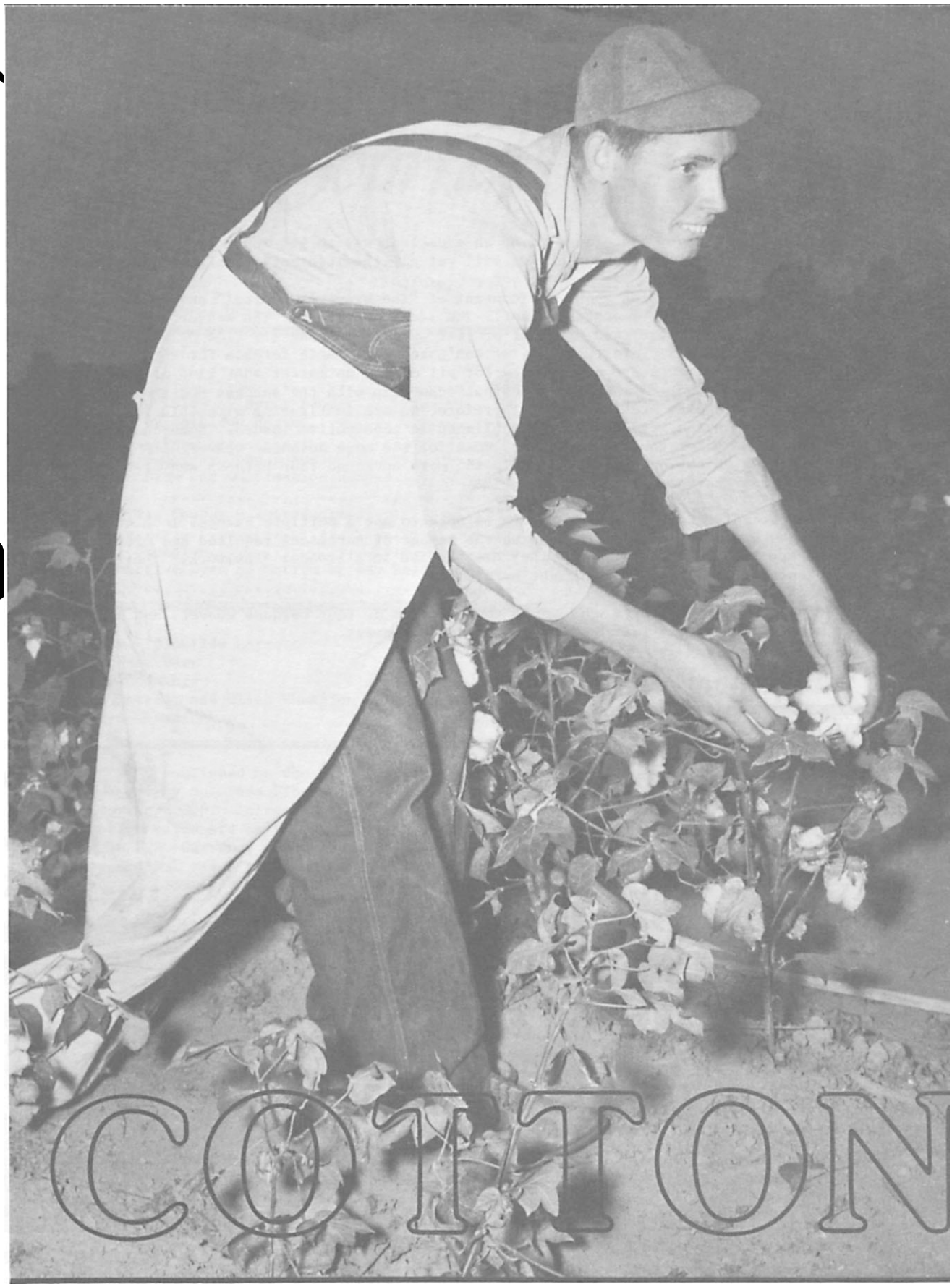
The Weaver's Journal



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VOLUME IV NUMBER 2 ISSUE 14

Letter From the Editor

Conducting a survey has proved to be an excellent way to get input from our readers. We want to thank everyone who responded and we will put all the information to good use.

We do a lot of thinking about the content of "The Weaver's Journal" and we are always wondering if the needs of our readers are met. The ideal article in "The Weaver's Journal" would be "How to make a successful and original project without wasting (?) time on samples and wasting (?) yarn on experiments." Unfortunately, we don't know the magic formula for this. It seems that samples and experiments are a necessity for all of us, no matter what kind of a weaver we are. However, we hope that "The Weaver's Journal" can help with the success and the originality of projects through teaching and guidance. Therefore, we are instigating with this issue a series of weaving courses of which the lessons will be published in consecutive issues. Some courses will be long, some short, some for the very beginner, some for the more advanced weaver. In this issue we start with a course which, hopefully will help the more advanced four harness weaver and those who have more than four harnesses.

"Understanding Weaves" is the key to be able to use a multiple harness loom creatively. Understanding a weave has nothing to do with the number of harnesses required and often four harness weaves are better understood when they are studied in a broader framework. Therefore, most of our examples will be explained for eight harnesses.

We hope that this course will widen the horizons of four harness weavers and help the eight (or more) weavers take full advantage of their equipment.

List of Advertisers

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Cover Photo: Courtesy of the National Cotton Council of America.

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Plate 1 - Picking Cotton Bolls

Cotton

Reprint: Courtesy of the International Institute for Cotton. Photography: Courtesy of the National Cotton Council of America.

1. The cotton plant

Cotton is grown mainly as an annual plant, though in a few places (such as India or Northern Brazil) it is sometimes allowed to grow for several years to reach tree-like proportions. It belongs to the Malvacea or Mallow family and two species --Gossypium hirsutum and Gossypium barbadense--account for 95% of all cotton grown commercially.

The cotton plant grows to a height of between 25 cms and 2 metres. The seed pods, or bools, develop from the fertilised flowers of the plant and the seeds are covered with soft downy hairs. The bolls continue to grow for about two months until they ripen and burst open to reveal the fluffy mass of fibres which, after separation from the seed, is known as cotton lint. Each boll contains about 30 seeds and each seed produces from 2,000 to 7,000 fibres.

2. Cultivation and harvesting

Normally it is accepted that between 175 and 225 frost-free days are needed for successful cultivation because cotton is sensitive to cold weather conditions. However, new intensive methods of cultivation in the US and elsewhere can shorten the growing season to as few as 135 days, improving yield per acre, cutting the cost of irrigation, weed and insect control, and reducing the danger of frost damage. At the same time agronomists are developing varieties of cotton to suit intensive cultivation techniques whereby the cotton bolls can all reach a state of maturity together, to permit once-for-all harvesting.

For many years intensive efforts have been made to obtain the largest possible yield of best quality cotton in those areas which are suitable for cotton cultivation. As a result, between 1935 and 1965, yields almost doubled on the same acreage by the use of specialised techniques for applying fertilisers, herbicides and insecticides.

As with all agricultural products, cotton growing methods vary from country to country. In the enormous plantations of the southern states of the USA machinery is used extensively for soil preparation, seed sowing and harvesting. Specially adapted aircraft are used for spreading pesticides and fertilisers. By contrast, in many plantations located in developing countries, part or all of the work is done by teams of oxen or buffalo, or even by the cotton worker himself.

From the quality point of view, hand picking has certain advantages over machine harvesting because the cotton pickers only gather bolls when they are fully ripe. Immature bolls may be left for a few more days until they become mature. Mechanical harvesters strip bolls and foliage together and little distinction can be made between mature and immature fibres. Fibre damage can occur, while dried leaves, pieces of stalk and husk are mixed in with the cotton itself. On the other hand the economics of harvesting weigh heavily: under ideal conditions a man can pick about 50 to 110 kg of seed cotton a day but a two-row mechanical picker can harvest up to 110 kg of seed cotton per hour.

Harvesting is spread over a period of some 30 days to allow the cotton fibres to mature and dry out. The cotton is then subjected to the 'ginning' process which separates the fibres from the seed. From 100 kg of fibres, 62 kg of seed and 3 kg of waste material. The raw cotton is then compressed into large bales usually of 230 kg which are wrapped and secured by metal bands.

3. Quality characteristics

Raw cotton varies considerably in quality and in the average length of the individual fibres. It is bought principally on the basis of fibre length (staple). Important quality considerations include uniformity, fineness, colour, purity, handle, strength and elasticity. Principal faults are excessive impurities and a high percentage content of short, immature, deformed or 'dead' fibres.

Its character depends on the type of cotton and the environment in which it is grown. The finest long staple cotton, known as Sea Island, comes from West Indies. Long and extra-long staple cottons are grown mainly in Egypt and the Sudan, and some also in Peru. The USA provides strong, medium staple varieties while the Indian cotton is mainly of short staple. In nearly all the cotton producing countries research and development is being carried out to improve both quality and yield of cotton crops.

Cotton fibres vary in length from about 15 to 42 mm. They fall into four main length categories as follows:

Short:	
below 26 mm	(Up to 1")
Meduim:	
26-29mm	(1" to 1 1/8")
Long:	
30 to 38 mm	(1 1/8" to 1 1/2")
Extra Long:	
39 mm and above	(1 1/2" and above)

Short and medium staples account for about 90% of world production; long staples for 7-8% and extra-long for 2-3%.

The maximum thickness of the individual cotton fibre varies between 12 and 45 microns (thousandths of a millimetre).

Plate 2

Cotton is the most versatile of fibres. It is clean, fresh and comfortable in wear. It readily absorbs moisture and dispels it with equal facility, allowing the skin to breathe. Cotton is also extremely hydrophilic. It is capable of absorbin 65% of its own weight in water without dripping. Cotton containing up to 20% moisture is still dry to the touch!

This absorption property makes cotton ideal for underwear, sportswear, nightwear, bedlinen and towelling. Cotton fabrics are pleasant to wear in all climatic conditions and are unrivalled in regions where the weather is hot and humid. Cotton is not affected by static electricity in the atmosphere and therefore stays clean much longer than other materials.

One of the greatest charms of a cotton fabric is its freshness. It is the easiest of all fabrics to wash. It is even stronger when wet than when dry and can be boiled repeatedly without harming the fibre. Since it also resists heat, it can be laundered beautifully again and again, emerging crisp and fresh each time.

Thanks to its excellent natural properties, cotton has become the most widely used fibre for the manufacture of textile fabrics. It can be utilised in a wide variety of materials, ranging from towelling and denim, cheesecloth and voile to heavy industrial fabrics.

Cotton is easily dyed and printed. For this reason cotton fabrics can be dyed in all colours and printed in bright multi-coloured designs. Its natural affinity for chemicals means that additional consumer benefits can be imparted by treating fabrics to make them wear-resistant, crease-resistant, stain-resistant, flame-retardant or water-repellent.

4. History

Man has worn clothes made from cotton fabrics since very early times. This has been proved by the discovery of the remains of seeds and clothes found in a cave near Tehaucan in Mexico which dates back to 5,800 B.C. Evidence of its use dates back to 3,000 B.C. at Mohenjo-daro in Pakistan. The Chinese historical work 'Schuking' records that cotton was also being grown in China in 3,000 B.C.

As a result of the armed conflicts and invasions which occurred around 1,000 A.D., the Saracens and the Arabs first brought cotton to Sicily and Southern Spain; then to Europe.

For quite a long period in history, cotton played only an insignificant role in Europe compared with fabrics of linen, wool and silk. In the 17th century

wide-scale cultivation of local wild cotton began in North America and in 1753 Carolina cotton appeared for the first time on the London Exchange. Cotton continued to occupy a modest place in world trade because harvesting and processing the fibre involved considerable manual effort at this time. In the New World plantations, slaves brought over from West Africa did most of the work.

The Industrial Revolution triggered off the triumphal emergence of cotton as the world's major fibre. In 1764, James Hargreaves built the first spinning machine and in 1779 Samuel Crompton produced the mule-frame. Edmund Cartwright invented the first power loom in 1785. Cotton production increased rapidly and was encouraged by the development of ginning machines which greatly speeded up the process of separating the fibre from the seed.

A Cotton Exchange for buying and selling raw cotton was established in 1871 at New Orleans in the USA. Almost simultaneously exchanges were opening in the main shipping ports such as New York, Liverpool and Bremen. Many other commercial centres followed suit and by 1900 cotton dominated the world textile market with an overall fibre share of 80%.

5. The importance of cotton

Cotton is grown by some 75 nations, mainly in tropical and subtropical zones, where climatic conditions are favourable.

In 1974/75 there was a total area of over 33 million hectares planted to cotton, producing over 63 million bales (13,8 million tonnes) of raw cotton.

Most of the cotton producing countries are classified as 'developing' by the United Nations. Nineteen of the twenty-nine *least* developed countries produce cotton. It has been calculated that more than 125 million people in developing countries (farmers and their families) derive their main source of income directly from raw cotton production. A further 45 million in these territories are dependent on the manufacture of cotton textiles. To these very large figures must be added the millions more engaged in ancillary activities and those employed by the cotton industries of the developed countries.

Apart from cotton's importance as a major provider of employment, for many developing countries it is also the cornerstone of their overseas trade and a substantial earner of foreign exchange. Exports of cotton and cottonseed products rank first or second in importance in some sixteen countries. Exports of raw cotton and cotton textiles combined represented a value of $6,100 million to the developing nations in 1974 and were second only to oil as a source of foreign exchange.

In a world where hunger and malnutrition are major problems, cotton is becoming increasingly important as a food crop. Annual world production of cottonseed is about 26 million metric tons. The seed is rich in protein, providing edible oils, meal, cattle cake, and fertilisers. Modern methods of refining cottonseed meal are producing high protein concentrates for use as additives to improve the nutritional value of food products.

Man's Shirt in Peruvian Inlay

by Harry Linder

Photography by Duane Binnie

Some years ago I came across Shuttle Craft Guild Monograph Twenty-Six, "Peru: Textiles Unlimited, Part II," by Harriet Tidball. One Peruvian weave which intrigued me was an overlay using supplementary warp and weft outlines. This weave was illustrated with a photograph of a Peruvian example which is now in the collection of the Detroit Institute of Art. The original piece has long floats on the reverse, but Mrs. Anne Blinks of California has done an interpretation of the weave using finely handspun black and white wool. I thought, "How nice it would be to reproduce this weave in natural brown and white handspun cotton as was the original piece." As pointed out in the Monograph the long floats on the reverse can be avoided by the use of six harnesses; four for the foundation and two for the supplementary warps. This allows for pattern on both sides of the fabric.

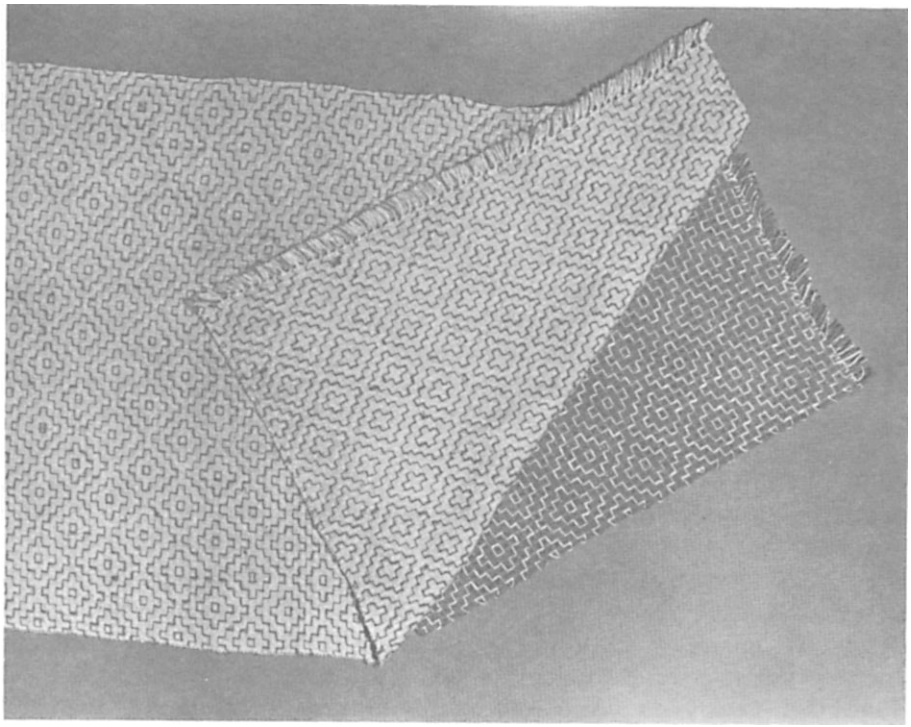


Plate 1
Material in Peruvian Overlay

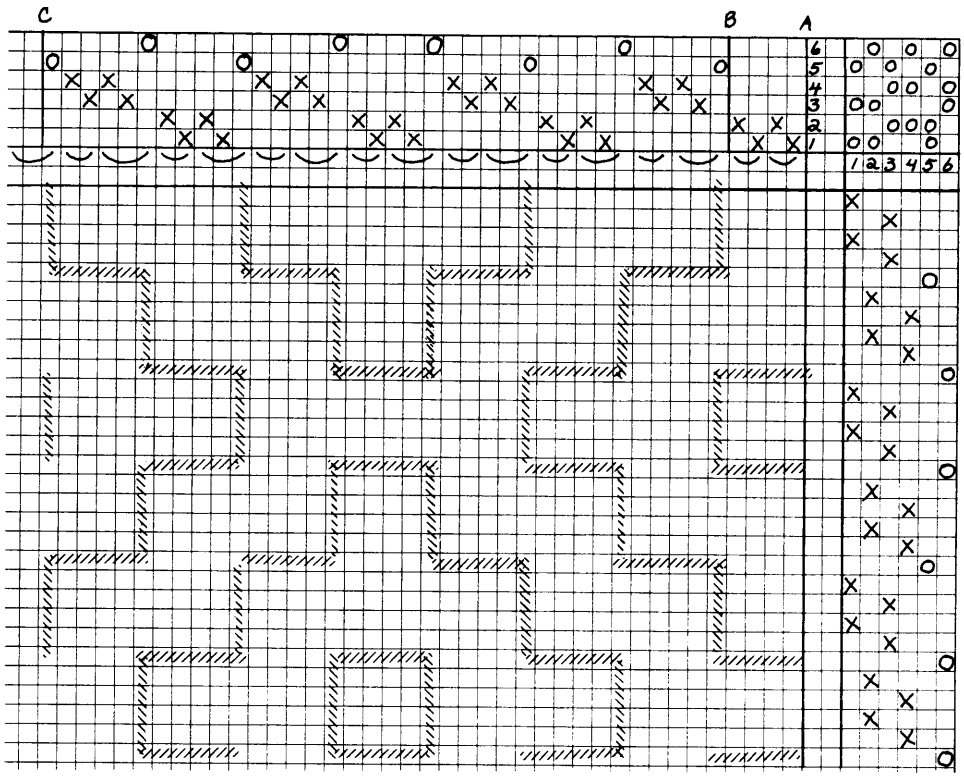


Fig. 1
Draw down showing overlay threads only
Thread A to C as desired
A to B to balance

X = handspun natural cotton - plied
O = handspun brown cotton - singles

With the thought in mind that I would like to weave yardage for a shirt, I set out to spin enough brown and white cotton for the project. Since brown cotton is more difficult to obtain than white, I decided to use white as my background weave and brown for the overlay. This is the reverse of the original piece which used brown as the background and white as the overlay.

The white cotton was spun and plied and the brown was spun as a singles to match the grist of the plied white.

