Of course the order in which the colours will follow each other has nothing to do with this proportion. The rule gives us only the total number of picks in one repeat. For instance if we have a repeat with 47 picks we can take the sequence: 5,8,13,21 and arrange our colours as follows:

WWAAWAAWWWWWWWAAWAAWWDDDZZDDDDDDDDDZDDDDDDDDDZZDDD

Here we too D 22 times instead of 21, otherwise the right band would not be symmetrical. In the next example:

WDDWWDWWWAWAAAAAAWAWWWDWWDDWDDDZDZDDDZDDDZDZDDD.

we had to change the number of picks both in col. D and W for the pattern,s sake. We have now 5,8,14,20. We would probably do better to make it 5,8,14,22 which would be closer to the original ratio.

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We must repeat once more that this is only one way of figuring out the ratios or proportions. The fact that proportions of a project do not follow this particular rule does not condemn it, and cannot be used even as a base for criticism.

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RUGS

IN BOUND WEAVING -

What we mean here by "bound weaving" is such a method of weaving which does not require any binder, even with the traditional pattern weaves. The weave is then "bound" by itself and this explains the name. Although in theory any pattern weave can be woven in this way, there are practical considerations which make many "higher" weaves unsuitable for this purpose. We shall discuss here only the simple weaves such as Overshot, Crackle, and Summer-&-Winter on four frames.

In bound weaving we have no tabby. This is replaced by a shot of weft of the same weight as the pattern weft, but of a contrasting colour, and made on an opposite shed.

Since this is important we shall remind our readers that "the opposite shed" is one which reverses the positions of all harness-frames. A frame which has been sunk is raised now, and one which has been raised is sunk. Thus shed 1,2 is opposite to 3,4 etc. Thus there is no such thing as an opposite shed in inself. It must be always opposed to the last one. We shall see later that the opposite shed does not even need to follow the pattern shed

immediately, but it must come very close. Here is the list of all opposite sheds possible with a 4 frame loom (numbers are frames):

Pattern shed: 12 23 34 14 1 2 3 4 123 124 134 234

Opposite shed: 34 14 12 23 234 134 124 123 4 3 2 1

Thus we can take any traditional or modern pattern which in normal circumstances requires tabby after each shot of pattern, and replace the tabby with the proper opposite shed. For instance the original treadling with the tie-up as in fig.1 runs as follows (numbers are treadles): 6 2 6 1 6 2 5 1 5 2 5 1 4 2 4 1 4 2 3 1 3 2 etc. Then the treadling for bound weaving will be: 6 4 6 4 6 4 5 3 5 3 5 3 4 6 4 6 4 6 3 5 3 5 etc.

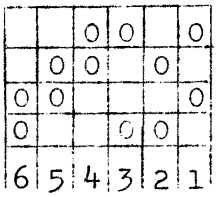

Fig.1

We cannot be sure that the pattern in the second treadling will be square. This depends on too many factors (sett of warp, weight of the weft, beating). But we can experiment for a while and find out how many more picks of weft are require to keep the pattern straight. As a rule the number of picks per inch here is much higher than in the traditional weave with a binder.

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When weaving rugs, and in our case they will be rugs of the flat tapestry type, we must go further than that. We must cover the warp completely with the weft. This is done first to get the desired thickness of the rug, and second - to conceal the neutral colour of the warp which has no place in the design of the rug.

This condition means a lot of things. The warp must be very open, i.e. with very few ends per inch. On the other hand it must be very strong or the whole fabric will be too weak. Then the weft must be bulky but soft. Finally the weaving itself becomes different. We shall come back to these problems at the end of our discussion.

There is however another more pressing problem partly practical partly theoretical. If we keep weaving one block of pattern as in the treadling given above: 6 4 6 4 6 4 etc., we may discover that to square it we must repeat this combination of two treadles for quite a while. What happens in the meantime is that the block gets distorted because the warp ends marked in fig.2 "abcd" and "efgh" are woven together all the time, and they finally gather into a bunch which acts as one warp end of heavier count. This

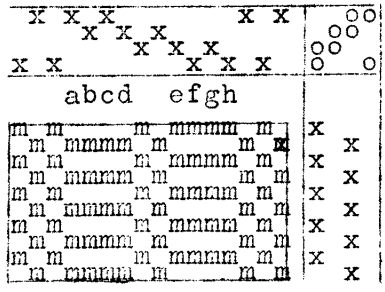

Fig.2

makes the float "a - d" shorter and shorter. In other words should we keep weaving in this way for any length of time, the blocks would get narrower and less distinct.

