proportion.

The colours shown on the chart can be divided into light and dark tones, as in Diagram 2, and it is here that the weaver must go warily and not combine the pale tones of one colour with the dark tones of another.

The ground or web of a piece of weaving should be regarded apart from the pattern, and the following experiments will prove useful to demonstrate the harmony of colour :

1. Mount a blue warp and cross it with bands of purple, red-purple, red, red-orange and orange.

2. Mount a yellow warp and cross it with the same colours.

3. Mount a blue warp and cross it with the same.

4. Mount a blue warp and cross it with green, blue, blue-green, green, yellow-green, green-yellow and yellow.

Further experiments can be made by weaving bands of pattern in these webs: yellow on 1, blue on 2, green on 3 and red on 4.

Grey and light fawn wools have much to recommend them for warps. They act as a splendid background for all the colours, particularly the stronger ones. Pleasing results are obtained by mounting a grey warp and weaving in grey for about an inch. For the next inch alternate rows of grey and

rows of green-blue and green, leading to an inch of green. Work back from this to the beginning through alternate blue and green, all green-blue, alternate grey and green-blue, finishing with grey.

On a fawn warp the same method can be followed, using yellow, orange, red-orange and red.

Useful Hints

A few hints may be the means of avoiding many of the mistakes that beginners so often make. One of these is to beat the rows of weft so close together that the warp is almost completely hidden. This results in a hard, stiff piece of material. A good plan is to weave so that there is as much warp as weft showing in the finished web.

Try to avoid getting a "waist" in the middle of the warp. It will be noticed that the weft threads are inclined to pull the warp threads close together after a few rows of weaving have been done. This is prevented by letting the weft lie rather loosely across the warp and by drawing the needle or shuttle backwards and forwards across the warp, thus keeping it spread out.

One of the tests of a good piece of weaving is to have even edges. This means that the weft is drawn neither too tightly nor too loosely across the warp.

Many weavers find great difficulty in keeping the warp from breaking. This may be caused by mounting thread that is too loosely twisted, using cheap thread or by

mounting unevenly, that is to say, that the tension of the warp threads is not equal. The last is perhaps the chief cause of the trouble, and too much care cannot be taken in mounting a warp.

Beginning, Joining and Ending

Beginning.—The easiest way of doing this is to let the ends remain on the outside and darn them in when the weaving is finished. This can be satisfactory when there are only one or two ends, but when several colours are used in the making of stripes and patterns the large number of ends lead to confusion and ragged edges, so that it is as well to know how to begin in the correct way.

When the warp is mounted ready for weaving, instead of going across it from right to left, weave the last six threads at the bottom right-hand side from left to right and then carry on with the weaving in the ordinary way. By this means the ends will be fixed between the warp threads.

Joining.—Here again it is as well to have the ends fixed in the web. Pass the end of the finished thread under the first six right-

hand warp threads and let the end hang down in front of the weaving. Take a fresh thread and begin to weave at the third right-hand warp thread, going over and under the same threads as was done with the old thread. This will mean that there will be two threads in one row of weaving instead of one for four threads. But when the rows of weaving are beaten down, it will not show very much, and the two ends can be cut off close to the work without fear of their coming undone.

Ending.—When a piece of weaving is finished, work back for six or eight threads and cut the ends off. When working striped patterns in two or more colours, do not have all the joins on the same side: alternate them to keep the sides equal.

Making a Knot

When mounting a warp on a loom it is often necessary to make a join in the thread, and it is well to know how to make a knot which will not easily come undone.

Cut two pieces of thread about 6 ins. long and follow the instructions given in Diagrams 3, 4, 5 and 6.

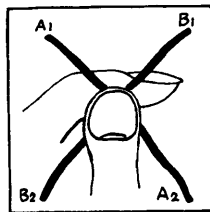


DIAGRAM 3.

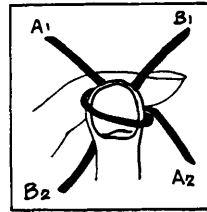


DIAGRAM 4.

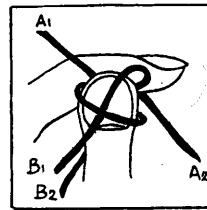


DIAGRAM 5.

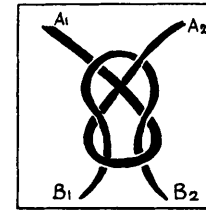


DIAGRAM 6.

1. TAKE ONE THREAD AND PLACE IT BETWEEN THE THUMB AND FIRST FINGER OF THE LEFT HAND, POINTING IT TO THE RIGHT, AS B. PLACE THE SECOND THREAD BEHIND THIS, POINTING TO THE LEFT, AS A. (*Diagram 3.*)

2. HOLD THE THREADS TIGHTLY, TAKE THE END A2 TO THE LEFT AND IN FRONT OF THE THUMB, BEHIND A1 AND IN FRONT OF B1. HOLD IT BETWEEN THE THUMB AND FINGER WITH THE OTHER THREADS. (*Diagram 4.*)

3. BEND B1 OVER TO THE LEFT AND PASS IT UNDER A2 IN FRONT OF THE THUMB. (*Diagram 5.*)

4. CATCH HOLD OF ENDS A1 AND A2 WITH THE RIGHT-HAND FIRST FINGER AND THUMB, THEN QUICKLY SLIP THE LEFT-HAND FINGER AND THUMB TO B1 AND B2. PULL THE HANDS APART AND TIGHTEN THE KNOT. IF IT HAS BEEN WELL MADE, THE ENDS CAN BE CUT OFF CLOSE TO THE KNOT, WHICH WILL REMAIN FAST. (*Diagram 6.*)

CHAPTER TWO

CARDBOARD LOOMS

The Notched Loom

THIS is the simplest of all looms, as it has teeth at the top and bottom round which the warp threads can be wound.

Mounting One Side of the Loom.—Take a fairly long piece of raffia and tie it round the tooth marked X in Diagram 7. Carry the raffia up to the left-hand side of the top tooth O, take it round the back of the point and bring it to the front again. Next go round the bottom tooth S, up again round the top one P and continue in this way until the whole card is filled. Finish by tying the raffia round the last tooth.

Tabby Weaving.—The warp threads are now ready to be crossed with the weft. Thread a raffia needle or long rug needle with a piece of raffia. Begin weaving at the bottom of the loom under one and over one from right to left and return from left to right. The black squares in Diagram 9 show where the weft comes in front or on top of the warp. Care must be taken to keep the warp threads well spaced out, and the rows of weft should not be beaten too close together.

Mounting Both Sides of the Loom.—To do this the raffia is tied at X, taken to the bottom through notch O, up the back and to the front again through notch P, as in Diagram 8. It is then brought round the front of tooth R, taken through notch S, down the back through notch T to the front and up again to notch S. It then goes round tooth U at the back and continued, as was begun at X.

The whole card is warped in this way until both sides are filled. It will be noticed that the top teeth are looped alternately back and front, while each bottom notch has a thread lying in it. In order to cross this with the weft there must be an odd number of warp threads on one side of the card.

Begin weaving at the bottom and go round and round the card, weaving both sides at the same time.

When the weaving is finished it can be taken off by lifting the loops off the top teeth and can be made into a pocket or bag.

The Pierced Loom

A very simple loom can be made from a piece of cardboard of medium thickness by piercing holes in it through which to thread the warp threads. These are useful for small samplers to show various weaves and patterns as well as to make small articles on.

Samplers.—The question of sampler making is rather a vexed one, partly due no doubt to the revolt against the fine cross-stitch samplers of our ancestors, and partly because of the utilitarian spirit so prevalent in this age. But weaving samplers can be quickly and easily done, they form a reference book for the child, they offer a great opportunity for experimenting in colour, and they show in a simple way how patterns, first planned on paper, are translated into weaving. Further, children find great joy in making them, and for this reason alone they are of value.

The Loom.—Cut a piece of cardboard 10 ins. by 5 ins., and divide it in half by a dotted line, as in Diagram 10. On the right-hand side paste the pattern, leaving the left side for the weaving.

The Pattern.—Cut a piece of squared paper 3 ins. by 3 ins. and darken or colour every alternate square. The dark squares show where the weft is in front of the warp. Paste this in position on the card.

Piercing the Loom.—Draw the lines X, X and Y, Y as shown in the diagram, and mark A and B 1 in. in from the left side. Measure and mark spaces $\frac{1}{4}$ in. apart on X, X.

Lines Y, Y have marks that come half-way between those on X. To mark these, measure $1\frac{1}{8}$ ins. from the left for C and D, and then mark quarter inches. In this way the warp threads can be mounted $\frac{1}{8}$ in. apart, and the card is not weakened by piercing the holes too close together. Make a small hole on each mark with a thick needle.

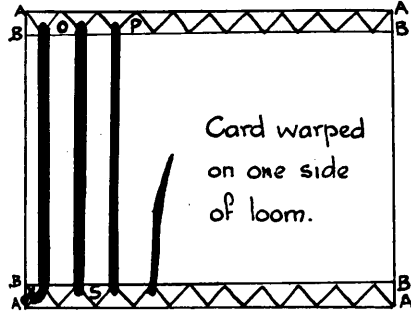


DIAGRAM 7.

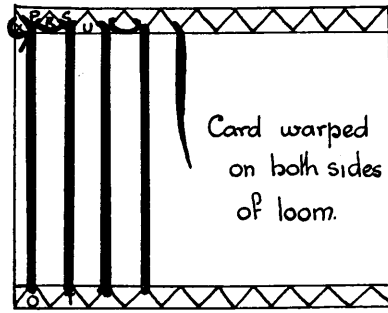


DIAGRAM 8.

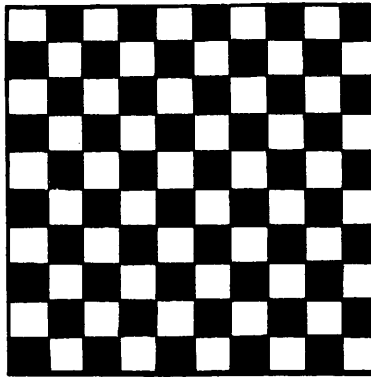


DIAGRAM 9.—TABBY WEAVE.

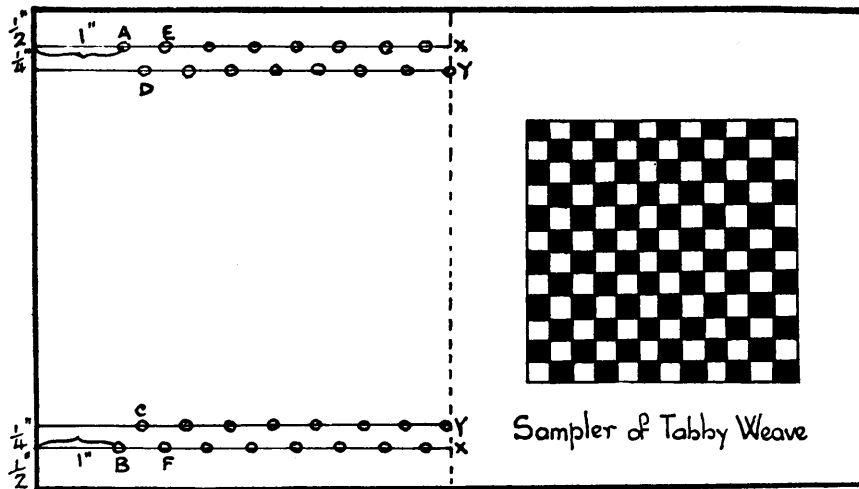


DIAGRAM 10.

THE BOOK OF SCHOOL WEAVING

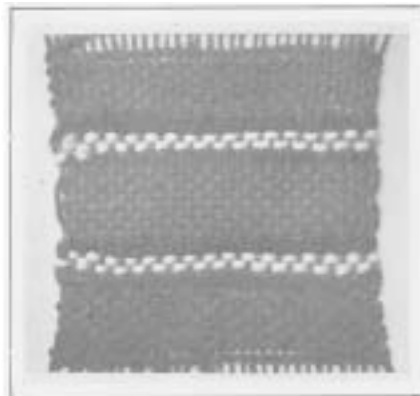


PLATE IA.

STRIPES. 2.

Warp.	Brown.	Weft.	8 rows brown.
Weft.	8 rows brown.	"	2 " black.
"	2 " black.	"	2 " yellow.
"	2 " yellow.	"	2 " black.
"	2 " black.	"	8 " brown.

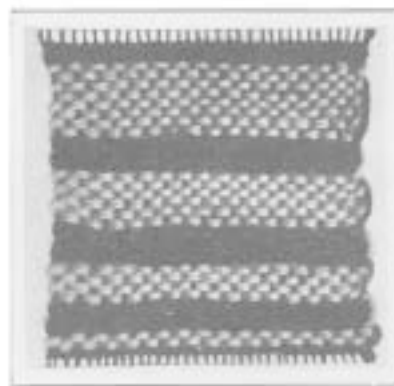


PLATE IB.

STRIPES. 1.

Warp.	Black.	Weft.	4 rows red.
Weft.	Black, with red stripes.	"	4 " black.
"	4 rows black.	"	6 " red.
"	2 " red.	"	4 " black.
"	4 " black.	"	6 " red.
		"	4 " black.

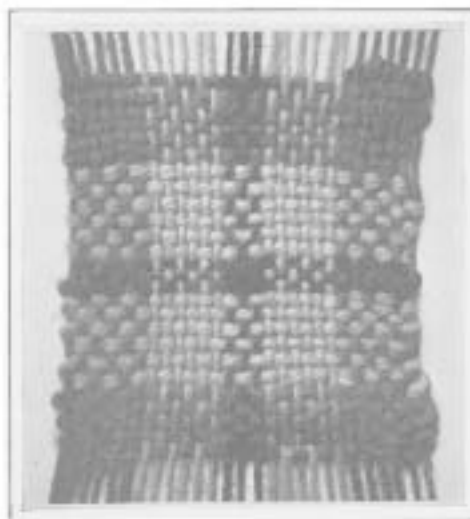


PLATE 2.

PLAID OR TARTAN.

Warp.	6 blue.	Warp.	6 green.	Warp.	6 blue.	Warp.	6 green.
"	6 green.	"	6 blue.	"	6 green.	"	6 blue.
"	3 black.			"	3 black.		

Mounting the Warp.—Thread a needle with some blue wool, tie a knot at the end of it and bring it through from back to front at A. Take it through B to the back, through C to the front, through D to the back, up

through E to the front, through F and so on until the end of the lines.

Weaving.—Thread a needle with green wool and begin to weave at the bottom in tabby weaving.

SIMPLE PATTERN WORK

Stripes in the Weft

The earliest forms of weaving were all of plain web, and when decoration was needed it was worked in afterwards. Later came the time when decoration formed part of the actual weaving, and there is little doubt that it first took the form of plain stripes in colour.

Plates 1A and 1B show two samplers of striped weaving for the next two samplers. Care must be taken with the joins.

A Striped Warp

The next step in the decoration of the web is to make stripes in the warp. Cut a piece of cardboard 5 ins. by 5 ins., mark it and pierce it as before, and then mount 24 warp threads on it, using blue and green wool. First mount 4 blue threads, break the wool near the hole, join the green wool to it, and mount 3 green warp threads. Continue in this way with 2 blue, 6 green, 2 blue, 3 green and 4 blue threads.

Cross this with green wool, and notice the colour where the blue crosses the green.

Plaids or Tartans

(Plate 2.)—A combination of stripes in both warp and weft give the beautiful materials known to us as plaids or tartans.

When working a piece of plaid, the chief thing to aim at is to get the weft stripes the same width as those in the warp. As a simple experiment, weave a piece of material like that shown in the photograph.

One or two of the well-known tartans can now be made, and although the original ones were not woven in a plain web, but in a twill weave (which will be described later), it is possible to get a good idea of the proportion of colours and the widths of stripes used in the various patterns.

Rob Roy Tartan.—The famous outlaw and

Jacobite leader dressed in a striking tartan of alternate black and red checks. Mount warp stripes of 12 black and 12 red threads, and cross them in the same order.

The Lindsay.—The colours in this are blue, green and red. Mount a warp with 4 blue, 1 green, 2 blue, 1 green, 2 blue, 8 green, 2 blue, 1 green, 2 blue, 1 green, 4 blue, 8 red, 1 blue, 2 red, 1 blue, 8 red, and then repeat from the beginning. Cross the weft in the same order.

Robert Bruce.—This is worked in the following order: 6 red, 2 white, 8 red, 2 black, 2 red, 4 black, 2 red, 4 black, 2 red, 2 black, 8 red, 1 white and back from 8 red to 6 red. Cross in the same order.

Checks.—Following on from the above come the regularly spaced warp and wefts to form small squares of varied colours.

Pattern Making

(Plate 3.)—We now come to what is perhaps the most interesting part of weaving, and the one which gives most scope for originality in design and colour. Patterns should first be planned on squared paper, as in Diagrams 11, 12 and 13. This is spoken of as *drafting* a pattern.

Pattern Samplers.—The diagrams show three patterns based on squares and rectangles. These can all be used when weaving small articles, not only in the form of bands, but as *all-over* designs.

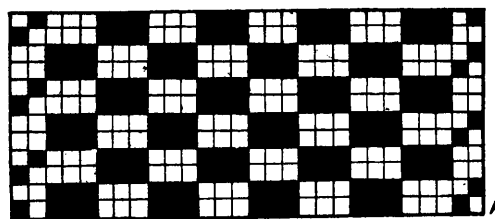


DIAGRAM 11.

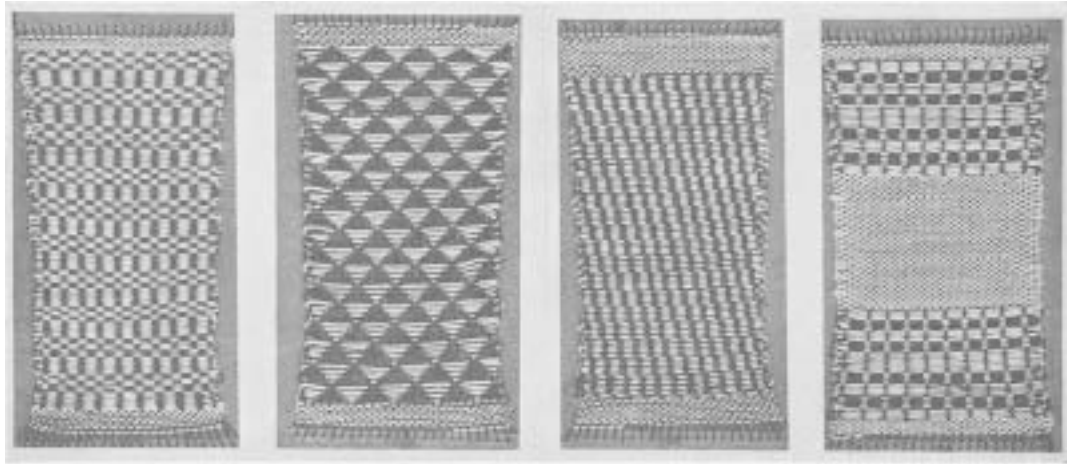


PLATE 3.—SAMPLERS OF SIMPLE PATTERN WEAVING.

1. Diagram 11. Mount a cardboard loom with 28 threads. Begin to weave at the bottom right-hand side and work six rows of tabby in the same colour as the warp. This is called the *ground* colour. Between each row of pattern there is a row of tabby in the ground colour. These rows must never be forgotten, as they form the web which holds the pattern, although they need not be shown in the pattern draft. They are called *binders*.

For the pattern, thread a second needle in a second coloured wool, darn the end in and work the first row by going under 1, over 1 and under 3, over 3, as far as the last two threads, which are worked 1 under and 1 over. With the first needle work a row of ground tabby. For the second row of pattern work left to right under 2, then over 3, under 3 three times, and lastly over 3, under 4, over 1. Work a row of tabby.

Continue to work the pattern from the draft shown in diagram 11 (*page 13*).

2. Diagram 12.
Warp 26 threads.

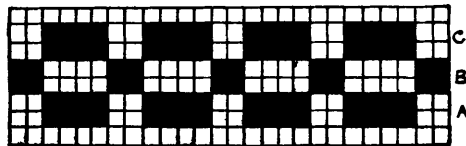


DIAGRAM 12.

Weave 3 rows of tabby.

First pattern row. Under 2, over 4.

Binder.

Second pattern row. Under 2, over 4.

This finishes A.

For B work over 2, under 4.

For C work under 2, over 4.

3. Diagram 13. This time each band of pattern is bordered by two rows of tabby in the same colour as the border.

Warp. 32 threads.

Weave 2 rows of tabby in the ground colour, 2 rows of tabby in the pattern colour, and 2 rows in the ground colour.

Pattern A is under 2, over 3.

Pattern B is over 2, under 3.

Pattern C is under 2, over 3.