A chain warp, seven yards (6.4m) long, and 14 inches (35.5 cm) wide, was wound using four white threads and one brown. My method in warping is to use a hole and slot paddle in order to get a one-and-one threading cross. The sett of the background fabric of white was planned at 20 epi (80/10 cm) with the brown supplementary warp sleyed along with two white warps as they appeared in the threading cross. If I owned a loom with two warp beams I would have placed the brown supplementary warps on the second beam.

Weaving progressed nicely for the first two yards. By then the supplementary warps were beginning to get a little slack and I had to pay close attention to see that the brown warps floated properly. Some were inclined to remain below the background and not come to the surface when they should. Various remedies were tried such as hanging weights on some ends. Best results were obtained by

lifting the harnesses carrying the supplementary warps, placing a dowel under them and carrying it over the back beam and weighting it. These problems made the weaving go a little slower and required a bit of patience, but on the whole it went rather well. I would, however, recommend the use of a loom with two warp beams.

The finished material, after being washed and ironed, measured five yards and 21 inches (1.45 m) long, and 12 inches (30.5 cm) in width.

Since I still had some brown and white yarn on hand, I then decided I would weave a small piece of fabric to use as trim on the shirt. I reversed the colors, using natural brown as the foundation and white as the overlay. Two 2-yard (1.82 m) warps were wound this time; one eight inches (20 cm) wide of brown for the foundation, and one with the necessary ends of white for the overlay. The loom was first dressed with the brown foundation warp. While threading the foundation warp a heddle was moved over on the proper harness for the supplementary warp. The white supplementary warp was then threaded through these empty heddles. After tying on, the supplementary warp was divided into two sections and weighted for tension. This warp was placed over a lease stick which was taped to the back beam with a small thin block under each end to elevate the supplementary warp above the foundation warp. The weaving progressed so much more rapidly with this arrangement that I wished I had done this with the first piece of material I wove. This also made me realize just how important it is to have that second warp beam and, if not, to at least contrive something to take its place.

My wife, Olive, who made the shirt, provides the following steps she took in its construction.

1. Measure the person who will wear the shirt. In this case, 60 (153 cm) inches was the length from the back hip line to the front. This allowed enough length for hemming.

2. Two 12-inch (30.5 cm) widths, each 60 inches (153 cm) long, were cut and the raw edges secured to prevent raveling. They were then hand stitched together the full length.

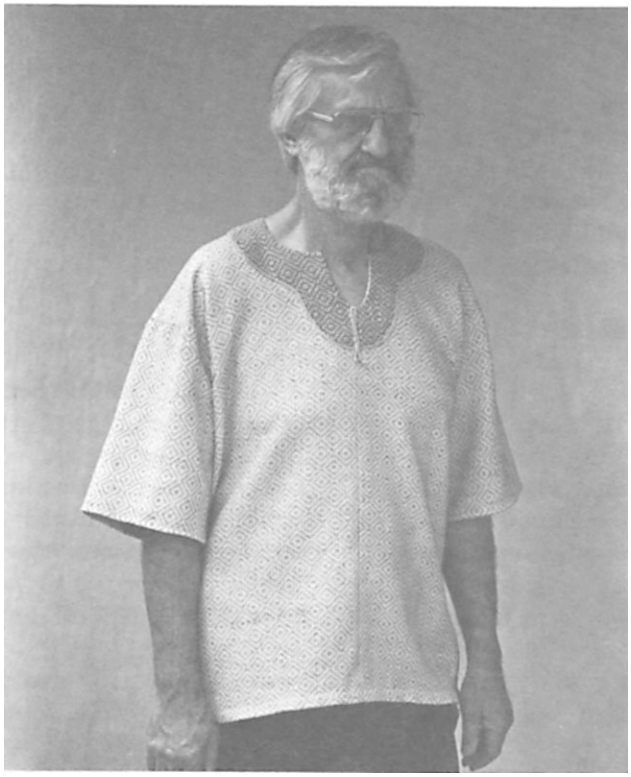


Plate 2
Shirt in Peruvian Overlay

3. A paper pattern was made for the facing and neck opening. An existing shirt which was comfortable and well fitting was used as a basis for the pattern. The facing was cut and the outer edge was secured with a basted narrow hem.

4. The facing material was laid on the garment material so that the right side of the facing was against the wrong side of the garment and was basted in place. This was then stitched on the sewing machine.

5. The neck area was cut away and the facing turned to the right side of the garment material. The right side of the facing is now superimposed on the right side of the garment material. The facing was handsewn to the shirt. A small 16-strand Peruvian braid was couched around the facing as a finish. The braid was made of the same yarn as the shirt.

6. The underarm seams were handsewn in a flat felled manner without trimming away the selvedge. In other words, the two pieces of fabric were lapped over and sewn with two parallel rows of stitching. A four-inch (10 cm) vent allowance was left at each hip for ease in wearing.

7. Using the 12-inch (30.5 cm) wide material, two strips 20 inches (51 cm) long were cut for the sleeves. Here we had the problem of raw edges. Our solution was to make a true French felled seam. We used the sewing machine on the inner part with hand sewing on the top layer which is visible. Rather than cut at the arm's eye, we lapped the material at an attractive angle over the shoulder area. The slight amount of thickness that resulted is less distracting than the bulk of a seam that had raw edges turned under.

8. Hemming the bottom edge of the shirt and the ends of the sleeves completed the garment.

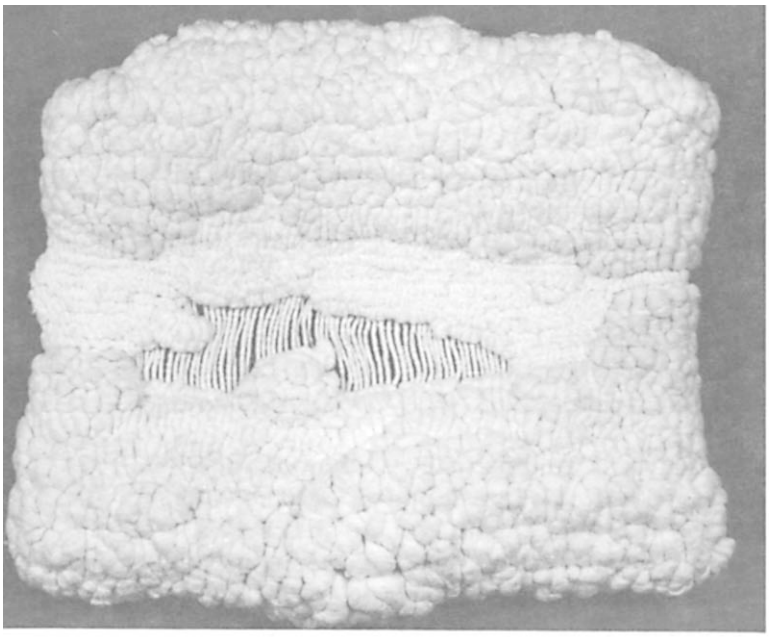


Plate 1

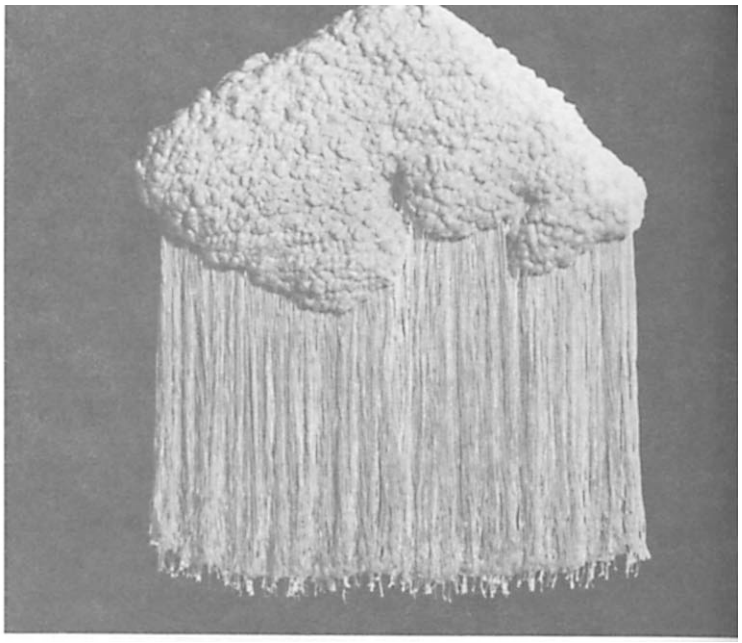


Plate 2

Cotton: An Invitation

by Kathleen Hagan

The artist's first task is to recognize the potentials and limitations of the materials with which he has chosen to work. Once these characteristics are identified, the technique, materials and concepts take on a meaning of their own, thus satisfying the nature of the materials and the concepts. With this in mind, I wove a series of white cotton wallhangings, varying in size and form, with spun and unspun cotton fiber. The hangings illustrated here are part of that series.

Basically, each piece involves the manipulation of the warp and/or weft into a form that enhances the soft, sensuous qualities of the cotton fiber. One of my primary concerns in this series was to achieve movement through the use of form, texture and the minimal color tones found in the natural cotton fiber. Compositionally, the sense of movement comes about through the repetition of a rounded, raised shape created by a tufting or looping technique, in which I consciously tried to vary height and thickness of each loop. I created the strongest textural contrast by juxtaposing spun and unspun fibers which draw attention to, and further define, the shapes created. The soft, billowy texture achieved with the unspun cotton works as a nice contrast to the linear character of the warp yarn, and often reminds the viewer of wool rather than cotton. In some pieces, I also used subtle color variations to re-emphasize shapes and thus reinforce the sense of movement which I hoped to achieve.

To create relief, I not only used on-loom techniques but, in some cases, manipulated the form once it came off the loom, as in Plate 4. I was able to create a very high relief by pulling the bottom corners of the woven form to the center and securing them. This created a stronger projection in the center of the form than was possible otherwise. On the other hand, the relief in Plate 3 was created entirely on the loom but was reinforced by stuffing from the back. In Plate 2 and 3, the warp ends were an integral part of the form, so I trimmed them to enhance the piece, thereby avoiding what I call "that obvious fringe look".

As I worked on this series, I found the cotton fiber to be tactually very satisfying and inviting.

Plate 3

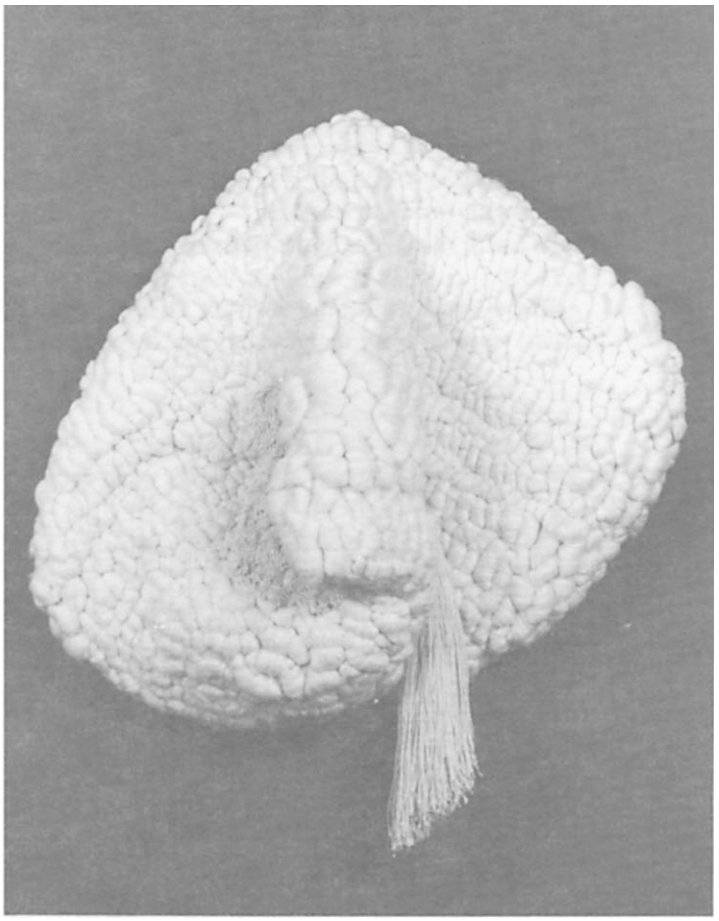


Plate 4

Kathleen Hagan is Assistant Professor of Art and head of the weaving department at Bowling Green State University in Ohio.

Combining Lace Weaves

There are some weaves which have such a close relationship among them that they can be threaded and woven side by side without increasing the number of harnesses and treadles. Huck and Swedish lace have such a relationship; so do Huck Lace and Canvas Weave and also Spot Bronson and Atwater Bronson Lace.

Fig. 1 shows the draft for huck. The fabric can be threaded for stripes of plain weave and areas of huck which can be woven side by side.

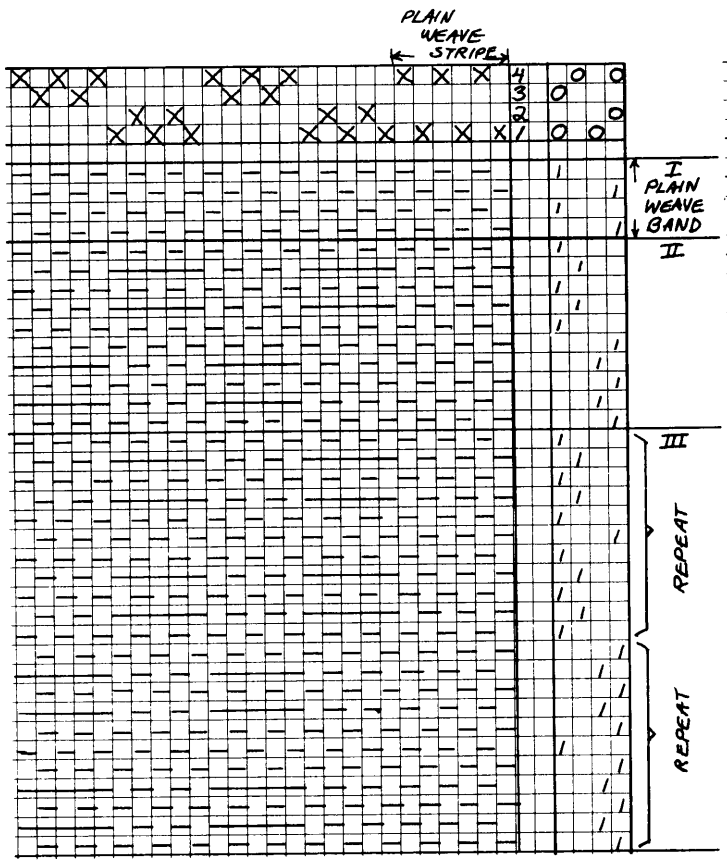


Figure 1

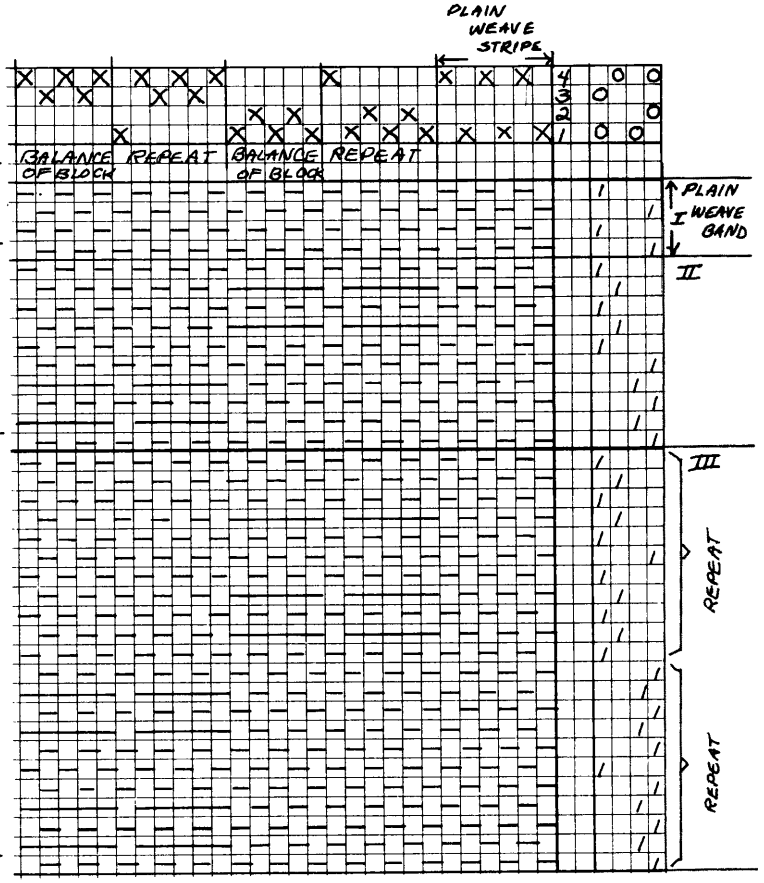


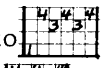
Figure 2

Section 1 is a plain weave band.

Section 2 is typical huck.

Section 3 shows the cloth when it is treadled for Swedish lace.

Figure 2 shows the draft for Swedish lace. The unit  has been expanded to  which can be repeated ad lib because a tie-down thread, threaded on harness 4 has been added which will prevent the weft floats from being longer

than over 5 threads. Note that the block has to be balanced by  . The unit  has been expanded to  which again can be repeated ad lib to form a block which is balanced by  .

Section 1 is a plain weave band.

Section 2 shows the cloth when it is treadled as huck.

Section 3 is typical Swedish lace.

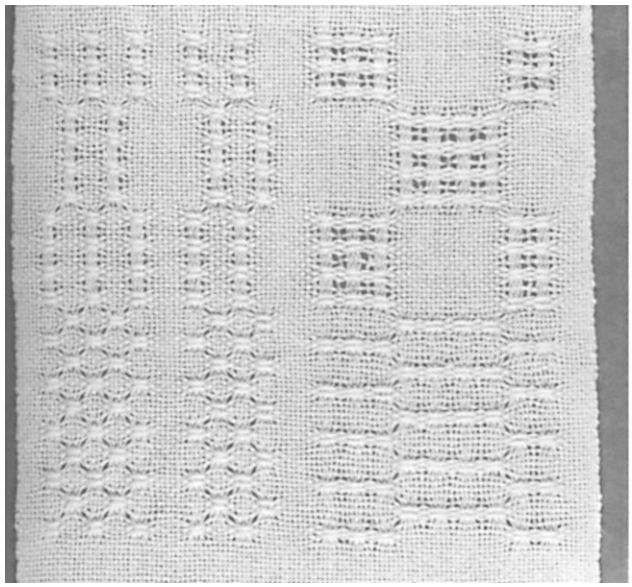


Plate 1 - Huck Swedish Lace

Huck and Swedish lace have the same tie-up and thus can be combined in one fabric. Plate 1 shows the fabric of Figs. 1 and 2 woven side by side. (Warp and weft - Frosttone from Lily, sett at 16 epi or 63/10 cm).

III ←

Huck lace and canvas weave which are also referred to as mock-leno have the same threading as huck (Fig. 1) and Swedish lace Fig. 2 respectively, but a different tie-up. The draft for these two weaves is shown in Figs. 3 and 4.

II ←

Section 1 is a plain weave band.

Section 2 is woven as typical huck lace.

Section 3 is woven as typical canvas weave.