Therefore when using overshot patterns for bound weaving - small blocks are a rule. But even with short floats as in Summer-&-Winter we cannot prevent the distortion of the blocks unless we change something in the treadling. Of course the easiest solution would be an occasional tabby shot, but this would ruin the texture of our rug. An alternative is to use from time to time the two remaining pattern treadles with different colours. For instance instead of treadling: 6 4 6 4 6 4 6 4 6 4 in fig.2 we can try: 6 4 6 4 5 6 4 6 4 3.

A still better solution is to use all four treadles all the time. This will produce an absolutely uniform texture (provided that the threading draft has all floats of about the same length). Thus the treadling in fig.2 would be: 3 4 5 6 regardless of the pattern.

The pattern can be of the traditional type, and dark on a neutral background. Then block 1-4 will be woven as follows: treadle 3 - dark (d); treadles 4, 5, and 6 - neutral (n). Block 3-4: tr.3 - n, tr.4 - d, tr.5 -n, tr.6 - n. Block 2-3: 3 - n, 4 - n, 5 - d, 6 - n. Block 1-2: 3 - n, 4 - n, 5 - n, 6 - d.

Or the pattern may have less background, but then the blocks will overlap. We shall use in each repeat of 4 picks of weft two shots of dark weft and two of neutral one. For instance: 3 - d, 4 - d, 5 - n, 6 - n for one block; 3 - n, 4 - d, 5 - d, 6 - n for the second, etc.

Then we can use three or even four colours: a different one on each treadle. Particularly charming effects will give gradations in value of the same colour with the darkest colour following the original pattern. For instance: dark brown, light brown, beige, natural (or ivory).

These are the general principles of weaving bound rugs; we shall go now into details.

OVERSHOT.

Few of the colonial overshot patterns are suitable for bound weaving. This is because of the difference in the length of floats. When using traditional overshot we must select patterns with floats not longer than 4. There are some in the Cross and Diamond class, as well as among the miniature patterns.

On the other hand all Modern Overshot patterns (MW 18) are suitable because of the uniform texture. However we must also think about the wearing qualitities of our rugs, and from this point of view it is better to avoid floats longer than 5.

As an example of simple traditional pattern we shall take the draft on fig.3 A. It will produce diamonds about 4 inches wide. The borders can be made in plain twill, or in very small diamonds. Since tabby is not going to be used except perhaps to start and finish the woven piece, we do not mark tabby treadles

in the tie-up. For practical reasons the tie-up in Fig.3 B will be preferable, because we can alternate the feet. Treadling directions given below apply to this 2-nd tie-up.

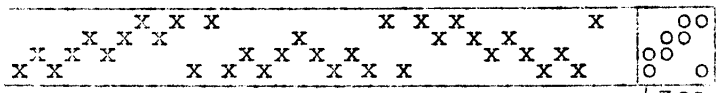

Fig.3 A

Fig.3 B

Here we have the following possibilities in treadling. Number means the treadle in the second tie-up, letter - the colour: d - dark, n - neutral.

1. The traditional pattern. First block: 1 - n, 3 - n, 2 - n, 4 - d. Second: 1 - n, 3 - n, 2 - d, 4 - n. Third: 1 - n, 3 - d, 2 - n, 4 - n. Fourth: 1 - d, 3 - n , 2 - n, 4 - n.

2. Overlapping blocks but still in two colours only. First: 1 - n, 3 - n, 2 - d, 4 - d. Second: 1 - n, 3 - d, 2 - d, 4 - n. Third: 1 - d, 3 - d, 2 - n, 4 - n. Fourth: 1 - d, 3 - n, 2 - n, 4 - d. We can also have spotted bands without any pattern by treadling: 1 - n, 3 - d, 2 - n, 4 - d; or 1 - d, 3 - n, 2 - d, 4 - n.

3. Three colours: a, d, w. Colour "d" is the dominant i.e. the darkest or the brightest in our case. The reamining colours can either follow the dominant one or produce a mottled background. In the first case the treadling will be: first block - 1 - a, 3 - w, 2 -d, 4 - d; second: 1 - w, 3 - d, 2 - d, 4 - a; third: 1 - d, 3 - d, 2 - a, 4 - w; fourth: 1 - d, 3 - a, 2 - w, 4 - d. In the second case use "d" as before, but change "w" and "a" at random, or alternate them every ¼" or so.

4. Four colours: a, d, w, z. Here we have so many possibilities that it would be difficult to describe all of them. But when the colours follow each other as in the example given before (d - dark brown, a - light brown, w - beige, z - ivory) the treadling will be: first block - 1 - z, 3 - w, 2 - a, 4 - d; second: 1 - w, 3 - a, 2 - d, 4 - z; third: 1 - a, 3 - d, 2 - z, 4 - w; fourth: 1 - d, 3 - z, 2 - w, 4 - a.