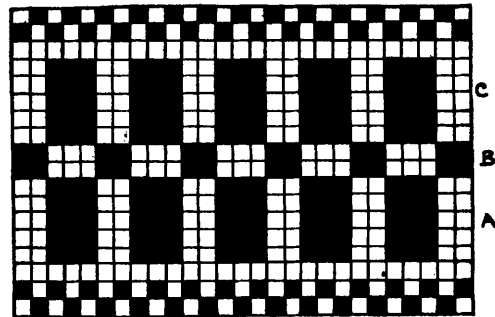
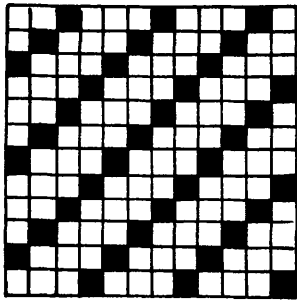


DIAGRAM 13.

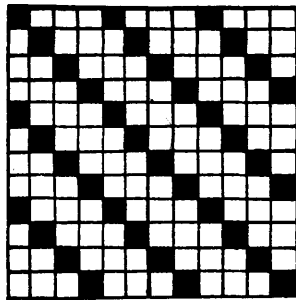
TWILL AND BIRD-EYE WEAVES (Plate 4)

So far we have only considered one class of weaving, the making of a web by going over one and under one alternately, which can be left quite plain or decorated with pattern.

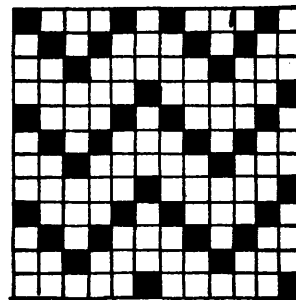
A second class of weave is that known as *twill*, in which the weft thread is passed over and under two, three or more warp threads in regular succession, but there is no tabby



A.—RIGHT-HAND TWILL.

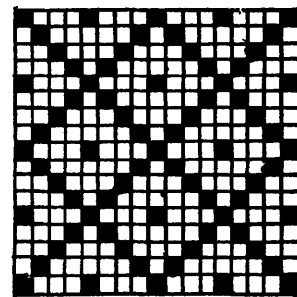
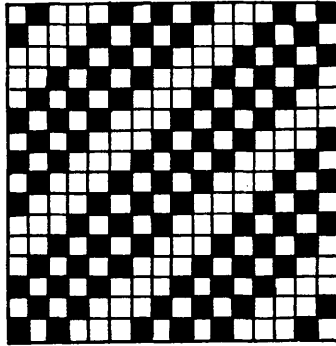
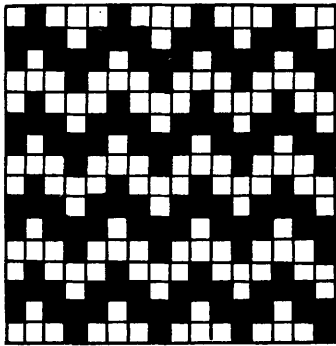


B.—LEFT-HAND TWILL.

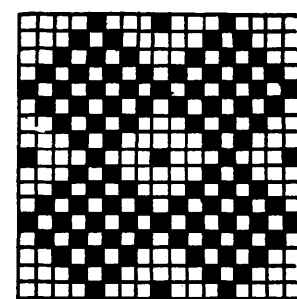
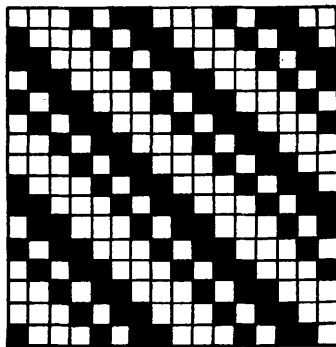
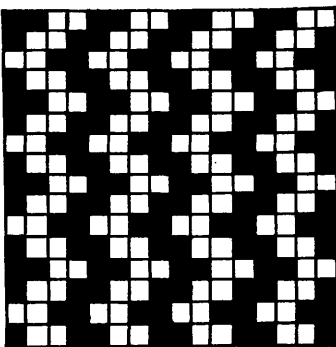


C.—ZIG-ZAG TWILL.

DIAGRAM 14.—PLAIN TWILLS.



A.



B.

DIAGRAM 15.—FANCY TWILLS.

DIAGRAM 16.—BIRD-EYE WEAVES.

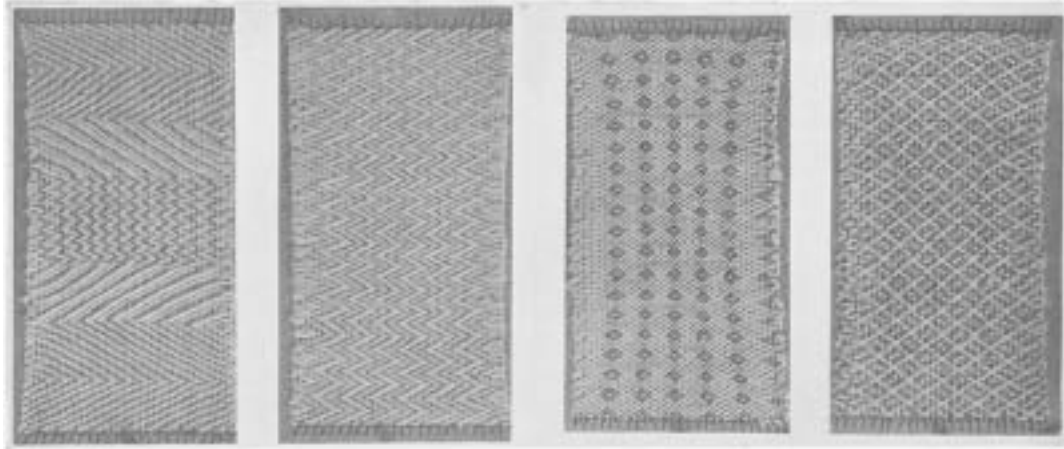


PLATE 4.—SOME EXAMPLES OF BIRD-EYE TWILLS.

row between. The simplest forms are those named above, and it is in one or other of these that most of the plaids and serges are made.

Right-hand Twill.—Mount a cardboard loom with 24 threads, making the first and last one double. The double warp is to make it easy to turn after each row by going over and under or under and over one thread in the double warp, which keeps the weft in position.

Begin working at the bottom from right to left, going over 1 and then under 3, over 1 to the end of the row. Return left to right, going over 1 and then under 3, over 1 to the end. Continue to weave by following Diagram 14A, making use of the double thread to turn where necessary. After a time it will be seen that the weft threads slant in step-wise succession to the right. Do not press the rows of weft too close together.

Left-hand Twill.—Diagram 14B shows the

weft slanting to the left. Mount a warp as before and follow the diagram.

Zig-zag Twill.—This is a combination of the two twills already worked, and is made by weaving three rows of right-hand, followed by three rows of left-hand. See Diagram 14C.

Fancy Twills.—In these twills we find that the warp threads are passed over in pairs as well as singly. Diagram 15 shows four of these, which can be easily worked by following the drafts. Pleasing results are obtained by working the warp in one colour and the weft in another.

Bird-Eye Twills. Following on from the twills, the old weavers soon found that by crossing them a trellis was formed, and then variations were made by putting spots or *eyes* in the diamond spaces. Diagram 16A shows the simple trellis with an eye in the centre. A more advanced one is seen at B. Both these are easily worked from the drafts, and either will make charming bands of colour on a tea cosy or bag.

THINGS TO MAKE ON CARDBOARD LOOMS

Kettle Holders

(Plate 5.)—Cardboard $6\frac{1}{2}$ ins. by 5 ins. Mark and pierce the loom, as in Diagram 17, and then mount it as follows: From back to front at A, down through B, up the back, and once again through A, through D, down the back through C, through D again up to E,

down the front to F, and up again through E. Follow this warping right across the card, and both sides of the card will have been mounted. Tie the end of the wool round the last warp thread.

Begin weaving at the bottom and work 6 rows of tabby in the warp colour, and then

stripe in a second colour, working right round the card.

Two suggestions for decoration are :—

1. Black Warp.—Weft : 6 rows black, 2 rows green, 2 rows yellow, 2 rows green.

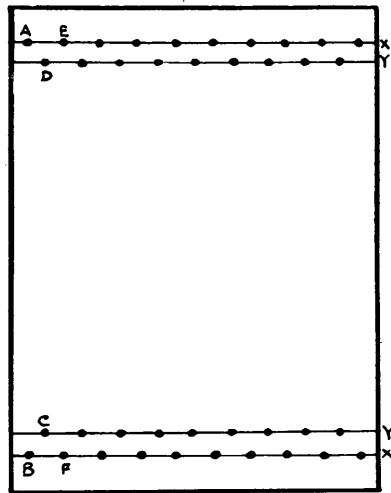


DIAGRAM 17.

Work alternate bands of black and coloured stripes until the warp is covered.

2. Black Warp.—Weft like that in plate 5, second specimen ; the stripes being in green and blue. When finished, break away the top and bottom pieces of cardboard, cut the warp threads at the top and take the cardboard out. Turn the ends in, tack them down, and either buttonhole or bind all four sides.

Needle Case

(Plate 6.) Cardboard 5 ins. by 7 ins. This can be made from a straight piece of weaving 3 ins. by 6 ins., using one of the patterns already worked to make a band of colour across the middle. Mount 56 warp threads on one side only, making each thread 4 ins. long. Weave tabby in the same colour for $1\frac{1}{4}$ ins., leaving about $\frac{1}{2}$ in. of warp free at the bottom. Then weave $\frac{1}{2}$ in. of pattern in a second colour, and finish with the first colour in tabby. Cut the ends and take the material from the card.

Cut a piece of lining 7 ins. by 4 ins. the same colour as the pattern wool, and tack

the weaving to it, so that $\frac{1}{2}$ in. is left all the way round. Turn the lining over on to the weaving at the top and bottom, as if turning for a hem, and hem it to the right side of the material. Now do the same at the two ends. Fold the case in half and sew a piece of flannel inside.

Striped Mat

(Plate 7.) Cardboard 7 ins. by 7 ins. Mount 40 warp threads 6 ins. long in the following way : 8 brown, 4 orange, 16 brown, 4 orange, 8 brown. Cut some brown and orange lengths for the weft 6 ins. long, and weave each one singly across the weft in the same order as the warp threads, leaving a fringe of $\frac{1}{2}$ in. at each side. Begin at the bottom with brown threads. When the weaving is finished, tie the side ends in two's, cut the mat from the card, and tie the top and bottom ends for a fringe.

Purse

Cardboard 9 ins. by 5 ins. Mount a warp and then weave 3 or 4 rows of tabby in the same colour. Weave a pattern to finish the part marked "flap" in Diagram 18. Do the rest of the weaving, back and front, in tabby. Cut the card away from the work, turn down a single hem at each side, and line the whole piece. Sew the front and back together down the sides.

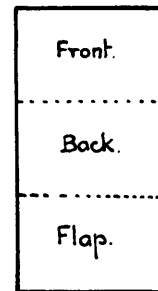


DIAGRAM 18.

Pochette

Cardboard 9 ins. by 6 ins. In this type of pochette the pocket part is woven round the card in one piece, while the flap is worked on the front only. A warp must be mounted so that it covers the whole of one side of the card and only half of the other side. To do this, work as follows, referring to Diagram 19 :—

1. Back to front at A.
2. Front to back at B.
3. Up the back and through to the front at C.
4. Across to D and through from front to back.



PLATE 5.—KETTLE HOLDERS.

PLATE 7.—STRIPED MAT.

PLATE 6.—NEEDLE CASE.

PLATE 8.—BAG WITH GUSSET.

PLATE 9.—TEA COSIES.

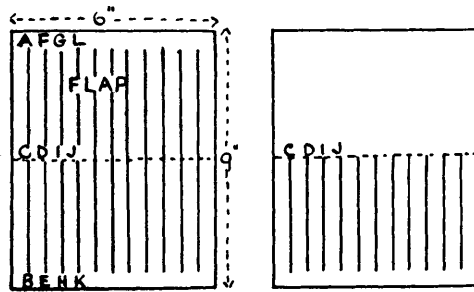


DIAGRAM 19.

5. Down to E and through from back to front.
6. Front to back at F.
7. Back to front at G.
8. Front to back at H.
9. Up the back to I and through from back to front.
10. Across to and through J front to back.
11. Down to and through K.

Continue in this way, making long warp threads in the front and short ones at the back.

Weave round the card at the bottom as far as the flap, which is then worked on one side only. Break the card from the weaving, and then line the pochette.

Bag with Gusset

(Plate 8). Cardboard 6 ins. by 8 ins.; 2 pieces. On the two cards mark the shape shown in Diagram 20. This is best done round a paper pattern previously cut out.

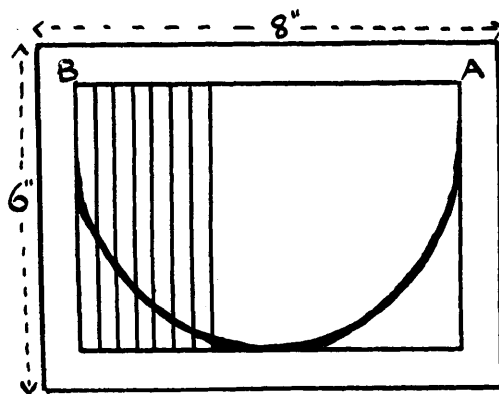


DIAGRAM 20.

Weave two pieces of material in jute yarn, velvino or thick wool. The spacing of the warp will depend upon the thickness of the thread.

Measure the distance from A to B round the curved part, and then weave a band of material 1½ ins. wide and half as long again as the curve measurement round a long piece of wood or on a braid loom.

Join the ends of this together and sew it between the curved sides of both pieces. Line the handle and then make a lining for the gusset piece and two side pieces and sew it into the bag.

Tea Cosy

(Plate 9.) Cardboard 14 ins. by 16 ins. Draw the lines AB and CD 1 in. from the top and bottom of the card, as in Diagram 21, and on them mark spaces ¼ in. apart. Join these, and where they meet the curved lines pierce holes for mounting the warp, as well as along line AB.

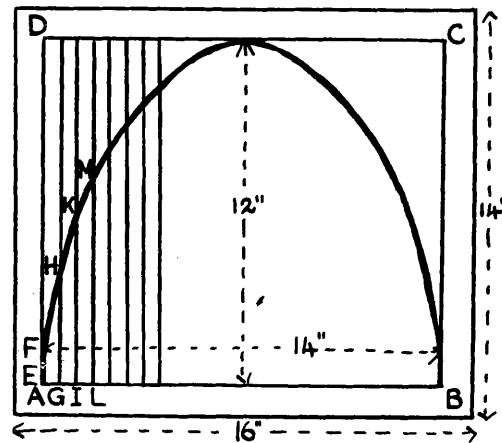


DIAGRAM 21.

Mount the warp on both sides of the loom as follows:—

1. Back to front at E. See Diagram 21.
2. Up to F.
3. Through F, down the back and through E.
4. Front to back at G.
5. Up and through H.
6. Front to back at G.
7. Back to front at I.
8. Up the front and through K.

9. Down to and through I.
10. Front to back at L and up to M.
11. Down the front and through L.
12. Continue in this way across the card.

Work one side of the cosy first. Weave 1 in. of tabby, 3 ins. of pattern, and the rest in tabby. When one side is finished, tack a

piece of thin material over it to keep it clean, and then weave the second side.

Break the card from the curved sides of the cosy, cut the loops at the bottom and slip the card out. Turn up about $\frac{1}{2}$ in. round the bottom of the cosy and tack it well down. If there is any space left between the sides, fill it in with a few rows of weaving.

Line and pad the cosy.

CIRCULAR WEAVING

Circular weaving differs from that which has already been described, in that the warp threads radiate from a central point instead of running parallel. The first thing to make in this way is a mat, and when this is mastered it is an easy matter to weave a baby's bonnet and a beret.

Mat

On a piece of cardboard 10 ins. by 10 ins. draw diagonal lines from corner to corner. From the point at which these lines meet, draw a circle with a radius of 4 ins. All round the curve mark spaces about $\frac{1}{4}$ in. apart. Pierce holes on these marks, then pierce a hole $\frac{1}{4}$ in. across at the centre point.

To mount the loom use a long thread of knitting cotton and bring it through the centre hole from back to front to a hole in the circle, leaving a short end at the back. Bring it through the centre hole again and then to the next hole in the circle. Continue warping in this way until the whole surface of both sides is covered, but care must be taken to mount an *uneven* number of threads. When the warping is finished, tie the first and last ends round one of the warp threads.

Begin weaving with wool or sylko at the centre and press the weft threads well down. It will not be found possible to push them right to a centre point, but this will not be detrimental to the general work. Continue weaving round and round, adding bands of colour which increase in size as they get to the edge. To do this, begin by a band made of two lines of colour, follow it with bands of four, six and eight lines with a stripe of ground colour between each.

Work both sides and then cut the card close

to the circle, taking care not to cut the warp threads. Finish the edge with one or two additional rows of weaving or by joining the two sides with close blanket stitching.

Bonnet

(Plate 10.) Plate 10 shows a small bonnet made from two pieces of material, one a small circular piece for the back and the other a straight piece. Soft wool or wool and sylko are the best materials to use for this.

For the straight piece, weave a piece of material 12 ins. by 8 ins. on a piece of card 13 ins. by 9 ins., mounting the warp threads

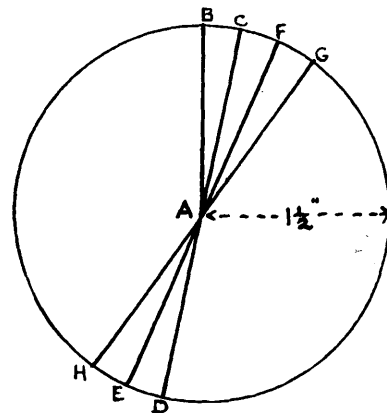


DIAGRAM 22.

parallel with the 9 ins. side. Work four rows of tabby, a border in pattern $\frac{3}{4}$ in. wide, and the rest tabby.

For the back piece draw a circle $1\frac{1}{2}$ ins.

diameter on a card 4 ins. by 4 ins. Warp, by following Diagram 22, back to front at A, up and through B, back to front at C, down to and through D, up through E, over to and through F, and so on until the whole surface is covered, but see that you have an *uneven* number of threads. Weave this and take it off the card without breaking or cutting any of the warp threads.

Take the straight piece of weaving off the card, turn back the patterned edge for 1 in. and sew the other 12 ins. side to the edge of the circular piece so that the ends meet. Line the bonnet and finish with ribbon strings.

Beret

(Plate 10.) This is made on cardboard 12 ins. square and will fit a child of seven or eight years. It can be made in a larger size by making the circles proportionately larger. As will be seen from Diagram 23A, the warp

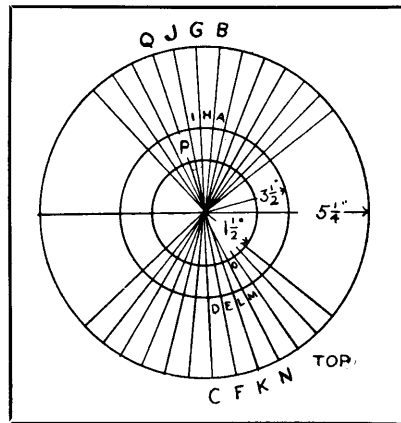
given, it will be found quite easy to put the warp threads on.

Mounting the Warp.—Divide the circle into eight parts, and seven of these into six divisions, the remaining one into only five. This is to give an uneven number of warp threads.

Warping

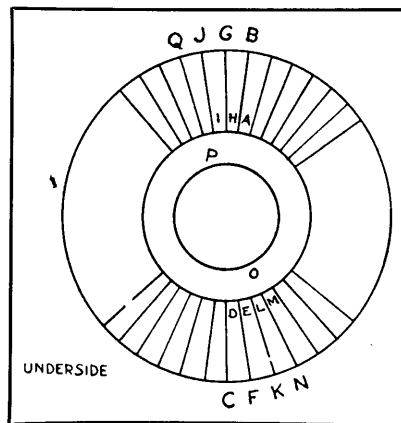
Front to back at A.	Back to front at J.
Back to front at B.	Front to back at K.
Front to back at C.	Back to front at L.
Back to front at D.	Front to back at M.
Front to back at E.	Back to front at N.
Back to front at F.	Front to back at O.
Front to back at G.	Back to front at P.
Back to front at H.	Front to back at Q.
Front to back at I.	Continue from C.

Begin weaving at the centre for the top of the beret and make bands of colour until the outer circle is reached. Turn over and weave the threads on the under side.



A

DIAGRAM 23.



B

is mounted on three circles 1 1/2 ins., 3 1/2 ins., 5 1/4 ins. in radius respectively. The mounting of the warp is the chief difficulty, as the whole of the upper side is warped while the under side is only partly warped, as seen in Diagram 23B. By following closely the directions

Cut the unwarped card from the under side of the beret and carefully take away the rest, but do not break or cut the warp threads. It will be found that there are a few loose short threads on the inside of the beret. These can be lightly tacked down.