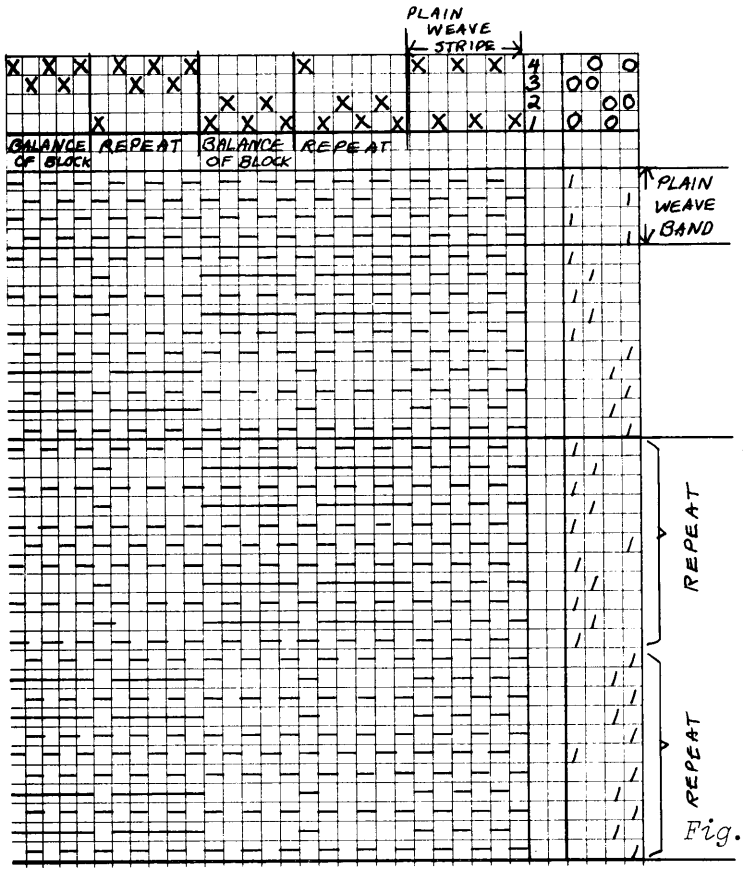


Fig. 4

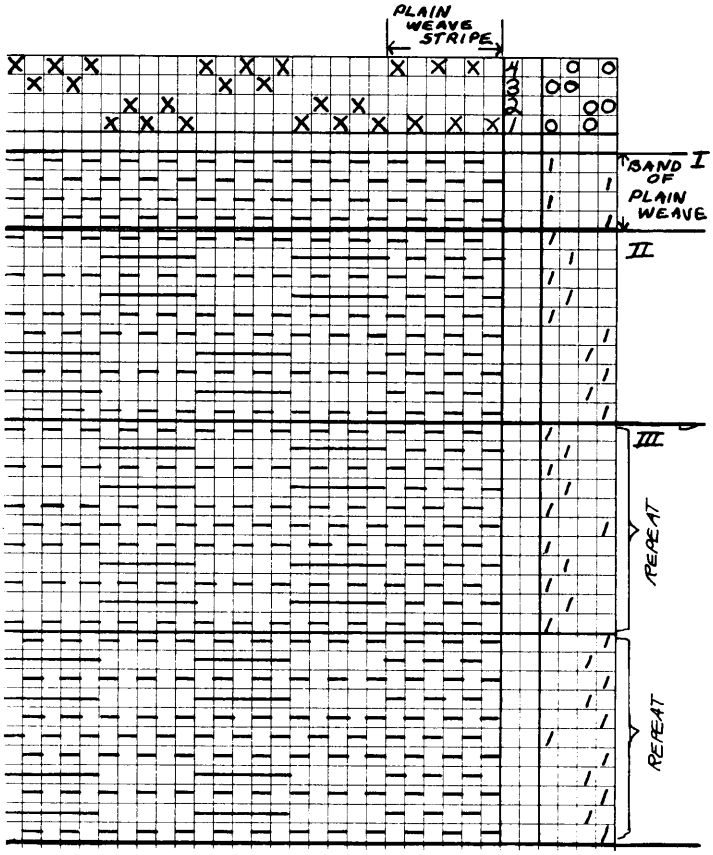


Fig. 3

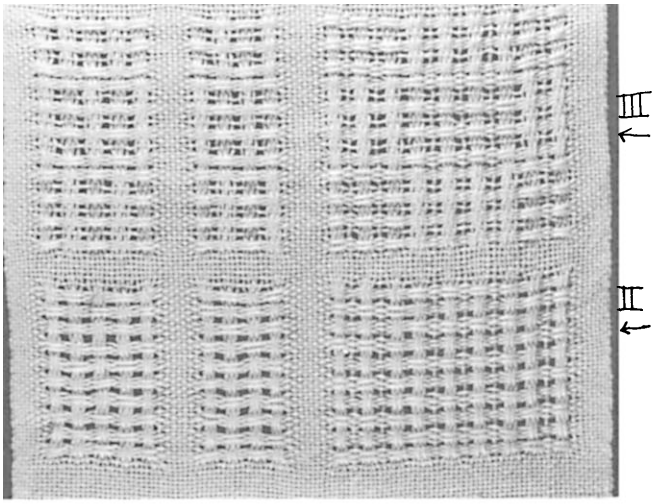


Plate 2 - Huck Lace and Canvas Weave

These weaves may be combined to create patterns that are more interesting than either one of these weaves alone.

Plate 2 shows the fabric of Figs. 3 and 4 woven side by side.

The hammock shown in Plate 3 is designed by combining huck and Swedish lace, and huck and canvas weave.

Plate 3

detail

Fig. 5 gives the threading and tie-up. ∧ indicates that a dent has been skipped in the reed in order to make the lace lacier.

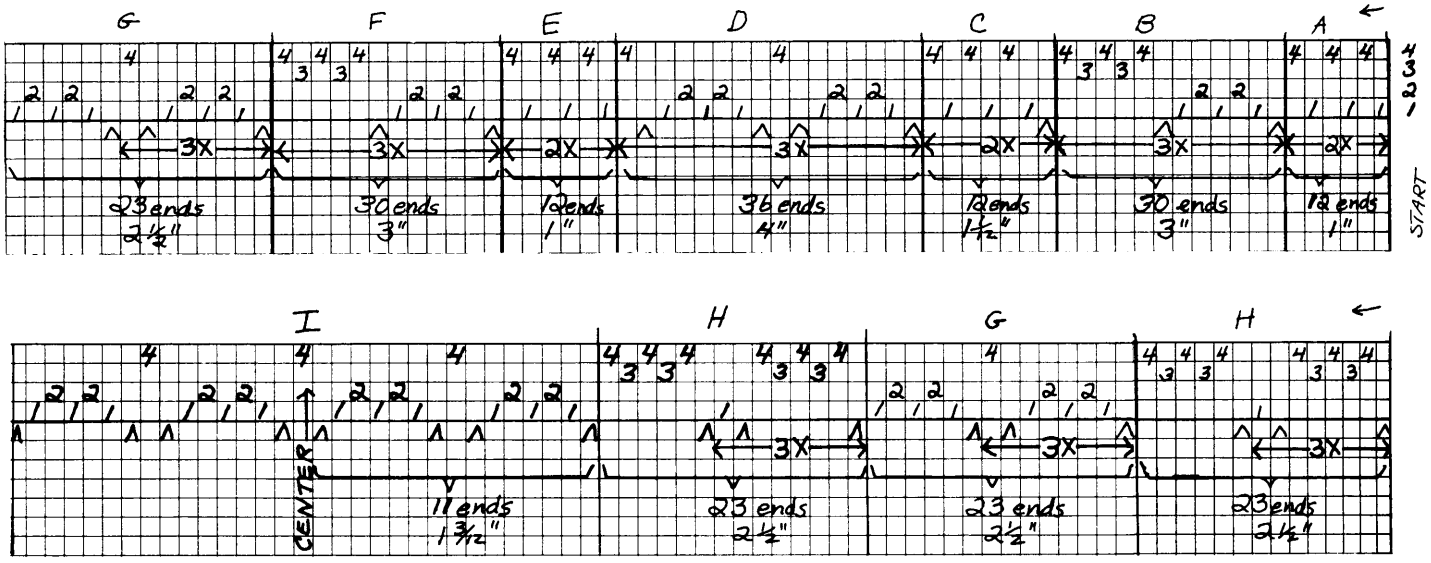


Fig. 5

WARP: natural 3/2 mercerized cotton from Contessa.

SETT: average of 10 epi (40/10 cm) in a 12 dent (48/10 cm) reed. Dents have been skipped according to Fig. 5.

WIDTH IN THE REED: 48½" (123 cm).

TOTAL NUMBER OF ENDS: 471 plus 4 to reinforce the selvedges. For a narrower loom, any of the sections, except section A, may be omitted from the threading draft of Fig. 5.

LENGTH OF THE WARP: 4 yards (3.68 m).

TREADLING: refer to Figs. 1, 2, 3 and 4.

CONSTRUCTION OF THE HAMMOCK: after the loom is dressed, the warp is divided into 23 parts. At the start, 18" (46 cm) of warp is left unwoven and is to be wrapped later.

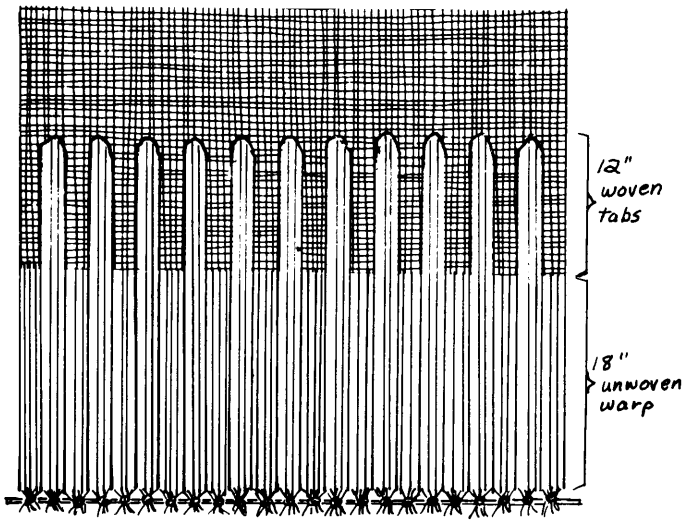


Fig. 6

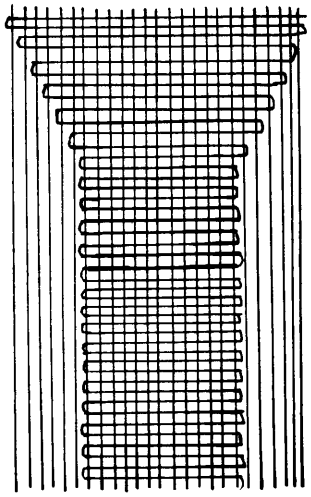


Fig. 7

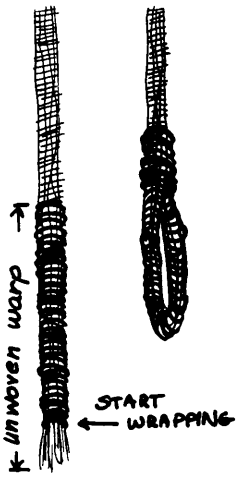


Fig. 8

The 12 odd numbered sections are each woven in plain weave with a butterfly or small shuttle. The beater is not used at first and the weft is pulled tight to make the tabs narrow. Gradually the tabs are widened so that the sett is the same as the sett in the reed. Now the beater can be used. The tabs are widened still more by increasing the number of warp ends in each tab, thus gradually including all the warp ends of the even numbered sections which had been left unwoven. See Fig. 7.

As soon as all the warp threads have been included in the woven cloth, the rest of the hammock is woven with one shuttle and lace patterns are introduced. When the fabric is off the loom, the free warp ends between the tabs are woven back into the cloth. The warp fringe of each tap is wrapped and folded. The loop is secured with glue, covered with wrapping. See. Fig. 8. The head section of the hammock is folded to form a pillow casing and also a casing for a 1½" (38 mm) diameter wooden dowel. The hammock was machine washed in warm water and machine dried (5% shrinkage).

There is also a relationship between spot Bronson (also called Barleycorn) and Atwater Bronson lace (sometimes referred to as Swedish lace).

Fig. 9 shows the draft of spot Bronson. The fabric can be threaded for stripes of plain weave and pattern side by side.

Section 1 is a plain weave band.

Section 2 is a draft using spot Bronson treadling.

Section 3 is a draft using the Atwater Bronson treadlings.

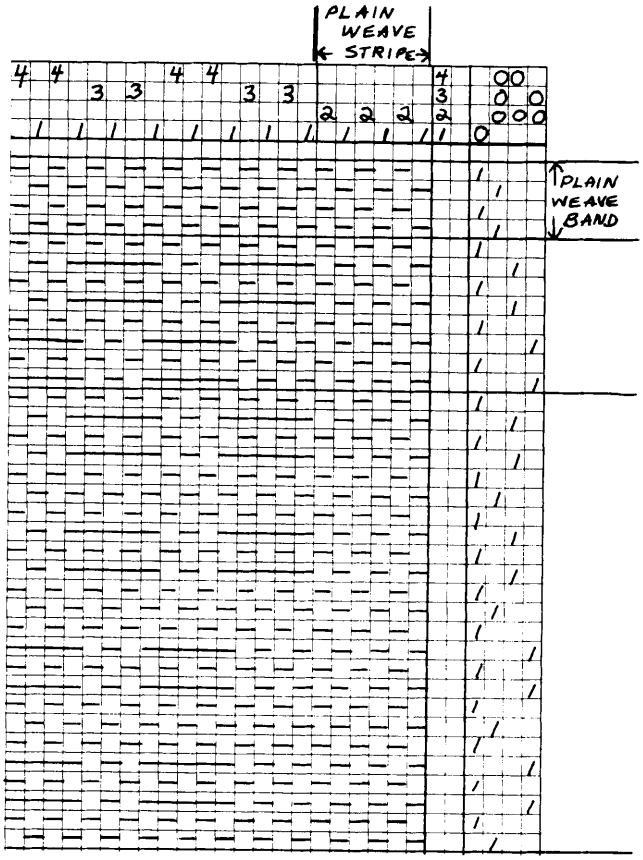


Fig. 9

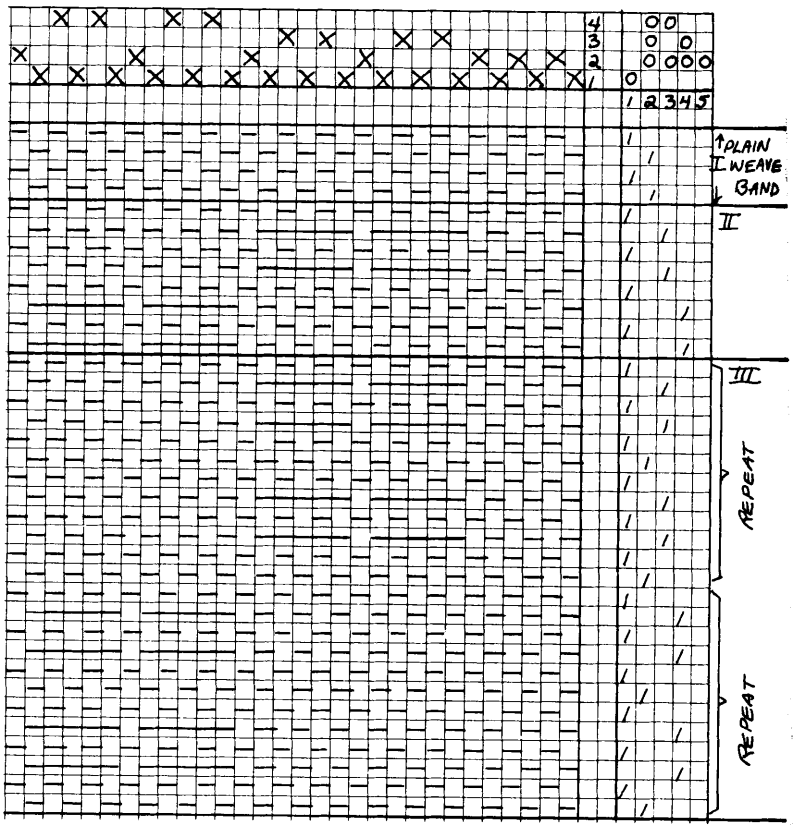


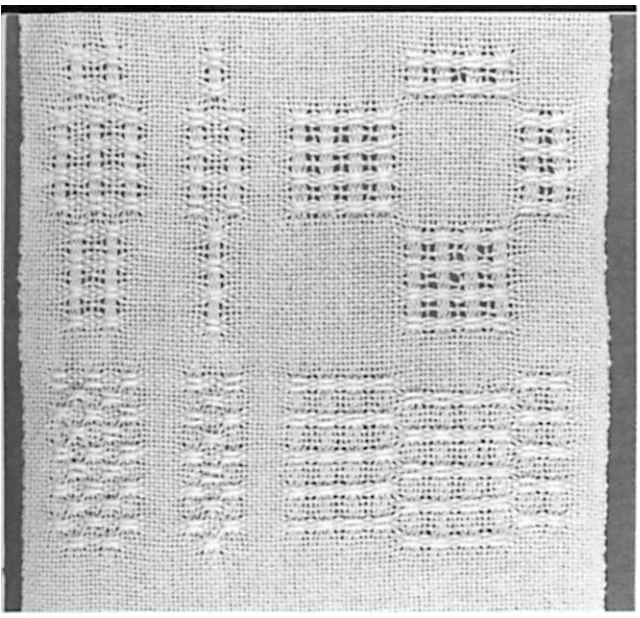
Fig. 10

Fig. 10 shows the draft for Atwater Bronson threading. The unit  has been expanded to  which can be repeated ad lib because the thread on harness 2 serves as a tie down thread preventing the weft floats from going over more than five threads.

Section 1 - plain weave band.

Section 2 - draft using spot Bronson treadling.

Section 3 - typical Atwater Bronson draft.



III ←

II ←

Plate 4 shows a sample illustrating Figs. 9 and 10. The yarn used is Lily Frosttone sett at 16 epi (40/10 cm).

The Christmas cards illustrated in Plate 5 are a project in which spot Bronson and Atwater Bronson are combined.

WARP: fine mercerized cotton sett at 40 epi (160/10 cm).

WEFT: same as warp. The weave shows up with more depth if the color of warp and weft are related but different.

Plate 5A

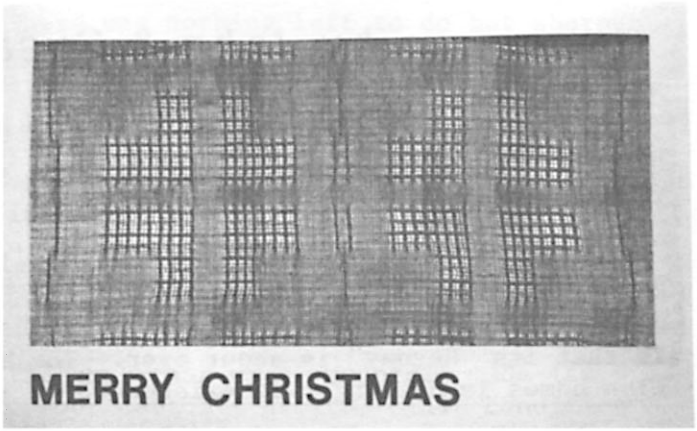
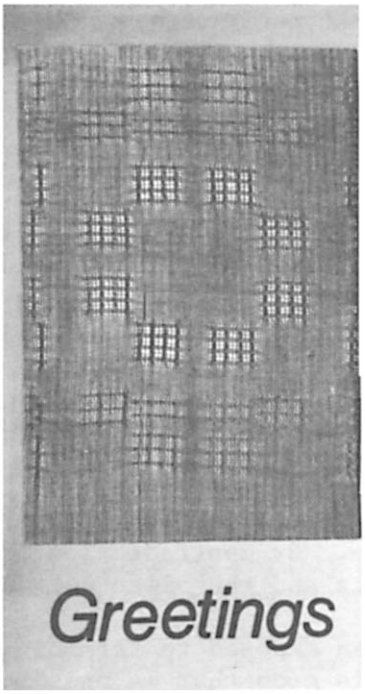


Plate 5B



WIDTH IN THE REED: 4½" (11.0 cm)

THREADING AND TIE-UP: see Fig. 11.

