NYLON. This as many other synthetic fibers is made of phenol, which in practice means coal tar. Its main drawback is that it gets soft and sticky at a very low temperature, and therefore cannot be ironed. It darkens in the sunlight. Otherwise it is strong, elastic, easy to dry, resistant to friction, decay, etc. In handweaving behaves poorly: too strong when stretched along a straight line, too weak when bent (as in a knot). Unpleasant in touch, but this may be a personal factor.

VINYON. Made of a resin. Weaker than nylon. Less resistant to chemical solvents. Softens already in 165°F. It also shrinks much below boiling point of water by 12% (one inch in eight!).

SARAN. Similar to Vinyon. Still weaker, but a little more resistant to heat.

ORLON. Similar to nylon, but weaker. More resistant to sunlight. Can be spun to produce an imitation of wool.

TERYLENE. Made of petroleum, salt, and coal. As strong as Nylon. Resistant to sunlight, and more resistant to heat.

PERLON. Similar to Terylene, and nearly as strong. But it melts at 345°F.

POLYTHENE. About the lightest of all fibers, and also more resistant to heat than most of them, but much weaker than nylon.

GLASS. It could be a good fiber since it resists nearly anything: high temperature, abrasion, chemical action of any kind, age, etc. But it is brittle and not elastic.

We realise that this is a very sketchy description of synthetic fibers, but a complete survey would take more space than we can afford. Those, who are interested will find more information in books about industrial weaving, provided that they are of a very recent publication.

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VELVET RUGS.

When we say "velvet" we usually mean a fabric and not a weave. And we are not going to speak here about the traditional velvet fabric. Although it certainly can be hand woven, and for that matter it has been done so for centuries, it is an extremely laborious process. Even an expert who weaves nothing but velvet can produce not more than a yard a day.

But if we so to speak enlarge the fabric by using heavy wool instead of fine silk for the pile and proportionately heavier warp and binder, we shall have a fabric identical with velvet in all respects except that it will have a consistency of a light rug.

Since the weave remained the same, we call it still Velvet weave, but of course not velvet fabric. Another name for it is warp-pile weave.

On a four frame loom we can weave rugs either in one solid colour, or with stripes parallel to the warp, or finally with a two-block pattern.

However we need additional equipment besides the standard one. First of all we must have one or two additional warp beams. One beam for solid colour or stripes, and two for a two-block pattern. Then we must also have velvet rods, or flossa rods of different sizes. About 5 rods of each size. We shall describe later how to make both.

But let us start first with the principle of the weave. As the name indicates, the pile of the rug comes from the warp. The pile is rising from a ground which in our case will be tabby, and which requires also a warp and a weft or binder. Fig.1 shows all three in cross-section.

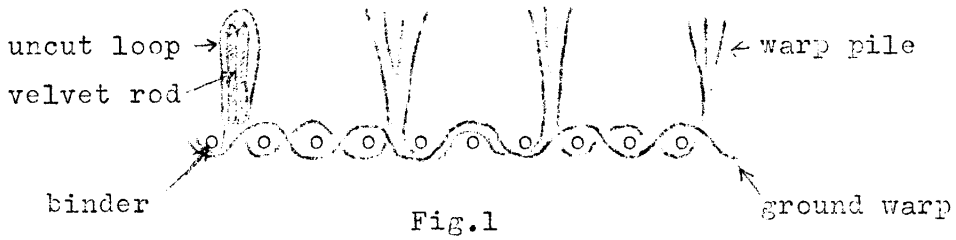

Fig.1

Fig.2 shows the process of making velvet. The ground is on the standard warp beam (A) and is threaded on frames 3 and 4. The pile warp is mounted on the additional warp beam (or beams) (B), and is threaded through frames 1 and 2. The ground is woven in the usual way. When we make a row of pile, the ground frames (3 and 4) are lowered, and the pile frames (1 and 2) are raised. In the shed thus formed we insert one of the velvet rods. Now: the ground warp is quite tight, while the pile warp is very loose. Therefore when we change the shed, the rod will remain entirely above the level of the ground warp, and the pile warp will go around the rod. We leave the rod there, and weave the ground for awhile (usually 3 to 5 shots), then repeat the operation, insert a second rod, weave the ground, insert a third rod, and so on until all rods are used up. Then we take a razor blade and cut the pile on the first rod,which has a groove in its upper edge. This releases the rod, and we use it in the next pile shed. We never cut more than one row of pile at a time, except at the end of the project.