PATTERNS

We have already seen when weaving the simple block patterns that this was done by passing or "flushing" the weft over groups of warp threads. On this principle many beautiful and elaborate patterns have been

built up, the names of which show how intimately the craft of weaving was bound up with the lives of simple people. Such names as Honeysuckle, Rose Path, Molly Pitcher, Blooming Flower, Monksbelt, Sea

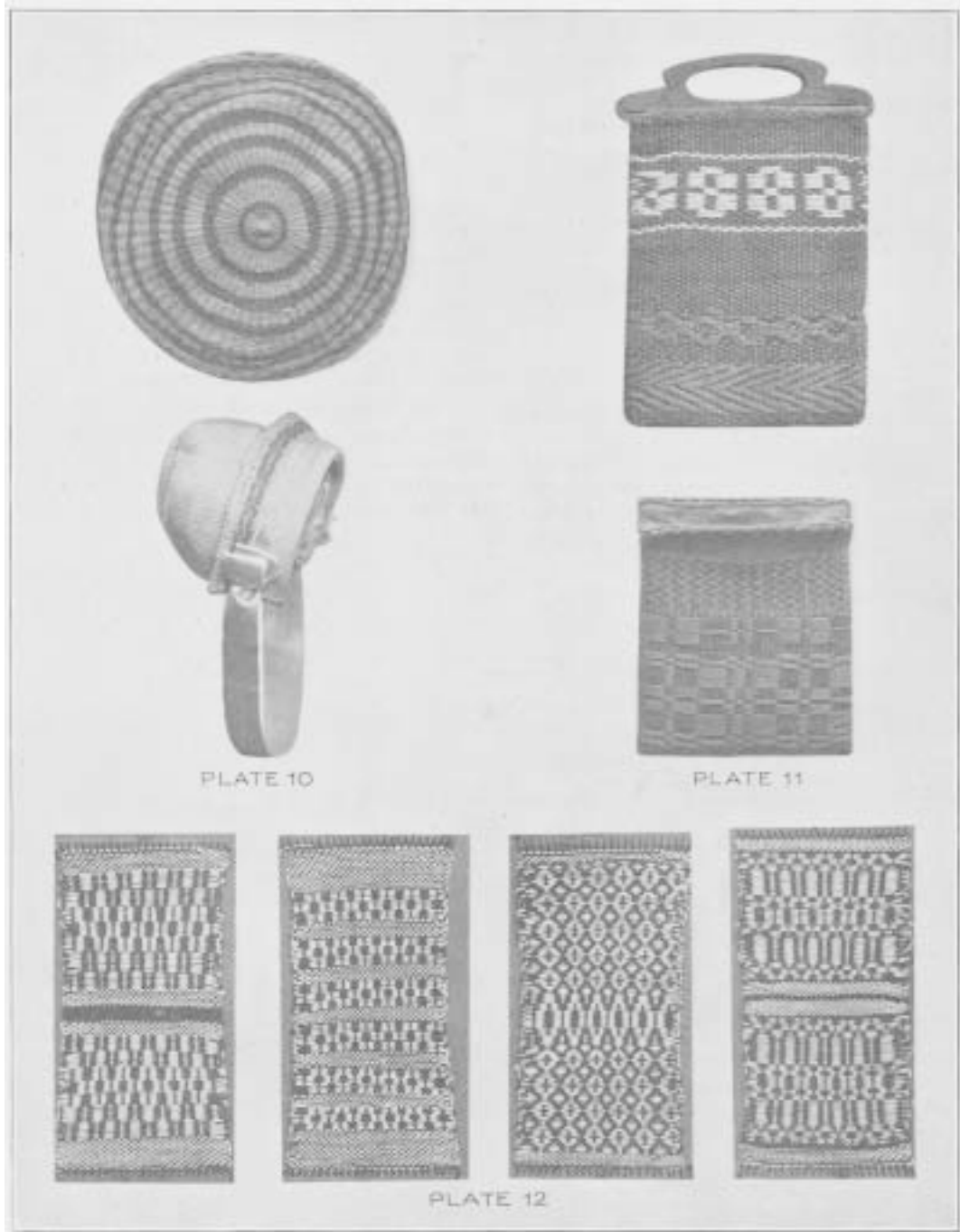


PLATE 10

PLATE 11

PLATE 12

PLATE 10.—*Top*: BERET.

PLATE 11.—WORKBAGS.

Bottom: BONNET.

PLATE 12.—SAMPLES OF ROSE PATH PATTERN.

Star and a hundred others remind us of days when cottages were not only the homes of the people but the workshops as well. These patterns were built up on two or more separate lines of flushing, which when worked in combination could be varied to a remarkable degree.

The Chief Rule.—The chief thing to remember when working them is that there must be a row of tabby between each line of pattern; that is to say, that every alternate row of weaving must be tabby. These tabby rows are called binders, because they hold the lines of pattern in position.

Monksbelt

Diagram 24 shows that Monksbelt is composed of two lines of pattern, A and B. The weaving of A is over 6, under 6, over 2, under 6, over 6, under 2, over 2, under 2, over 2 and under 2, while that of B is under 6, over 6, under 2, over 6, under 6, over 2, under 2, over 2, under 2 and over 2.

But these two rows repeated alternately would give a very indefinite pattern, and in order to dignify and beautify a web the rows must be grouped as well as the warp threads. Diagrams 25 and 26 show how these lines of pattern can be grouped to give bold and satisfying patterns. It will be seen that the pattern consists of 36 warp threads and it can be extended by using 72 threads or any multiple of 36.

Mount a cardboard or board loom with 72 threads. First work 4 rows of tabby in the ground or warp colour and then with another coloured thread work row B from right to left. Now work a row of tabby in the ground colour from right to left, followed by a second row of B from left to right and a row of tabby left to right. Group B is now finished and group A begun. It will be quite easy to follow Diagram 26 to complete the band of pattern.

Work other combinations on the same warp, but work 6 rows of tabby in the ground colour between each band of pattern.

Combinations.—1. Four rows A, 6 rows B, 4 rows A.

2. Six rows B, 2 rows A, 6 rows B, 2 rows A, 6 rows B.

3. Two rows tabby in pattern colour, 6 rows B, 2 rows tabby in pattern colour.

4. Six rows B, 2 rows tabby, 6 rows A, 2 rows tabby, 6 rows B.



DIAGRAM 24.

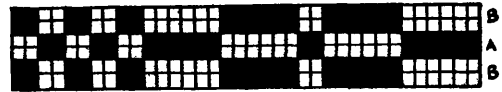


DIAGRAM 25.

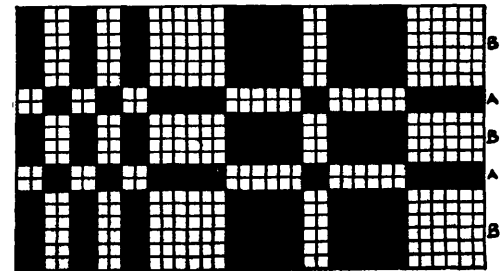


DIAGRAM 26.

Rose Path Pattern

The Monksbelt pattern consists of 2 lines of weaving. We now come to one which has 4 lines, as shown in Diagram 27.

One pattern is completed on 8 warp threads, but in order to get the full beauty of the design it will be well to warp a card with 32 threads, thus getting four patterns. Weave 1 or 2 rows of tabby, and then follow the diagram which shows two patterns. Before beginning the work draw the full pattern across 32 squares, and this is done by merely repeating from X to Y. After the 8 rows have been worked, viz., 4 rows of

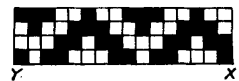


DIAGRAM 27.

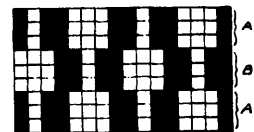


DIAGRAM 28.

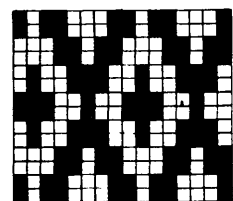


DIAGRAM 29.

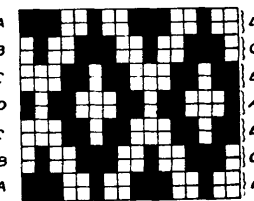


DIAGRAM 30.

pattern and 4 binders, weave 2 or 3 rows of tabby and then make bands of pattern, as shown in Diagrams 28, 29, 30.

Let the children work out other combinations for themselves first on squared paper and then on the warp.

Honeysuckle Pattern

This, the third pattern, is somewhat larger in plan than the preceding ones and should therefore be done in a finer weave; that is to say, the warp threads must be fine and fairly close together. Two-ply wool or Star sylko, No. 5, about 12 threads to the inch, are suitable materials to use.

As seen in Diagram 31, the design is based on 4 rows of pattern, and these can be so

DIAGRAM 31.



DIAGRAM 32.

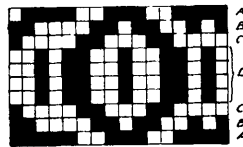
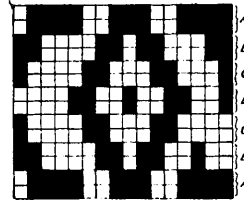


DIAGRAM 33.

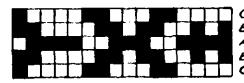


DIAGRAM 34

arranged in combination to form very effective and pleasing bands of ornament. See Diagrams 32, 33, 34.

Work these on a sampler and then let the children plan out others for themselves on squared paper.

Workbag (Plate II)

On a card, 11 ins. by 9 ins., mount a warp on both sides, as was done for the kettle holder, leaving only $\frac{1}{4}$ in. at the bottom and the sides. Use a fairly thick wool for both warp and weft. Begin weaving at the bottom, going all round the card with 1 in. of tabby weave. Now use the Monks-belt pattern, and if the warp threads have been spaced $\frac{1}{8}$ in. apart there should be 72 on each side of the card, thus giving two complete patterns. If, however, the Rose Path is preferred, the number of warp threads, being a multiple of 8, will serve just as well.

When the pattern is finished continue working round the card in tabby weave until $5\frac{1}{2}$ ins. have been worked. Now weave on one side only and then turn and finish the other side. In this way an opening is left at each side, and this saves cutting the material. Cut and join a lining to fit the bag, slip it inside and sew it to the open sides and tops. Sew the bag to wooden or bone handles, or sew rings inside through which to run a cord.

CHAPTER THREE

BOARD AND FRAME LOOMS

I.—SIMPLE BOARD LOOM

WE now come to the first piece of apparatus on which small articles can be made, using any of the stripes and patterns which have already been described. It can be used over and over again and is simple to make and work on.

Making the Loom.—Cut one piece of plywood 16 ins. by 12 ins. and two pieces of hardwood $1\frac{1}{2}$ ins. by $\frac{3}{4}$ in. Shape the latter pieces as in Diagram 35 and then cut slots in them $\frac{3}{16}$ in. deep and $\frac{1}{4}$ in. apart. They should be finished by rubbing with a piece of folded sandpaper run through the slots. By leaving the top surface flat a thin piece of veneer or cardboard can be fastened with three or four drawing-pins over the slots, to keep the warp threads in position. Screw the two ends to the base.

Mounting the Warp.—This is done by fixing the thread in the slits alternately top and bottom. Follow Diagram 36 and work as follows: Take a ball of wool and make a large knot at the end. Slip the wool into A so that the knot is on the outside. Carry the wool through B, back again through C, down to and through D, through E and up to F. Continue thus until the whole surface is warped and fasten the wool round the last corner.

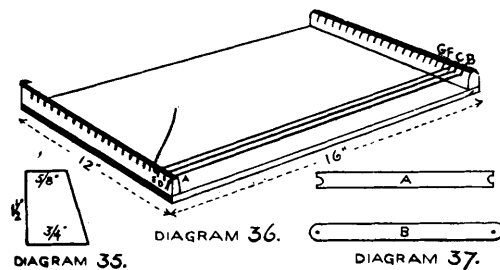


PLATE 13.—A SIMPLE BOARD LOOM.

Making the Shed.—Cut a thin strip of wood 11 ins. long and either shape it at the ends as at A in Diagram 37 or pierce a small hole quite near to each end, as at B. Thread this under every alternate warp thread, and, in order to prevent it from slipping out, tie a piece of thread right round it. This thread will be on the outside of the warp threads and is kept in place by either the concave ends or by threading it through the holes. This stick acts as a shed, for if it is turned on to its thin edge alternate warp threads are raised and a shuttle wound with wool or a long needle threaded with wool can be passed through it, thus working one line of weaving in one movement. The next line of weaving will have to be worked by picking up alternate threads one at a time with either needle or shuttle. Quite a number of small articles can be made on this loom, two of which, a book cover and a tea cosy, are shown in plate 16, p. 28.

II.—SIMPLE FRAME LOOM

Diagram 38 gives the dimensions and shows the plan of a simple frame loom with the top and bottom bars jointed to the side bars. This is easy to make, and the diagram speaks for itself. The simplest way of mounting a

warp is by means of pieces of canvas fixed at the top and bottom.

Cut two pieces of canvas (about nine holes to the inch is best) 8 ins. wide and 4 ins. deep. Fold these in half on the long sides and fix

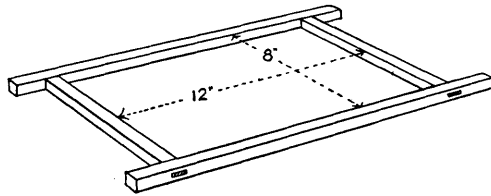


DIAGRAM 38.

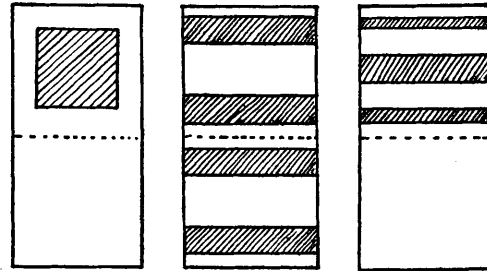


DIAGRAM 41.—SACHETS.

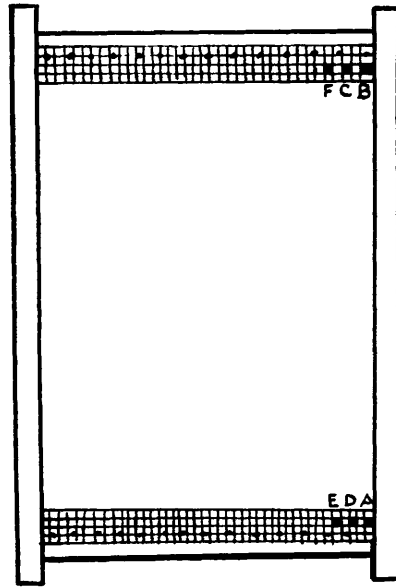


DIAGRAM 39.

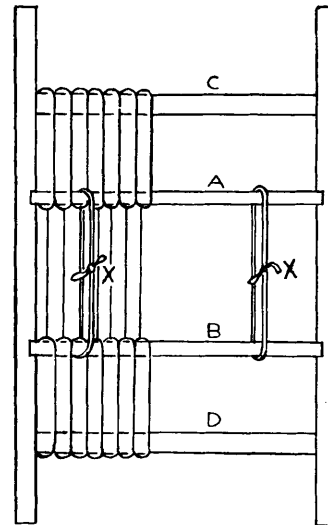


DIAGRAM 42.

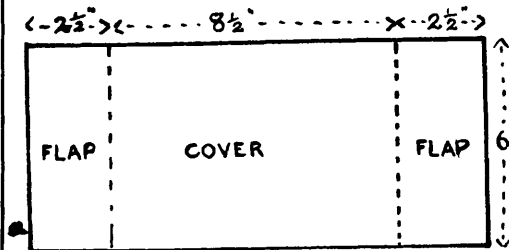


DIAGRAM 40.—BOOK COVER.

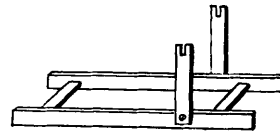


DIAGRAM 43.

them with the fold towards the inside of the loom by means of drawing-pins or small tacks.

To mount the warp, thread a needle with a long thread and make a knot at the end. Thread it through every alternate hole in the canvas in the following way :—

1. Back to front at A, leaving the knot at the back of the canvas. See Diagram 39.
2. Front to back at B.
3. Back to front at C.
4. Front to back at D.
5. Back to front at E.
6. Front to back at F.

Continue in this way right across the canvas and fasten off by tying the end round the last warp thread.

Weaving.—This can be done with a needle only, or with needle one way and shed stick the other. Begin weaving at the bottom, leaving about an inch of warp unwoven, and weave to within an inch of the top canvas.



PLATE 14.—A SIMPLE FRAME LOOM.

Various small articles can be made on these looms, as shown in plate 17, p. 28, and diagrams 40 and 41 on p. 26.

III.—FRAME LOOM WITH LEASHES

The same frame as that mounted with canvas can be used for a longer warp and also be fitted in such a way that two sheds can be made.

Long Warp.—Take two sticks about 10 ins. long and fix them to two chairs or behind two sets of nails at a distance of 20 ins. apart. Wind warp threads about $\frac{1}{8}$ in. apart round these until a warp of 7 ins. is made. Now place the warp down flat on a table, place

the frame on top, bring stick A over the frame at C and stick B over D. The sticks are now tied together at XX. [See Diagram 42, p. 26.]

By making a warp in this way a longer piece of material can be woven, as the warp can be moved so that B is right up against D, and as the work proceeds B can be raised so that A comes against C. Then, again, if the warp becomes slack, it can be tightened with the strings XX.

The next step is to fit up the warp in such a way that two sheds can be made, through which a shuttle containing the weft thread can be passed alternately left and right. In this way the work of weaving is speeded up, and although this fitting up may seem to take a little time, it is worth while in the end. Added to this, it is the traditional method of all weaving. This is called harnessing the loom, and the apparatus required for it the harness. Although what is to be described is very simple, it nevertheless



PLATE 15.—A FRAME LOOM FITTED WITH LEASHES.



PLATE 16.—BOOK COVER.
TEA COSY.

PLATE 17.—ARTICLES MADE ON CARD AND FRAME LOOMS.

conforms to the method of harnessing large pedal looms.

Cut two pieces of $\frac{1}{4}$ -in. wood 4 ins. by 1 in., cut a slot $\frac{1}{2}$ in. deep at the top, and screw them to the sides of the frame 6 ins. from the bottom. [See Diagram 43, p. 26.] Next cut two thin strips of wood 12 ins. by $\frac{1}{2}$ in. and pierce or drill small holes at the end of each one. Fix one of these pieces under every alternate thread, and tie a string across to keep it from slipping out, as was done on the Board Loom.

Take the second strip and tie a piece of string across it from end to end, through the holes, letting the string lie along the top edge. Fit the stick into the slots on the two upright pieces.

Cut several pieces of thin string 8 ins. long, which will be made into leashes or holders for the threads that were not raised by means of the first stick. Push this first stick right up to the top of the loom as far away from the raised stick as possible.

Now take one of the pieces of string, pass

it under the first right-hand warp thread lying *under* the top stick and tie the ends, first round the stick and then round the string which is lying on the top edge. With the other pieces of string fix every alternate thread to the stick in the same way.

Working the Loom.—Leave one stick right at the top of the loom, lift up the stick with the leashes on and pass a shuttle of wool through the space or "shed." Now bring the top stick down, turn it on its edges, pass the shuttle back through the second shed thus made and push the stick up again. Continue to work forwards and backwards through the two sheds, beating the lines of weft together very gently with one end of the shuttle or a piece of comb. Be careful not to beat down too much or the weaving will become hard and board-like. Of course, the only weave that can be done in this way is tabby, as the patterns require three or four leash rods instead of only one.

CHAPTER FOUR

BRAID AND ROLLER LOOMS

First Type

THE simplest form of loom is made by stretching a warp on two sticks, one of which is attached to the waist of the worker and the other tied to a desk or chair to keep the warp taut.

Take two smooth pieces of wood about 12 ins. long and fix them about a yard apart. A good way is to let them rest behind two pairs of nails (Diagram 44). Cut twelve

lengths of wool $2\frac{1}{4}$ yards long. Take one of these, place it round stick A and then tie the ends together on the outside of stick B. Now do the same with the other 11 threads,

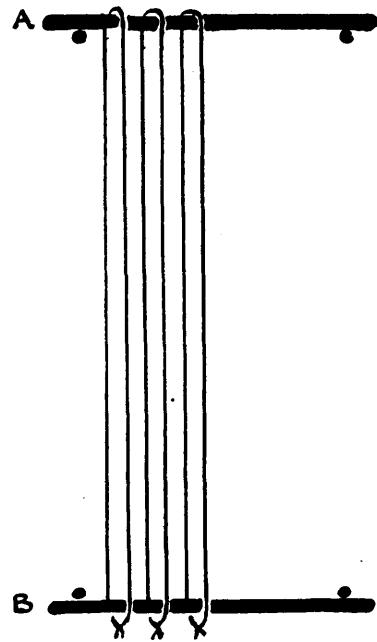


DIAGRAM 44.