TOTAL NUMBER OF ENDS: 175 plus 2 for selvedge. (Double first and last warp ends both in the reed and in the heddle).

TREADLING: see Fig. 12.

Similarily, refer to Fig. 12 to weave the second card.

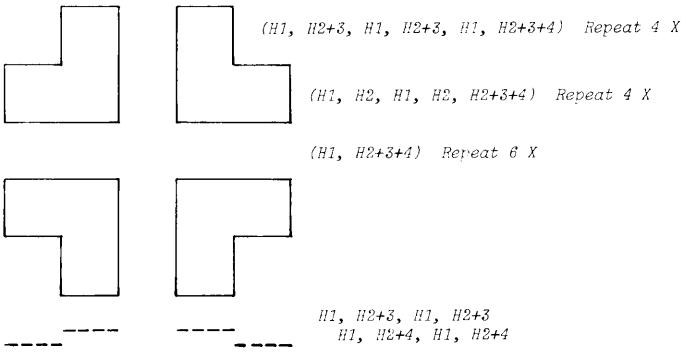


Fig. 12

Fig. 11

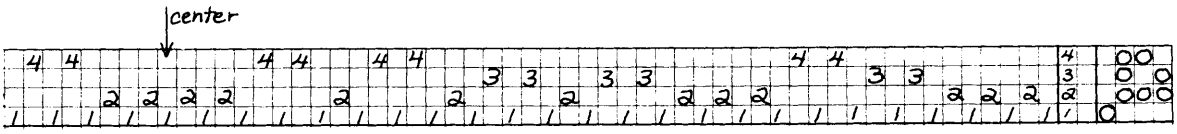


Fig. 13

For a coarser yarn, such as 10/2 cotton, sett the warp at 20 epi (80/10 cm) and use the threading given in Fig. 13.

In order to make the card shimmer in the light a sheet of silver colored mylar is used as a backing for the lace weave.

Cotton of a Different Color

by John & Susan Campbell

This is our story on the growing of cotton: Our reason for growing cotton, our experiences growing it, the problems we encountered, and the solutions we found to those problems.

Susan and I live in the small, Mississippi Delta town of Shaw. Shaw's economy is mainly agricultural. Cotton, soy beans, and rice make up the major crops with some peanuts grown on allotment. Shaw is much like other small Delta towns in that its "Heyday" is about over. The kind of farming associated with plantation homes is no longer in existence.

Years ago, literally hundreds of people worked on farms. All had a job to do. Today, due to machines, only two to ten people do the work of the hundreds. Most of the farms here average between 800 - 1400 acres, and not many farmers actually own all of the land they farm. Of course, there are exceptions. The methods have changed, but one fact remains constant; farming one certain crop is a direct contradiction to the land in its natural state. By contradiction we mean the never-ending battle between the native wild plants and the alien cotton.

Though we claim no expertise in the matter, we have been exposed to farming and have planted a small cotton crop this year. It is this crop that is presently the center of our attention and the reason for this article. Through our association with Penny Powell, a spinner-weaver from Indianola, Mississippi, we learned of a brown-fibered cotton which has been grown in limited quantity in southern Louisiana for quite some time. Craftsmen grow it for their personal use. The cotton is a coveted crop, and after seeing its pleasingly soft, reddish-blonde color, we can see why. The cotton has a short staple (fiber length) that can be spun if care is used. We wanted to obtain seed and grow some partly for ourselves, as Susan weaves, and partly because we felt that this fiber could be used by many weavers across the country who spin natural fibers and share in its appreciation. Obtaining seed was not as difficult as we had anticipated, but it did take us a little while. We owe special thanks to those who helped us acquiring it.

The time for planting was getting very close, and we had a great deal to do. Susan's father, Jimmy Simpson, is a farmer and gave us permission to plant the seed in a soy bean field close to his headquarters. On Saturday, May 19, at 11:00 A.M., the John Deere tractor pulling a six row planter was ready to re-

ceive the six or so pounds of seed that Susan and I had hand cleaned of lint. We found that seed free of excess lint passed through the planter much easier. The seeds were slick and brown. They looked so small in the hoppers, which were fitted with special corn plates to accomodate the lintless seed. After we distributed the seed fairly evenly in each hopper, the tractor was ready to roll. The ground was already rowed, but we had not applied any herbicide nor were we going to use a premerge. This was our first mistake. The planting went just fine. Jimmy and I walked behind the tractor making sure the seeds were going through the planter and being covered with dirt. At 12:00 we were finished. Sunday we had a shower and by Tuesday the cotton was beginning to push up through the rich, brown earth. As Susan and I looked out over our acre of cotton, we were bursting with excitement. Who would have thought two BFA majors would be growing brown cotton in the Delta? Then we saw *them*. Their common name is Prickly Sida. A more common name is Tea weed. Millions of them sprang up. It was too late to spray a herbicide because the cotton was up and poisoning would have killed it along with the weeds. There was nothing left to do but sharpen the hoes and work around each little cotton plant. We worked, and worked, and worked and....oops, wrong plant. It was getting time for the tractor to do its thing. We were able to cultivate once before it rained again and left the ground too wet to plow. The weeds kept coming. So did the insects. Tiny, sucking insects called Thrip usually attack the cotton in its early stage and sap the plant of its vital juices. A good systemic insecticide will control them nicely. A systemic insecticide is one that the plant absorbs and holds in its circulatory system. When the insect penetrates the plant, it gets a good dose of the poison which eliminates that insect and its reproduction of more insects.

Unseasonable cool weather and more frequent than usual rainfall made its presence in the Delta in the early stages of our cotton's growth. This condition caused very slow early development in the cotton. As the field dried, we began to hoe on a daily basis. The weeds were not affected by the unusual weather conditions and continued to grow rapidly. Most of June was spent hoeing the cotton and spraying insecticide. Due to an unexpected illness, we had to abandon the cotton for approximately ten to twelve days. This was unfortunate. When we returned to the field, the weeds and insects had nearly taken it over. At this point we were totally devastated. We had to decide between total devotion to the cotton or failure in our venture. Without any discussion, we fell on our hands and knees and began to pull the weeds which were now bigger than the cotton. When a situation like this arises, one's true friends appear. Help came quietly and asked nothing in return. After several days of back breaking, physical labor, the field was reasonably free of the damaging weeds and insects. On July 23rd, while again hoeing in the field, we found our first bloom. We give special thanks for this bloom to: Jimmy Simpson for providing the land and experienced advice; Grady Simpson, Susan's sister, for her tractor driving and Tea weed pulling ability; Russell Cox, Grady's husband, for his willingness to help in any situation; Al Robinson for his advice and generous, unconditional help in the field; and Lucy Lamb, an English teacher, for her valuable suggestions concerning this article.

Growing this brown cotton has been a true learning experience. We did not anticipate the physical and mental devotion which growing cotton demands. The best solution we found to our problems was good, hard work. With continued care of the cotton, we should have an ample supply of fiber for ourselves and other interested craftsmen. If you have any questions concerning the brown cotton, please write to us at this address: John and Susan Campbell
Box 556
Shaw, Mississippi 38773

Four Harness Straight Draw and Combination Weaves

This study will give the four harness weaver guidance to explore the many weave structures that can be woven on a four harness straight draw. See Fig. 1.

The combination of these weave structures offers a challenge to the eight harness weaver.

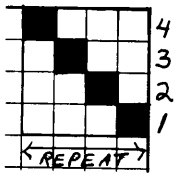


Fig. 1.

Combination weaves are characteristic of a fabric in which two or more weaves are threaded side by side. For example, when a plain weave selvedge is added to a twill fabric, the two weaves are threaded side by side. The threads of one weave are threaded on one set of harnesses (1 through 4), those of the other weave on a separate set (5 and 6). The combination weave is shown in Fig. 2.

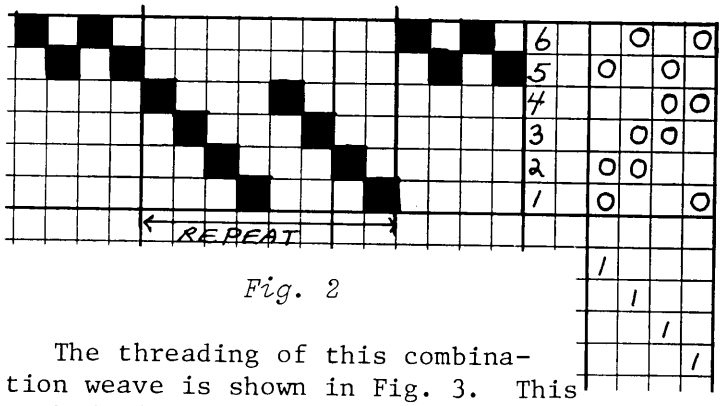


Fig. 2

The scope of combination weaves is quite vast and in this article we will limit ourselves to the study of combinations of two weaves which have the same threading draft. Furthermore, that threading draft is a straight draw.

The threading of this combination weave is shown in Fig. 3. This method of designing fabric structures produces stripes, checkerboard effects and other interesting patterns.

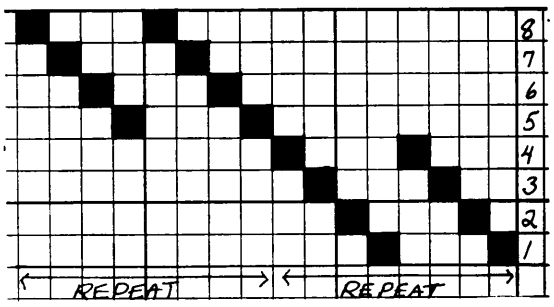


Fig. 3

THE STUDY OF WEAVES DONE ON A FOUR HARNESS STRAIGHT DRAW.

Figs. 4,5,6 are weaves that belong to the plain weave class.

Fig. 7 shows a lace weave and its opposite.

Fig. 8 and its opposite are a spot weave.

Fig. 9 is double weave.

Fig. 10 is a balanced 2/2 twill.

A and B differ in the direction of the twill line.

C is a broken twill.

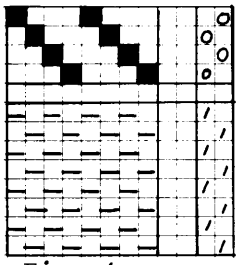


Fig. 4

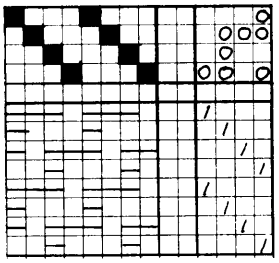


Fig. 9

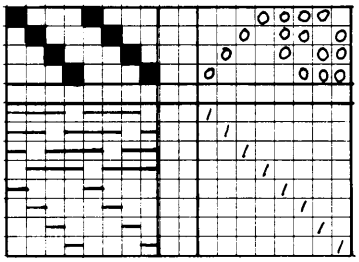


Fig. 12

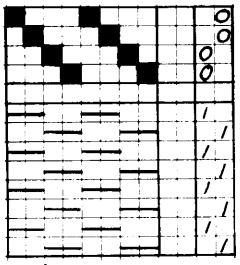


Fig. 5

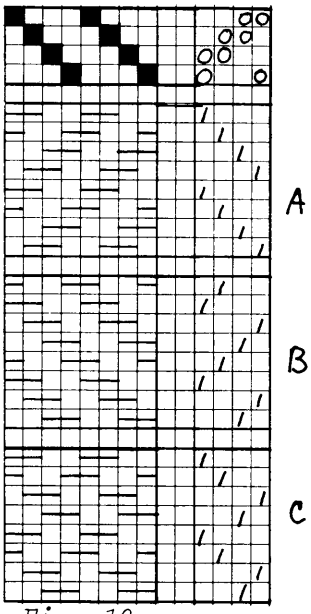


Fig. 10

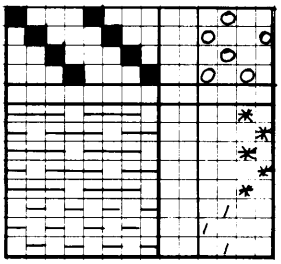


Fig. 13

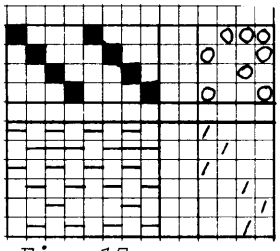


Fig. 17

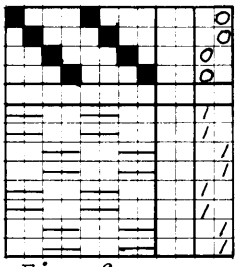


Fig. 6

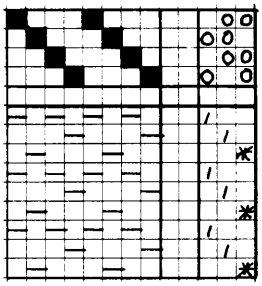


Fig. 14

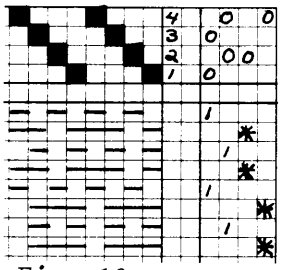


Fig. 18

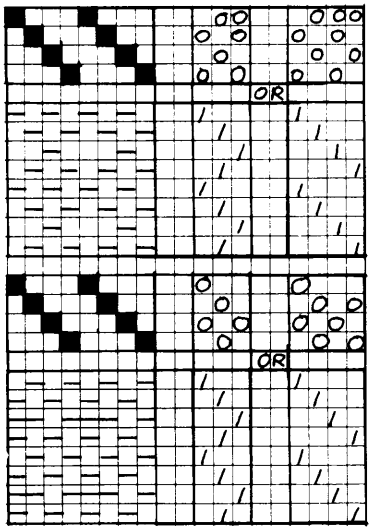


Fig. 7

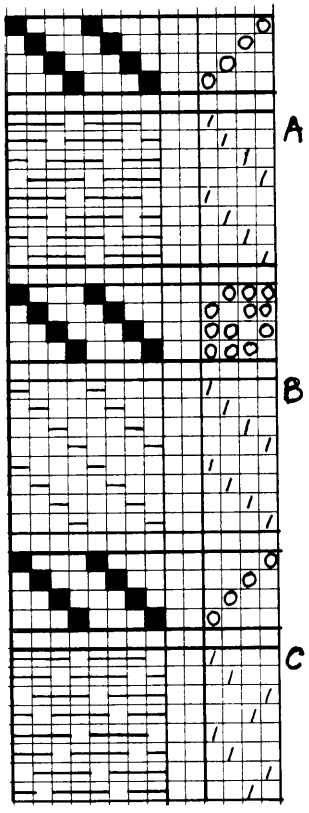


Fig. 11

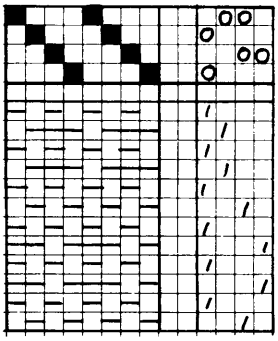


Fig. 15

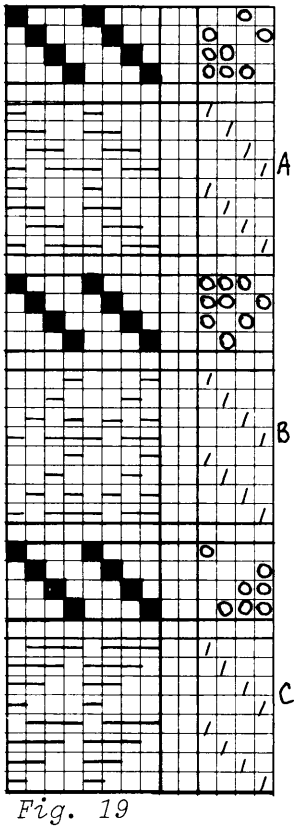


Fig. 19

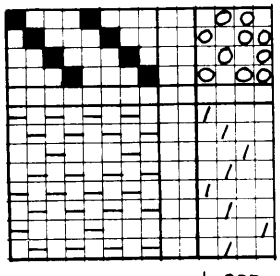


Fig. 8

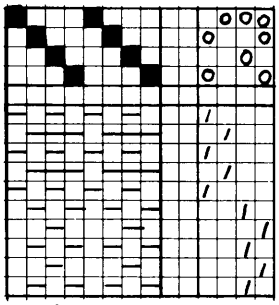


Fig. 16

Fig. 11 shows unbalanced twills.

A. is a $\frac{1}{3}$ twill.

B. is a $\frac{3}{1}$ twill.

C. is a broken twill.

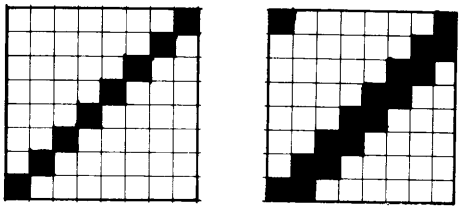


Fig. 12 combines $\frac{1}{3}$ and $\frac{3}{1}$ twill in the treadling.

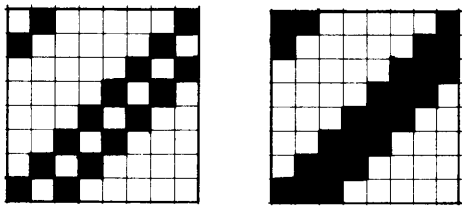
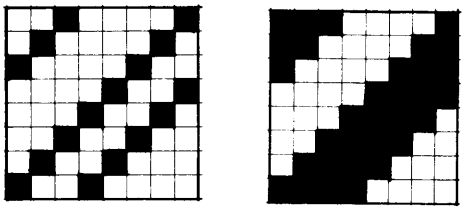


Fig. 13 is a corded weave that is more effective when it is woven with two wefts.

Fig. 14 is complementary weft tabby for which the pattern only shows up when different colors are used in the weft.



Figs. 15, 16, 17 are spot weaves that are most effective when colored or textured wefts are used.

Fig. 18 is a one block Summer and Winter using two different wefts.

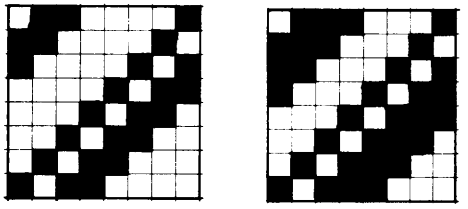


Fig. 19 shows weaves that have been inspired by eight harness twills. To design such twills, take graph paper of the same size as that on which the eight harness twills have been drawn. Cut out a 4 X 4 square. See. Fig. 20.

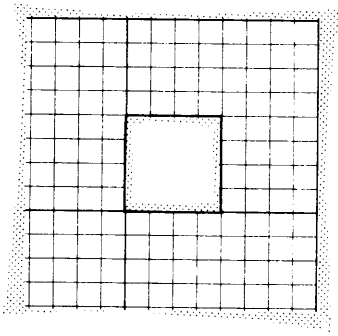
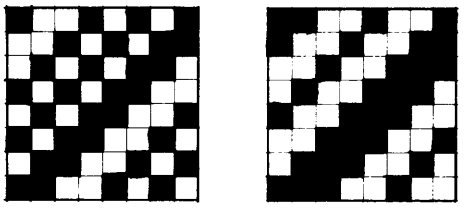
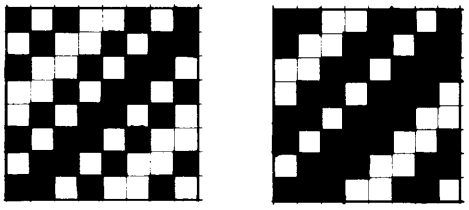


Fig. 20

Lay this frame on any of the graphs of Fig. 21 and you will uncover a multitude of new tie-ups by replacing the black squares by o's. Note that each column should contain at least one black and one white square.





