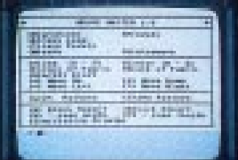
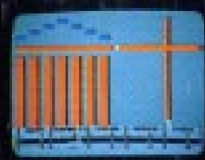
The Weaver's Journal

$4.00 Volume VIII, Number 2, Issue 30 Fall 1983

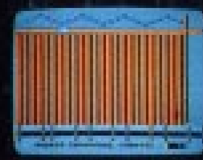
- Plant Fibers
- Towels: Basic Four-Shaft Weaves
- Rainbow Dyeing



Simple familiar commands make it easy to use

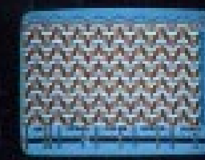


Thread the loom.
VIEW LEVEL 1

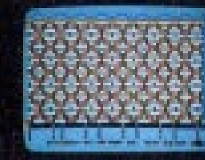


Repeat the Draft.
VIEW LEVEL 2

Tie up the pedals.
VIEW LEVEL 0



Weave the pattern as you prefer...



Or treadle-as-drawn-in.

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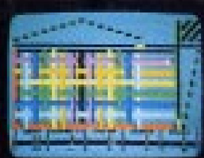
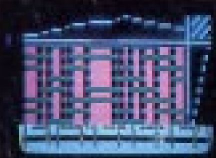
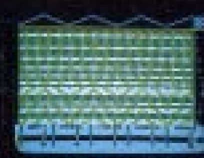


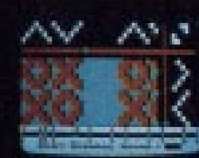
Each thread [warp and/or weft] can have its own COLOR,...
VIEW LEVEL 5



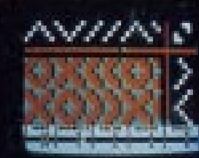
SIZE, [warp]...
VIEW LEVEL 2



and SPACING [weft].
VIEW LEVEL 3



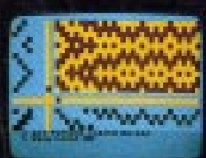
Insert warp or weft threads.



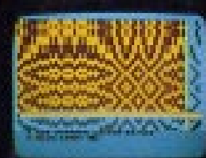
Fill in warp or weft threads.

Erase warp or weft threads.

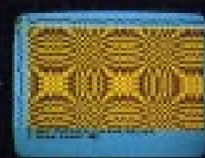
THE TEXTILE DESIGN TOOL



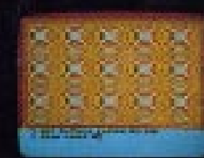
You can zoom in, ...
VIEW LEVEL 1



out...
VIEW LEVEL 2

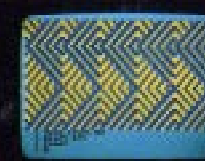


farther out...
VIEW LEVEL 3



and farther out.
VIEW LEVEL 4

Note that your draft can be positioned in any one of the four corners or all four.



You can examine the front of your fabric rising shed,

Or the back of your fabric falling shed.

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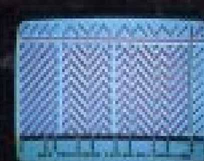
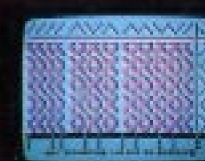


You can combine the threading from one

pattern with the tie-up from a second



and the treadling from a third.

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The Weaver's Journal

Quarterly Journal for Textile Craftspeople

Fall 1983 Volume VIII, Number 2, Issue 30 ISSN #0160-3817

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ARTICLES

DEPARTMENTS

Cover photo: Spinning thick and thin cotton weft yarn for "transparent weaving." (See article, p. 44.) Photo by Andrea Green.

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LETTER FROM THE EDITOR

This issue has been in the making for a long time, two years at least. We wanted to feature the lesser known plant fibers and proceeded to collect the proper information and to make contact with people and organizations directly involved with these fibers. Our files grew heavy with clippings, photocopies and carbons of letters. We searched for sources of suppliers for both the unspun fibers and the yarns. Our looms were threaded with ramie, and off came the interesting woven goods.