PLATE 18.—FIRST TYPE OF LOOM.

placing them about a $\frac{1}{4}$ in. apart. Now take a flat piece of stick 12 ins. long and pierce a hole $\frac{1}{2}$ in. from each end. With this stick pick up the half of each thread which lies under the sticks. To prevent this slipping out, tie a piece of string from end to end through the holes. This will act as a shed by enabling the worker to lift up half the threads at a time. Push this stick up near to rod A. Tie rod A to a desk or chair and the other to the worker's waist. Thread a long needle with weft thread and darn across from right to left close to stick B, picking up the threads that were left under the shed stick. Pull the shed stick down, lift it up and pass

the needle from left to right through the shed thus made. Beat both rows of weaving together and continue the weaving, taking care to push the shed stick up near A when working from right to left.

Second Type

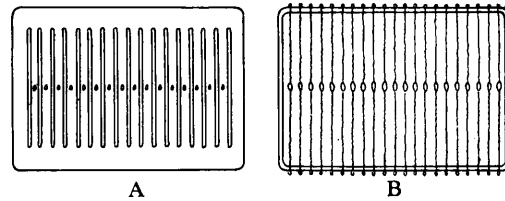


PLATE 19.—SECOND TYPE OF LOOM.

In the first loom the weaving was done partly by darning alternate threads with a needle and partly by lifting the other alternate threads at one time by means of a stick. The next step is to get some device by means of which the darning is dispensed with and alternate sheds are made, through which a shuttle can be passed. On hand and pedal looms the warp threads are passed in regular order through cords or thin pieces of metal, which are attached to rods corresponding to the shed sticks, so that by lifting alternate

ones two sheds are made. In addition to this, each thread is passed through a reed which is really a comb with the ends of the teeth covered. This serves to hold the warp threads in place and to beat the weft threads together.

There are three very good heddles to be obtained, two of which are shown in diagram 45. A is of vulcanite or aluminium, B is of twisted wire, and a more modern type has



VULCANITE HEDDLE.

WIRE HEDDLE.

DIAGRAM 45.

dents or spaces of *standard* size filled with soft metal for a short space in the centre between alternate dents and having this soft metal drilled.

Having fully realised the purpose of the heddle, it remains to discover ways and means by which this useful little piece of apparatus can be made for temporary use. Thin wood or oiled card may, for instance, be used.

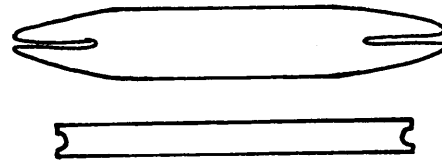


DIAGRAM 46.—SHUTTLES.

Threading the Heddle.—Make a warp as before, but this time the ends at B must be cut and the threads threaded through the heddle alternately in a hole and space. By lifting up or pressing the heddle down, sheds are formed through which to pass the shuttle.

When all the threads are entered tie them round stick B.

Weave as before.

The Roller Loom

So far we have found that a loom is a frame on which a warp can be stretched, and

this, with the addition of leashes and shed sticks, has enabled the worker to weave with the simplest of mechanical appliances. In studying the development of the craft, it is found that primitive peoples developed their work in this way, the first frames being probably the branches of a tree, on which threads were stretched and on these the weft threads were darned in and out with a bone needle. The next step was to develop some means by which a long length of material could be made, and the idea of rollers which could be turned at both ends of the loom solved the difficulty.

Making a Roller Loom.—Diagram 48 is a drawing of a frame loom with a bracket at

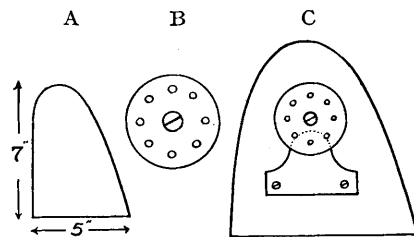


DIAGRAM 47.

each corner to hold the rollers. The frame consists of two pieces of wood 36 ins. by 2 ins. by 1 in. for the sides, and two pieces 24 ins. by 2 ins. by 1 in. for the ends, which should be screwed together at the corners and made firm with thin strips of wood fixed diagonally from corner to corner, as shown in the diagram.

The brackets are cut from four pieces of 1-in. wood, each 7 ins. by 5 ins., and shaped as in Diagram 47A. They are fixed to the sides of the frame by means of a mortice and tenon joint, or screwed from the bottom. Both frame and brackets must be well smoothed down with glass paper, as if they are left rough the thread for weaving will tend to catch on the rough wood and break.

Into these brackets are fixed two rollers, as shown in the diagram.

On the ends at A and B a disc is fitted, as in Diagram 47B. These discs are of $\frac{1}{8}$ -in. brass, 2 ins. in diameter, and are pierced at regular intervals with small holes. Small mirror plates are fixed to the outside of the brackets A and B, so that the top hole of the plate comes directly in line with the holes in the disc. (See Diagram 47C.) By means of a nail or split pin inserted in one of the holes in the disc and the hole in the mirror plate the roller is kept in position.

Preparing the Rollers.—The next thing is to prepare the rollers in order that the warp threads can be tied on them. It is not satisfactory to tie the threads round them as they are, for the simple reason that when the rollers were turned the threads would not turn with them. To avoid this, each roller must have a piece of strong calico tacked to it. This should be, when hemmed, slightly narrower than the width between the brackets, about $21\frac{1}{2}$ ins. and 4 ins. wide. Make narrow hems on the 4-in. sides and on one long side a hem wide enough to take a dowel rod. Turn the other end down once and tack it to the roller. Now cut two pieces of dowel rod $21\frac{1}{2}$ ins. long, slip one of them into the hem, and to prevent it slipping out tie it in four or five places with fine strong

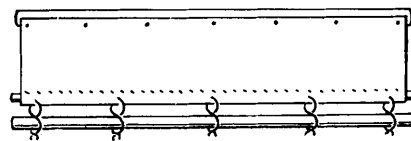


DIAGRAM 49.

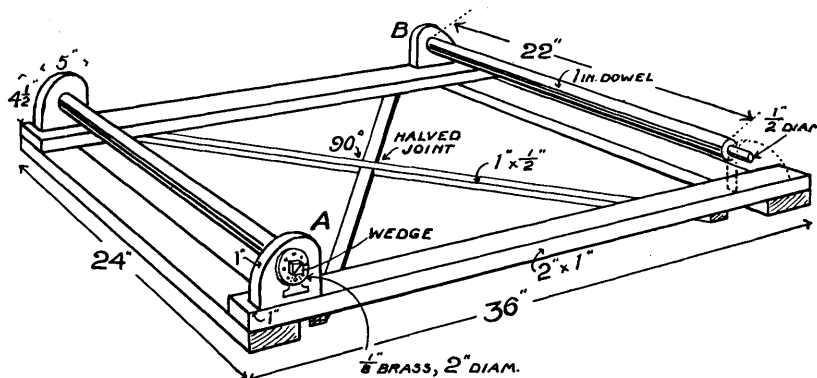


DIAGRAM 48.—ROLLER LOOM.



PLATE 20.
ROLLER LOOM SHOWING
WARPING CLOTH.

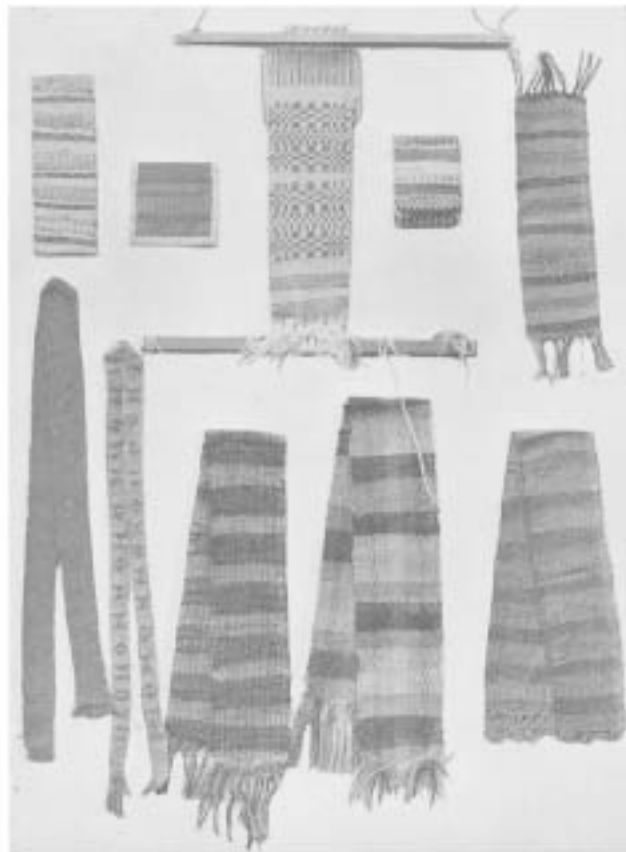


PLATE 21.
ARTICLES MADE
ON BRAID LOOMS.

cord. The ends of these cords must be long enough to tie round the second rod, leaving a small space between the rods. (See Plate 20 and Diagram 49.)

Fix one of these warping cloths, as they are called, on each roller.

Cut two pieces of dowel rod the same length as those in the calico and stretch a warp across them, as was done for the frame loom. Roll the warp on one of the rods, first placing a small flat stick against the rod to keep the threads from moving round. Now tie the other rod quite loosely to the rod in the calico, as shown in Diagram 49.

Take the peg out from B and roll both calico and warp on to the top roller, unrolling the warp slowly from the first rod. Be very careful that all the threads are kept at the same tension.

The Heddle Reed.—This is a wire frame with twisted wires stretched across it, as in

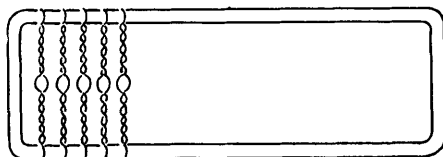


DIAGRAM 50.—THE HEDDLE REED.

Diagram 50, each wire having a loop in the middle. In these loops and in the spaces between the wires the warp threads are entered, so that it is necessary to know how many loops and spaces there are before the warp is made. Make one thread for each space and loop and four extra to form the selvedge.

Find the middle thread of the warp and thread it through the middle hole of the reed. On either side of that, thread into a space.

Now work right and left alternately, threading into a loop and a space, taking care to keep the threads in the order in which they are on the shed sticks. Tie them in groups of six in front of the heddle reed while the threading is being done. In the two end loops and spaces thread two warp threads, and these form the selvedge.

The Breast Beam.—When this is finished, tie a rod to the front roller or *breast beam*,

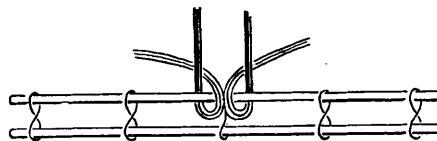


DIAGRAM 51.—THE BREAST BEAM.

leaving a space between it and the rod in the warping cloth. Take the six middle threads, three in one hand and three in the other, put them under the rod, up the front of it, over and down into the dividing space. Bring three under and up to the right, three under and up to the left, and tie them together. (See Diagram 51.)

Be sure that the threads are quite taut. Do the same with the end groups and then tie at intervals until all are secure. Test the warp with the tips of the fingers to see if all the threads are tied at equal tension and retie any loose groups. The weaving can now be begun near the breast beam, the heddle reed being used both to make the sheds and to act as a beater.

Rolling the Material.—When a few inches of weaving have been done, take the pegs out of both brackets and roll both towards the worker, rolling the material woven on to the breast beam and unwinding some of the warp from the top roller.

CHAPTER FIVE

TAPESTRY

TAPESTRY weaving can be worked on any of the looms already described.

Early weaving was of two kinds: the simple tabby web and the bands or spots of pattern woven in as decoration, in which the rows of weft thread were pressed very close together, covering the whole warp completely.

In simple tabby weaving the weft crosses the warp fairly tightly so that each thread lies straight across the warp, thus making an equal proportion of warp and weft to show in the material.

In the second kind of web, which we now know as tapestry, the weft threads lie very

loosely across the warp, making as it were little loops over and under alternate threads. These, when pressed down closely together, give the effect of two rows making only one row by covering the whole of the warp. This form of weaving gradually developed from simple ornament to more advanced work, until it became a method of weaving the whole web.

We nearly always think of tapestry as large pieces of work, but it is quite possible to weave small articles, bags, stool covers, screen panels and pochettes by this method.

Materials to Use.—In making the warp it is necessary to stretch it as tightly as possible and also to use a thread which will not "give" when the weft is pressed down. Use a strong, evenly twisted thin string or cotton cord, and for the weft, three- or four-ply wool, according to the article to be made. Later on, when the difficulties encountered in the work are overcome, linen, sylko and silk can be used.

Weaving.—At the top and bottom of the loom weave about $\frac{1}{2}$ in. of tabby weave with the weft wool which is to form the main or ground colour of the work. This keeps the warp threads firm and equally spaced. The tapestry can now be commenced. Take the colour required for the weft and weave it across the warp above the tabby weave, taking care to leave the weft slack. It should have the appearance of lying loosely in loops between the warp threads. Beat it down firmly so that no warp shows. This is best done with a strong comb or one made in hardwood $\frac{1}{8}$ in. thick, as shown in Diagram 52.

Joining.—When joining a fresh thread leave about 1 in. of the old one facing the worker and start the new thread about 2 threads back from where the old one finishes, also leaving a short end. Always join in the middle of a row, never at the margins. As the weft is beaten together, the ends will be secured.

Edges.—Care is needed to see that the



PLATE 22.—A TAPESTRY LOOM.

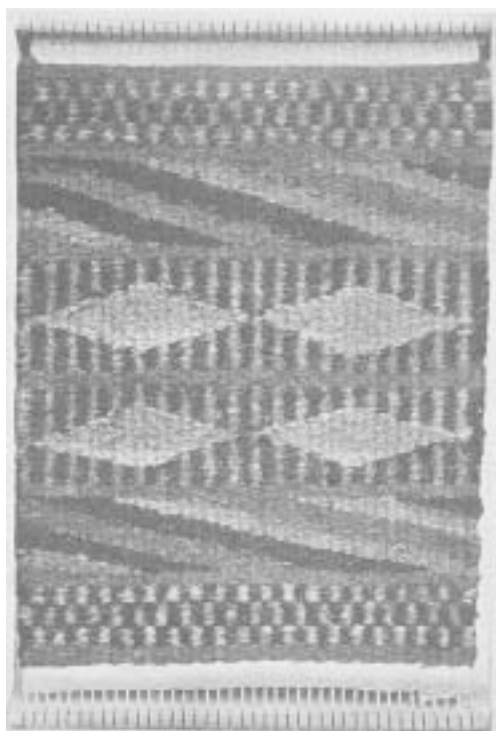


PLATE 23.—TAPESTRY RUG.



PLATE 24.—TAPESTRY SCARF, PURSE AND POCLETTE.

weft is turned neatly over the edges, as a loose edge gives a ragged appearance to the work. On the other hand, the edge must not be too tight or the slits will gape open.

Closing the Slits.—This can be done in two ways: 1. As a fresh piece of pattern is woven the thread can at each turn pick up the loop between the rows in the previous pattern. (See Diagram 53.) 2. When the work is finished the slits can be sewn together at the back of the work.

Patterns.—In planning for tapestry, the design should go as far as possible diagonally across the warp, because each piece of pattern is woven singly. If the lines of the units comprising the pattern were parallel

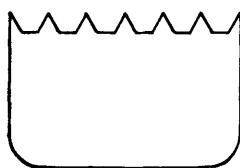


DIAGRAM 52.

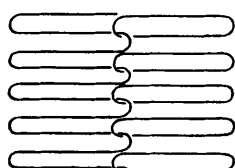


DIAGRAM 53.

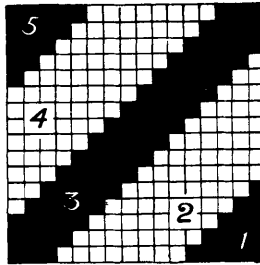
with the warp threads, long spaces would be left which would be difficult to draw together. Diagrams 54 and 55 show two simple designs which are a good introduction to tapestry.

In Diagram 54 first work one in a dark colour then two in a lighter colour and so on until the whole surface is worked. To get the pattern exact, employ one of two methods: either mark it with ink on the warp threads or pin a drawing on the loom under the warp.

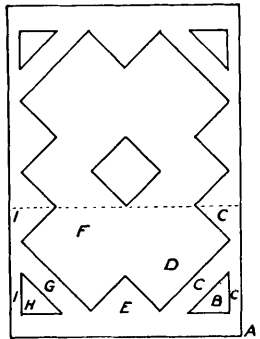
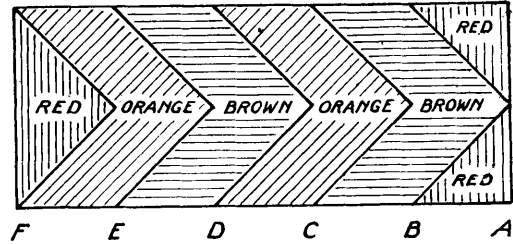
In Diagram 55 work the two right-hand red pieces first and then work the diagonal shapes one at a time.

A second way in which this can be worked is to thread 6 needles, 2 with red wool, 2 with brown and 2 with orange. Work loosely from A to B with the first needle, B to C with the second, and so on until 1 line is finished, letting the threads which are not being worked hang straight down (see Plate 22). Return for the second row, using the needles in their right order. Loop the threads round each other as each fresh thread is used.

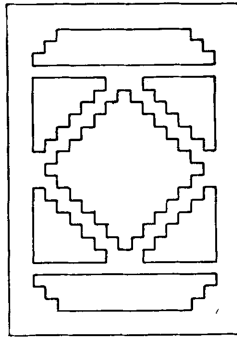
Pattern 1.—This pattern has the lines going



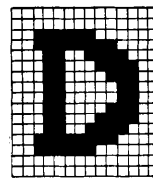
Left: DIAGRAM 54.
Right: DIAGRAM 55.



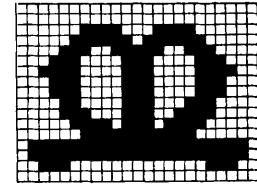
PATTERN 1.



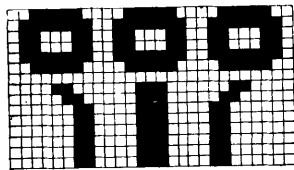
PATTERN 2.



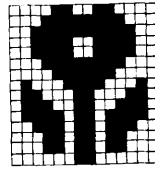
PATTERN 5.



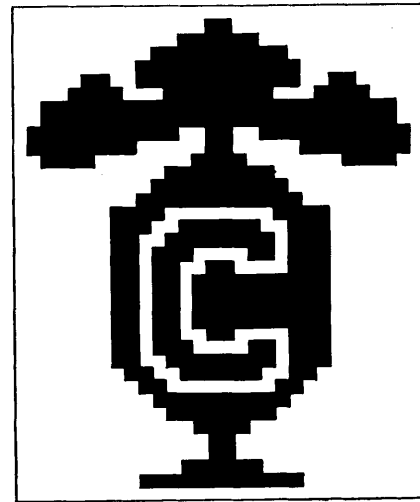
PATTERN 6.



PATTERN 3.



PATTERN 4.



PATTERN 7.

DIAGRAM 56.

diagonally, and therefore avoids perpendicular slits. It can be worked in two or three colours, and the weaving proceeds according to the letters. This should be planned on paper the exact size of the rug to be made, before the warp is mounted.

Pattern 2.—In working this pattern it will be found that slits will be made up both sides. These can be sewn together when the work is finished. Commence weaving at the bottom and continue by working the pattern to the right side and then filling in the ground towards the left side.

Patterns 3 and 4.—These are suggested motifs showing flower treatments of units which can be planned to make a border or an "all-over" pattern.

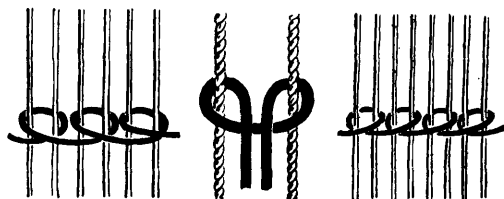
Patterns 5, 6 and 7.—The first two patterns show how simple initials can be planned for working either as a repeat pattern or an initial by itself. The third one, No. 7, is a suggestion for a decorative initial which can be worked in two colours on a plain ground.

Patterns 3, 4, 5, 6 and 7 are suitable for small work such as purses, pochettes, needle cases and sachets.

CHAPTER SIX

RUG MAKING

IT is possible for the children to make small rugs and mats, using the traditional methods. It should be realised at first that rugs and mats must be made firm and substantial to resist hard wear.



DIAGRAMS 57, 58 AND 59.

There are two big classes of rugs and carpets: *smooth-faced* and *pile*. The smooth-faced ones are tapestry woven, either by the method already described or by interlacing the weft threads in definite order, as in the Soumak weave.