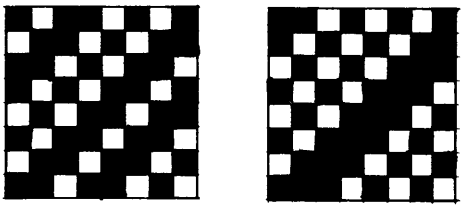
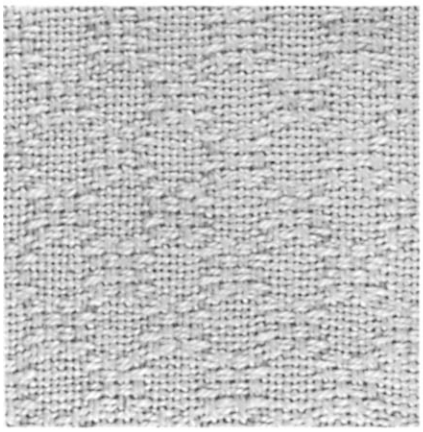


Fig. 21

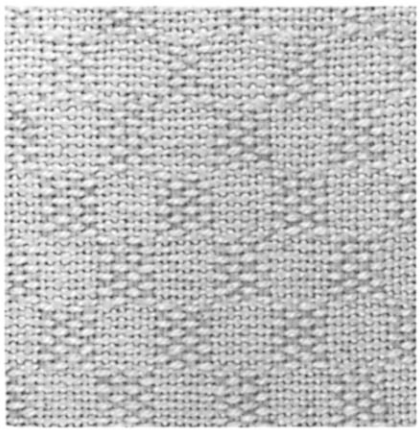
THE STUDY OF COMBINATION WEAVES

In theory, any of the weaves shown in Figs. 4 through 19 can be combined side by side on the threading shown in Fig. 3.

In practice, we will omit the weaves of Fig. 13 and 14 because of their dependence on color and we will omit the weaves of Figs. 8, 13, 14, 15, 16, 17, and 18 because their repeats require a number of weft picks different from



1



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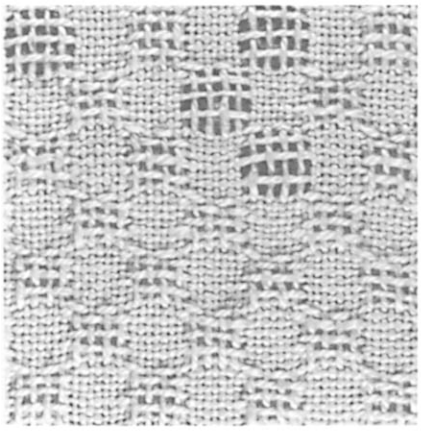
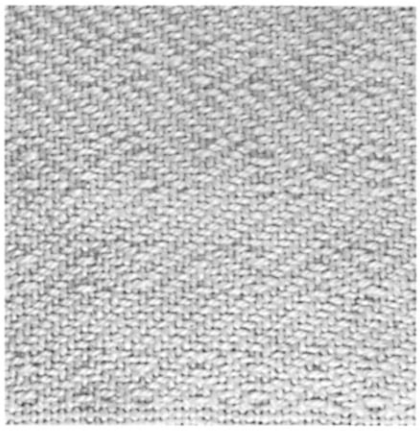


4



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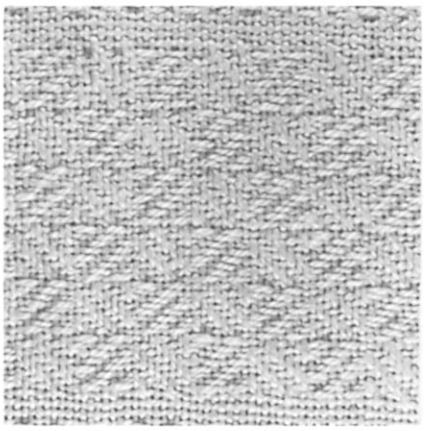

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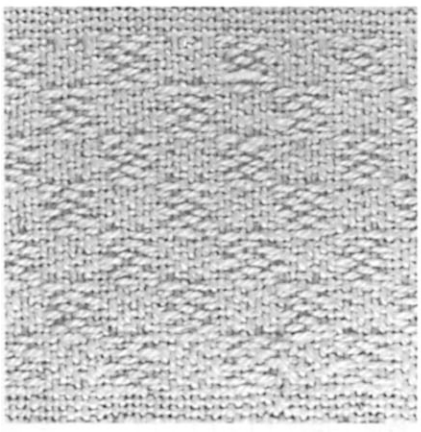


7

8

9

Plate 1

2 or 4, this, when combined, boosts up the number of treadles for the combination weave to numbers larger than 8.

When two weaves are combined, care must be taken at the line of junction. The separation of the weaves should be as clean and crisp as possible, a float in one weave should not be floating across the line of junction. See Fig. 22.

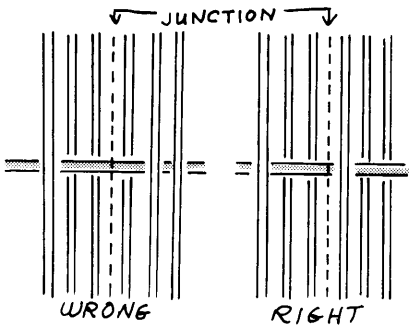


Fig. 22

Also avoid floating warp threads across the dividing line between a block and the one above. Thus. if, possible, the last weft of a block and the first weft of the block above should be woven on opposite sheds.

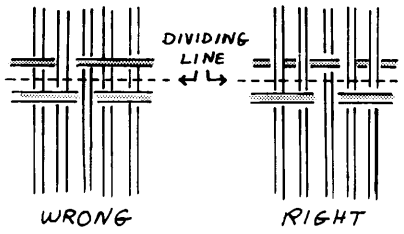


Fig. 23

The woven samples shown in Plate 1 illustrate several combination weaves.

Sample 1 combines plain weave (Fig. 4) and basket weave, (Fig. 6). The draft for this combination weave is shown in Fig. 24A.

Notice how treadles 1,2,3,4 are tied-up to the lower set of harnesses (1 through 4) to weave plain weave and to the upper set of harnesses (5 through 8) to weave basket weave. This is reversed for treadles 5,6,7, and 8.

Sample 2 combines plain weave (Fig. 4) and basket weave (Fig. 5). The draft is shown in Fig. 24B.

Sample 3 combines plain weave (Fig. 4) and lace (Fig. 7). The draft is shown in Fig. 25. This weave only requires 4 treadles (treadle 1 is the same as treadle 5, treadles 2,4,6 and 8 are the same).

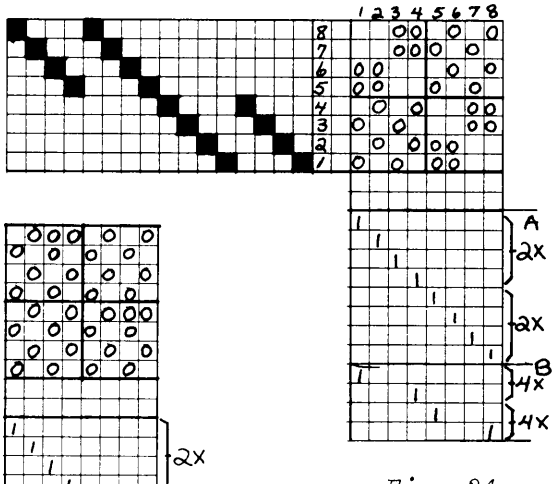


Fig. 24

Fig. 25

Sample 4 combines plain weave (Fig. 4) and double weave (Fig. 9). The draft is shown in Fig. 26.

Sample 5 is a combination of 2/2 twills (Fig. 10) going in different directions. The draft is shown in Fig. 27.

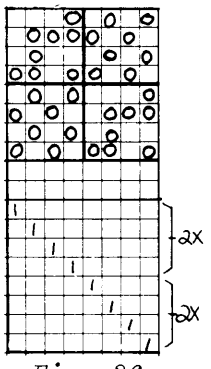


Fig. 26

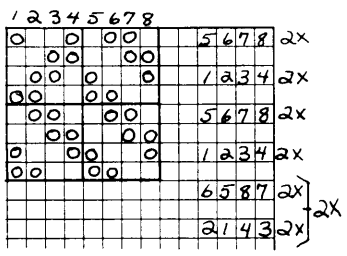


Fig. 27

Samples 6 and 7 are combinations of $\frac{1}{3}$ and $\frac{3}{1}$ twills (Fig. 11). The draft is given in Fig. 28. The weave B is often referred to as false damask.

Samples 8 and 9 are inspired by 8 harness twills (Fig. 21). Their drafts are given in Figs. 29 and 30.

Plate 2 illustrates a combination weave woven on two six-harness straight draws side by side. The weaves in the blocks are $\frac{1\ \ 1}{3\ \ 1}$ twill and huck lace. The draft is shown in Fig. 31.

WARP: Azure blue silk (Robin & Russ Handweavers). A smooth 4 ply silk (12,800 yards/lb.)

WEFT: Same as warp.

SETT: 40 epi (160/10 cm)

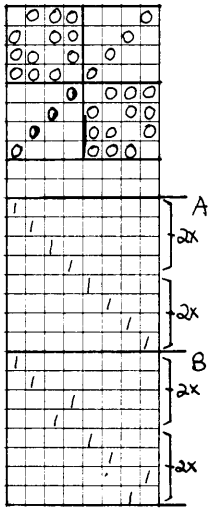


Fig. 28

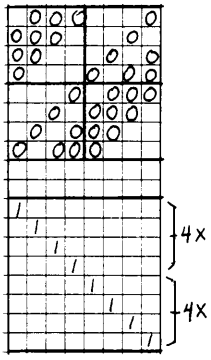


Fig. 29

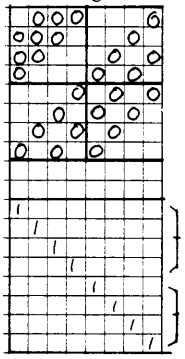


Fig. 30

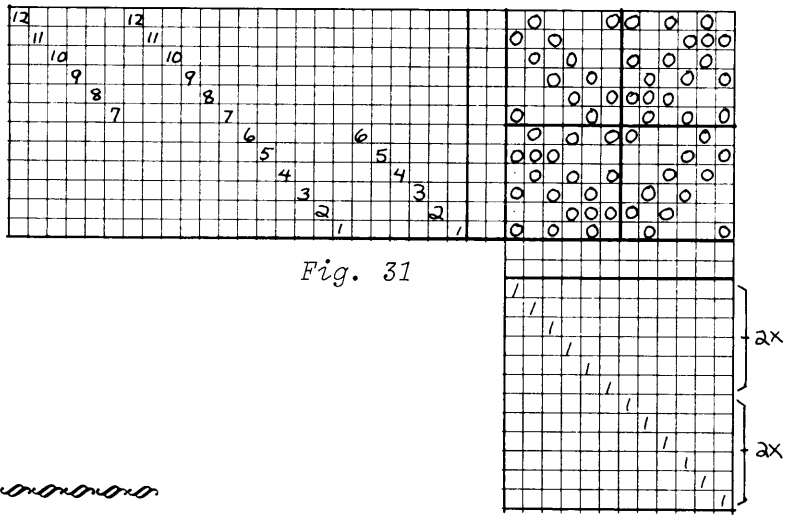


Fig. 31

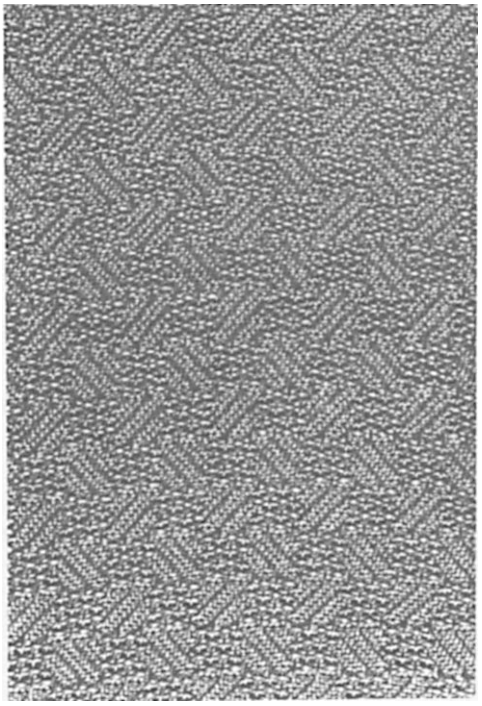


Plate 2

Projects with Cotton

In this article we are describing four four-harness projects in which cotton has been used and whose weave structure is lace or woven on a straight draw and is described elsewhere in this issue.

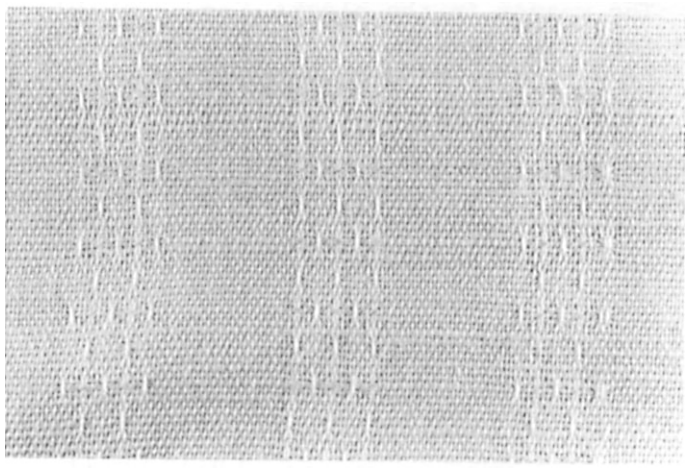


Plate 1
Fabric designed and woven by Robin Daugherty

1. Yardage suitable for clothing, stoles or draperies.

WARP: Lily cotton 20/3 in white and natural.

WEFT: Tussah silk, handspun specifically for this project.

SETT: 24 epi (100/10 cm)

THREADING, TIE-UP, AND TREADLING: See Fig. 1.

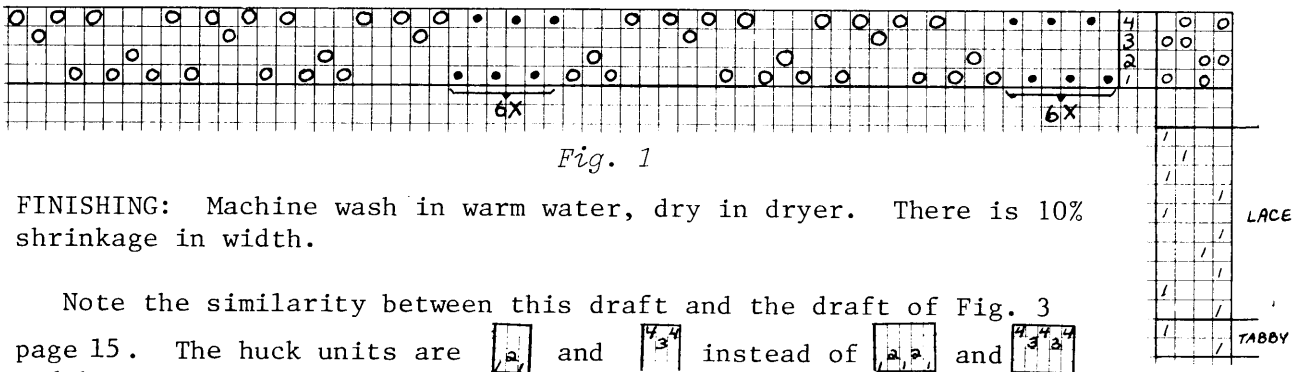


Fig. 1

FINISHING: Machine wash in warm water, dry in dryer. There is 10% shrinkage in width.

Note the similarity between this draft and the draft of Fig. 3 page 15. The huck units are [2,1] and [4,3] instead of [2,2] and [4,3,4] and between each huck unit there are two warp threads threaded for plain weave.

This threading may be combined with huck and Swedish lace (Ref: *Combining Lace Weaves*, page 14 of this issue.)

2. Cotton Stoles.

The natural cotton bubble yarn from Contessa is soft cotton spun around a fine two-ply core. It is really a weft yarn but it was used for both warp and weft as an experiment.

The warp was beamed before putting it through the heddles to minimize the wear and tear that the yarn suffers from having to slide through the small eyes. The reed should not be finer than 8 dents per inch. The weaving was done with care and it worked!

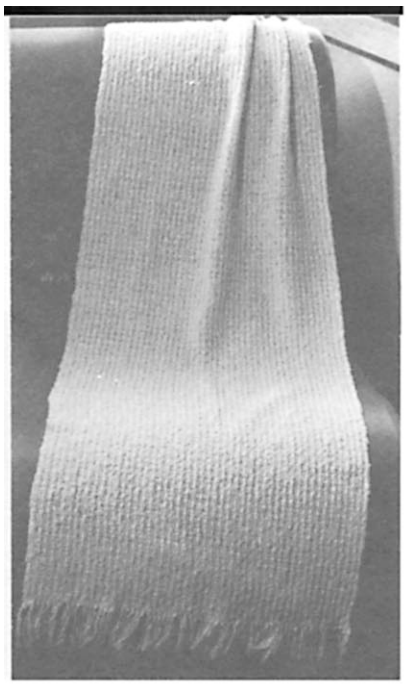
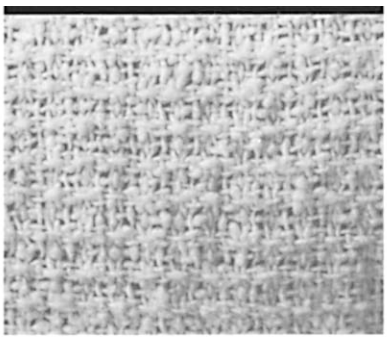
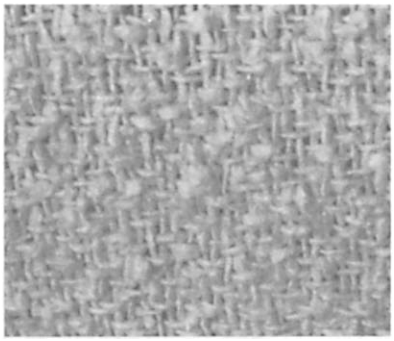


Plate 2 - Stole A
Woven by
Clotilde Barrett



detail

detail



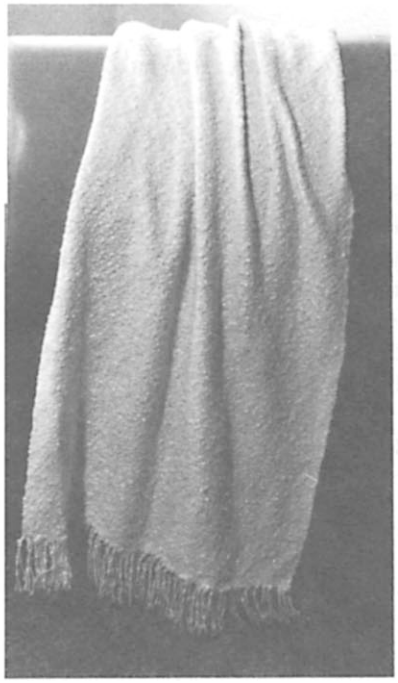


Plate 3 - Stole B Woven by Clotilde Barrett

WARP AND WEFT: Natural cotton bubble yarn from Contessa (1 3/4 pounds for two stoles.)