Once started, we keep the following rythm of weaving: cut the pile on the lowest rod, open the pile shed, insert the rod, weave a few shots of the ground.

It is rather important to understand this process before going any further.

It should be obvious now that we can control both the length of the pile and its thickness. The length of pile is equal to the

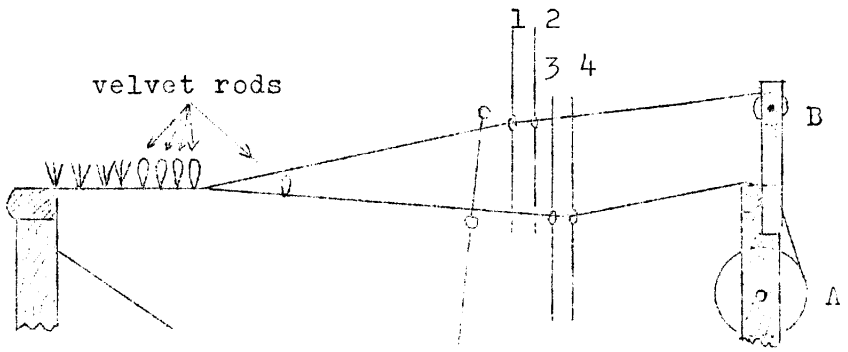

Fig.2

width of the velvet rods, therefore for each length of pile we must have a different set of rods. The thickness of the pile depends on how close we set the pile warp, and how much ground we weave between two sheds of pile. The less ground the thicker the pile , but also the weaker it is.

In general one cannot expect to get a very heavy rug by following this method, but the weaving is quite fast when compared with other pile techniques.

We can describe now the whole set-up a little closer.

Equipment. The additional warp beams are the greatest problem, but fortunately one which can be solved at home if one has a few simple tools. The pile warp has hardly any tension therefore there is no need to make elaborate brakes, releases etc. The contraption shown in fig.3 will be quite satisfactory. Two flat pieces of wood (A) about 1" x 2" x 12" are bolted to the sides of the loom frame. Each of them has two holes to support the beams. The latter (B) are simply broom sticks or dowels 1" in diameter, and of such length as to fit exactly between the two supports. A nail driven in the center of each end of the dowels and passing through one of the holes in the supports will act as a shaft on which the beam will turn. As a brake we can use a piece of string (C) tied to the loom frame and wound around the beam with a weight hanging at the other end of the string.

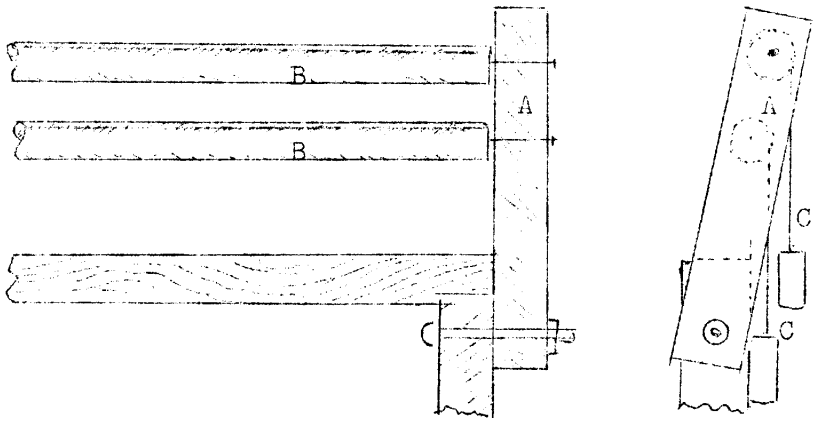

Fig.3

The warp can be tied directly to the beams. A few tacks may be driven in the beams to prevent slipping of the warp. This is the whole thing.

Fig.4

The velvet rods are hard to find and rather expensive. We can make them from the steel tape used for crating. This tape can be had in several widths. To make a rod we take two lengths of tape (equal to the width of the loom) and have them spot welded along one edge as in fig.4. This welded edge will later on point always downwards. When cutting the pile we insert the razor's blade between the two tapes.