Materials.—The materials used for both classes are the same, and it is advisable to use a firm string or Egyptian cotton for the warp, and wool for the weft or pile. In the making of pile or knotted carpets a thinner string than that used for the warp is required to work rows of weft to go between the rows of knots.

The Soumak Weave.—Diagram 57 shows the weft threads going forward in front of 4 warp threads and back behind 2. These weft thread stitches can slant in either direction, as shown in Diagrams 57 and 59.

The usual plan is to have alternate lines of opposite slant, giving a herring-bone effect. After working 2 lines, an ordinary row of tabby weave in the same thread as the warp is worked in order to give a firmness to the work. Use a thin string or cotton cord for the warp and tabby weft and one of the rug wools for the Soumak weaving.

At the beginning and end of the rug weave 6 rows of tabby. A small rug can be made on a frame loom, tying the warp in the way already described.

Rug Knotting.—In knotted or pile rugs, warp threads are set up and crossed with

weft thread with the addition of short threads which are tied or knotted to the warp strings. Thus we realise that the warp is used to fix the knots to, the weft is used to hold the knots in place and to keep the warp threads evenly spaced, and the knotted pieces form the pile.

The Turkish Knot.—There are several ways of knotting, but the best and most practical one is the Turkish knot. Mount a warp of thin strong cord, with threads a $\frac{1}{4}$ in. apart. With the same thread, work 6 rows of tabby. Now take some four-ply rug wool and wind it round a ruler. Cut along one edge and you



PLATE 25.—A RUG LOOM.

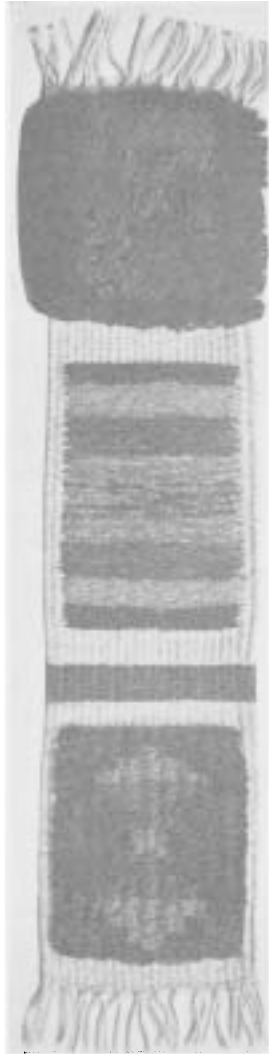


PLATE 26.—SAMPLER OF RUG WEAVING AND KNOTTING.

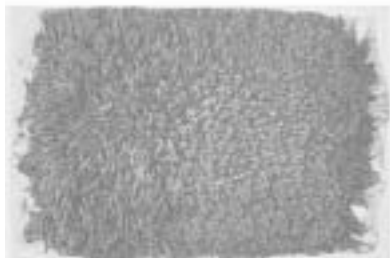


PLATE 27.—SMALL KNOTTED RUG.

will have a number of short lengths of wool. Take one of these and place it across and in front of the two right-hand warp threads at the bottom. Put one end behind the right warp and the other behind the left one. Bring the two ends up between the two warp threads and under the cross-piece. (See Diagram 58.) This is really more a loop than a knot. Continue to knot each pair of threads in this way until one row is complete, and then work a row of tabby in the thin cord. The second row of knots can now be done, knotting the same pairs of threads.

Patterns.—As a rule a knotted rug has a

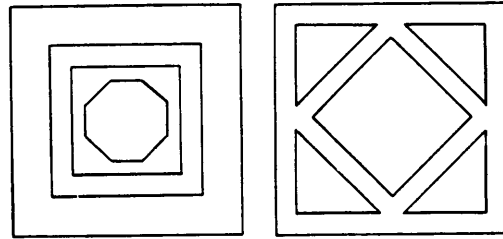


DIAGRAM 60.

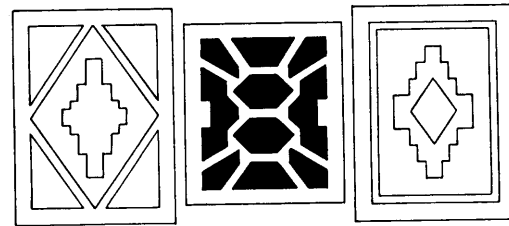


DIAGRAM 61.

border either in one colour or an outer band of one colour enclosing a second. The inner part may be plain and have a repeat pattern or a decorated panel in the centre. This is quite an accepted plan and one that has been handed down through the ages. But interesting and original treatment can be found in the study of mats made by primitive people, and a visit to museums in this connection will prove full of interest. In planning for small work the design should be simple and bold and the use of too many colours avoided.

Suggested patterns are shown in Diagrams 60 and 61, but before a piece of work is begun the full-sized pattern should be first drawn on paper to avoid mistakes in the working.

CHAPTER SEVEN

PREPARING THE THREAD

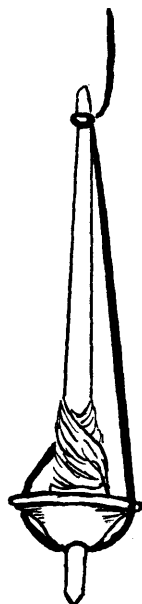


DIAGRAM 62.
A SPINDLE

Spinning by the Spindle

SPINNING is the process of drawing out and twisting the fibres of various vegetable and animal substances into a continuous thread. This can be done on wooden spindles by quite young children, and in the early stages they should learn to weave with their own spun thread. Simple experiments can be made in dyeing in order to give colour and interest to the work.

A Spindle.—The spindle is a piece of wood about 8 ins. to 10 ins. long, shaped like a crochet hook with a weight or whorl attached to the thick end. The whorl makes the spindle spin continuously and by means of the hook it is kept in a vertical position. See Diagram 62.

Preparing the Spindle.—Take a piece of ordinary machine-spun wool about 2 yards long and tie one end of it round the spindle just above the inside of the whorl. Wind it round once or twice in figure 8 fashion, pass it under the whorl up to the top, and fix it round the hook with a loop, as seen in the diagram.

Spinning.—Take a small bunch of wool in the left hand and pull out a few strands with the right hand. Place the end of the long thread against them and hold them together with the thumb and finger of the left hand. The right hand gives the spindle a sharp twist to the right. The right hand now goes to the bunch of wool, pulls out a few more threads, and again twists the spindle. Go on doing this until the spindle touches the ground. Take care to twist gently or the spin will run into the bunched wool and spoil the spinning.

Winding the Thread.—The thread must now be wound on the spindle. Take the

latter in the right hand, slip the thread away from under the whorl, push the loop off the hook with the left thumb, and turn the spindle so that the hook is pointing downwards. Wind the spun yarn on the left hand across the palm between the little finger and thumb, beginning to wind at the bunched end. Now roll the spindle inwards to the right, rolling the yarn on it like the figure 8. Continue doing this until only about 12 ins. are left, and then fix the thread as at the beginning.

When a fair amount has been done, the thread must be taken off the spindle. Push it gently to the hook end and it will come off like a cocoon. Slip a paper spill through this and turn the ends up to prevent it slipping off. The thread is now ready to be dyed and woven.

The Spinning Wheel

The invention of the spinning wheel marked a great step forward, as it enabled the worker to spin and wind at the same time instead of first spinning and then winding, as with the primitive spindle. There are two shapes of wheels in general use: the horizontal, which has the larger wheel and spins more quickly, and the upright. As the latter has a smaller wheel and takes up less floor space, it will perhaps be the more suitable one to describe.

In the plate on page 6 the various parts, treadle, wheel and spindle, are easily seen. The last named is more fully illustrated in Diagram 63, as it is the most complicated part.

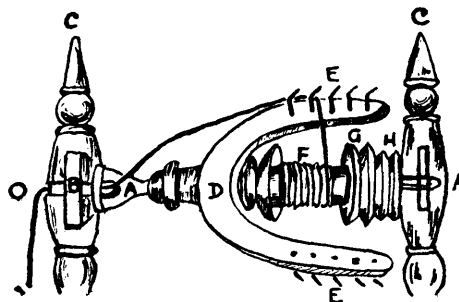


DIAGRAM 63.

The *Spindle* proper, at A, is made of iron or steel. It rests in holes cut in pieces of leather, B, which are attached to two uprights, C. On it is fixed a pair of wooden wings or *Fliers*, D, fitted with wire hooks, E.

The *Bobbin*, F, just inside the fliers, is shaped like a reel, one end being bevelled and the other grooved, as at G. Outside this is the *Bobbin Screw*, H, which is also grooved.

In these grooves a double driving cord is fixed which passes twice round the big wheel. The cord round the bobbin screw twists the yarn while the cord round the bobbin winds the spun thread on to the bobbin.

To fix the cord, pass it once round the bobbin, round the big wheel, round the bobbin screw and again round the wheel. Sew the two ends together firmly.

Before the actual spinning is done the

fleece is usually prepared by scouring, teasing and carding.

Scouring.—This is a process for cleansing the wool. Take the fleece, or part of a fleece, and spread it out in warm water, letting it stay for about twelve hours. Take it out and put it in a bath or bowl of warm soapy water. Wash it well by lifting it up and down, taking care to keep the fleece light and unmatted. When quite clean, rinse it well in warm water and spread it out to dry, pulling out any parts that may be at all matted. It is, of course, best dried in the sun, but in this case it must be well sheltered from the wind.

Teasing.—When the fleece is quite dry, pull it out into a pile of fluff. It should be pulled sideways so that the threads lie side by side. While doing this, take out any pieces

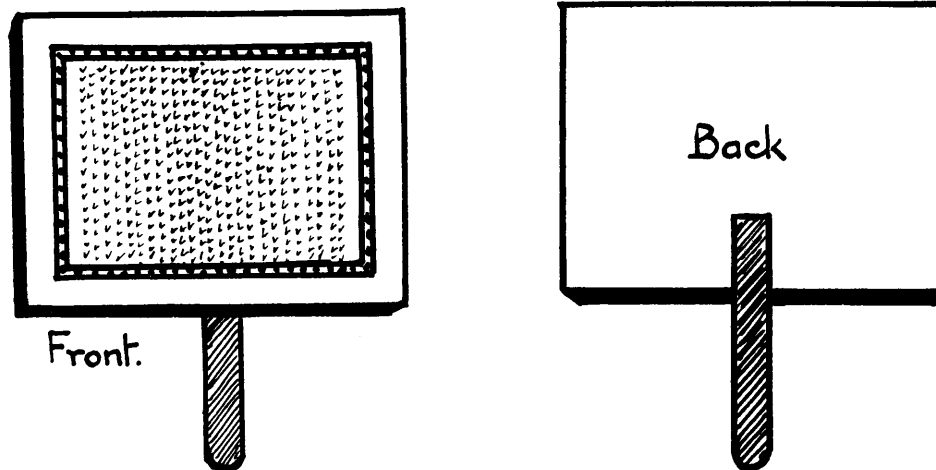


DIAGRAM 64.—A CARDER.

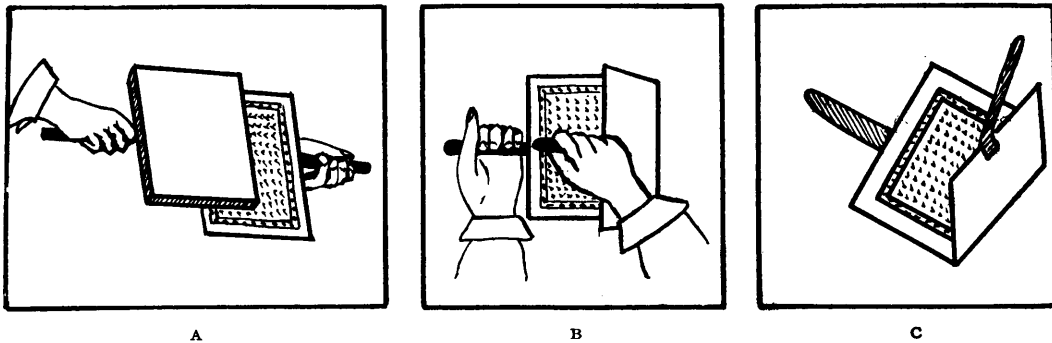


DIAGRAM 65.

of leaf or burr that may be found clinging to the wool.

Carding.—Diagram 64 shows the front and back views of what is called a *Carder*. It is a piece of wood fitted with a handle and one of its flat surfaces covered with a material which is fitted with a large number of bent wire teeth which turn up towards the handle. Two of these are required to brush or card the wool into order, ready for spinning. It is best to work on a low seat so that the feet are well on the ground and the hands can rest easily on the knees.

Hold one of the carders in the left hand with the wires uppermost and the handle pointing away from the worker. (See Diagram 65.) The back of the left hand should rest against the left knee. Put a small quantity of fleece on the wires and spread it lightly all over. Take the second carder in the right hand so that the first finger is stretched along the back of it. Draw the right-hand carder over the left one lightly and quickly towards you several times. This draws the fibres apart and straightens them out.

The wool is now ready to be taken off the carders. To do this place the lower edge of the right carder at right angles with the lower edge of the left one. (See c, Diagram 65.) Lightly pass the edge of the right one across the lower part of the left one and the wool will lie loosely on the left carder. Pick the wool up gently with the right one and shake

it lightly on to the back of the left one. The wool should now be rolled lightly between the backs of the two carders to form a *roll* or *rolag* ready for spinning.

How to Spin.—Tie a piece of thick cotton firmly round the bobbin and wind it several times to the right, pass it over the hooks and thread it through the opening of the spindle at O. Turn the wheel with the right hand over to the right, use the treadle and the cotton will be drawn round the reel. Before threading, however, it is well to practise working the treadle and so getting used to moving the wheel round to the right and not letting it fly back.

After the cotton is threaded and drawn round the wheel, leaving only a few inches free, take a *rolag* in the right hand, draw out a few strands and join it to the cotton. Turn the wheel, keep the left hand under the thread a few inches from the spindle, and gently draw the strands from the *rolag*, which is still in the right hand.

Begin very gently and slowly, spinning only a few inches at a time. Later, the left hand can be held further away from the spindle and the right hand can be stretched out at full length. Then the left hand can be lifted and the thread allowed to run on to the reel.

Fill the reel evenly by putting the thread over the hooks in succession. When the reel is full, throw off the driving band, unthread the spindle and wind the thread into balls.

DYEING

The art of dyeing is a very ancient one and has been practised by all races in some form or other. History relates how the Syrians were famous for their purple dyes, and that Alexander the Great brought the art of dyeing in black, green and yellow from India to Greece. In the Middle Ages we find a great development in the art, especially in Florence and Northern Italy. The discovery of the New World led to new and valuable dye-stuffs being introduced, and right up to the middle of the nineteenth century we find natural dyes in use. After that time these gradually gave way to artificial dyes obtained from coal tar.

The traditional art of natural or vegetable dyeing still survives in parts of Europe,

Scotland and Ireland, as well as in India and Central Asia, but the chemist is now the dominant factor in the producing of colour. Vegetable dyes are pleasing and beautiful in tone, and an added recommendation is that, if they fade, they do not change colour, but only become lighter in tone.

It is not intended to go very deeply into the processes of vegetable dyeing. The various methods will be described and then some simple ways of colouring fleece or thread will be dealt with. By these means it is hoped to arouse an interest not only in colour but in plants and trees, both wild and cultivated, the bark, leaves, flowers, roots or fruits of which will yield fascinating results.

There are two classes of dyes, the first giving their colour to the material with which they are boiled without the help of any foreign substance, and the second requiring a mordant to prepare the wool to take the dye. Simple recipes and directions will be given for both classes.

Preparation of the Fleece.—Before the fleece or yarn is put into the dye bath it should be soaked in warm water. When it is well saturated it is taken out, squeezed lightly and shaken out.

The Dye Bath.—This can be a galvanised pail or bath, or an enamelled saucepan or bowl. It should be large enough to allow space for sufficient water for the wool to be freely turned about in.

Class 1.—Dyeing without a Mordant

Lichen and Moss.—This is quite the simplest form of dyeing, as lichens are easily obtained and easy to use. Lichen is found growing on rocks and trees, and is used largely in Scotland and Ireland for dyeing various shades of brown, straw colour, bright brown and plum-colour, according to the kind of lichen gathered.

Stone or Rock Lichens.—The horse-hair lichen or rock-hair grows on fir trees and dyes a pale greenish-brown. The oak lung or oak rag dyes an orange colour. Some grey stone lichens dye a light yellow-brown, while others dye a dark reddish-brown. Experiments with these and any that come to hand are fascinating to children and “grown-ups” alike.

Grey Lichen.—This is found on old stone walls, trees and often on rotting wood. Gather the old grey and black lichens, which give a deeper colour than the lighter ones.

In the dye bath put a layer of lichen, a layer of fleece or yarn, a layer of lichen, and so on until the bath is about half full. Add cold water until it is three-parts full, and then bring it to the boil. Let it boil gently for about two hours, stirring carefully occasionally. Allow it to cool, then take the fleece out, rinse it in several waters, shake it well to get rid of the lichen, and then spread it out to dry.

Another method is to boil the lichen in water first, to extract the dye. Allow it to cool, and then boil the wool in it until the

required shade is obtained. A light shade is got by boiling the wool for half an hour, and a darker shade if kept boiling for from one and a half to two hours. The best result, however, is obtained by having a stronger dye solution for a darker shade. The fleece or yarn must be constantly stirred in the boiling dye. Before it is hung out to dry, it should be well shaken.

TO DYE RED

Sorrel and Lady's Bedstraw.—Get some sorrel roots, boil them and make a dye. Into this put the wool and boil it for one or two hours. Do the same with the roots of Lady's Bedstraw.

TO DYE YELLOW

1. Birch leaves.
2. Bracken tops (young).
3. Gorse flowers and young shoots.
4. Pear and plum leaves.
5. Willow and poplar leaves.

Make dyes from any of these and boil the wool in the liquid.

TO DYE BLUE

1. Elderberries.
2. Sloeberries.
3. Whortleberries or bilberries.

Boil any of these berries, strain the dye obtained and boil the wool in it.

TO DYE GREEN

1. Elderberry leaves.
2. Lily of the Valley leaves.
3. Nettles.

To get a fairly strong dye from any of the above, fill the dye pot three-quarters full with leaves, cover them with water and boil for two or three hours.

It is not suggested that these reds, yellows, blues and greens will be bright in colour or even permanent, but, on the other hand, they are simple experiments which will prove how certain things will give certain colours.

Class 2.—Dyeing with a Mordant

A mordant is a substance which will fix the dye to the wool. The most common ones

are alum, cream of tartar, tin, sulphuric acid, bichromate of potash, copper sulphate or iron.

Alum and Cream of Tartar are the most generally used of all the mordants, and have been known in many parts of the world from early times. They are easy to obtain and safe to use, and for these reasons will be the only ones dealt with here.

Sometimes the mordant is mixed with the dye itself, but more frequently the wool is first boiled in a mordant bath and then in the dye bath.

The following recipes will prove useful as a beginning and will doubtless lead to individual experiment.

TO DYE PURPLE

Logwood.—Logwood for dyeing consists of chips of wood from the heart of the logwood tree, and is imported from Central America.

To extract the dye take a handful of chips, tie them loosely in a piece of muslin, and drop them into a saucepan of water. Boil well for about an hour, and the dye will be ready for use.

To prepare the wool put 2 oz. of alum and $\frac{1}{2}$ oz. of cream of tartar into a sufficient quantity of water to cover the wool, and let it come to the boil. When it is dissolved, put in about $\frac{1}{2}$ lb. of wool and boil for an hour. Take the wool out, and when it is cool squeeze it gently, but do not let it become quite dry. It is now mordanted and ready for dyeing.

Put about a cupful of the logwood dye into a saucepan in a quart of water and bring it to the boil. Place the cooled wool into this and boil for an hour, stirring from time to time. If the colour is not deep enough, more dye can be added until the required tone is obtained.

Lastly, lift the dyed wool out of the saucepan and wash it in several waters until no more dye comes out. Spread it out loosely to dry.

TO DYE YELLOW

1. *Wild Parsley.*—Alum, 1 teaspoonful; Wild Parsley, 2 lb.

This will dye about 4 oz. of wool. Boil the parsley for an hour, strain the liquid, add the alum and bring to the boil. Boil the wool in this for about an hour.



PLATE 28.—TAPESTRY IN VEGETABLE-DYED WOOLS.

2. *Dry Birch Leaves.*—Alum, 1 teaspoonful; Birch leaves, $\frac{1}{2}$ lb.

The dried leaves should be soaked the day before using. Boil them in water for an hour, strain the liquid, add the alum and boil the wool in it.

3. *Dry Apple Bark.*—Alum, $1\frac{1}{2}$ teaspoonfuls; Apple Bark, 4 oz.

With this dye the wool must be mordanted with the alum first, after which it is placed

in the dye, which has been previously prepared in the same way as logwood.