When the deadline for this issue was nearing, we had a lot going and yet, we had little publishable material. The necessary slides were not yet available; Kay Reed, our illustrator, was still in the final steps of earning a master's degree in Meso-American religions at the University of Chicago; copyright releases had not yet been granted. In the meantime, this Fall issue was growing fuller and fuller with scores of interesting articles related to other fibers, spinning, weaving and computers. I knew that a great issue was coming up but what about our feature articles?

Then came the day! The mail was bulging and the telephone was ringing. From everywhere came help, kind answers to our requests and the permissions to use material which we were eager to publish. By then, we could have put out a double sized Fall issue and still have material to spare. Unfortunately, this course of action was not too practical. The alternative was to return some of the articles on plant fibers (and some of the others) back to the file and wait to publish them at a later date. These articles involve mainly hemp, jute and ramie. Thus, we plan to feature those fibers again and, if anyone spins or weaves these fibers or knows of sources of supply, we would really appreciate hearing from you.

Our special thanks to Charles Keen, outside communication manager, Ciba-Geigy Corporal Relations, for the help he has given us.

Clotilde

EARL BARRETT 1919-1983

Together my husband and I have shared the enjoyment, the excitement and the occasional difficulties of producing and publishing *The Weaver's Journal.*

Earl helped with copy editing, with the photography and with evaluating the role of personal computers as an aid and a tool for handweavers. He was most supportive of *The Weaver's Journal's* philosophy of sharing knowledge and encouraging good handcrafts. His sudden death is a loss that no words can express.

MAIL BAG

After threading my loom with much interest and care to try "The All White Overshot Rug" by Connie Kendahl in Spring 1983 issue, I found that my sample in *no way* resembled the photo. I am enclosing a sample. Please help.

Rita Burnstein
Elkins Park, PA

Editor: When we receive letters like this, we try very hard to help the weaver out of her predicament. And we hope we pinpoint the problem.

We enjoy hearing from The Weaver's Journal *readers and try to answer all the letters we receive. However, please enclose a self-addressed stamped envelope with your letter. It would help us very much and bring you a speedier reply.*

Many songs about spinning and weaving have been lost forever. These songs were sung while working at the wheel, winder or loom. Every ethnic group that spun had them. If you know any, or know someone who still sings them, please contact me so they can be collected and saved. Words, music, even a tape of actual singing, together with as much information as you know about the song (nationality, purpose, original language, together with information about the informant—when the song was learned, how old is the person now, etc.) will help preserve a small but significant part of our spinning and weaving traditions. Thank you.

Donald Graves
338 Arch St
Bethlehem, PA 18018

Editor: This is an exciting project. If you know of a spinning or weaving song, let Donald Graves know.

I was pleased about the two pages you devoted to my work in the last issue (Winter 82-83) of *The Weaver's Journal* and thank you.

It is true, I spend time and effort on expressing the joy of weaving through beautiful garments. I have been teaching how to finish woven garments for five years and this has allowed me to involve other weavers in this field, one of constant research and discovery.

Anne Poussart
Quebec, Canada

I was a bit taken aback by the article on "A Handwoven Wedding Chuppa" because Shalom means both Peace and Love (in some senses) and the word shown is *not* shalom. So I got out my 26 languages Dictionary and find that it is Ahavah which is 'love' in another sense.

R. L. Shep
Lopez, WA

Your index to Vol. VII is most exciting; I hope you will continue to provide such indexes. This at once converts the indexed 4 numbers into a high quality textbook on weaving.

P.S. I now think *shaft* is better than *harness*, so I've switched my vote!