WIDTH IN THE REED: 24" (61 cm)

LENGTH OF THE WARP: 5 yards (4.58 m)

SETT: 8 epi (30/10 cm) in an 8 dent reed.

THREADING, TIE-UP AND TREADLING: See Fig. 2.

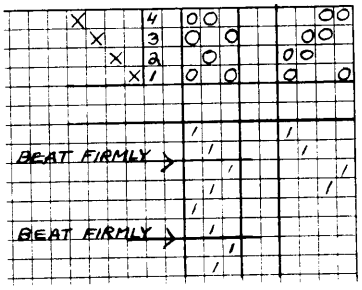


Fig. 2

FINISHING: Handwash in warm water, machine dry. The finished stoles measure 21" x 68" (53.5 x 173 cm) plus fringe.

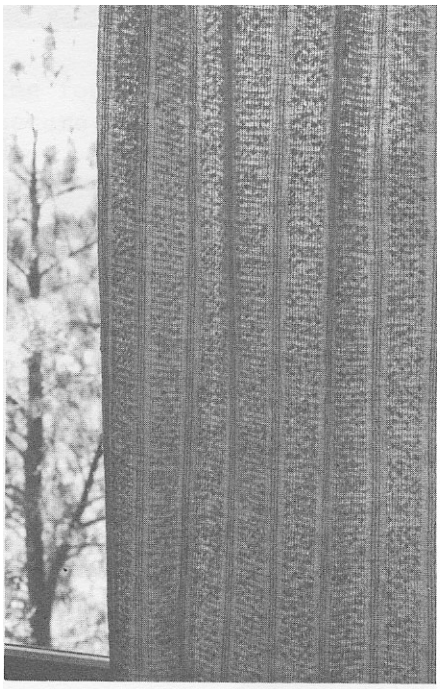
NOTE: These are two examples of the many weaves that can be done on 4 harness straight draw.

A was chosen for laciness.

B was chosen because broken twill gives a soft drape without showing any twill lines.

3. Yardage suitable for draperies.

Curly Q is a highly textured cotton from Henry's Attic. One should call it a weft yarn but if it is used with a coarsely dented reed (10 dent or less) and if it is not crowded, it works well for warp.



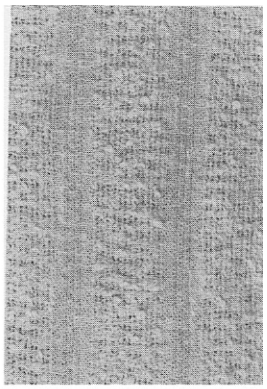


Plate 4 - Drapery fabric and detail

WARP: Curly Q (from Henry's Attic) (*)
Cotton Flake (or 2-ply cotton slub) mill end (X).

Natural flax and rayon boucle from Contessa (•).

WEFT: Cotton flake

SETT: See threading for the denting pattern. 10 dent (40/10 cm) reed.

 means together in one dent

 means skip a dent

THREADING, TIE-UP AND TREADLING: See Fig. 3.

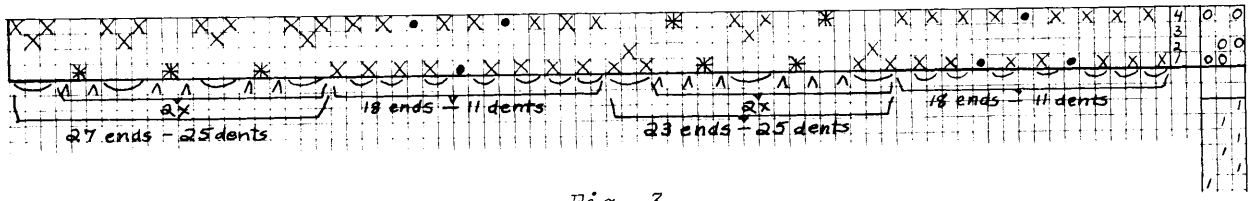


Fig. 3

FINISHING: Machine wash, air dry and steam press.

SHRINKAGE: 20% in width (from 40" to 32"), 12% in length.

NOTE: This threading is a combination of lace weaves. Besides the plain weave stripes there are stripes of huck lace as in Fig. 1 and stripes of Swedish lace. (See reference: *Combining Lace Weaves*, page 14 of this issue.

Because of the heavily textured warp, it is recommended that the warp be beamed before it is threaded through the heddles.

When beating in, watch the plain weave stripes to see if the fabric is beaten in uniformly.

Plate 5 - Olga Plam models a cotton shirt woven by Lyn Fletcher.

detail

4. Cotton Shirt

WARP: (10/2 cotton (x)
(3/2 mercerized
cotton (*).

WEFT: Same as warp.

WIDTH IN THE REED:
19" (46 cm)

LENGTH OF THE WARP:
2 3/4 yards (2.5 m)

SETT: 24 epi (100/10 cm)

SELVEDGES: For the first and the last warp thread, use the 3/2 cotton instead of 10/2. This makes an attractive picot edge with the weft loops of the heavier cotton.

THREADING, TIE-UP AND TREADLING: See Fig. 4

FINISHING: Handwash and press. There is a 10% shrinkage.

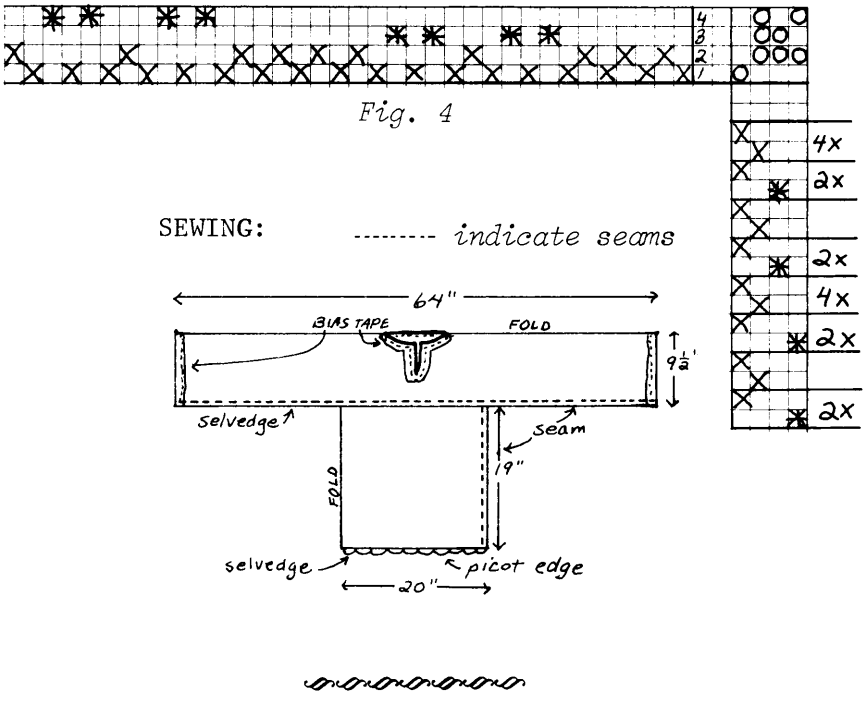


Fig. 4

Multiple Harness Weaving Course - Introduction

Many weavers who weave on four or more harness looms look for swatches of fabric (or photos) and the accompanying draft to get them started on a project. This is a valid inspiration because the weaver puts a lot of his own into the final project such as the choice of yarn, color and texture. For the four harness weaver such inspiration is readily available, but when it comes to more than four, the full potential of the loom can not be expressed through recipes that are well tried and work well.

Using the harnesses of a loom is a design problem which involves making many decisions. Those decisions must be based on a thorough understanding of the weaves, their relation with the loom and their graphic representation through drafts.

This weaving course, of which a lesson will be published in each issue of *The Weaver's Journal*, aims at giving the weaver the knowledge and the tools to design weaves and patterns and explore the potentials of the loom as a tool for designing.

In general, we will work with 8-harness examples but the four harness weaver as well as the more than 8, will find that the same principles govern the understanding of all loom controlled designing. In this introduction we wish to publish the bibliography.

Required books for the course:

Black, Mary, *New Key to Weaving*, 1957, Bruce Publishing Co.
Oelsner, G. H., *A Handbook of Weaves*, Dover Publications, Inc., New York, NY.

Books that will be referred to in this course:

Barrett, Clotilde, *Summer and Winter and Beyond*, 1979, Colorado Fiber Center, Inc., Boulder, Colorado.
Bronson, J. & R., *Early American Weaving and Dyeing*, Dover Publications, Inc., New York, NY.
Collingwood, Peter, *The Techniques of Rug Weaving*, 1968, Watson Guptill, New York, NY.
Cyrus, Ulla Zetterström, *Manual of Swedish Handweaving*, 1950, second U. S. edition 1977, Charles T. Branford Co., Newton Center, MA.
Holroyd, Ruth Jacob, *Angstadt Designs*, Ruth Holroyd, Pittsford, NY 14534.
Kerby, Mary, *Designing on the Loom*, Select Books, Pacific Grove, CA.
Landis, Lucille, *Twills and Twill Derivatives*, Lucille Landis, Old Greenwich, CT.
Laughlin, Mary Elizabeth, *More Than Four*, 1976, Laughlin Enterprises Ltd., West Sacramento, CA.
Powell, Marian, *1000 (+) Patterns in 4, 6 and 8 Harness Shadow Weave*, 1976, Robin & Russ, McMinnville, OR.
Tidball, Harriet, *The Handloom Weaves*, 1957, HTH Publishers, Freeland, WA.
Voolich, Erica, *Playing With Blocks*, Erica Voolich, Somerville, MA.
Watson, William, *Textile Design and Color*, 1946, Lomans, London.
Worst, Edward F., *Foot Powered Looms*, 1945, Bruce Publishing Co., Milwaukee, WI.
Zielinski, S. A., *Encyclopedia of Hand Weaving*, 1959, Funk & Wagnalls, New York, NY.

It is advisable to note next to each title where the book is available for purchase and the current price, and where the book can be borrowed.

There is an art to reading and using these books as the authors use different drafting systems. The differences will be explained here for four books. Most others use similar systems. During the course, further clarifications of drafting systems will be necessary.

THE DRAFTING SYSTEM THAT WILL BE USED IN THIS COURSE.

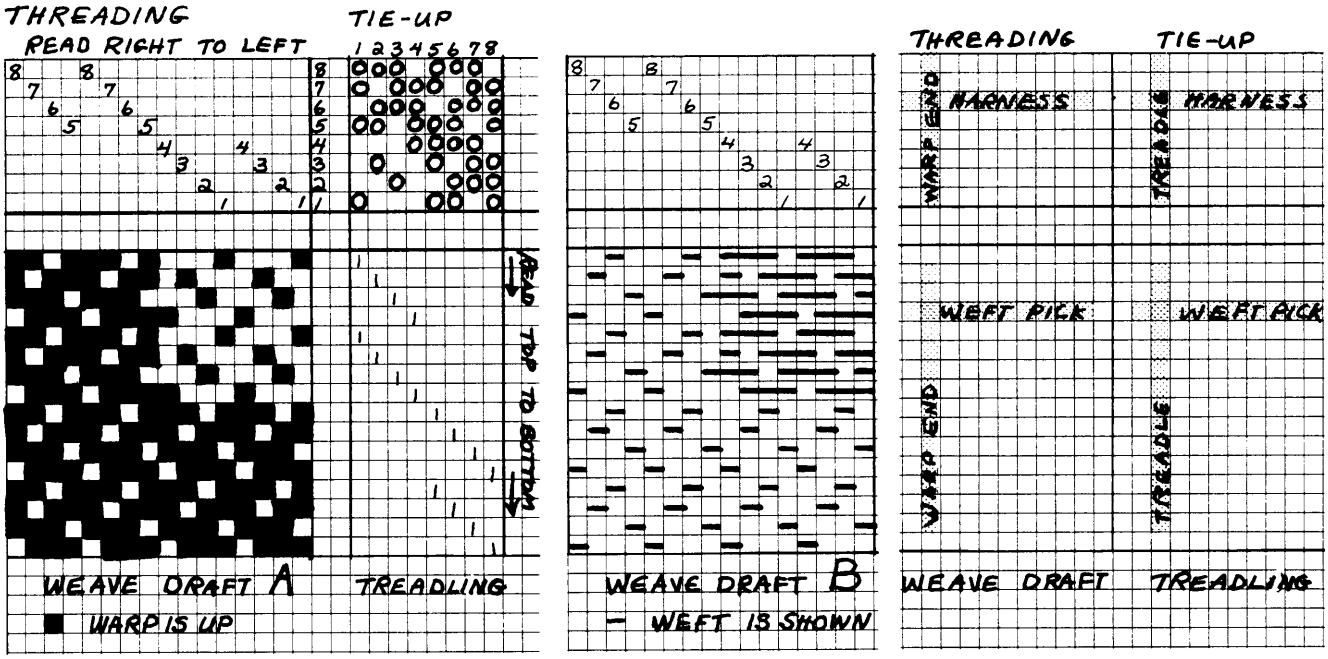


Fig. 1

THREADING: The harnesses are numbered from bottom to top; the numbering of the harnesses is at the right. When a warp end is threaded to a harness, the number of that harness is written inside that square. The fraft is read from right to left.

Advantage: It is the system most used by American handweavers. (see Mary Black, *New Key to Weaving*).

Disadvantages: For people who thread their looms from left to right, the draft reads backwards. If two or more yarns or colors are used, a symbol has to be added to or replace the numbers.

TIE-UP: The tie-up is for a rising shed loom, hence o instead of x. The tie-up is drafted to the right of the threading.

Advantages: More treadles can be added to the right of the present draft. This system is used by many American handweavers. Ref. Mary Black.

TREADLING: The treadling gives the order in which the treadles are used. The order is read from top to bottom.

Disadvantages: One has constantly to refer to the tie-up above in order to see which treadle it is and which harnesses are lifted. The reading is done from top to bottom but the actual weaving procedes from bottom to top which, for example, reverses the direction of the twill line.

Advantage: This is a neat, logical and concise way of giving the treadling order and additional weft picks can be added at the bottom of the established draft.

THE WEAVE DRAFT (cloth structure or interlacement): This draft represents the interlacement of the warp and weft. A filled square indicates that at that crossing of warp and weft, the warp is raised and lies on top of the weft. This draft illustrates graphically a section of cloth that is woven with as many epi as ppi of which the warp is black and the weft is white.

In this course, the opposite weave draft shown in Fig. 1B will also be used. A line through a square indicates that at that crossing of warp and weft, the weft lies on top of the warp. This weave draft is especially useful when colored pattern wefts are used.

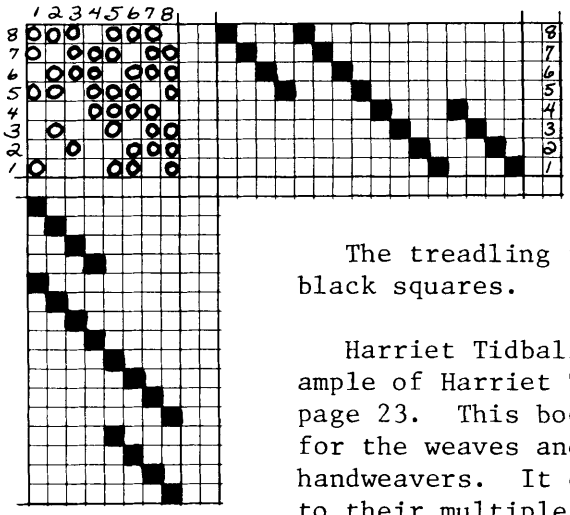


Fig. 2

DRAFT BY HARRIET TIDBALL (See Fig. 2)

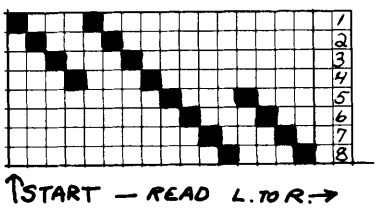
The threading draft is the same as in Fig. 1 but black squares are used instead of numbers. The tie-up is the same as in Fig. 1 but is placed to the left of the threading draft.

The treadling is the same as in Fig. 1 with the use of black squares.

Harriet Tidball rarely uses weave drafts. For an example of Harriet Tidball's draft see *The Handloom Weaves*, page 23. This book is valued as a concise reference manual for the weaves and drafts that are most commonly used by handweavers. It deals with the expansion of these weaves to their multiple harness equivalents.

DRAFTS USED BY G. H. OELSNER.

A Handbook of Weaves is written for the textile industry but is of great value to the handweaver. It takes time to become familiarized with its symbols and syntax but the effort is well worth while. This book contains a wealth of information for the multiple harness weaver.



In *A Handbook of Weaves* there are few threading drafts; when they do appear, they are read from left to right and the harnesses are often numbered from top to bottom. See Fig. 3.

Fig. 3

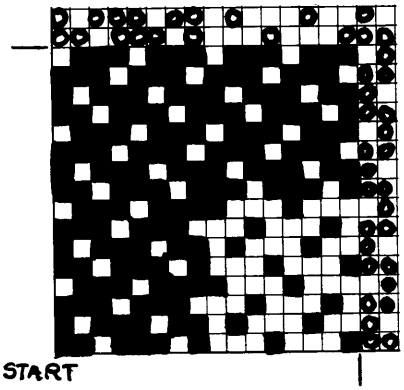


Fig. 4

With a few exceptions, the weaves in Oelsner's book are represented by their weave draft only. See Fig. 4.

These drafts are the same as the weave draft in Fig. 1 but are read from left to right and from bottom to top. This is a more accurate graphical representation of the cloth as it is woven on the loom. If the weave draft shows more than one repeat, as in Fig. 4, a pair of short lines will often aid the reader at blocking off one repeat. In many cases, but not consistently, different symbols are used to make the "one repeat" show up clearly in the weave draft. See Fig. 4.

The weaver has to be able to derive the threading, tie-up and treadling from these weave drafts.

HOW TO DERIVE THREADING, TREADLING AND TIE-UP FROM A WEAVE DRAFT. See Figs. 1 & 5.

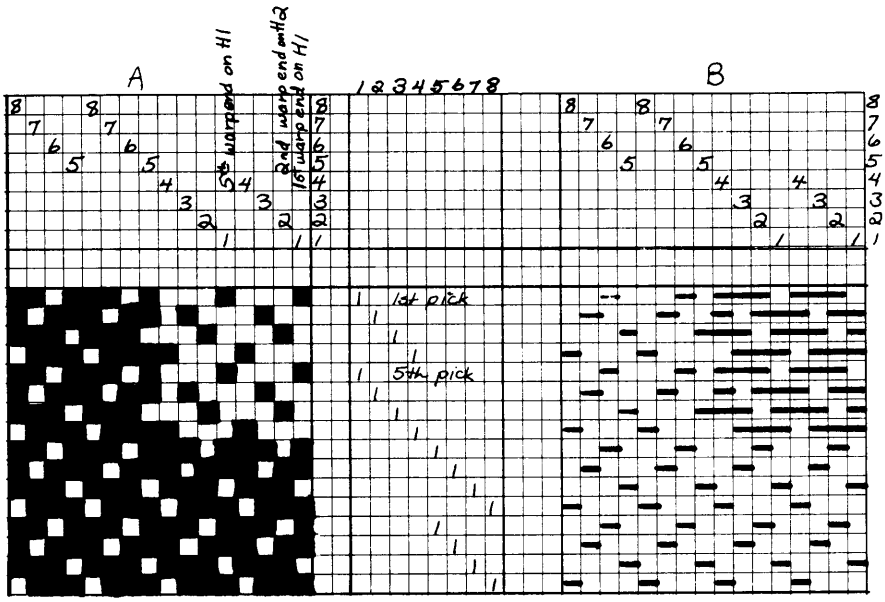


Fig. 5

Copy "one repeat" of the weave draft on graph paper. Scan the grid of the weave draft from right to left and place each warp on a different harness (1, 2, 3 and 4). When two warp ends interlace in an identical way, then these warp ends may be threaded on the same harness. In our example, threads 1 and 5 are identical and are both threaded on harness 1.