Crackle.

Since crackle has the sametie-up as overshot, and the main difference between the two weaves is the length of floats, all what we have said about overshot can be applied here. We can use with Crackle the same treadlings as with overshot.

However crackle is a more suitable weave for bound rugs than overshot, because it has a firmer and more uniform texture. Also the blocks of pattern can be of any size ezactly as in the Modern Overshot. Finally it can be woven with pattern blocks in one solid colour. This is done in the same way as in Summer-&-Winter, by using two treadles for each block. E.g. in plain crackle (fig.4) the treadling for bound weaving will be: 4 - d, 2 - n, 3 - n, 1 - n for one block. This will give vertical columns

of floats separated by narrow lines of a different colour. But if we substitute for this treadling another one: 4 - d, 2 - d, 3 - n, 1 - n - we shall have one block of pattern corresponding to the

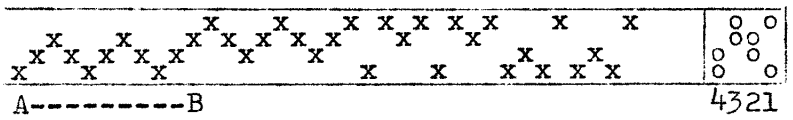

Fig.4

first unit of the draft (A to B) in one solid colour. The treadling for all four blocks will be as in fig.5 A and 5 B. The first column (A) gives the same amount of pattern and of background. The second (B) 3 times as much background as of pattern.

1-st bl. -	4d 2d 3n 1n
2-nd bl. -	4n 2d 3d 1n
3-rd bl. -	4n 2n 3d 1d
4-th bl. -	4d 2n 3n 1d

Fig.5 A

4d 2n 3n 1n	4n 2d 3n 1n
4n 2d 3n 1n	4n 2n 3d 1n
4n 2n 3d 1n	4n 2n 3n 1d
4d 2n 3n 1d	4n 2n 3n 1n

Fig.5 B

With more than two colours we simply follow treadling given for overshot.

Summer-&-Winter.

This would be a perfect weave for bound fabrics, and if not for one drawback, it could produce with a larger number of harness-frames effects very similar to simple tapestries. The drawback is the number of treadles required. Only traditional Summer-&-Winter can be made in bound weaving on 6 treadles (fig.6).

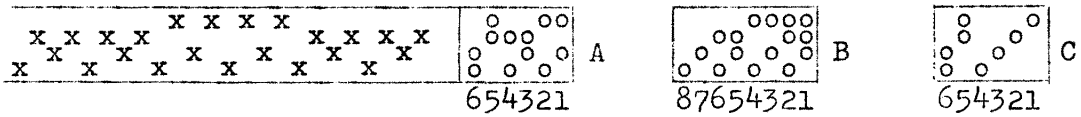

Fig.6

To take full advantage of a 4-frame draft we should have at least 8 treadles as in fig.6 B, better 10 treadles if tabby is needed. In other words we must have an 8-frame loom to weave 4-frame patterns. On the other hand if we can use both feet at the same time (which means much slower weaving) we can have a compound tie-up as in fig.6 C. But even a compound tie-up would not help with a large number of frames. This is because each shot of pattern must be followed by the shot on an opposite shed. Thus is the tie-up B - after tr.8 comes 1, after 7 - 2, after 6 - 3 etc.

Let us start with traditional patterns. The treadling for the first block will be (tie-up 6 A): 4 - d, 1 - n, 3 - d, 2 - n; and for the second block: 4 - n, 1 - d, 3 - n, 2 - d. Four colours are not advisable, but three can be used by having two

shades in the background (e.g.: d - dark, n - neutral, w - white). First block: 4 - d, 1 - n, 3 - d, 2 - w several times, then: 4 - d, 1 - w, 3 - d, 2 - n also several times. For the second block we have: 4 - n, 1 - d, 3 - w, 2 - d, and 4 - w, 1 - d, 3 - n, 2 - d. This gives a mottled ground.

Now let us supposed that we would like to weave a more "modern" pattern such as in fig.7 for instance. It has four different horizontal elements of the pattern (or combinations of blocks): A, B, C, D. And this is how they are treadled supposing that we have two colours only: d, and n. Tie-up in fig.6 C; 4+5 etc. means that we are pressing two treadles at a time.

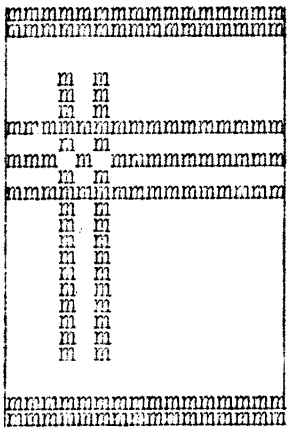

Fig.7

A - 4+5d, 3n, 3+5d, 4n.