A. Gilbert Wright
Silver Spring, MD

Editor: We have included the index in each July issue since 1980. Earlier issues had separate indexes, which are still available at The Weaver's Journal *office. Please send a SASE with 37¢ stamp.*

MORE ABOUT THE HARNESS RACE

In 1970, at an age well past 50, I enrolled at Central Michigan University for a summer course in weaving taught by well-known Michigan artist/weaver Catherine Ux. In the class were two young women in their 30's and a dozen very young college students. The first morning as Mrs. Ux was introducing us to the mysteries of the loom and weaving, she spoke of the warp threads and asked what the threads crossing the warp are called. Dead silence! Did being the oldest mean I should know the answer? I wasn't so sure, but I tentatively murmured "Woof?" Again silence while Mrs. Ux glanced at me, noticing my white hair, gently said, "I haven't heard *that* word for YEARS, now we call it the "weft."

So I had to discard a familiar word for one less familiar. As I became better acquainted with looms and weaving I met up with words that were new and strange: heddle, raddle and porrey cross, for example. But the ones that really gave me trouble were the words I'd known and used all my life, now being applied in completely foreign usage: beater, reed, for example.

So to the point at hand: The Great Debate of 1983—Harness vs Shaft.

When naming the loom parts to a neophyte, I find myself saying, "And these frames are called harnesses or shafts." AHA! So that's what they are: FRAMES for the heddles!

Well, since 'woof' has gone to the dogs (canines) let us now put 'harness' back in the barn and 'shaft' back in the mine and settle the whole debate by declaring it a moot question and "tell it like it really is"—they are, after all, simply FRAMES.

Helen E. Anthony
Alma, MI

Editor: What a good idea! Perhaps you have solved the problem. Some old weaving books use frame instead of shaft or harness, too. But it might be a problem to get weavers to use the word.

I've just read all the letters in the Summer issue concerning the use of the words harness or shaft. I am afraid I must disagree with everyone. Shaft, leaf, wing are all foreign words. Harness does seem to be American and that is the term I learned over 30 years ago, and I fear, use automatically. Actually frame should be the proper word since it really is a frame that carries the heddles. I feel sure that frame is not going to be widely used—so why change at all? If an author chooses to say shaft or harness, the term can be defined either as an early explanation or in a glossary. As I teach beginning weavers, I explain the various terms for frames as well as the many ways of writing a long draft. Soon there seem to be no problems and when the students read publications, they have no trouble understanding.

Dorothy Reichert
Park Hills, KY

I have just received the Summer 1983 issue of *The Weaver's Journal* and can hardly put it down.

I am particularly interested in weaving terminology and methods as laid down in your article "Let's Pull Together" and I want to say that I am very glad that you mentioned that you thread your loom form left to right. I have been doing it this way since I started weaving 35 years ago and for the same reason you gave—that's the way I learned to read and write. It seems so natural that way. Also, doing it from left to right, you can advance the next heddle of the pattern ahead of your thread and then if you get called away to the telephone or something, you know exactly where you are to continue. Sometimes I have to convert patterns for borders and selvedges to my way but that is no problem.

I think I prefer the word "harness" to "shaft" because I started with that word and was not introduced to the word "shaft" until sometime after I started weaving and read "Peter Collingwood: His Weaves and Weaving." Stanley Zielinski used the words "frame" and "heddle" in his "Master Weaver" series. For instance, a two heddle four frame loom was a four harness (shaft) loom—a four heddle eight frame loom was an eight harness (shaft) loom, etc. I thoroughly enjoyed reading his publications and still get a lot of information out of them. Incidently, I learned how to weave velvet from Mr. Zielinski. I am very much interested in it and would love to see an article on the weaving of velvet in your magazine.

Exilda von Braun
Hackett, AR

I agree, we should all be talking the same language. There are two resources which could be guides, along with Emery's PRIMARY STRUCTURES. . . Zielinski's ENCYCLOPEDIA OF HANDWEAVING and Burnham's WARP AND WEFT both agree on the use of the word "SHAFT." Just because the major weaving writers of the 40's and after, many of whom I greatly respect, established the use of "harness" in the minds of us "older" weavers, it does not mean we have to stick with the term. In my professional life as a librarian in the educational field, I have witnessed at least three changes of vocabularies (new terms for the same old things and concepts) in the last 40 years—in *each* field! If the use of harness creates confusion with more complex loom terms, or with other English-speaking weavers, then let's use "shaft." I think there should be more uniform use of vocabulary, based on the *existing* authorities (who have researched the terms, before deciding on which ones are most appropriate). I learned harness, but do not find it hard to change to shaft.