TO DYE RED MADDER

Dark Red.—Alum, 2 teaspoonfuls ; Cream of Tartar, $\frac{1}{2}$ teaspoonful ; Madder, 2 oz.

Soak the madder for twenty-four hours in enough cold water to make a thin liquid. Mordant $\frac{1}{4}$ lb. of wool in alum and cream of tartar. Add sufficient water to the madder, and when it is just warm place the mordanted wool in it. Heat this slowly until the fingers can only just be dipped in it. Keep it at this temperature for about an hour, but do not allow it to boil or it will turn brown. After an hour let the liquid cool down with the wool still in it. It must be constantly stirred whilst cooling. After this rinse the wool well in several waters.

Rose Red.—Alum, $1\frac{1}{2}$ teaspoonfuls ; Madder, 1 oz.

Prepare the madder as above. Mordant $\frac{1}{4}$ lb. of wool in alum and then wrap it in a cloth so that it will not dry. Keep it like this for a week and then dye it as before.

Light Red.—Alum, $1\frac{1}{2}$ teaspoonfuls ; Madder, 4 oz.

Mordant $\frac{1}{4}$ lb. of wool in alum and then leave it in a warm madder dye for half an hour.

Chickweed.—Alum, 1 teaspoonful ; Logwood, 1 oz. ; Chickweed, 1 full pail.

Boil the chickweed for an hour and then strain the liquid. Add the alum to this and then steep the wool in it and boil for an hour.

Boil the logwood in muslin for half an hour. Take the wool from the alum and chickweed liquid and place it in the logwood dye and let it boil for an hour. Let it remain in it until it is cool.

Heather.—Alum, $1\frac{1}{2}$ teaspoonfuls ; fresh Heather tops, 2 lbs.

Chop the heather up small and then boil it in water for four hours. Strain the liquid and add the alum. Boil the wool in this for an hour and a half. Allow it to cool in the dye, which must be stirred now and again.

Experiments with the following will prove interesting and useful:—

Privet Berries will dye blue if used with alum and salt.

Walnut Leaves will dye a bronze-brown if the wool is first mordanted with alum.

Cochineal will dye red if the wool is first mordanted with $2\frac{1}{2}$ oz. of alum and $1\frac{1}{2}$ oz. of cream of tartar for 1 lb. of wool and then dyed in 1 oz. of cochineal.

Fustic will give a yellow dye if the wool is mordanted with cochineal and then 5 oz. of fustic allowed to 1 lb. of wool.

Walnut.—The green shells of walnuts will dye a brown shade even without a mordant. The shells are soaked in water until the dye is deep enough in colour.

Onion Skins.—Boiled onion skins will dye a yellowish brown. Boil some skins, strain the liquid and let it cool. Mordant the wool in alum and then boil it in the onion dye for about an hour.

CHAPTER EIGHT
SMALL TABLE LOOMS

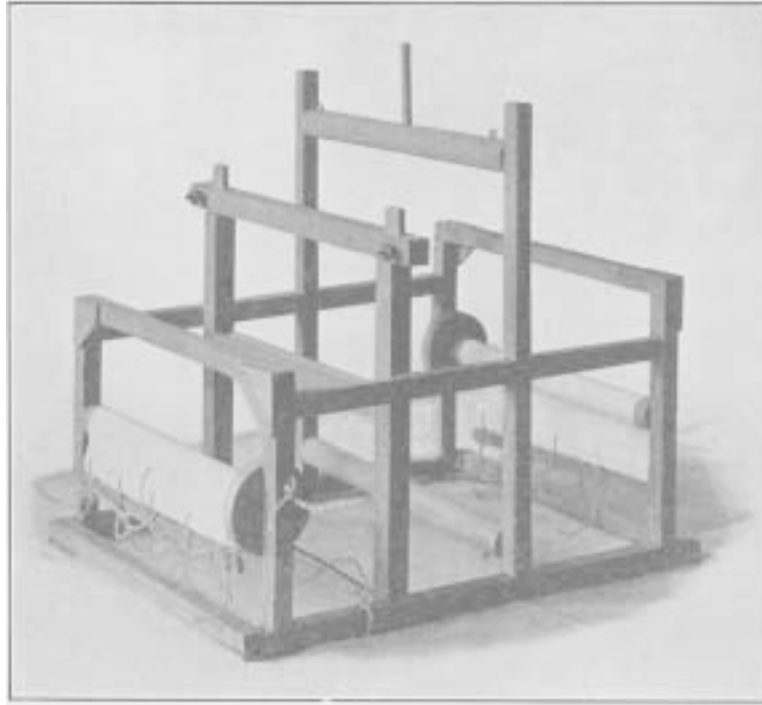


PLATE 29.—A HAND LOOM.

THIS loom is a big advance on the looms previously described, from the fact that it is fitted with a *Heddle Frame* and *Reed Frame*.

Diagram 66 shows a general view of the loom and the positions of the various parts. From it, as well as from Plate 29, we see that it consists of four parts :—

1. A Framework.
2. A Heddle Frame.
3. A Reed Frame.
4. Front and Back Beams.

The Framework.—This is made from four pieces, 17 ins. by $\frac{3}{4}$ in. by $\frac{3}{4}$ in., marked A, four pieces, 10 ins. by $1\frac{1}{4}$ ins. by $1\frac{1}{4}$ ins., marked B, and four pieces $13\frac{3}{4}$ ins. by $1\frac{1}{4}$ ins.

by $\frac{3}{8}$ in., marked C. The pieces marked A are jointed to posts B with mortise and tenon joints (see Diagram 70), and the cross-pieces C are screwed to A. See Diagram 66.

The Heddle Frame.—Cut two pieces of wood 18 ins. by 1 in. by $\frac{3}{8}$ in., and shape them at the top, as in Diagram 69. These are screwed to the sides, as shown in Diagram 67, and then two rollers, 12 ins. by 1 in., are screwed into them at the top and bottom.

The Reed Frame.—The construction of this is shown in Diagrams 68 and 69, and the action of it in Diagram 69.

The two upright sides are $11\frac{3}{4}$ ins. by 2 ins. by $\frac{3}{4}$ in., and are joined by two pieces, one 12 ins. by 1 in. by $\frac{3}{4}$ in., and the other 11 ins. by 2 ins. by $\frac{3}{4}$ in. The latter is fitted with a

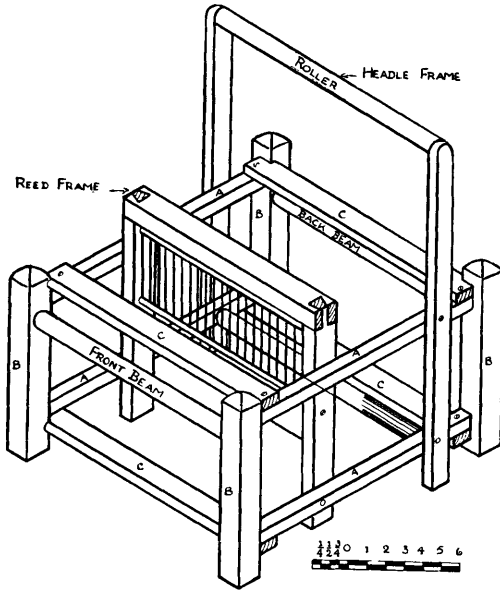


DIAGRAM 66.—GENERAL VIEW.

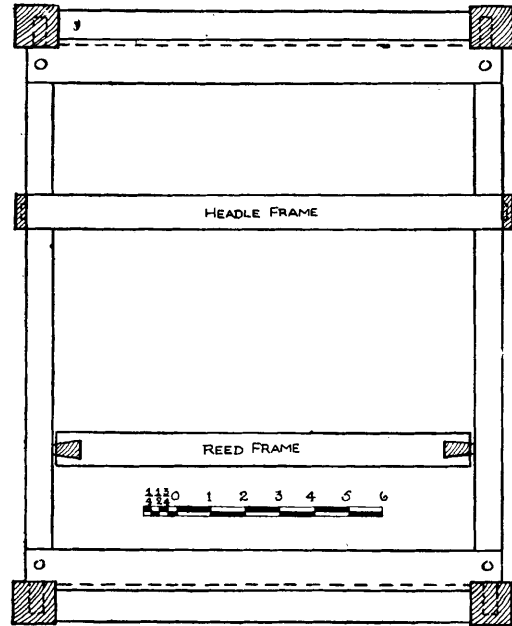


DIAGRAM 67.—PLAN.

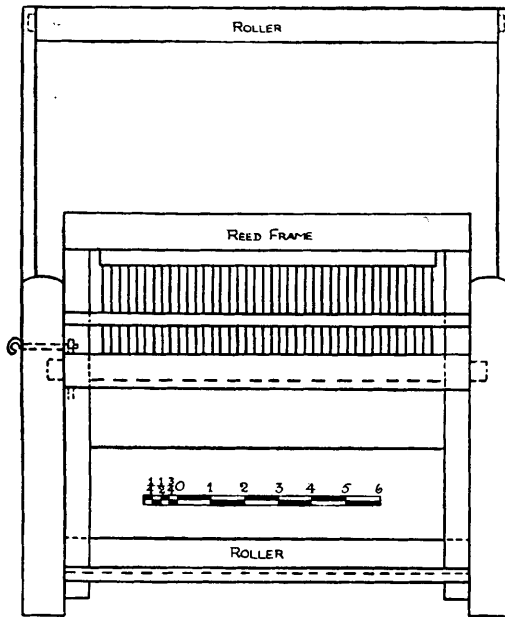


DIAGRAM 68.—REED FRAME: FRONT ELEVATION.

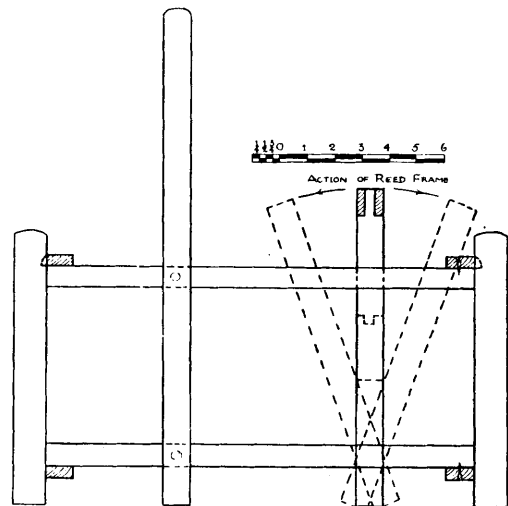


DIAGRAM 69.—REED FRAME: SIDE ELEVATION.

halving joint, so that the bottom edge is $4\frac{3}{4}$ ins. from the base of the side pieces, and it has a $\frac{1}{2}$ -in. groove in it to hold the reed. The former is cut to fit over the side posts, but is left free. It is fitted with two wing nuts and bolts, so that it can be lifted up and down to put the reed in or take it out. The whole frame is then screwed to bar A, as shown in Diagram 66.

Front and Back Beams.—Two rollers, 12 ins. by 1 in., four pieces 2 ins. long, and two pieces $3\frac{1}{2}$ ins. long of 12 gauge iron wire are required. The rollers or beams are fitted into the upright bars B, as shown in Diagram 66. The left end of the front beam and the right end of the back beam are fitted with the 4-in. pieces of wire. See K in Diagram 71. These act as stops when the rollers are turned. The other wires, $3\frac{1}{2}$ ins. long, are turned as at H in Diagram 71 and fixed through post B, in Diagram 66, just above the beams.

Preparing the Loom : Leash Making

The loom must now be prepared in readiness to mount a warp. The Reed Frame has a reed fitted into it and the Heddle Frame has heddles or leashes mounted on it.

The Reed Frame.—This is a frame to hold the reed or comb, which keeps the warp

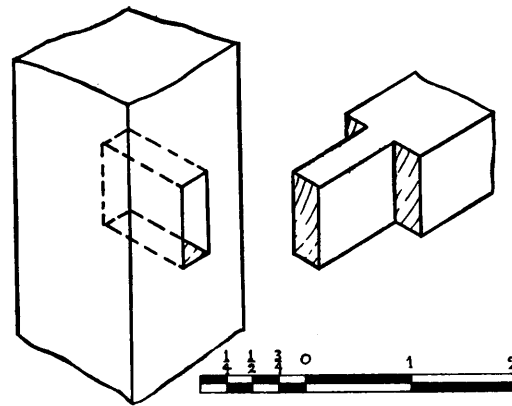


DIAGRAM 70.

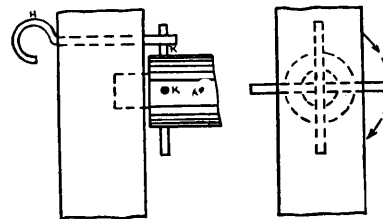


DIAGRAM 71.

threads spread out and beats the lines of weft together. It replaced the primitive comb as a beater and gets its name from the fact that the teeth or divisions were originally made of fine strips of cane or reed.

The spaces between these strips are called *dents*, reeds being made with a varying number of dents to the inch. It is in these that the warp threads are entered. Coarse work will have only six or eight dents to an inch, while for fine work there can be 100 or more to an inch. For our purpose, however, a reed of twelve dents will answer well, as if a fairly thick thread is used one thread can go through each dent, while a fine warp can have two threads entered through each dent. The reed for the table loom should be 10 ins. long and 4 ins. deep, with twelve dents to an inch. Take the top bar from the reed frame, place the reed inside, letting the lower bar fit into the groove, and screw the top on again.

The Heddle Frame.—This is shown in the diagram of the loom as two rollers joined by side pieces and fixed to the outer frame. On these rollers the heddles are fixed. A heddle in its simplified form is a pair of laths or

NETT SIZES OF MATERIALS.

No. Pieces.	Length.	Width.	Thickness.
B . . . 4	10	$1\frac{1}{4}$	$1\frac{1}{4}$
A . . . 4	17	$\frac{3}{4}$	$\frac{3}{4}$
C . . . 4	$13\frac{3}{4}$	$1\frac{1}{4}$	$\frac{3}{8}$
Roller Frame 2	18	1	$\frac{3}{8}$
Reed Frame 2	$11\frac{1}{2}$	1	$\frac{3}{4}$
„ „ 1	11	2	$\frac{3}{4}$
„ „ 1	12	1	1

EXTRAS.

4	12	1in. Dia.	Rollers
4	2	12 Gauge	Iron Wire
2	$3\frac{1}{2}$	12 „	Stops



PLATE 30.—SCARVES AND POCHETTES.

sticks joined by leashes. (See Diagram 72.) The sticks have holes pierced in them about $\frac{1}{2}$ in. in from the ends.

The Leashes.—The leashes are cords tied so that there is a loop in the middle, and these can be made on a jig or bought ready made. They can be made on a block of wood into which four nails are driven. The heads of the nails are sawn off and the ends smoothed with emery paper. (See Diagram 73.)

Cut a number of lengths of fine, strong thread about 8 ins. long. Take one of these and put the middle of it round C and tie a knot to the inside of B; take it round A and tie it firmly. A second thread is passed through the short loops between B and C and tied to the outside of D. Make ten of these, one on top of another, and then tie them together on both sides between AB and CD. Make as many of these as are required for the warp, one for each thread.

Next take two flat sticks and slip some groups of leashes over each of them, half the number of warp threads on each one. Put

them down flat and place a second stick in the lower loops, taking care not to twist them. Tie a thin string from end to end of each stick by means of the holes. Get eight screw eyes and screw four of them into the four sticks at the outer side of the narrow edges and about $\frac{1}{2}$ in. in from the ends. (See Diagram 72.) Then screw the remaining four into the top and bottom rollers of the heddle frame 1 in. in from the ends, as seen in the photograph of the loom (Plate 29). Those on the top roller must point upwards and those on the lower one downwards.

Tie two pieces of thin, strong cord about 12 ins. long round the neck of each screw eye on the top roller, so that the ends are of equal length. Take the heddle frames and tie them by these ends to the screw eyes in the top sticks so that the centre holes of the leashes are in a line with the middle of the reed.

Now cut two more pieces of cord, slip them through the eyes of the screws on the lower roller and tie each end into one of the screws of the lower heddle sticks. It will now be seen that the heddle frames are fixed at the top by the cords, but free at the bottom.

Turn the top roller towards the back, and if the tying has been done rightly, one set of heddles will go up and the other down, while if the roller is turned towards the front the headles that were up before will go down.

Making, securing and taking off a Warp

When a long warp is needed, it must be made in a special manner in order to keep the threads from becoming entangled. For this purpose a board or frame with pegs inserted in it, round which the warp threads are passed, is required. The frame must be strong, so that it will not bend or break under the strain, and the pegs must be quite $\frac{1}{2}$ in. thick.

Allowing for Waste.—Diagram 74 is a suggested plan for a frame on which warps of three lengths can be made, one of about $1\frac{1}{4}$ yards, a second 2 yards and the third just over $2\frac{3}{4}$ yards.

In calculating the length of the piece of

material or article to be made, allowance must be made for a certain amount of wastage necessary for tying. On the three lengths that can be made on this board from 9 ins. to 12 ins. must be allowed, thus making the finished articles 1 yard, $1\frac{3}{4}$ yards and $2\frac{1}{2}$ yards. These are suitable lengths for runners, towels and scarves.

The number of threads to be warped will depend upon the width of the reed and the number of dents to the inch. Count these and add 4 extra threads for the selvages.

Making the Warp.—It is taken for granted that in the majority of cases the wool or other thread used in school is skeined and not wound on spools. There are two ways of warping from these skeins, the first being to wind them into balls and place them in a box on the floor, and the second for two girls to work together, one to hold the thread and the other to warp.

First Warp. $1\frac{1}{4}$ Yards. Make a loop at the end of the thread and slip it over A. Now take the thread over B, under C, over D, round H and I, up and over G, under F and over E. One warp thread has now been wound and we have to return to A to make the second thread by going under E, over F and G, round I, H and D, over C, under B, and over A. You will notice that between A and B, B and C, E and F, the threads are crossed, and it is these crosses which prevent the threads from becoming entangled.

The third thread is now warped like the first, and the fourth like the second one. Continue in this way until the required number of threads has been warped.

Second Warp. 2 Yards.—Work as for the

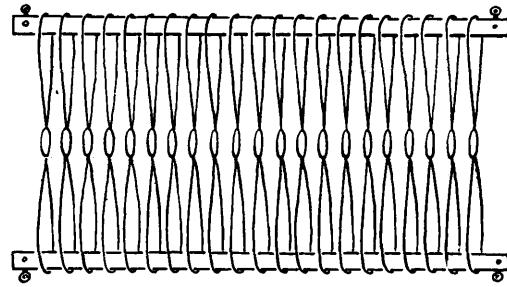


DIAGRAM 72.

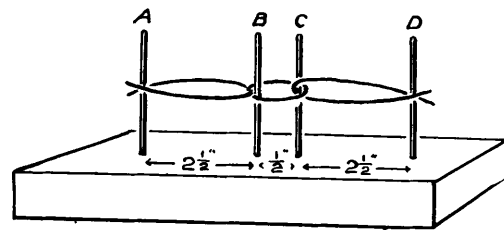


DIAGRAM 73.

first warp as far as I and then go to the left round L before going up to G and on to F, E. When coming back, after leaving G, go round L and then down to I. In this way a warp of 2 yards is made.

Third Warp. $2\frac{3}{4}$ Yards.—Begin at A and go round to I, as in the first warp. Now go round J, K and L up to G and on to E. When returning, go round G, L, K, J and I back again up to A. In this way we get a warp about $2\frac{3}{4}$ yards long.

Great care is needed in making a warp, especially in keeping the crosses in their proper order.

In making a warp it is advisable to keep a

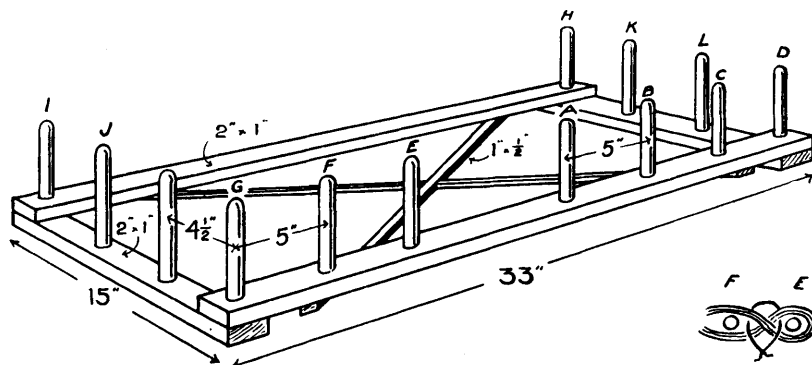


DIAGRAM 74.



DIAGRAM 75.

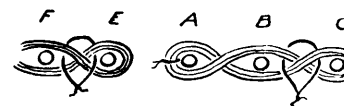


DIAGRAM 76.