B - 4d, 3+5n, 3d, 4+5n.

C -1+4d, 2+3n, 1+3d, 2+4n.

D - 2+4d, 1+3n, 2+3d, 1+4n.

We can also have a sort of borders without pattern. The vertical borders should then be threaded (reading from the left): 1 3 2 4 or 1 4 2 3. The horizontal borders are treadled: 2+4d 2+3n 1+4d 1+3n 2+4n 2+3d 1+4n 1+3d.

****

The practical side of bound weaving is not less involved than the theoretical one. First of all we must achieve a good balance between the sett of warp, its count, and the count of weft.

If we use wool for weft the best size for rather heavy rugs is about 2/2 (two ply of no.2 or 560 yds per lb). The sett of warp is then from 8 to 10 ends per inch. Either carpet warp (8/4 cotton) or 10/2 linen can be used. Single linen No.5 is not so good because it may stretch at the edges.

For finer work we may use 4/2 wool (about 1150 yds/lb) with the same warp as above set at 10 to 12 ends per inch.

The weaving is slow. The main difficulty is to keep the edges from drawing in. Since all the take-up is in the weft, the amount of weft to be left in each shed is much higher than with any other kind of weaving. We can either throw the weft in an arc

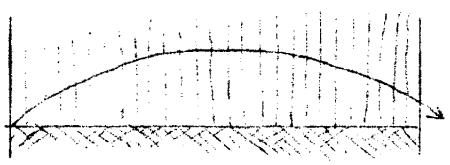

Fig.8

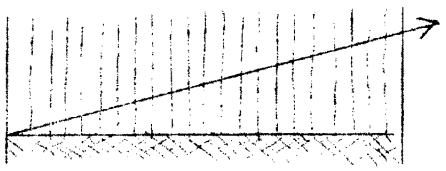

Fig.9

as in fig.8, or at an angle as in fig.9. The latter is perhaps easier. The exact amount of extra weft must be found by experiment.

If there is too little weft, the edges will pull in, and weaving will become impossible after a few inches. If there is too much of it, the edges will be uneven and soft.

The beating is done after changing the shed. Thus the rhythm is: throw the shuttle, adjust the angle of weft if necessary, change the shed, beat very hard several times. If the batten is not heavy enough it may be necessary to use a short comb or fork as in tapestry weaving. Even beating is extremely important - any variation will distort the pattern and the appearance of the fabric.

Finishing is the same as for tapestries. The warp is tied into small groups (4 ends) and the fringe left hanging. If so desired the ends can be pulled into the fabric and clipped off.

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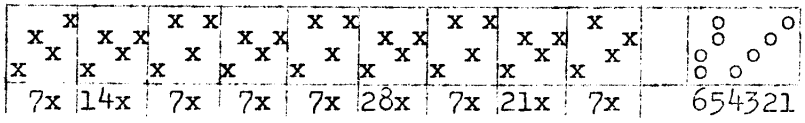
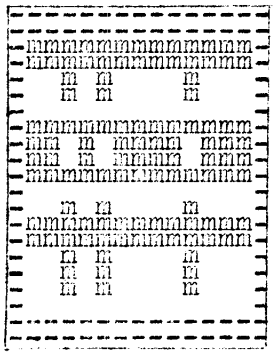
PRACTICAL PROJECT. A rug 60 x 40 in Summer-&-Winter. Wool on linen.

Before making the draft we must decide what kind of wool we shall use, because the sett of warp and the number of ends in warp depend on this factor. Let us suppose that we have 3/2 wool (2 ply No.3) and that we shall set it at 10 ends per inch. Then the to tal No.of ends in the warp is 420 (2" for take-up and shrinkage). Now we can work out the draft. E.g.:



The warp will be 10/2 linen (8/2 or even 12/2 can be substituted).



The colours: heather brown (d), old gold (n), and natural or ivory (w).

Treadling:

A - 2+4d 2+3n 1+4d 1+3w 2+4n 2+3d 1+4w 1+3d.

B - 4+5d 3n 3+5d 4w 4+5d 3w 3+5d 4n.

C - 4d 3+5n 3d 4+5w 4d 3+5w 3d 4+5n.

D - 1+4d 2+3n 1+3d 2+4w 1+4d 2+3w 1+3d 2+4n.

E - 2+4d 1+3n 2+3d 1+4w 2+4d 1+3w 2+3d 1+4n.

We shall weave: 6 inches of A, 6" of B, 6" of C, 3" of D, 3" of B, 6"of E, 3" of B, 3" of D, 3" of C, 6" of B, 9" of C, 3" of D, and 6" of A,

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