

Leaves from a Weaver's Notebook

By FLORENCE B. FOWLE

On the shelves of my studio stands a row of notebooks, containing detailed records of twenty years of weaving experiences. Into the notebook, constantly at my elbow when working, goes full information, a description of the warp — material used, weight, ends per inch, length. Each piece is noted as woven—length, use (doily, towel, etc.), both colors and widths of borders and other information, which will save the necessity of unrolling the woven cloth, as this is likely to injure tension and the allignment of rolled edges on the cloth beam.

It is to these notebooks I turn when beginning a new problem, or repeating a design made so long ago that amounts of material used and details of technique have escaped my memory. It is from these notebooks that I am quoting such pages as may be useful to other weavers, in the hope that it may save experimentation, which while always interesting, is often expensive both in time and material.

The beginner in weaving finds herself faced by two major difficulties, even selvages and uniform surfaces. The same factors are concerned in both. Perhaps the best way to understand these factors is to analyze the order of motions on a power loom, where these motions are produced mechanically and without possibility of variation.

The first motion, logically, is the passage of the shuttle thru the open shed. When we have completed the cycle of motions, we will see that the shed is open when it is time to throw the shuttle, so we will assume an open shed and begin.

First: Throwing of the shuttle.

Second: Closing of the shed.

Third: Beating down of the weft by the bringing forward of the beater.

Fourth: Changing of the shed.

Fifth: Return of the beater back to position.

This completes the cycle which then begins again.

It is quite worth while for a beginner to repeat these motions slowly and consciously until their order becomes habitual. Any deviation from this order, which, tho impossible to a machine is only too possible to a hand weaver, will produce at once a variation in selvage and surface. It is the fact that absolute evenness is impossible to the human machine that gives hand weaving the slight variations in texture that give it its charm. The variations however, must be imperceptible as such. It is the differences in light reflection that they produce which gives a more interesting surface than that of monotonously uniform machine weaving.

Having determined the order of motions we will go back and discuss each in turn.

First motion: The throw of the shuttle:

On a power loom the woven fabric moves forward mechanically with each stroke of the beater an amount equal to the pick of yarn beaten in, so that the angle of the weft, from the selvage of the cloth to the shuttle box on the opposite side is constant. It is this angle of the yarn with the selvage which determines the amount of weft laid in the shed. If the angle is too flat, the amount of weft laid in is little more than the width of the cloth. As the weft does not lie flat, but bends under or over each thread of the warp, enough thread is required to allow

for this bending and to beat to the required closeness, at the same time making a close contact with the outside warp end to produce a smooth selvage. The tension on the shuttle, whether power driven or hand thrown, controls the closeness of this contact. The angle also affects the selvage. For if not enough weft is laid in the shed to allow for the bending, there will be a drawing in at the selvage as the beater pushes down, and a consequent narrowing of the cloth. If the warp is pulled in more than one or two dents of the reed, breakage of the warp ends is likely to occur.

The diameter of the weft thread has to be considered in determining the angle at which it is laid in the shed, a very fine thread, bending more readily over and under the warp threads, requires greater length, hence a greater angle. The necessary angle for each article must be determined by experimentation, but it might be helpful to see what my notebook says about selvage technique in weaving a fine linen towel sixteen inches wide: When the beater is forward, note that the fabric is not more than one or two dents narrower than the threading in the reed. As the thread is laid in the shed for the next pick, the open end of the angle should measure three fingers, or about two inches.

For open weaving, as scarves, a lower angle is desirable, to keep the picks further apart. For close weaving, as towels, rugs or bag material, a slightly wider angle will leave more weft to be distributed. Beyond a certain point, to be determined by experiment, too much weft is disastrous, causing the excess weft to protrude in loops on the surface of the cloth. It is the watching of such details, and establishing a nice balance between tension on the weft and angle in the shed, which gives hand weaving its continued interest.

We now come to the second motion, — the closing of the shed.