My pet peeve: THREADING and TREADLING . . . Look at those two words. How easy it is to confuse them when reading or writing. Heather Thorpe, in her book A HANDWEAVER'S WORKBOOK, uses the word "tromp" (or tromping). I find it much easier to say and read. She calls use of the word a "visual aid only," but I find it has become most useful in my teaching—even saying threading and treadling is often misunderstood by hearers. So I use "tromping" and lots of problems are avoided.

Gene E. Valk
Gloversville, NY

Ed: Our discussion of shaft and harness seems to have created interest in the weaving terminology. What is your pet peeve? If you are bothered by weaving terms that seem ambiguous or difficult, let us know. We would like to know about them. ■

WEAVER'S NOTEBOOK

OBSERVATIONS ON A CHINESE DRAWLOOM

by Helen Sellin

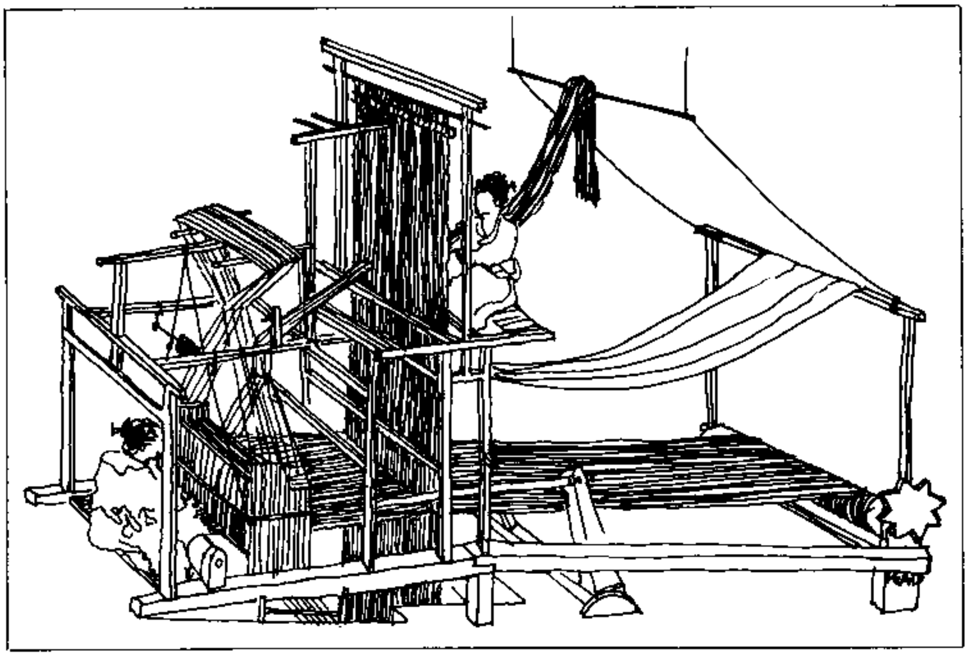
A detour of considerable magnitude to Chicago, Illinois, before October 2, 1983, is well worth any inconvenience to most weavers interested in complex mechanisms. As part of its Fiftieth Anniversary Celebration, the Museum of Science and Industry, at 5700 South and Lake Shore Drive, has a special exhibit called China: 7000 Years of Discovery, from the China Science and Technology Museum. Weavers will be particularly interested in the Chinese drawloom demonstration at the exhibit.