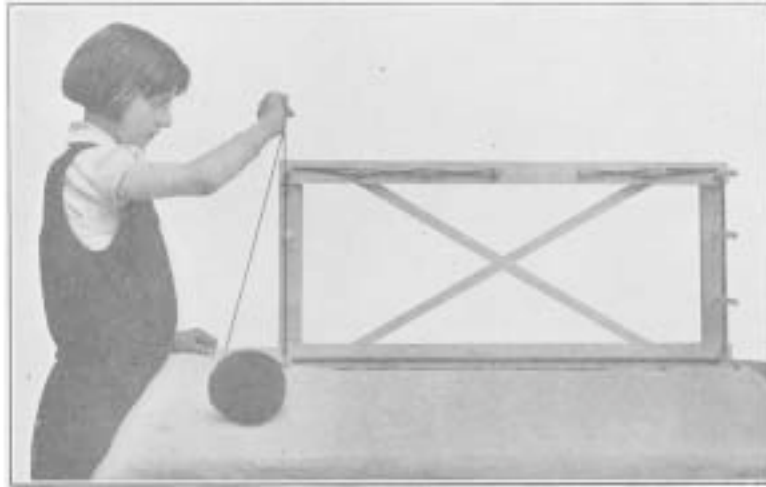


PLATE 31.—MAKING A WARP.



PLATE 32.—SHED STICKS IN THE CROSS.



PLATE 33.—MAKING A CHAIN OF THE WARP.

record of the number of threads. After the thread has passed forwards and backwards five times put one end of a piece of fine cord through the opening next to peg E and the other through the opening next to peg F, and leave them hanging. (See Diagram 75.) Warp 10 or more threads and then put the end of cord Y through the opening next to E and X through the space next to F. In this way a cross is made in the cord and it is a simple matter to know at a glance the number of threads on the board.

Securing the Cross.—Before the warp is taken from the board or frame it is necessary to secure the crosses. It will be noticed that there are three of these, one between A and B, a second between B and C and the third between E and F. It is those between A and B and E and F which are secured. Take two pieces of strong thread and place them on either side of the crosses, as shown in Diagram 76. Tie the ends and let them hang loosely. Finally tie the warp threads together at the outside of A.

Taking Off the Warp.—Now that the crosses have been made secure, the warp can be removed from the frame.

Remove peg A, take the warp from B, C and D, while a second girl holds it to L, and slip the tied loops over the wrist. Keep the warp quite taut, and it is as well at this stage for the second girl to let it loose at L and hold it at H.

Now make the second loop of a chain by catching hold of the warp with the right hand while the left hand brings the first loop from the right hand. Slip this second loop over the right wrist and make a third loop in the same way, just like making a crochet chain, letting the left hand pull each new loop over the right one. Tie the end securely so that the chain does not come undone.

Plate 33 shows the method of making the chain.

A Striped Warp.—Stripes are made by joining the coloured threads on the outside of the end pegs A and E. A careful plan must be made before the warping is begun of the width and position of the stripes, and a correct count of the number of threads required for each one must be noted down.

Mounting the Warp. Beaming

Before a warp can be mounted the loom must be fitted up with a warping cloth on

both front and back beams in the same way as was done for the roller loom. Then, in order to give space for the warp to be stretched, the leashes must be lifted up. To do this, untie the strings on the bottom heddle sticks, roll sticks and leashes together and tie them to the top roller firmly at each end. Cut two sticks the width of the roller for the shed sticks and bore holes $\frac{1}{2}$ in. from each end. These are placed on each side of

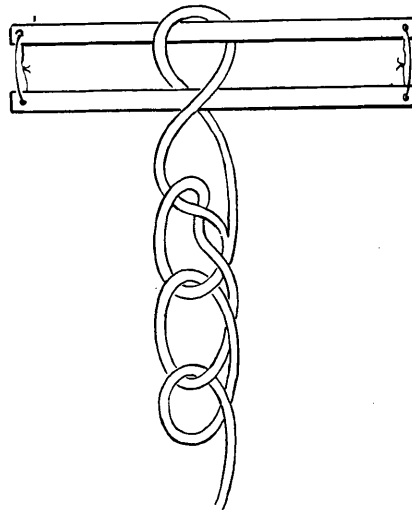


DIAGRAM 77.

the cross and tied together at the ends. (See Diagram 77.)

Beaming or Turning On.—When mounting the warp on the roller loom it was tied and rolled on the warp beam first and threaded through the heddle reed afterwards. With the table loom a method of *beaming* or *turning on* used by many weavers will be described. The chief points in turning on a warp are to have the threads evenly spaced and all threads of the same tension. To be sure of this, without making use of any additional apparatus, the warp is first threaded through the reed from front to back before it is tied to and rolled on the warp beam.

Before taking out the cords that hold the cross and the groups of ten, find the middle warp thread and tie a piece of coloured cotton round it. Now spread the warp out along shed sticks, as in Diagram 78, tie the sticks loosely to the top of the front roller near the reed



PLATE 34.—ENTERING THREADS THROUGH THE REED READY FOR BEAMING.

frame with the loops facing the reed and the warp hanging down. It is now ready to be threaded, but before doing this some understanding of the reason for this step is to be desired. As was said before, it is necessary in good weaving to have the threads well spaced before the warp is rolled on the beam, and to achieve this the threads are drawn through the spaces in the reed.

The method will depend upon the coarseness of the thread, and this will decide whether a double thread is drawn through every dent or only through every alternate dent. If the warp thread is fine and necessitates having 24 threads to an inch, then we must thread through every dent, but if it is a fairly coarse wool, three- or four-ply, then only each alternate dent is used. We will take it that a coarse warp is being mounted and use the latter method. A small *reed hook* will be required to pull the threads through and a short dowel rod on which to slip the loops.

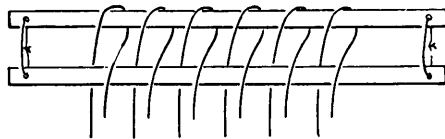


DIAGRAM 78.

It is well to work in pairs, one at the front of the loom, whom we will call L, and one at the back whom we will call M. Let M hold the dowel rod and the reed hook while L takes charge of the warp—M must find the left-hand end dent and put the reed hook through it while L gets the right-hand end loop.

The loop is placed over the hook, drawn through by M and looped on to the stick. The second loop is drawn through the second dent and the third loop through the third dent. This disposes of the selvedge.

The threading is now done through every alternate dent until the selvedge at the other end is reached, when the three last loops are threaded in the three last dents. This may sound as if L has a simple task, but in reality it is the more important, as she has to watch the cross on the sticks to see that the threads are taken in their right order, alternately over and under the shed sticks.

When the whole of the warp has been threaded, pull the dowel rod and tie it to the warping cloth. Peg the roller so that it cannot move.

Transferring the Cross

Our next step is to get the cross to its proper position *behind* the reed by means of the shed sticks. Let L and M still work together, L at the front and M at the back. The latter must see that the peg is in the roller so that it cannot turn when the warp is pulled, and she must get a third shed stick, while L takes the warp, straightens the threads and holds them quite taut. M now comes to the front of the reed, unties the shed sticks and turns the one nearest to the reed on its edges and pushes it right up against the reed.

She will then see that the shed is at the back of the reed as well as at the front, and she must put her third shed stick into the one at the back, afterwards taking out the one at the front. She must watch very carefully to see that the remaining stick does not fall out, and L must continue to stretch the warp quite taut. M should now secure the back stick by tying a thread across from end to end by means of the two holes.

The second stick must now be moved up to the front of the reed, and it will be seen that a second shed is thus made at the back of the reed. The first stick—the one previously taken out—is now placed at the back of the loom in the second shed and secured the same way as before. The cross having now been transferred from the front to the back of the reed, the remaining front stick is taken out and the two sticks at the back are tied together.

Winding the Warp.—M must now return to the back, take the peg out and turn the warp on the roller. In the meantime L holds the warp very tightly and lets out a little at a time, combining the threads with her fingers and watching that all the threads are held at the same tension. The outside ones sometimes tend to become looser than the inner ones.

As the warp is wound, the shed sticks are taken back with it, and from time to time M must move them forward. On no account must they be wound on the roller. If the warp threads are inclined to stick, L should shake the warp before letting it go through the reed and watch for any threads that may catch or get twisted.

This must be continued until the end loops are near the reed. The shed sticks should now be tied to the back beam by M, and L can cut the loops and let the ends go right through the

reed. Tie these ends lightly in small groups.

Now that the warp has been well wound, it is time to fix the thread in such a way that alternate threads can be lifted automatically, and to do this we must fix the heddles and leashes into position again.

Entering or threading the Heddles and Reed

Entering the Heddles.—We now come to the process of *entering* or threading the warp through the leashes. As before, let L and M work together, this time M taking charge of the warp while L takes the reed hook with which to carry the threads through the leashes.

While L unties the bundles of leashes and pushes them along the heddle sticks to the left, M unties the end group of warp threads to her left. The first leash on the back heddle must now be pushed to the right by L, who puts the hook through the eye. In the meantime M has taken the two end threads which she now puts over the hook. L draws them to the front and then pushes the first leash on the front heddle to the right.

The second pair of warp threads are drawn through this and we have now finished with one selvedge. From now onwards, until the other selvedge is reached, the threads are entered singly. L must move the second back leash to the right, pull a thread through



PLATE 35.—TRANSFERRING THE CROSS.

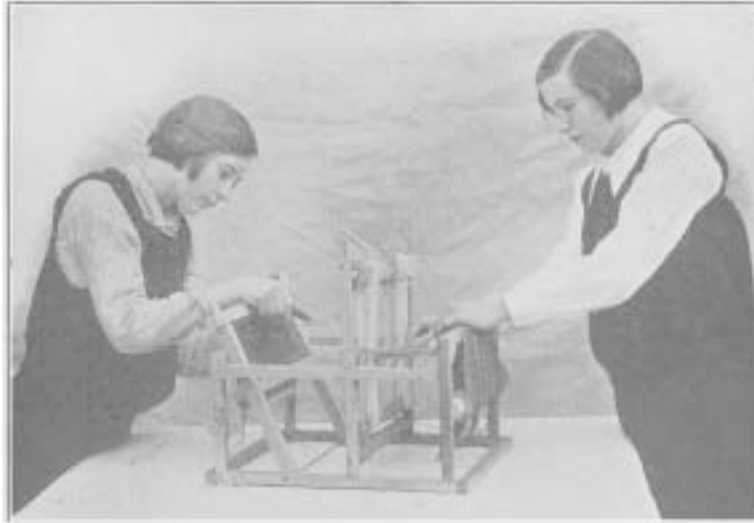


PLATE 36.—ENTERING THE HEDDLES.

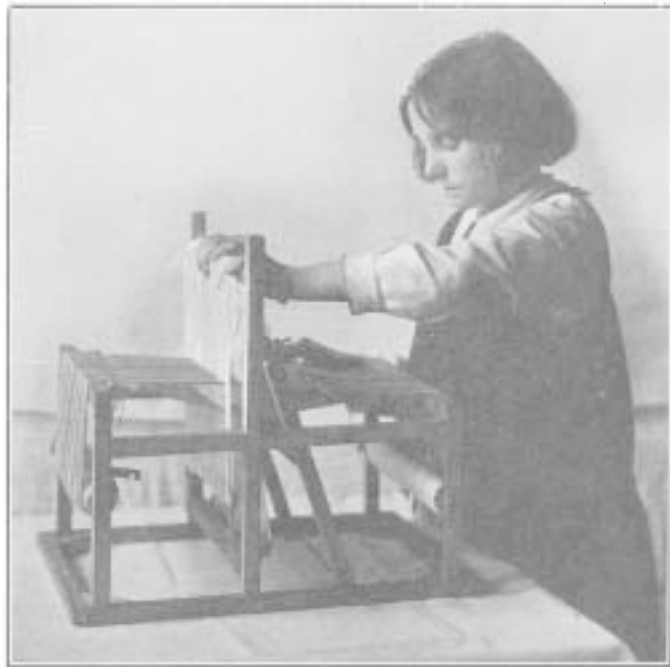


PLATE 37.—MAKING THE SHED.

and then move the second front one to the right. Continue in this way, M taking the greatest care to see that the threads are in their right order on the shed sticks and L moving one leash at a time to the right.

When twelve threads have been entered, tie them loosely in front of the leashes. Enter all but 4 threads singly and these are entered double for the second selvedge.

It is advisable to go over every group of 12 to see if they are alternately in back and front leashes, as if one is missed the warp will have to be re-threaded or leave a continuous fault in the weaving.

The reason why the leashes are pushed to the left and then moved one by one to the right is to prevent the threads crossing and so hindering the proper action of the heddles.

Threading the Reed.—When the threads were entered in the leashes the work was done from right to left of the front of the loom. In entering the reed the threads are entered from left to right, therefore M stands at the right of the loom at the back while L is at the left in front. M should untie the first group of threads, select the last pair threaded and put them over the hook which L has put through the first dent in the reed. The next pair are drawn through the second dent. From now until the last four threads are reached there should be one thread in each dent. Great care must be taken by M to see that back and front leashes alternate and L must watch that she does not draw two threads through one dent or miss a dent. It is advisable to check the reed entering at every twelve threads and tie them in groups in front of the reed.

Tying the Warp.—This is the final stage in the preparation of the warp for weaving. It all sounds rather involved and at first seems a very long process, but it becomes easier and is more quickly done with practice, and without careful warping and mounting no good piece of weaving can be hoped for.

The last step is to tie the ends of the warp on to the warping cloth on the front beam. Tie a second stick to the one in the hem of the cloth, leaving a space of about $\frac{1}{2}$ in. between the two.

Now take the 12 middle threads and divide them in half, 6 in the right hand and 6 in the left. Put them under the loose rod, bring them up to the front of it and then

over and down into the dividing space. (See Diagram 79.)

The right-hand group is taken to the right and the left-hand group to the left. Both groups are brought together at the top and tied. Next tie the group at the right side of the warp and then the group at the left side. This keeps the stick in position. The rest of the groups are now tied in the same way, care being taken to keep all the groups at the same tension. When the tying is done, just run the tips of the fingers along the warp,

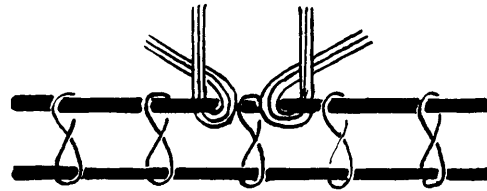


DIAGRAM 79.

and if any threads are looser than the others they must be retied.

Look along the warp and see that the threads lie in a straight line from back beam to front beam when the eyes in the leashes on the two heddle frames are opposite one another. If they are lifted up or depressed in the leashes, then the heddles want adjusting.

Weaving

Winding the Bobbin.—A small wooden shuttle such as was used on the simple



DIAGRAM 80.—SHUTTLE.

looms can be filled with thread and used for weaving on the small table loom, but it is preferable to use one which will run easily along the warp.

A suitable one is shown in Diagram 80. There is a hollow cut out in the middle, and running across this is a steel pin which fits into two small holes at either end. A small spring is fitted into one of these and this keeps the pin in position. This pin holds the bobbin after it has been wound.

The bobbin is made on a winder, as illustrated in Diagram 81. Screw the winder on to a table, cut an oval piece of paper and wrap it round the spindle, catching in the end of the thread at the same time. Guide the thread with the left hand and wind slowly at first with the right. The bobbin should be elongated at each end and piled up in the centre, but must not be wound too near the

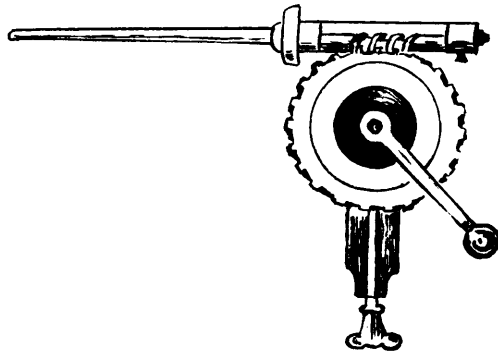


DIAGRAM 81.—WINDER.

edges of the paper or it will get twisted. When a fair-sized bobbin has been made, take it off the spindle and slip it on to the steel pin of the shuttle.

Weaving.—Before beginning the actual weaving, try one or two lines of weft in order to get the right action of the heddles and also to see if the mounting of the loom has been exactly and carefully done. Turn the top roller to the back and it will be seen that the threads in the front leashes are lifted up while the back ones are sent down,

thus making the first shed. Put the shuttle through this in front of the reed frame, which should lie against the heddle frame, and let the weft thread lie across the warp. Now turn the roller towards the front and a second shed will be made. When the shuttle is passed back through this, the reed is brought forward smartly to beat the two rows together.

We now come to the question of texture. In almost every case beginners tend to beat the lines of weft too close together, the consequence being that the whole of the warp is completely covered with the weft and the material is hard and unpleasing. This is avoided by beating with one short beat and leaving an equal quantity of warp and weft showing.

Beginning and Joining.—It is best not to leave ends to be darned in afterwards, but to work them in as the weaving proceeds. To begin the weaving, turn the top roller to the front and run the shuttle through at the right-hand side from left to right for about 3 ins. and then begin weaving in the ordinary way.

To make a join do not tie two threads together, but let one end fold over the other for about $\frac{1}{2}$ in.; that is to say, that for this space there is a double thread across the warp.

Things to Make.—Several useful things can be made on looms of this size: scarves, runners, guest towels, chair backs, pochettes and bags, and the decoration of these made by means of stripes or pattern darning with a needle.

CHAPTER NINE

THE PEDAL LOOM AND PATTERN WEAVING

PATTERN weaving is determined by the method of entering the warp threads through the leashes. In the small table loom the threads were entered in regular order in alternate back and front leashes on two heddles, with the result that only tabby

the same ones are always used for tabby, and the others for the pattern. This will be better understood if a pattern draft is described.

Pattern Drafting is a method of showing, by means of drawing on squared paper, how



PLATE 38.—A PEDAL LOOM.

weaving could be done by heddle action. Pattern weaving requires the use of several heddles and pedals according to the pattern to be worked.

Plate 38 shows a very simple and effective pedal loom. The four heddles are fitted to the frame by chains or wires, thus avoiding any difficulty in getting the heddles properly adjusted. The pedals are fixed; so

threads are entered in the heddles. Only one or two simple patterns will be dealt with, but they offer an abundance of scope for individual work. Monksbelt, Rose Path and Honeysuckle have already been dealt with in a simple way, and it now remains to be shown how they are entered in four heddles. These are numbered 1, 2, 3 and 4. Some weavers number from front to back and

others from back to front. In the pattern drafts shown here the latter method will be followed, the back headle being No. 1.

Monksbelt.—36 threads = 1 pattern. For this 4 heddles and only 4 pedals are used, as the pattern consists of two units only with lines of tabby between.

Diagram 82 is in three parts :—

I. In this the black squares are arranged in four lines to correspond with the heddles. The squares show the order in which the leashes are entered.

II. Here the units or lines of pattern are shown.

III. This shows the attachment of pedals to the heddles. Only the four inner pedals are used, the two outer ones being left free. The horizontal lines represent the heddles and the vertical lines the pedals. The crosses show how heddles are attached to pedals.

Pedal 1 is fixed to heddles 1 and 4.

„ 2 „ „ 1 „ 2.
 „ 3 „ „ 3 „ 4.
 „ 4 „ „ 2 „ 3.

Before beginning the threading, the following steps are necessary :—

A. Make a warp. In the making of this the number of threads to a pattern must be taken into account. Monksbelt has 36 threads, therefore the warp must be in groups of 36 plus 16 threads for the selvedge.

B. Tie the heddles to the top bar.

C. Fix shed sticks in the cross, and tie them together at the ends.

D. Enter the warp backwards through the reed and place on a rod.

E. Fix the rod to the back beam.

F. Transfer the cross.

G. Tie the shed sticks to the back beam.

H. Fix the heddles in position again.

I. Move the leashes to the right of the back worker.

The entering of the leashes is best done by working in pairs as before. Read the draft from right to left and enter double threads in 4, 3, 2, 1 for the selvedge, thus accounting for 8 threads.