A weaver closes the shed before the beater begins to move forward so that the closing of the shed may hold the weft laid in the shed at the desired angle and tension, as securely as if closed into the pages of a book. You may prove to yourself that all the weft laid in is distributed across the width of the loom by observing what happens to the warp as the beater descends. The first contact is the point where the weft emerges from the shed. If you keep your eye on this point you will observe that it moves down to the cloth line as the beater descends, distributing evenly all the weft laid in.

The third motion is beating down the weft.

This motion is more concerned with the surface of the cloth than with the selvage. The pressure of the beater on a power loom is not a factor in closeness of weaving. That is taken care of by the "pick wheel", which is geared to move the cloth forward an amount equal to the size of the weft yarn. The beater does not hit the cloth, but strikes against fixed stops. On a hand loom the amount of pressure exerted by the weaver is the determining factor. Strange to relate, as the weaver tires she tends to beat harder, not more lightly. The only way to obtain even results is to count the picks. There is a small inexpensive device known as a pick glass, having a magnifying glass over a half-inch opening which is in-

tended for this purpose. On course work one may count with a ruler. Tape measures are unreliable for such small measurements.

In determining the closeness of the weave, shrinkage must be taken into account. Cloth must not be woven as closely as it is to appear when off the loom and finished. My notebooks always state the picks per inch for each piece of work. On a linen warp of forties twos, set thirty ends to the inch, I find fourteen picks to the glass, or half inch, noted on most pieces of work.

To teach muscles uniformity of pressure is not an easy matter. I find it wise to weave half the number of picks desired to a half inch and count these with those of the preceding quarter inch, until eye and hand are accustomed to appearance and technique. It is much easier to maintain an even pressure than to repeat a bang. Do not allow yourself a double bang, for that is even harder to maintain. If close weaving is desired hold the beater firmly against the cloth until *after* the new treadle has been pressed down. The crossed warp ends will then lock the last weft strand into position, preventing any recoil.

The fourth motion, — the changing of the shed.

The change to the next treadle to be used is always made while the beater is forward. If close weaving is desired it should be held firmly against the cloth, as just mentioned. If loose weaving is being done, let the beater be moved slightly away from the cloth, in order not to push the last pick down any farther than you have just spaced it.

Another reason for not starting the beater back until the new treadle is down is that warp ends, especially of linen or wool, sometimes cling together in passing each other while the shed is changing. If there is the little extra time of the return of the beater before the shuttle is thrown, plus the cutting motion of the reed as it moves back, the warp will separate and imperfections are not so likely to occur.

The last motion, — the return of the beater ready for the cycle to begin again, has already been covered. Remember that once the foot has depressed the new treadle, it does not come off until after the shuttle has been thrown again.

In ordering material for a new project a beginner is often at a loss to calculate the amounts required. The following page from a notebook may prove helpful.

Problem:—a linen luncheon set of eight doilies, eight napkins and a runner.

Size:—doilies, 15 in. by 12 in.
 napkins, 15 in. by 15 in.
 runner, 15 in. by 32 in.

All to have half inch hems on the ends.

For length of warp allow as follows:

Doilies, washed (shrunken) and hemmed, length, each	12 in.
Doilies, washed before hemming, length, each....	14 in.
Doilies, on loom, allowing 10% for shrinkage, each	15½ in.
Napkins, finished and hemmed, each.....	15 in.
Napkins, finished, before hemming, each.....	17 in.
Napkins, on loom, allowing 10% for shrinkage, each	19 in.
Runner, finished and hemmed.....	32 in.
Runner, finished, before hemming.....	34 in.
Runner, on loom, allowing 10% for shrinkage....	37½ in.
8 doilies, 8 x 15½ in.	124 in.
8 napkins, 8 x 19 in.	152 in.

1 runner 37½ in.

317 in.
 or 8.8 yds.

Allowing for the amount of unweavable warp which must remain in the loom, from in front of the beater to the warp beam, and the waste resulting from retying if it is necessary to cut off before the entire warp is woven, a ten yard warp is desirable. Eight ready-warped spools of sixty ends each would make the set.