While the loom was reported to be from the Han dynasty, 205 B.C. to 200 A.D., this dating may be questionable as Geijer[1] believes that the drawloom was invented and developed in Iran during the Sassanian dynasty, 226-651 A.D. From the general complexity of polychrome Han silks in warp-faced compound tabby,various writers inferred the existence of an intricate mechanism during the Han period. However, Geijer argues the view of Harold B. Burnham that the silks were woven by pickup method resembling an old Scandinavian method, using an ordinary treadle loom supplemented with narrow pattern rods and a broad pattern stick or weaving sword, the *skälblad*. For another discussion see Keasbey.[2] Drawlooms have definitely been in China for at least 1500 years, if not 2000 years as dated in this exhibit.

Three such looms exist: one in a museum in China, one for teaching, and the third for exhibitions such as the one currently at the Museum of Science and Industry. The two-story loom frame,[3-7] with the drawboy on the side rather than in the back, is made from wood and the outside cords from rope. Otherwise the various parts are made from bamboo, including reed, treadles, lingoes, etc., or from silk including heddles, draw cords, etc. The beater[3,5] is especially interesting in that it is connected to a slanting pole longer than the depth of the ground shafts and pattern shafts combined. This in turn is connected to an upright support that is braced in one of eight possible positions (notches) to the main chassis at floor level. This mechanism allows immediate return of the beater to a neutral position after use.

The demonstrators are two of only five people in China who know how to operate the drawloom. They are unique in that they both know both jobs, drawboy and weaver, and therefore are able to exchange positions. Normally each person knows and does only one job. They work in a traditional workshop connected to a textile factory in Sichuan province, a center of 'brocade' hand-weaving. Otherwise 'brocade' weaving is automated in China today.

Two warps, each on a separate beam, are used. The main warp on the lower beam consists of 5760 red silk warp ends which form the background in the woven cloth. The binding warp on the upper beam has 1920 white silk warp ends which form a continuous regular



A Chinese drawloom. Note that here, the drawboy sits on top of the loom.

weaving stitch that binds the pattern weft. The binding stitch is invisible on the face of the fabric. The white binding warp crosses through the red main warp and a bamboo rod is placed behind the pattern heddles on top of all white binding warp ends. Presumably this improves the shed. With 92 warp ends per cm. (230 epi) and 120 weft ends per cm. (300 ppi) the men are weaving weft emphasis cloth far finer than anything normally woven in China. The silk thread is so gossamer that it is almost cobweb-like, floating easily on the slightest breeze, and has approximately 100,000 yards per pound. The silk thread is dyed in brilliant colors with chemical dyes.

The pattern is controlled by the shedding of the main warp where each group of three threads (1920 groups) is individually manipulated by the figure harness mechanism. The drawboy knows 32 patterns, all from memory, using no written records. The shafts of the ground harness and treadles control the weave structure through manipulations of the binding warp. The ground harness has twelve shafts but adjacent shafts are treadled in unchanging pairs. Perhaps the high sett requires heddles distributed on two shafts operating as one in the weave structure. The white binding warp is threaded on paired shafts 1-2; 3-4; 5-6 (where number one is nearest the weaver), presumably in a three-end twill binding. The red main warp is threaded on paired shafts 7-8; 9-10; 11-12, also presumably in a three end twill binding. One binding warp end is used for every three main warp ends. White selvedge threads initially pass through their own small semi-floating comberboard near the rear of the loom. Separate sets of lease sticks remain in each warp during the weaving.

Five bamboo shuttles each carrying a different color are used. The replaceable bobbins are also made from bamboo. Pairs of treadles are used for every passage of five weft threads. The first treadle lifts shafts 11-12, raising some of the red warp ends. The weaver throws the shuttle with brown weft forming a line of red background on the face of the fabric. The second treadle, raising shafts 5-6, lifts one-third of the white warp ends. This shed is held open until the next *four* shuttles are used. The drawboy pulls the first set of lashes which lifts certain red warp ends *in addition to* the white warp ends lifted by treadle control. The weaver throws the light green weft through the shed. Light green will appear on the face of the fabric wherever the red warp ends have *not* been lifted.[8] After releasing the first set of lashes the drawboy pulls a different set of lashes and a blue weft is woven. Similarly, the weaving is done with orange and finally dark green wefts with the drawboy selecting different lashes to raise different red warp ends for each weft color. When the four main weft colors have been used the weaver releases the foot treadle completing one-third of the treadling sequence. The process repeats with the weaver using the second treadle pair: shafts 9-10 raised for the brown weft and shafts 3-4 for the four main weft colors. Finally the third treadle pair is used; shafts 7-8 is raised for the brown weft and shafts 1-2 is raised for the four main colors, thus completing the process. The entire treadling sequence is repeated as many times as necessary to develop the pattern which may involve hundreds of lashes.