The pattern now begins—one in heddle 4,

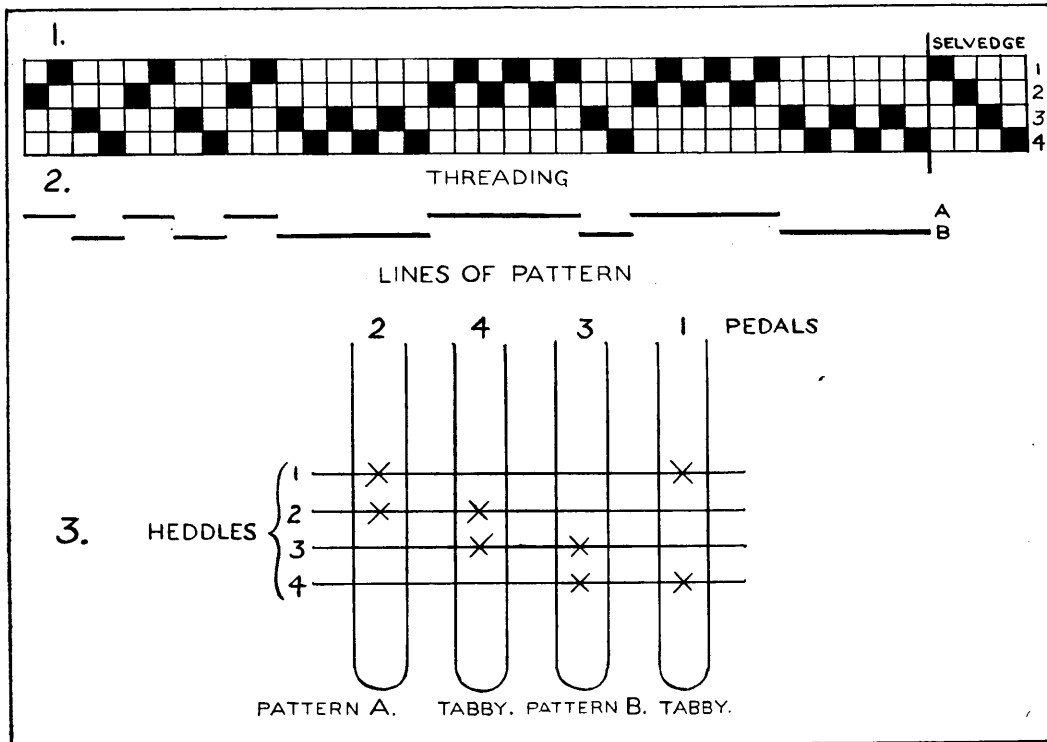


DIAGRAM 82.—MONKSBELT THREADING.

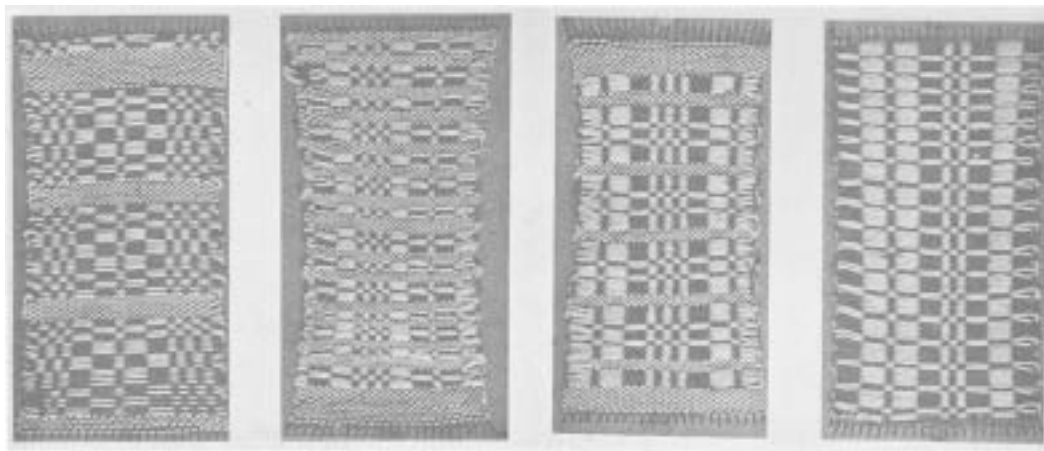


PLATE 39.—MONKSBELT PATTERNS.

one in heddle 3, one in heddle 4, and so on, until 36 threads are entered. When one pattern is threaded, count the threads carefully, see that they have been entered in the right order, and tie them loosely together. Repeat from the beginning of the pattern, and so enter all the warp, entering the last 8 for the selvage as before.

The warp is now threaded through the reed and tied to the front beam.

Weaving the Pattern.—As shown at 3 in Diagram 82, the two lines of pattern are worked on pedals 2 and 3, while the binders of tabby are on pedals 1 and 4. A comparison of the threading with the pedal tying will show that when pedal 1, which is tied to heddles 1 and 4, is pressed down, alternate threads will be depressed over which the weft thread is passed, while if pedal 4, which is attached to heddles 2 and 3, is pressed down, the other alternate threads are depressed, and thus the tabby web is woven on which the pattern rests.

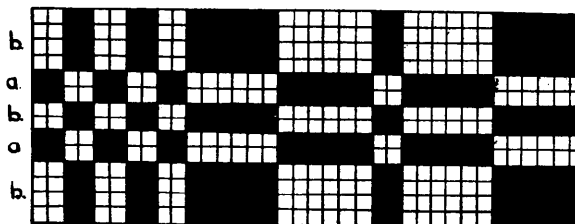
The lines of pattern can be followed in the same way. To begin weaving press down pedal 1 and work a line of tabby. Now take a second shuttle for the pattern, press down pedal 3 and weave the first line of pattern.

Press pedal 4 for the second binder and pedal 2 for the second pattern row.

These pattern rows can be used in a variety of combinations, but care must be taken to weave a row of tabby between each row of pattern.

Diagram 83 gives a suggested plan for a band of Monksbelt.

Rose Path.—In Monksbelt it was seen that the pattern was made up of two different lines. We now come to some that have four lines to complete the pattern. Diagram 84 shows the selvage and two groups of threading for Rose Path and underneath is seen the pattern obtained from the four lines. Six pedals are used, and these are tied to the heddles, as shown at 3 in the diagram. Two ways of combining these lines are seen in Diagram 86. Diagram 84 shows that line *a* is worked by pressing down pedal 1, line *b* by pressing pedal 3, line *c* by pressing pedal 4, and line *d* by pressing pedal 2. Pedals 5 and 6 make the tabby binders which go between the rows of pattern.



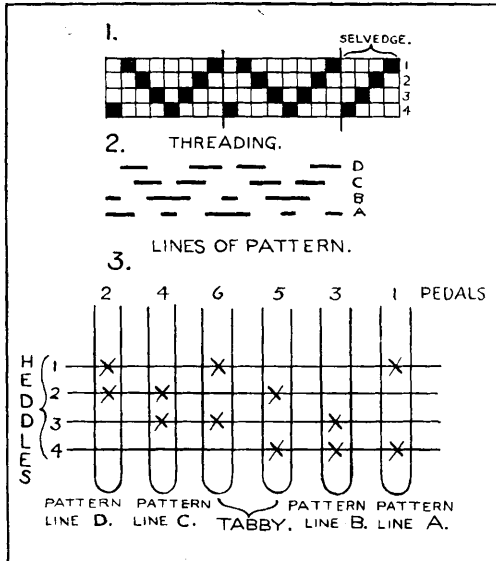


DIAGRAM 84.—ROSE PATH. DRAFT OF PATTERN.

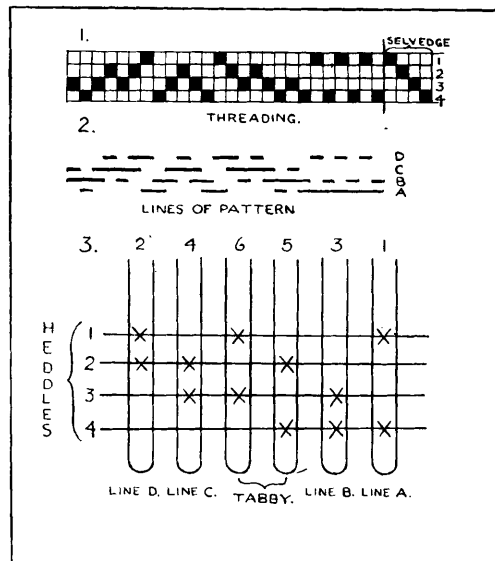


DIAGRAM 85.—HONEYSUCKLE. DRAFT OF PATTERN.

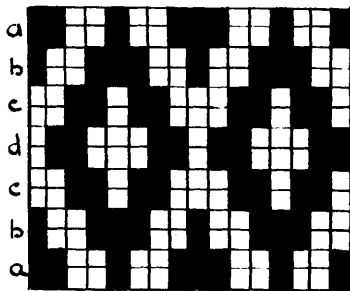


DIAGRAM 86.—COMBINATIONS OF ROSE PATH PATTERN.

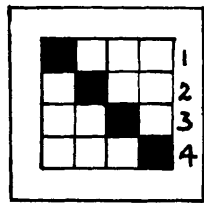
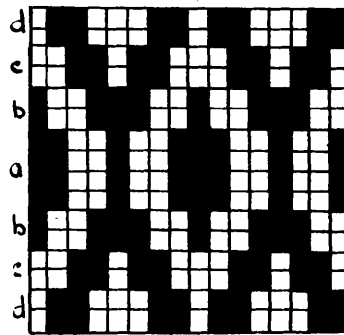


DIAGRAM 87.—TWILL DRAFT.

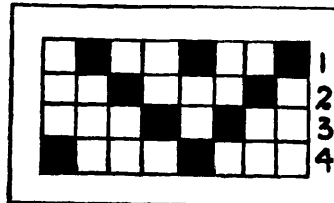


DIAGRAM 88.—BIRD-EYE DRAFT.

tained by combining the lines in various ways, and the following combinations are suggested:—

1. Two rows each of lines C, D, A, B, A, D, C.
2. Two rows each of lines C, B, A, B, C.
3. Two rows each of lines A, B, C; 6 rows of line D, and 2 rows each of lines C, B, A.
4. Two rows each of lines C, D, A, B, C, B, A, D, C.
5. Four rows A, 3 rows B, 2 rows each of C, D, B, C, A, C, B; 4 rows of A, 2 rows each of B, C, A, C, B, D, C, 3 rows of B and 4 rows of A.

Additional Drafts of Patterns.—So far the patterns have been those which have a tabby binder between each row, but there are many others in the twill and linen weaves which do not have the binders. The simplest of these are the left-hand and right-hand twills which were worked on the first samplers. It is now proposed to show how they are threaded up and worked on a four-shaft loom.

Left-hand and Right-hand Twills.—The entering is done as shown in Diagram 87. The pedals are numbered 1, 2, 3 and 4 from right to left and are tied to the heddles as follows:—

- Pedal 1 to heddle 4.
- " 2 " 3.
- " 3 " 2.
- " 4 " 1.

For the right-hand twill work the pedals in the order 1, 2, 3, 4.

For the left-hand twill work in the order

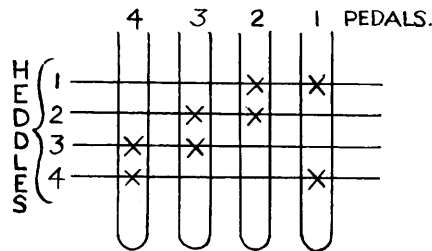
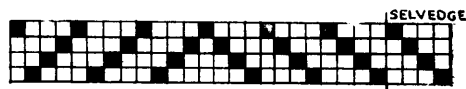


DIAGRAM 89.—GOOSE-EYE, DRAFT AND TIE-UP.

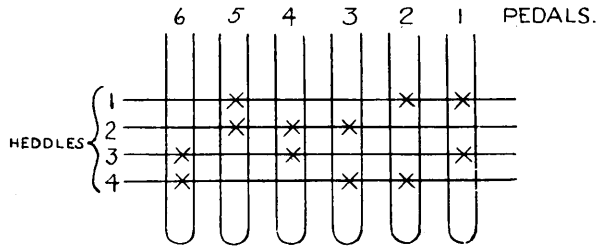


DIAGRAM 90.—BETSY ROSS, DRAFT AND TIE-UP.

4, 3, 2, 1. A combination of these will give the zig-zag twill by working the pedals in the order 1, 2, 3, 4, 3, 2. If a wider form of this pattern is required, work pedals 1, 2, 3, 4 as many times as required, and then go back to 3, 2, 1, followed by 4, 3, 2, 1. Plate 4 in the chapter on Twill and Bird-Eye Weaves gives examples of variation in this weave (page 16).

Bird-Eye Weave.—This is a combination of the above twills with an "eye" or spot in the centre. The entering is shown in Diagram 88, and the pattern is formed by working the pedals in the order 4, 3, 2, 1, 2, 3, 4.

Goose-Eye.—The threading of this is shown in Diagram 89, as well as the tie-up of pedals to heddles. A herring-bone or a diamond pattern can be produced from this. For the former the pedals are worked in the order 4, 3, 2, 1 repeated, while in the latter the order is 2, 3, 4, 1, 2, 3, 4, 1, 2, 3, 4, 3, 2, 1, 4, 3, 2, 1, 4, 3 repeated.

Betsy Ross.—This is one of the linen weaves requiring no binders between the lines of pattern. The pedals are numbered 1, 2, 3, 4 from right to left, and are tied as shown in Diagram 90. The reason for presenting this method of numbering the pedals and the above tie-up is to show the worker that there is more than one method employed, and that care must be taken in reading a draft to note the pedal numbering and the attachment of pedals to heddles.

A suggested method of using the pedals is as follows:—

- 1, 3, 1, 4, 2, 4, 2 and 3. Repeat four times.
- 1, 2, 3, 4. Repeat six times.
- 1, 3, 2, 4. Repeat six times.
- 1, 2, 3, 4. Repeat six times.



PLATE 40.—SCARF SHOWING HONEY-SUCKLE PATTERN.

PLATE 41.—RUNNER AND TOWEL WITH ROSE PATH PATTERN, CHAIR BACK AND TOWEL WITH MONKSBELT PATTERN.

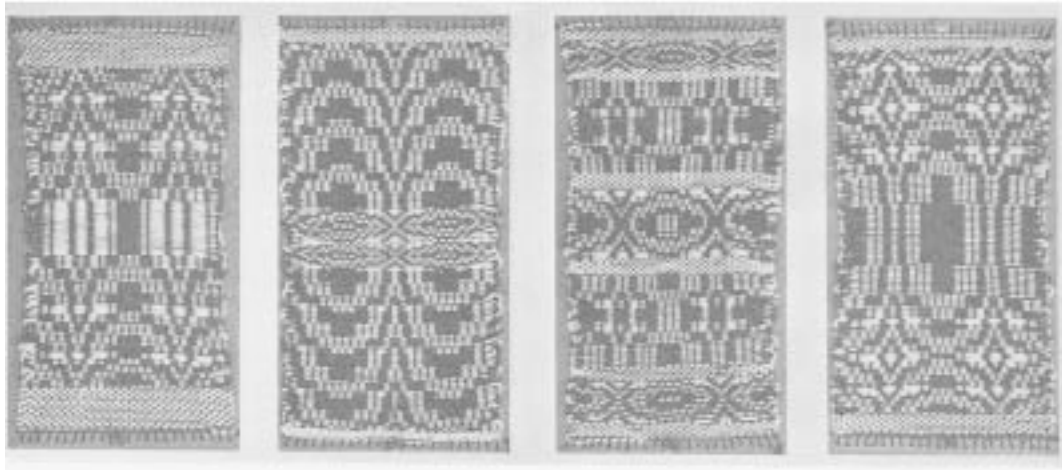


PLATE 42.—HONEY-SUCKLE PATTERNS.

CHAPTER TEN
IN CONCLUSION:

MATERIALS TO USE AND ARTICLES TO MAKE

AT the beginning of this book hints were given on materials, and it is fitting that the final pages should develop this a stage further by giving suggestions for the use of various materials as well as a description of what can be made with them.

Reed and Heddles

The Reed.—This has a twofold purpose: first to keep the warp threads evenly spaced and secondly to beat the weft rows together. The latter is perhaps the more important, as the beating is evenly distributed across the width of the warp, which in this way is not unduly strained. A certain amount of practice is needed in beating up in order to keep the weaving an even texture. The reed should be moved so that a sharp tap is given to each row of weft; pulling or pressing should be avoided.

For the table and pedal looms a twelve-dent reed will meet all requirements. When coarse or medium thread is used, one warp thread can be entered through each dent, and when a finer thread is used the

threading can be two in each dent. This means that in the first case there are 12 threads to an inch, while in the second case there are 24. This fact needs taking into account when the warp is being made.

Heddles.—These can be made on the board already described, or they can be bought ready made. If the previous method is adopted, care must be taken to keep all the loops exactly over one another. In both cases when they are mounted on the heddle sticks they must be kept from twisting.

Articles to Make

It is now proposed to take the articles which have been described and suggest the materials that can best be used to weave them.

CARDBOARD
LOOMS

For the specimens of various weaves, odd pieces of wool can be used, but care must be taken in the selection of colours.

Kettle Holders.—Three-ply cotton.

Plaid Mat.—Three-ply wool.

Needle Case.—Three-ply cotton crossed with wool.

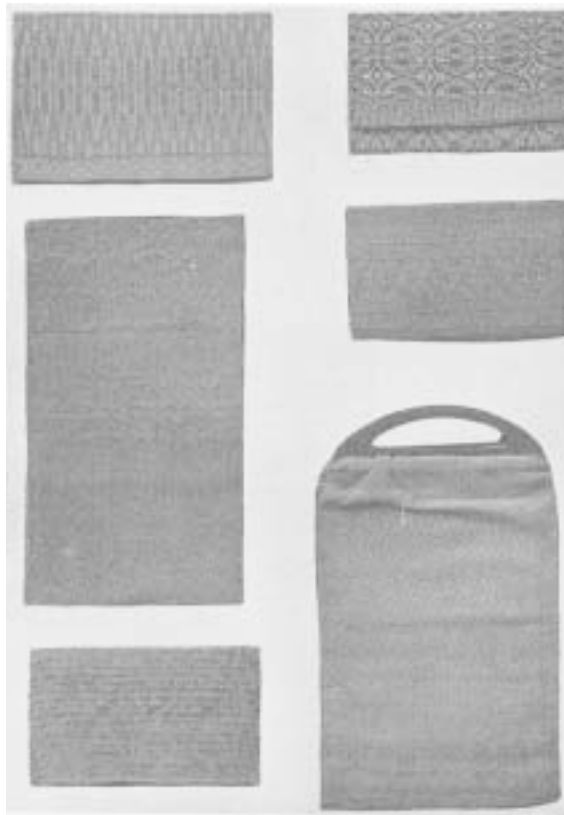


PLATE 43.—PATTERNS BASED ON ROSE PATH—HONEY-SUCKLE AND GOOSE-EYE.

Pochette.—Three-ply wool.

Cosies.—Three-ply wool crossed with two-ply wool and mercerised cotton for the pattern.

Bag with Gusset.—Jute yarn.

Work Bag.—Two-ply wool crossed with mercerised cotton.

Bonnet.—Two-ply warp and weft with pattern in mercerised cotton.

Beret.—Two-ply wool for warp and four-ply for the weft.

BOARD AND FRAME LOOMS

Book Cover.—Linen warp crossed with mercerised cotton.

Handkerchief Sachet.—Mercerised cotton warp crossed with linen.

Pochette.—Mercerised cotton warp and weft.

Braid Looms.—Mercerised cotton. Two-ply wool. Weaving cotton and linen.

TABLE LOOM

Although the small table loom is restricted to plain tabby weaving, it is possible to vary the texture of the web in the following ways :—

1. By using a coarse warp and a fine weft.
2. By mounting alternate coarse and fine warp threads and a fine weft.
3. By crossing a warp of one kind of thread with another kind.
4. By striping the warp and weaving the weft in one colour.
5. By striping the weft.
6. By striping both warp and weft.
7. By brocading ornament in a plain web.
8. By weaving patterned stripes with a needle.

Various articles can be made on these looms using any of the above means of decoration.

Scarves.—It is well not to make these too thick, and for this reason two-ply wool is

best for both warp and weft. A fine mercerised cotton can also be used. Scarves can be made in any of the following ways :—

A. A plain web with border stripes in plain colour or pattern about 3 ins. from the ends.

B. A patterned striped border with plain stripes in mercerised cotton.

C. Coloured stripes in the weft at equal distance the whole length of the scarf.

D. A striped warp crossed with weft of one colour only.

E. Stripes in both warp and weft.

F. A warp of one colour and the weft in another. In the choice of colours for this, care must be taken to get the same depth of tone in both warp and weft. It would not do to have a bright warp and dull weft, or *vice versa*.

Guest Towel.—Use white linen or weaving cotton for this and cross it with the same kind of thread, making bands of colour in mercerised cotton near the ends.

Pochettes.—These can be made in wool, or wool and mercerised cotton. A plain warp with bands of pattern across it at regular intervals gives a very pleasing effect. A plaid pochette also looks well.

Runners.—Made in white or cream weaving cotton and crossed in the same kind of thread with bands of mercerised cotton, these can be very useful articles, as they wash so well and retain their beauty to the end.

Quantities.—It is useful to have an idea of the length of thread contained in a given quantity in order that the amount required for a class of children can be quickly calculated.

There are about 160 yards in 1 oz. of four-ply wool.

Three-ply wool has about 175 yards to an ounce and two-ply about 240 yards.

The weaving cotton suggested in these articles has about 800 yards to a $\frac{1}{4}$ lb., while there are about 700 yards in the same quantity of linen.

Any further information concerning looms and materials referred to in this book will willingly be supplied by the author. Enquiries should be addressed to :

*Mrs. N. A. Reed, at her Weaving Studio,
143a High Street,
Bromley,
Kent.*