Note that the industrial designer does not worry about putting a weave on as few harnesses as possible. The industrial threading for the weave draft of Fig. 4 is likely to be a 16 harness straight draw because there are 16 warp ends in the repeat.

Next, scan the grid from top to bottom and allow a treadle for each weft pick. When two weft picks interlace in an identical way, one can economize on treadles by assigning the same treadle to those two picks.

The tie-up is figured last. Study the first pick of the weave draft and notice the filled squares which indicate that those warp ends and thus the corresponding harnesses are up. Check their harness number above in the threading and tie the treadle for the first weft pick (treadle 1) to those harnesses by putting o's where the first treadle column crosses the rows 1, 5, 7 and 8. See Fig. 1.

Check each pick in turn and tie the corresponding treadle to the harnesses that carry the warp ends which are up.

For an accurate derivation of a complete draft from Oelsner's weave draft, one has to rearrange the quadrants as shown in Fig. 6. This is a very popular drafting system.

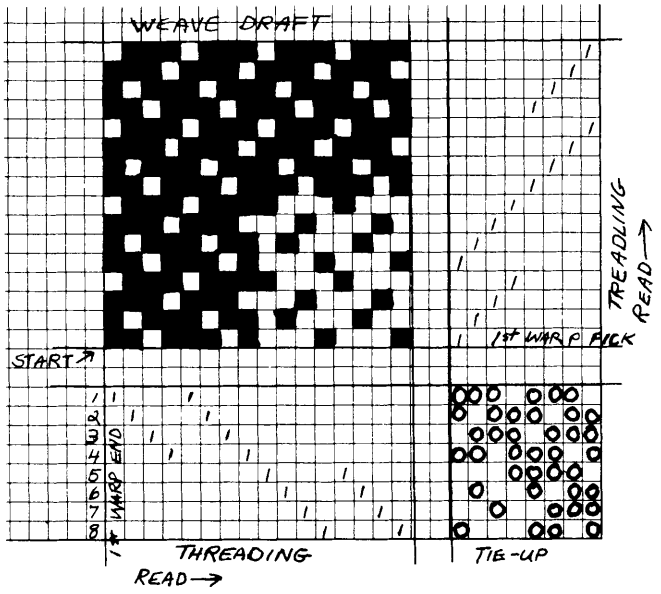


Fig. 6

The advantage of giving the weave draft only is to be able to cram a lot of information in a minimum of space.

U. CYRUS ZETTERSTRÖM'S BOOK is written for the handweaver but the author brings to the attention of the weaver some structures that have a typical European tradition and some weaves that are used more commonly by industrial designers.

Cyrus' method of drafting is essentially the same as Oelsner's, but Cyrus does give the complete drafts rather than just the weave draft. See Fig. 6.

MARY KERBY SYSTEM OF DRAFTING is the most difficult for the handweaver to cope with.

The threading draft is standard and basically the same as all other authors'. However, Kerby combines the tie-up and the treadling in one draft called the peg plan.

This method is convenient for dobby-looms and also saves space, but most handweavers will have to convert the peg plan to a more familiar drafting system.

For example, on page 39 of *Designing on the Loom* one finds a threading E and several peg plans E1, E2. See Fig. 7.

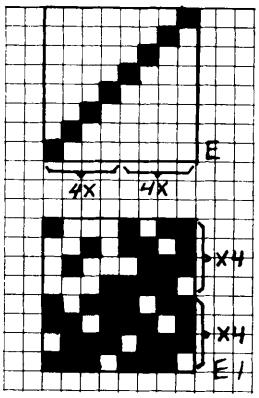
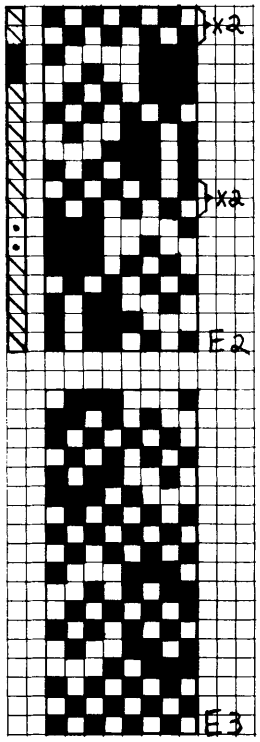


Fig. 7

If there were no repeats in the peg plan such as in E3, nor in the threading, then the peg plan is the same as the weave draft in Oelsner. See Fig. 8 and 6. However, there are repeats both in the threading E and in the peg plans E, and E2. In this case put the harness numbers on the row above the peg plan, numbering from left to right. See Fig. 9.



Read the peg plan row by row starting at the bottom.

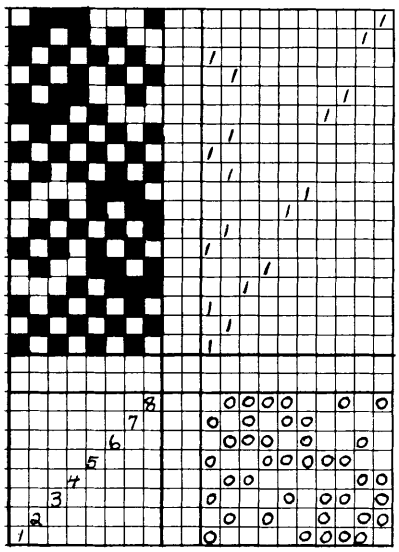


Fig. 8

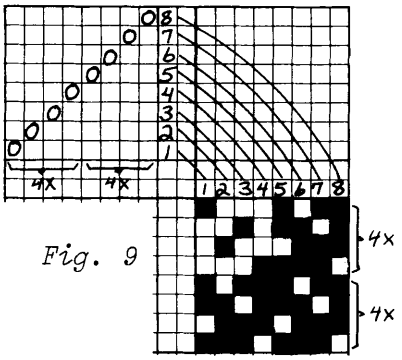


Fig. 9

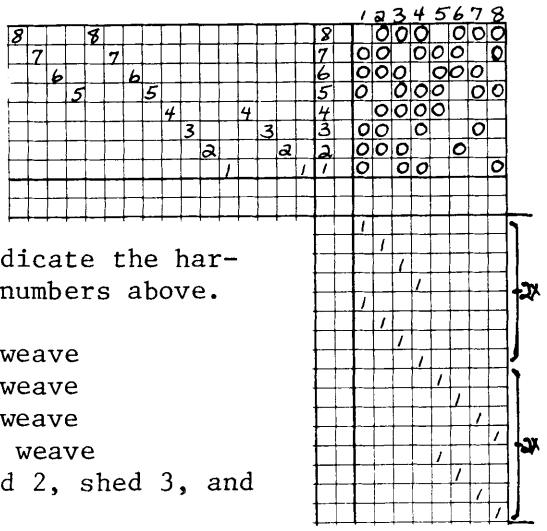


Fig. 10

Each row is a shed in which dark squares indicate the harnesses that are lifted by referring to the numbers above.

Shed one - lift harnesses 1,2,3,5,6,7 - weave
Shed two - lift harnesses 2,3,4,6,7,8 - weave
Shed three - lift harness 1,2,4,5,6,8 - weave
Shed four - lift harnesses 1,3,4,5,7,8 - weave
For the next 4 picks, repeat shed 1, shed 2, shed 3, and shed 4. Repeat the sequence twice more.
Shed five - lift harnesses 4,5,6,7 - weave
Shed six - lift harnesses 2,6,7,8 - weave
Shed seven - lift harnesses 3,5,6,8 - weave
Shed eight - lift harnesses 1,5,7,8 - weave

There are 8 different sheds, thus 8 treadles tied up as in Fig. 10.

The complete draft of Fig. 10 is the one we would use as the standard draft in this course which would weave the same cloth as that woven from drafts E, E1.

Book Reviews

A LOOM TO BUILD by Carrie Rogers, 1979, Carrie Rogers, 901 Fairway Drive, Columbia, Missouri, 65201, 86 pp. $8.15.

The subtitle of this book is "Complete directions for a 4-harness floor loom, including a chapter on warping the loom."

"Complete" is the key word. The author gives all the information necessary to see the construction through from the beginning to the end. The loom is a 4-harness, 6 treadles, counter-balanced type with a weaving width of 26".

The text is clear and well illustrated. The author guides the builder through every step, warns when there are potential problems and nudges the loom maker on with many encouragements. It looks like no one should fail with this project, even the rankest amateur.

The cost of the loom is kept down by avoiding expensive metal parts. This loom is really home-built all the way!

The vast experience of the author shows through the book and assures a well designed loom that really works.

The instructions for dressing the loom are good too.

The end of this book marks the beginning of a happy new weaver.

Clotilde Barrett

DESIGNING FROM NATURE by Esther Dendel, 1978, Taplinger Publishing Co., New York, 159 pp. $5.95.

Weavers who feel the lack of education in design will get a good start by reading this book.

The elements of design are introduced by means of a narrative text and splendid nature photographs. All this makes learning much more pleasant.

The author emphasizes the different ways of relating to visual and tactile experiences: abstract, poetic, subjective, objective. She also explores ways to interpret those experiences with fiber.

Throughout the book, the focus seems to shift between design and inspiration. Many of the textile pieces shown in the photographs are excellent illustrations of works that were inspired by natural surroundings but are poor examples of design.

In this book, Esther Dendel teaches the fiber craftsman how to discover design and how to find inspiration in the most unexpected places.

Clotilde Barrett

FINE-ART WEAVING by Irene Waller, 1979 Batsford Books, London, 144 pp. hardcover, $7.50.

This book is a survey of contemporary fiber art in Great Britain. The focus is on the work done since World War II (1940-1945) with an introduction depicting the development of handweaving in Britain since the Industrial Revolution.

The author introduces us to key figures and influential schools and manufacturers whom she credits with having been of great importance to the development of today's fiber art movement in Britain.

The bulk of the book is about 17 artists who, during the last 35 years have made important contributions to the arts, using fiber as a medium, and their work.

Their names are: Tadek Beutlich, Archie Brennan, Geraldine Brock, Peter Collingwood, Bobbie Cox, Fiona Geddes, Myriam Gilby, Maureen Hodge, Robert Mabon, Fiona Mathison, Theo Moorman, Kathleen McFarlane, Alec Pearson, Maggie Riegler, Sax Shaw, Unn Sonju, and Ann Sutton.

The author traces the development of these artists and dwells on their aesthetic achievements.

The book is profusely illustrated with black and white and colored photographs. A listing of the artists' studio addresses, exhibitions, commissions and collections is helpful for those who want to get better acquainted with the works.

This book is a great inspiration for textile craftsmen and gives a much needed account of what's going on in a country that has so many cultural ties with others where fiber art has evolved with great vigor.

Clotilde Barrett

PUEBLO WEAVING AND TEXTILE ARTS by Nancy Fox, 1978, Museum of New Mexico Press, Santa Fe, New Mexico, 94 pp.

It is generally believed that the Navajo Indian learned to weave from the Pueblos. But who are these Pueblos? What fiber did they use? What dyes? What equipment? What techniques? What designs? What kind of textiles did the Pueblos produce in the past and what are they doing today?

The reader will find answers to all these questions in this superb little book. The author gives a wealth of information and illustrates it with photographs (12 in color) and line drawings.

The chapter on the beginnings of the Pueblo culture traces Southwest textile development back to the Basket Makers (A.D. 300-500). Cotton, and later on, wool are the fibers most commonly used. The author discusses the preparation of these fibers.

The techniques used in the Southwest are varied, each requiring an appropriate loom or other equipment. All of this is well illustrated in this book and there are many photographs showing textiles woven by the Pueblos in historic times.

Charts, maps, a bibliography and a glossary further enhance the value of "Pueblo Weaving".

Clotilde Barrett

FIBER EXPRESSIONS: KNOTTING AND LOOPING by Sarita Rainey. Davis Publications, Inc., 136 pp. 300 illustrations, 25 color. $13.95.

Sarita Rainey, well known author of *Weaving Without A Loom* has written this book focusing on knotting and looping, including wrapping, coiling, netting, macrame, rug knotting, crochet and knitting techniques. She gives basic techniques, shows variations, and then makes many suggestions for further exploration of the technique.

There are chapters devoted to mounting devices for fiber projects, jewelry and body adornment, fiber sculpture, and innovations combining fiber with non-traditional materials. The introductory chapter on design elements is valuable for study, for designing and evaluation of fiber expressions.

This book is written for the serious fiber artist, hobbyist and professional. It could easily be used for a high school or college text and would be a valuable addition to the library of art and home economics teachers as well as fiber artists.

Ellen Champion

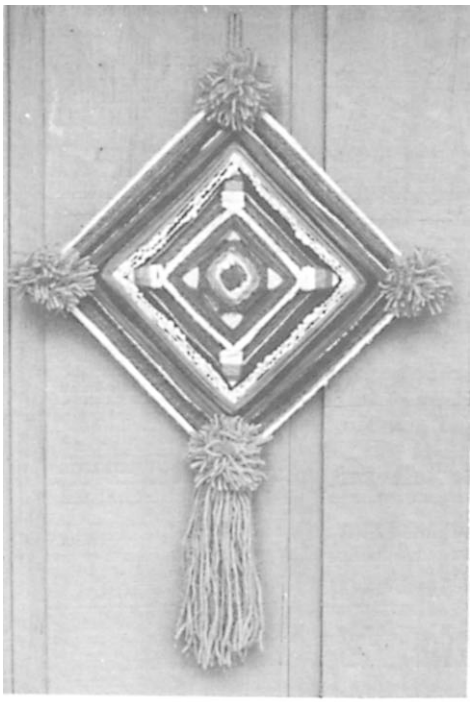


Plate 1
Ojo de Dios by
Nancy Champion

Ojo de Dios

by Ellen Champion

The beautiful ojo de Dios, or God's eye, decoration of the southwestern U. S. and central and south America, has its origin as an Indian good luck symbol. The basic structure is a pair of sticks or rods of equal length; dowels, flat sticks, popsicle sticks, coffee stirrers, swab sticks, toothpicks or fine wire (for earrings). A beginner should start with rods about 8" to 10" long and about ½" in diameter. The weaving is done with 3 to 7 colors of yarn, carefully chosen to blend and complement each other. One of the colors should be very light or white and one should be very dark. The yarns may be knitting, weaving, or craft yarns or sewing thread for tiny "ojos". The sticks are crossed at the center and must be held tightly together with a bit of glue or be tied with yarn. Figure 1 illustrates the steps for constructing a God's eye.

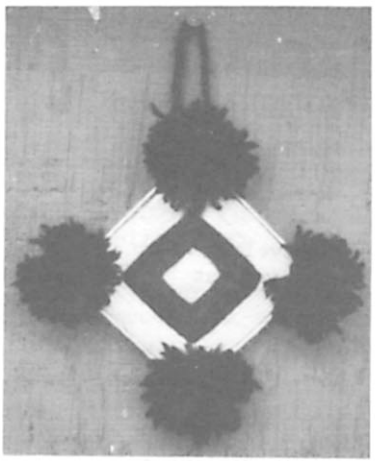


Plate 2

Start a contrasting color yarn with a clove hitch on a different spoke from the one which was just used for ending the last color. Proceed to weave counterclockwise as before, ending the color on the same spoke as it started.

The front surface appears as a set of flat diamond shapes. The back shows the wrapped spokes or "ribs". One may occasionally weave so that the flat surface appears on the back and the ribs appear on the front, by turning the frame over so the back ribs are toward you, and proceeding as before. Make sure all the yarn ends are hidden under wraps.

Decide which spoke end is the "top", and tie a small loop of doubled yarn on the back, weaving in all ends. This becomes a hanging loop. The spokes may be wrapped with yarn to the ends, or pompoms or tassels may be attached to the ends. Figs. 2 and 3 illustrate making pompoms and tassels.

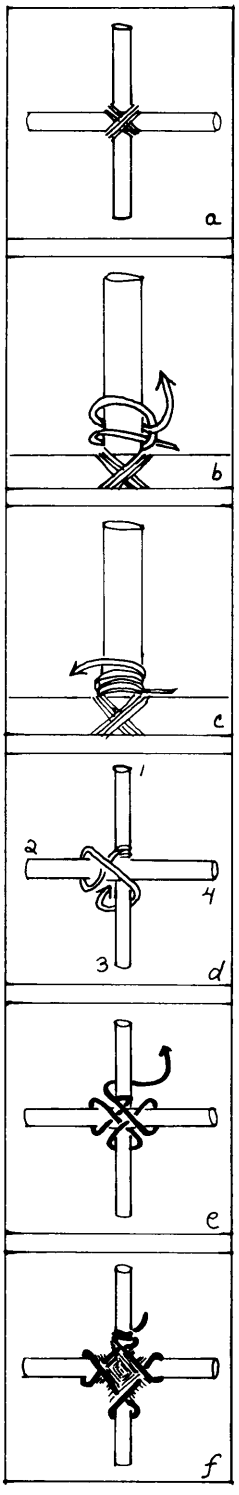


Fig. 1

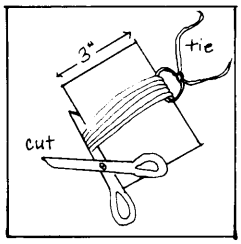


Fig. 2

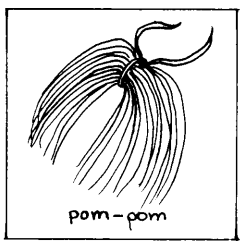


Fig. 3A

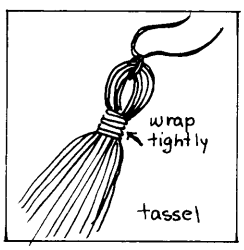


Fig. 3B

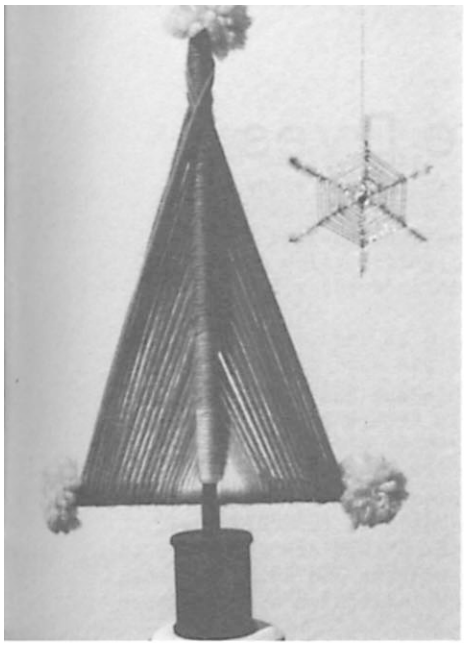


Plate 3 - Tree by Barbara Knollenberg Backside showing rib

To make a tree shape, cross the rods so that spoke 2 is much longer than spoke 4. Spokes 1 and 3 should be equal. Hold the tree stem (spoke 4) with one hand. Start green yarn with a clove hitch on spoke 1, wrapping over the knot. Wrap twice around spokes 1, 2 and 3, and back to spoke 2 passing in front of the cross when going from one spoke to another. Do not wrap around spoke 4. As you weave, push the wraps snugly in toward the center.

To make a snowflake, use 3 small white rods, or cotton swab sticks about 3" long. Glue and then tie the centers with white thread, crochet thread or fine yarn. Start at spoke 1 and wrap over and around spokes 2, 3, 4, 5, and 6, and on to 1, similar to the basic God's eye weave. (See Fig. 5) This makes a 6-sided figure. Alternate a few rows of front wrapping with a few rows of back wrapping for a lacy look. Use a dot of white glue to help hold the ends securely under any knots and at the tips of the spokes.