The demonstrators are weaving a Tang dynasty pattern, 618-906 A.D. Knowing the historical period, the technology, and the proposed threading, the weave structure is most probably a weft-faced compound twill or samitum. The almost exclusive use of a twill for silk weaving after the Sassanian dynasty until the eleventh century would give a

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more vivid effect, bring out the luster of the silk better than the warp-faced compound tabby of the Han period.

Unfortunately my examination of the actual fabric was much less thorough than my scrutiny of the loom. Careful observation of the fabric for weft-faced twill, symmetry and asymmetry features of the design, nature of the motifs, color distribution within the motifs, length and color of floats on the reverse face, etc. would be most enlightening. Confirmation or rebuttal of this hypothesis by future visitors to the exhibit would be greatly appreciated.

[1]Agnes Geijer. *A History of Textile Art. A Selective Account* (London: Sotheby Parke Bernet Publications. 1982). p. 94-95. 100
[2]Doramay Keasbey. *Pattern Devices for Handweavers* (Bethesda. MD: Doramay Keasbey. 5031 Alta Vista Road 1981) p. 14-15
[3]Geijer. p. 103
[4]Dorothy K. Burnham. *Warp and Weft: A Dictionary of Textile Terms* (New York. Charles Scribner's Sons. 1981). p. 50
[5]Alice Hindson. *Designer's Drawloom* (Boston. Charles T. Branford Company. 1958). p. 53
[6]Silk Culture and Manufacture. 17th Century
[7]Keasbey. p. 16
[8]Opposite to exhibit description but necessary. I believe. for understanding how the pattern is formed

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Keasbey. Doramay. *Pattern Devices for Handweavers* Bethesda. MD: Doramay Silk Culture and Manufacture. 17th Century.

AMERICAN TAPESTRIES

Do you know of any American tapestries? The American Tapestry Alliance is documenting all American woven tapestries, especially those on public display. A prize will be given to anyone who finds the earliest tapestry, to the person who locates the most tapestries and to the group or guild finding the most tapestries.

For each tapestry, include the title, date, artist, owner, weaver, location, size, whether it is on public display or in a private collection and any other pertinent information or history. Include your name and address. Send it to the American Tapestry Alliance, Rte. 2, Box 570-D, Chiloquin, OR 97624

MIDWEST WEAVERS CONFERENCE 1984

The theme of the 1984 Midwest Conference is *By Ways in Fibers*, an exploration of ethnic diversity. The conference will be held at St. Catherine College, St. Paul, MN.

In January 1984, each member of the Midwest Conference will receive the 1984 conference announcement letter. If you are a member and did *not* receive the January 1983 announcement letter or if you have changed your name and/or address, notify Marjorie O'Shaughnessy immediately, 2126 Skyline Place, Bartlesville, OK 74006. If you wish to join, send $2.00 to Marjorie for a life-time membership.

A SPECIAL LETTER FROM HOLLAND ABOUT RAMIE

In response to your letter of December 15th, 1982, we are sending you the information on RAMIE that was assembled by our study group. We have spun ramie, woven and knitted with it. We have used it natural and dyed so that you can see the results. We are enclosing the samples. Also a picture of the plant which yields the fiber.

If there are new developments in your country concerning ramie, which would benefit us, we would appreciate that you keep us informed.

Ramie combed top, silky white and ready to spin is for sale here at f 6/100g (about $10.00/lb.). The spun yarn can be used for weaving or knitting. A two-ply ramie-wool blend (70%/30%), vegetable dyed into a wide range of pastel colors is available at f20/100g (about $30.00/lb.).