If the warp is to be made at home, calculations are:
 Warp., 40/2, linen warp, yards to the pound... 6,000

A 10 yard warp of 480 ends will require yards... 4,800

This warp may be obtained in two ounce tubes, each of 750 yards. Thus 6 plus or 7 tubes will be needed. As such warp is less expensive by the pound, it would be advisable to get a pound of warp. Better a little too much than not enough.

Roughly the same amount of linen yarn by weight will be required for weaving. If small amounts of linen are left on hand they are never wasted in a weaving workshop.

The number of yards in a pound, compared with the diameter of the forties twos, set at thirty to the inch, will be found a guide to the sleying of other yarns. Linen weaver, which has twice the diameter, has half the yardage. For a firm fabric, such as a heavy table runner, it can be set fifteen or sixteen ends to the inch.

I have a small four-harness table loom, eight inches wide, on which all new projects are tried out for texture, shrinkage and color combinations. The following record of measurements is taken:

Length as woven on the loom.

Length off the loom, showing shrinkage from tension.

Length after washing and ironing.

Length after hemming.

From this the percentage of shrinkage can be calculated accurately and correct final measurements obtained. Lacking the experimental loom, if absolute accuracy is required, weave an experimental piece to obtain the necessary information. When the correct measurements are obtained, one may safely go ahead.

If uniformity of size is required, as for doilies or napkins, a special measure is the best insurance. The preparation and use of such a measure is described in a recent article by the writer in the _____ issue of *The Weaver*. The article is entitled

(Note to the editor. Kindly fill in the omissions, as I have not seen the article in print.)

For convenient reference a table is added giving information about the yarns most used in hand weaving. The table gives yardage per pound and ends per inch in the threading as a basis of calculations. When warp and filler are approximately the same size, as *Fabri and Weaving Special*, about the same yardage of each will be needed. If calculation of filler only is the problem, estimate as follows:

Width of fabric on the loom, say—16 inches.

To this add 10% to allow for the extra length laid in the shed, which will make the length of each pick 18 inches, or half a yard.

If the warp is entered thirty ends to the inch and the weft is the same size, thirty picks will be woven to the inch. Thus thirty picks to the inch, each half a yard long, would require fifteen yards of filler to each inch of cloth, and thirty-nine times fifteen yards for the thirty-nine inches on the loom necessary to insure a yard of shrunken

linen. If the filler is twice as large as the warp, (as when linen weaver is used instead of linen special), only half as many picks will be required. The weight, however

will be about the same, as the decreased number of picks about corresponds to the decreased number of yards to the pound.

—*Florence B. Fowle*

Reference table for yarns used in Hand Weaving.

<i>Name of yarn</i>	<i>Suggested use</i>	<i>Suggested warp</i>	<i>Ends per in. as warp.</i>	<i>Yards per lb.</i>
Afghan	Sheer scarves or dress material.	Suitable for both warp and filler.	24 to 30, according to closeness desired	7000
Fabri	Used chiefly as warp. For bags, scarves, dress material.	It is primarily a warp.	20 to 24	4800
Weaving special	A soft filler to use with Fabri as warp for bag and dress material.	Combines well with Fabri wool, fine linen or silk warps.		4000
Miro silk and soft wool	Baby things, bags, dress material.	Fabri.		3000
Laurel lustrous wool	Bags, runners, scarves, & Dress material suiting.	Fabri.		2200
Homespun		May be used as warp with care, or thru Fabri.		2200
Glorine lustrous wool	Used as filler for heavier scarves, bags, & Coating,	Fabri. May be used as		1200
Shetland	baby blankets and couch throws.	both warp and filler.	14 or 15	2000
Germantown	Baby blankets.	Shetland.		1200
Knitting worsted	Bags, Coating.	May be used as warp also.	10 or 12	288
Peasant wool	Bags, runners but for filler only.	Knitting worsted.		1100
Rug wool	Rugs or heavy bags.	Knitting worsted for all wool rugs Rug warp of cotton set at 15 to in.		945
Smyrna rug worsted a soft, very lustrous yarn	Rugs and heavy bags.	Used with warp as above.		275