As our first project we shall make a rug in one colour. The pile will be made in wool No.3/2 or 4/2 (roughly between 850 and 1150 yards per pound). For the ground we shall use cotton No.10/2, and for the binder linen No.12 to No.16 (or 25/2). The exact count of yarn does not matter in our case. Let us make the pile ½ " long, which means velvet rods made of ½ " tape.

If we space the rows of pile about 1/6 of an inch apart, we shall need 6 inches of pile for one inch of ground. This means that our pile warp will have to be 6 times longer than the ground warp. Thus if the rug is supposed to be 5 feet long, we must have 30 feet or 10 yards of pile warp, and about 3 yards (counting wastage etc.) of the ground warp.

In the ground we shall have 12 warp ends per inch, and in the pile 8 ends per inch. If our rug is 30" wide, this means 360 ends for the ground warp, and 240 for the pile warp.

We make first the ground warp as usual, beam it, thread and slay. To be able to do this we must have the draft which is as follows: (fig.5)

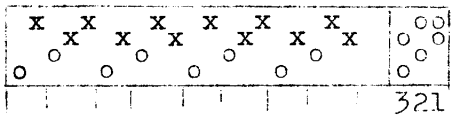

Fig.5

The draft shows two repeats or one inch in our case. The strokes under threading indicate the slaying (passing through the reed). The reed will be therefore No.8.

When threading the ground warp we must leave empty heddles on frames 1 and 2 as indicated by the draft.

Now we make the pile warp with 240 ends, beam it on the lower of the two additional warp beams, and thread in the empty heddles on frames 1 and 2.

We tie both warps together to the apron, and start weaving the ground on treadles 3 and 2. We keep this on until the warp is spread. If we notice that the pile warp makes loops, it means that it has too little tension. Make one more turn of the string on the pile warp beam or increase the weight at the end of the string. We can resort here to an empty soft drink bottle as a weight. It can be

filled with water until the desired tension is obtained.

Now we open the pile shed, insert the velvet rod, change the shed and see what happens. If the rod is only partly above the sur - face of the fabric - the tension of the ground warp is too low, or the tension of the pile warp too high or both. Adjust both tensions until satisfied. And this is all. From now on follow the rythm of weaving described previously.

The treadling will be: 23231, or 23213231, or 232321323231, or even: 2323231. Try all of them and find the best.

When the finished piece is taken off the loom, it seldom looks satisfactory. In most cases it shows too much ground. The fi - nishing consists first on combing the pile with a brush in all direc- tions, then beating it vigourously with a long and flat piece of wood Try an odd lease rod, a yard stick or something similar.

In the next article on this subject we shall take up patterns in velvet weave.

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PROBLEMS IN TWILLS — Part 1

HIGH TWILLS.

What do we mean by "high"? Let us say, anything woven on more than four frames. Therefore this article is written for "multiharness" weavers. We expect that each weaver of this class is familiar with plain biased twills of any kind. If not he can get all the informa- tion wanted from text books (Reed, Oelsner, Watson).

The following is the most important part of the theory of twills: 1-st, that you can divide one repeat of twill into as many floats as desired, provided that we do not get plain tabby as the re- sult; 2-nd, that there must be the same number of floats on each side of the fabric (e.g. a twill: 2:3:2:1:4 is impossible); 3-rd that the twill is woven on a number of frames equal to the sum of the numbers designating it (e.g. twill 1:1:4:4 is woven on 10 frames because 1+1+ 4+4=10).

For instance a 6 frame twill can be either: 1:5 (over one, under 5), 2:4, 3:3, 1:1:1:3, or 1:1:2:2 (fig.1 A, B, C, D, and E).

It may appear that we forgot something. For instance 1:2:1:2 twill. Yes, but this twill is identical with 1:2 twill, which can be woven on 3 frames. Then we have a different twill in fig.1 F. Yes, but this is only the reverse of 1:1:1:3 twill in fig.1 D.

Thus any original twill must not be a repetition of a 3 or 4 frame twills, for instance: 1:2:1:2, 1:3:1:3, 2:2:2:2, etc. On the other hand it should not be the reverse or a variation of a twill already listed. Thus 1:1:1:3 is the same as 1:1:3:1, and 1:3:1:1, and 3:1:1:1; and 1:1:2:2 is the same as 2:1:1:2 etc.