J. Ridders-Tenkink
Huissen (The Netherlands)

Ed.: Many thanks for your contributions to this special issue of The Weaver's Journal in which we are featuring ramie. The illustrations and the information you sent did help us in preparation of our essay on lesser known natural fibers.

PRIZE WINNERS OF *THE WEAVER'S JOURNAL* GREAT WEAVING COMPETITION

Every other year, *The Weaver's Journal* offers $1200 in prize money for written articles on successful projects in which fiber techniques are used in a creative way. The entries for 1983 were due in April and the winning articles will be published during the coming year. As in the previous year, the largest number of entries were in the division of clothing. The winners of this division are: 1. Bettie Roth of Carmichael, CA, A Jacket for Hiking; 2. Elserine M. Sprenger of Calgary, Canada, Happy Dress; 3. Winifred Clark Shaw of Durham, NH, Win's Pullover. These articles will be published in the Winter 83-84 issue.

The rug division held the most happy surprises; not only were there many more entries than in the last contest, but the projects were exceptionally well-designed. The winners in this division are: 1. Jeryn Oles of Columbus OH, Mystery Sun Rug; 2. Connie Kindahl of Pelham, MA Shaft-Switched Rug; 3. Mary Martin of Pymole, Australia, Tapestry Rug in Meet-and-Separate Technique. Look for these articles in the Spring 84 issue.

In the category of household furnishings there were fewer entries than we had expected. However, the three winners were most innovative in their approach. The winners of this catetory are: 1. Kathy Spoering of Grand Junction, CO, Primary Patterns; 2. Lila Nelson of Minneapolis, MN, An Adaption of a Telemark Card Woven Belt from Waist to Wall; 3. Linda Hanna of Vina, CA, The Blanket Project. These articles we will share with you in our Summer 84 issue.

Last, but not least, the category of handspun. You will find the articles by the winners in this issue. They are: 1. Andrea Green of Batavia, IL; 2. Jean Newsted of Calgary, Canada; 3. Olwen MacGregor of Buffalo, N.Y. Their articles show three completely different uses of handspun yarns.

We thank all the participants for making this competition a success. We hope the readers of *The Weaver's Journal* will continue to weave exciting projects and will enter them in the next weaving contest which will be announced in the Summer 84 issue.

COMPLEX WEAVES

The first annual Conference of Complex Weaves was held at THE LOOMS in Mineral Point, WI on July 7-9, under the sponsorship of the Charles Babbage Research Center. About 40 weavers and textile historians attended. The conference consisted of readings of papers that were about 30 to 60 minutes in length. Fifteen papers were presented. Some were of contemporary ethnic interest: textiles of Western Peloponnese, Japan and Okinawa. Rita Adrasko talked about the weaving of silk portraits with the aid of Jacquard looms. Adele Cahlander and Peter Collingwood gave presentations on very complex weave structures done with a minimal amount of equipment. There were also talks about new approaches to known fabric structures and about the manipulation of hand looms to give greater patterning capacity. Janet Hoskins talked about graphical representations of multi-layered cloth.

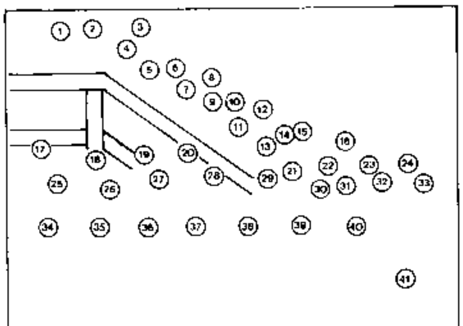
These papers will be collected into the first volume of a new weaving journal called *Ars Textrina*, devoted to all aspects of the history, theory and practice of complex weaves.

It is planned to publish two issues of *Ars Textrina* per year. The yearly subscription rate is $70.00 (U.S. funds).

For more information, write to The Charles Babbage Research Center, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2.