A good reference for more variations is *Ojo de Dios - Eye of God* by Charlet Albaum, 1972, Grosset and Dunlap.

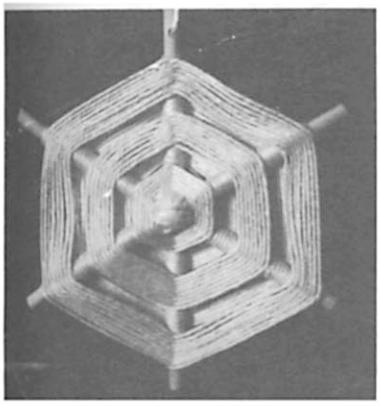


Plate 4
snowflake

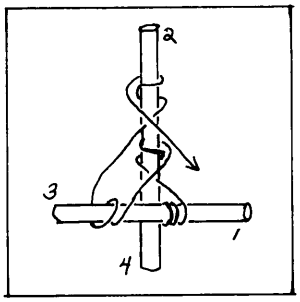


Fig. 4
tree wrap

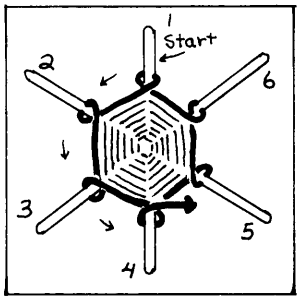


Fig. 5
snowflake wrap

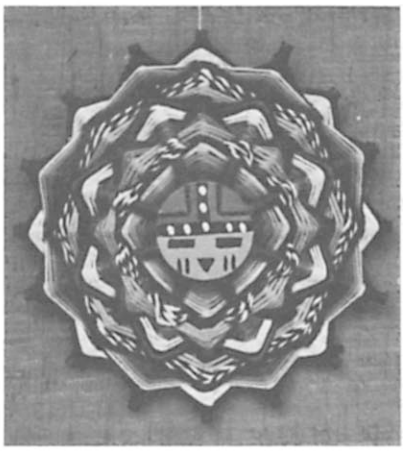


Plate 5
Ojo de Dios - purchased in New Mexico - 4" diam.

Dyeing with Fiber Reactive Dyes on Cotton

by Kay Read

For years cotton was a difficult fiber to dye. To gain a full range of colors one had to go to several different types of dyes. Some of these lent a dull look to the cloth while others were less than colorfast, bleeding in the wash and fading in strong light.

In the past 20 years this situation has changed for both industry and craftsman alike since the introduction of a new class of dyes called Fiber Reactive in 1956. These dyes were designed for cellulosic fibers (plant fibers) but will work on some protein fibers as well. Besides cotton they are effective on linen, jute, hemp, sisal, viscose rayon, and silk. They are colorfast, fade resistant and boilproof when handled properly. An enormous range of colors is possible and when treated right will have a magnificent depth and brilliance that is truly beautiful.

I began working with fiber reactive dyes over 11 years ago when I studied briefly with Meda Parker Johnston. I had been batiking on silk (very expensive for my student's budget) using aniline dyes and was very disappointed with the results. That one summer workshop with Meda was responsible for changing the entire direction of my art due to my introduction to these dyes and Meda's expertise with them.

Although I was originally trained in weaving, as many of my generation of fiberists were, I do not consider myself a weaver. Primarily, I am a surface designer. Notwithstanding a certain amount of three-dimensional work in crochet and quilting, I mostly batik, paint and silk screen on fabric. Since this is where my experience lies, the main thrust of this article will deal with those areas I'm most comfortable with. However, the dye information I intend to pass along is basic enough that I see unlimited possibilities for experimentation for weavers in areas such as space dyeing, Ikat, or warp painting. After all, space dyeing and Ikat are woven variations of tie dyeing on cloth and warp painting is a variation of direct application. Given some thought there are many possibilities weavers may want to try on any of the fibers already mentioned.

FIBER REACTIVE DYES/PROPERTIES AND COLORS

It is my understanding that all fiber reactive dyes ultimately trace their origins back to the same source, I.C.I. of Great Britain, regardless of the brand name. However, brands do seem to vary as to effectiveness due to the fact that they can be cut in strength with other substances. Common brand names here are Procion, Fibrec, and Dylon. Procion has always been successful for me and is distributed by the main source of fiber reactive dyes in this country: I.C.I. of America. It is available from numerous retail stores and mail order houses. My personal preference is for a source which sells it in bulk according to the I.C.I. code numbers. This assures a degree of repeatability; furthermore, they are cut quite strong (concentrated), therefore only small quantities are required in mixing.

Basically, the home dyer will want colors from the "M" range, although one useful color, turquoise, comes from a different range. The "M" range is more stable and easier to use. Turquoise has ceased to give me trouble after years of working with it and should not give you much trouble either if you follow my procedures.

Before I plunge into a discussion of the chemical properties of these dyes, I feel the need to explain that I've never had a chemistry class in my life but found it necessary to learn all this stuff in order to gain an understanding of what I was doing. With that said, I'll proceed with my layman's knowledge. The dyes are formulated to produce a molecular bond with the fiber. All things have a molecular structure. Cotton has one and so do fiber reactive dyes. When they "bond" that means that the "loose ends" of the molecular structure of one are just hanging out there waiting to attach themselves to corresponding "loose ends" of the other. Given proper conditions these molecules bond to each other never to be parted again: hence the extreme permanence of these dyes.

The chemicals, all of which are common household ones, which are needed for the proper conditions are as follows:

1. Sodium Chloride, either in the form of uniodized salt, available at grocery stores as pickling or canning salt, or:

2. Urea: a common fertilizer available at feed and supply houses. Be sure to get one that is white and not yellow in appearance. These substances improve solubility of the dyes, prevent aggregation, and act as swelling agents which delay drying, thereby allowing more time for the bonding.

3. Soda: either as bicarbonate of soda or washing soda; both are available at most grocery stores. The soda causes the dye to go into solution and bond with the fiber. I might add that this is not a completely perfect bond, but it is close to perfect.

4. Phosphate: usually in the form of a water softener such as Calgon also available at your grocery store. This also slows down the reaction time allowing for a better bonding.

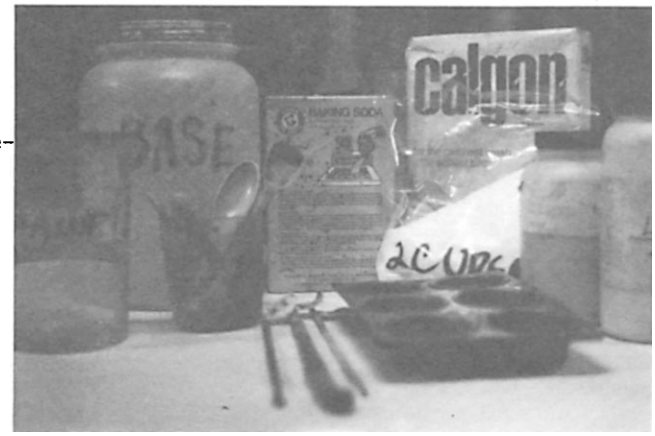


Plate 1

All of the chemicals are mixed in plain old tap water. The dyes work best in an alkaline environment of 10.5 pH to 11 pH. In some instances, though not all, vinegar is used as a preliminary bath. The temperature of the water will also vary with the process and recipe.

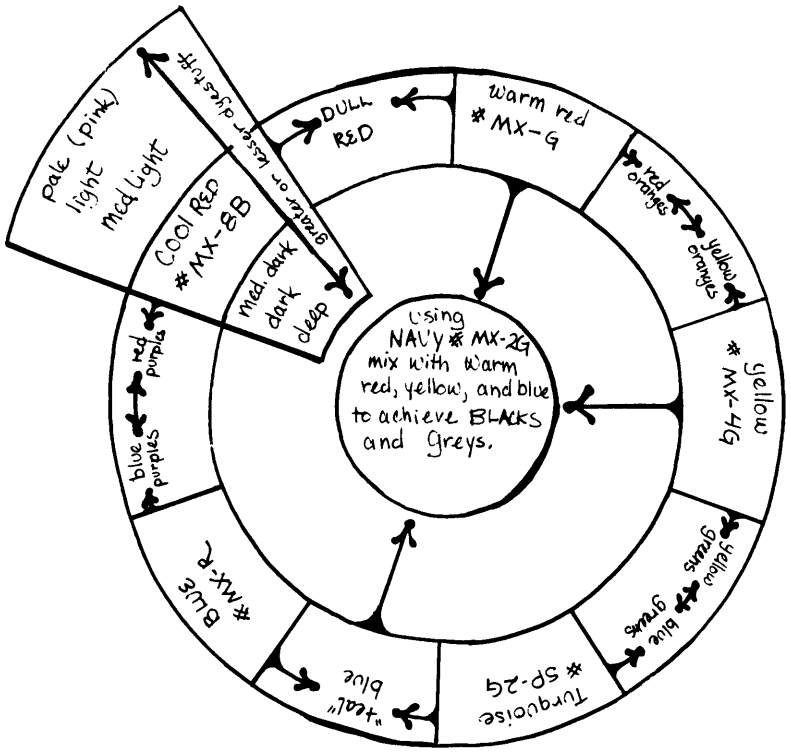


Figure 1

I use only six colors from which I've been able to get almost any other color I've ever wanted. I use ICI yellow MX-4G, which is lightly cool in tone but can be easily warmed with warm red MX-G, which is a coral hue; cool red MX-8B, which is a magenta hue; blue MX-R, which tends toward cobalt; turquoise SP-2G, a blue-green and also the only non-"M" range color and therefore requiring some special handling; and finally, navy MX-2G, which I use almost exclusively for mixing greys and blacks and for softening colors. Figure 1 shows a very workable color wheel for mixing purposes.

The manner in which you approach mixing colors depends on your aims. If you need strict duplication of colors for production works then be sure to keep a notebook with color swatches on the fiber used, quantities of dyestuff and chemicals, and times and procedures, to insure repeatability. If, however, you are using the dyes in a free-form manner on one-of-a-kind items in which expression, creativity, and conceptualizations are of the primary purposes and repeatability of color is of little importance, then the notebook approach will be most inhibiting to say the least. The approach is up to you. I use both depending on the item I'm making.

COTTON FIBER: VARIETY AND PREPARATION

Whatever you work on must be 100% cotton whether it is yarn or ready made cloth. As I pointed out, these dyes are formulated to bond only with cellulose fibers and will have no effect whatsoever on synthetics. However, experimentation with "heather" effects might be interesting on cotton and synthetic blends.

The fiber must be clean and free of all foreign matter including soaps and detergent build-ups and can have no chemical treatments with the exception of mercerization. Most chemical treatments coat the fiber, prohibiting the bonding reaction. Mercerization, however, was designed to increase dye uptake on cotton, and therefore, is very desirable. Mercerized cotton will have a lovely sheen to it which will enhance the dyes greatly.

POSSIBLE HAZARDS/HEALTH AND ENVIRONMENTAL

Robert Stetson of ICI of America has informed me that these dyes are judged to be non-toxic by the U. S. Government. He claims neither the dyes nor the dye chemicals contain any known carcinogen and that they will not irreversibly pollute the environment. The phosphate is environmentally bad but is used in only some of the recipes and then in extremely small quantities. It is possible to eliminate it if you are very conscientious in this area. In terms of health issues I wish to inject a personal note here. I do feel they are potential allergens to some people. I've known of two or three individuals who developed skin rashes and nosebleeds due to the dyes; both of these are common allergic reactions. This, I feel, is most likely when the dyes are in their powdered state. Anyone can develop a hypersensitivity to any substance at any time regardless of allergy history or lack thereof. I strongly advise using a bit of common sense. In all instances the afflicted people were the sort who practically took baths in the dyes. Please, use rubber gloves! Also, invest in a cheap dust or particle mask available at most drug stores (often sold as hot or cold air masks) and wear it when working with the powdered dyes. This, I feel, applies only if you plan to work with them on a regular basis. A one or two shot experimentation with them leaves you in little danger.

RECIPES AND PROCESSES

There are two basic recipes which can be used in a variety of ways. One involves salt and washing soda. This is a slower reacting recipe but generally produces more even results. Because of the time factor and the fact that it works better warm it is best used under vat conditions and therefore is good for batch dyeing and things like tie-dye.

The second recipe uses bicarbonate of soda and urea instead. Because this one is a quick reacting recipe (albeit it produces less even results) that can be used cold, it is ideal for processes such as Batik direct application and fold and dye, and also works well for silk screen and other kinds of printing.

I have three words of caution pertaining to both recipes. Number one, use only plastic, glass, stainless steel, or enamel containers to avoid unwanted chemical reactions. Number two, colors will vary in intensity so the quantities of dyestuff I list for you in the following recipes are rough estimates. You will want to run your own experiments. And, finally, turquoise, since it comes from a different range, requires double the quantity of soda in any of the recipes and must be oven set (as is explained in point 4 of the section on batik) before any rinsing or washing is done to it.

1. Salt and Washing Soda Recipes and Processes

TIE DYE (Dyes 1 lb. of fiber)

Presoak tied items in a weak vinegar solution before beginning process.

1. In one container dissolve 3 Tbsp. washing soda in 1 gal. of hot water.
2. In a second container dissolve the dyestuff and salt according to the following table in another gal. of hot water.

Dyestuff and Salt Table for Recipe #1		
1/4 Tsp. dye + 4 Tbsp. salt	=	pale shade
1 Tsp. dye + 8 Tbsp. salt	=	light shade
2 Tsp. dye + 12 Tbsp. salt	=	medium shade
4 Tsp. dye + 1 Cup salt	=	med. dark shade
8 Tsp. dye + 2 Cups salt	=	dark shade

3. Mix the two together and immediately immerse tied-up item. Stir for 10 minutes. Let it sit, stirring occasionally for another 50 minutes.
4. Rinse well in cold water and then in hot.
5. Can retie at this point and repeat steps 1 - 4 until finished.
6. Untie and rinse well again in cold water and then in hot. To finish, wash in a mild detergent.

BATCH DYEING (Dyes 1 lb. of fiber)

This recipe works well for fairly even results on both yarn and large quantities of cloth.

Again, presoak item in a weak vinegar solution before dyeing.

1. Dissolve 3 Tbsp. washing soda in 1 Cup hot water. Set aside.
2. Dissolve Dye, following the table in Step 2 of the tie-dye recipe, in 2 gal. of hot water.
3. Add cloth and stir for 5 minutes.
4. Remove cloth and add salt (again follow the table in Step 2 of the tie-dye recipe) and dissolve well.
5. Return cloth and stir for 15 minutes.
6. Remove cloth and add predissolved washing soda.
7. Return cloth and agitate for 5 minutes.
8. Leave in dye bath, stirring every 5 minutes, for 15 - 40 min. or longer depending on desired shade.
9. Remove and follow Step 6 of the tie-dye recipe to complete.

Plate 2

2. Urea and Bicarbonate of Soda Recipe and Processes

Base Recipe

This base can be stored indefinitely before the dye or soda is added and can be used for a variety of processes.

Base Recipe

1. In 1 qt. warm water dissolve 1 Tbsp. Calgon and 2 Cups Urea.
2. Add 2 qt. cold water and mix well.
3. When ready to use follow these proportions for mixing with dyestuff and bicarbonate of soda:

   1 Cup base + 1 Tsp. soda + 1 pinch to 1 Tbsp. dyestuff depending on desired shade.

Warning number one: You must use this within three hours after the soda has been added for the bonding reaction poops out after this point and the dye becomes ineffective.

Warning number two: Never mix two different containers of already mixed base, dye and soda. The reresults are at best dull, and at worst look as though the item has "rusted."

I will not go into great detail on any of the following processes since any one of them could constitute an article by itself. I will give only the process as it relates to the dyes in question for the benefit of those of you who know something about them already. If you know little or nothing about any one of these processes and wish to know more, I've included a short bibliography as well as a suppliers list at the end of this article for further reference.

Batik

Batik is an ancient wax or paste resist method of decorating cloth dating back to very early African and Far Eastern history. Hot wax or a paste resist is applied to the cloth. These "resisted" areas are coated, thereby preventing dyeing. In the end the resist is removed to reveal the colors that have been slowly built up from repeating the process many times. I have some comments that may prove useful to those of you who want to use the dyes for this purpose.

1. I rarely vat dip anything anymore but apply the dyes with a brush instead. This allows greater freedom in color build-up as well as better control. If bleeding is not desired the base recipe can be thickened and applied with a stiff brush such as an oil painting brush.

Painting Base Recipe
1 qt. Base.
1¼ Tsp. Halltex, Manutex, or Kelltex
1½ Tsp. Lutrol
Mix by hand, beater or blender until it is smooth and glassy. Use in the same manner as the unthickened base.

2. If a greater "crackle" is desired I then vat dip using the Base Recipe.

3. It is best to work on a dry background since the dyes tend to dull if allowed to mix wet.

4. However, a watercolor approach can be followed if you wet the cloth with clear base and soda using this mixture to bleed your colors. Remember, this will dilute your colors so mix them stronger than you normally would.

5. After the wax is ironed out follow these steps to assure permanence and brilliance of your dyes:

   a. Heat in oven at 285° F. for 10 - 30 minutes depending on the size of your item.

   b. Allow to "air-out" for 24 hours or more.

   c. Remove remaining wax by dry cleaning.

   d. Rinse well in cold water, then hot and then wash in a mild detergent.

Fold and Dye

This is a quick and fun method in which cloth is folded and ironed and then corners are dipped in containers of dye using the above recipe. You then carefully unfold and allow it to line dry. Then follow Point 4 of the batik section (skipping Step 3) to finish it. Experimentation will teach you many possibilities and much control.

Direct Application

This is a catch-all term referring mostly to painting with the dyes directly on cloth but may also mean some printing and drawing methods such as ink pen and dye on cloth.

Silk Screen

Silk screen is basically a stencil method of printing which makes use of numerous methods of applying a stencil to a piece of silk or nylon mesh stretched over a wooden or metal frame. The ink or dye is then forced through the stencil onto whatever is being printed. Again, for those who are familiar with the process I have a couple of notes.

1. Since the dyes are water base, any kind of water soluble stencil such as glue will not work for obvious reasons. I've used the dyes very successfully with photo silk screen.

2. It helps to work in a humid environment to keep the screen from clogging and prolong the bonding time of the dyes. I run a humidifier in my dry Colorado studio while screening to accomplish this.

3. The following recipe for screening dyes has proved useful to me:

Screen Printing Base
1 qt. Base
7¼ Tsp. Halltex, Manutex or Kelltex.
Mix in same manner as the painting base and use in the same way as the unthickened base.

4. Once the cloth has dried follow Point 4 (eliminating Step 3 again) of the batik section to successfully finish your item.

I wish anyone experiencing these dyes for the first time good luck, patience and good fun. No other dye for cellulose fibers can compare in brilliance, versatility and permanence.

SOURCES

Dyes and Dye Chemicals

FAB DER, 3553 Old Post Rd., San Angelo, TX 76901
ICI Organics Inc., 55 Canal St., Providence, RI 02901

Cloth

TESTFABRICS, P. O. Drawer "O", 200 Blackford Ave., Middlesex, NJ 08846

BIBLIOGRAPHY

Johnston & Kaufman, Design on Fabrics, Reinhold 1967
Meilach, Dona, Contemporary Batik and Tie Dye, N. Y. Crown Press 1973
Schwalbach & Schwalbach, Silk-Screen Process Printing, Van Nostrand Reinhold 1970
Stetson, Robert, "Using Procion Dyes," *Interweave, Vol. III, No. 3,* Spring 1978.