Complex Weavers, Mineral Point, Wisconsin, July 8, 1983; left to right, back to front:

[1]Clarita Anderson, [2]Marjorie Pohlmann, [3]Sue Nolin,
[4]Clotilde Barrett,
[5]Merrill Horswill, [6]Judith Gordon,
[7]Kathleen O'Neal, [8]Diane Tramba,
[9]Elizabeth Courtney, [10]Mary Bock,
[11]Evan Jones, [12]Paul O'Connor,
[13]Adele Cahlander, [14]Janet Hoskins, [15]Alan Donaldson, [16]Bill Hoskins,
[17]David Xenakis, [18]Peter Collingwood, [19]M.M. El-Homossani, [20]Ted Hallman, [21]Dorothy Miller, [22]Helen Sellin, [23]Jon Violette, [24]Larry Edman,
[25]Martha March, [26]Kati Meek, [27]Dawn Andrews, [28]Rita Adrosko, [29]Verda Elliott, [30]Ruth Harris, [31]Grace Burr, [32]Bro. Kim Malloy, [33]Ken Colwell,
[34]Ellen Felix, [35]Susan Gustafson, [36]Mildred Lamm, [37]Eleanor Best, [38]Blenda Femenias, [39]Joyce Carey, [40]Bill Adkins, [41]Robert Donaldson.
Not pictured: Naomi Towner, Kathleen Hanson, Alexis Xenakis, Maggie Mazera.



Key to photo above.

ELIZABETH CRAWFORD
1910–1983

Mrs. Crawford, 73, died Aug. 16th of cancer at Barnes Hospital.

Mrs. Crawford, who was called Libbie, became interested in weaving in the late 1930s and studied the craft in this country and in Europe. She taught weaving at Berea College, Berea, Ky., at Washington University and the St. Louis Artists Guild, and gave lessons in a studio in her home.

Mrs. Crawford was born in Woodsfield, Ohio, and was reared there and in Okmulgee, Okla. She moved to St. Louis in 1951 and lived in Kirkwood with her husband, S. Paul Crawford, whom she married in 1948.

A memorial fund has been set up by The Weavers Guild of St. Louis. Contributions may be made by making your check to the Weavers Guild of St. Louis and mail to Mrs. Betty Epstein, 7275 Greenway Ave., St. Louis, Mo., 63130.

WEAVING TOWELS AS A MEANS OF LEARNING THE BASIC FOUR-SHAFT WEAVES

by Clotilde Barrett

The knowledge of basic four-shaft weaves is essential to all weavers because they are the foundation on which to build skills and to acquire a better understanding of the design potentials of interlacements of threads. This knowledge can be acquired from a good weaving teacher who assigns the weaving of samplers and projects or by using a good textbook such as Mary Black's *New Key To Weaving*. We offer another alternative. In order to make the learning experience a pleasant and rewarding one we have designed twelve kitchen towels, each one celebrating a different month of the year. Almost every towel is woven in a different technique and together they cover quite a bit of ground toward the acquisition of a sound knowledge of 4-shaft weave structures. It is assumed that the weaver knows tabby and twills and that he/she has a good textbook available for reference.

The basic yarns are 40/2 linen for the warp and 20/1 linen for the weft. The pattern threads are either 5-strand cotton floss, cottolin or 10/1 linen. Six of the towels can be woven on the same warp but the warp will have to be rethreaded five times. The other six towels each require their own separate warp.

This project is very suitable for study groups. Each of 12 members sets up a warp long enough for 12 towels and each member weaves on 12 different looms.

The finished towels may suggest many new projects such as table linens, casement cloth, clothing.

1. JANUARY — Snowflakes are suggested by an all-white Spot Bronson weave.
2. FEBRUARY — Valentines are woven in a pick-up turned Summer and Winter. This is a good time to study the very versatile Summer and Winter weave and to learn the concept of "turning a weave".
3. MARCH — Saint Patrick is celebrated with a shamrock woven in overshot.
4. APRIL — A simple point-twill threading (Rosepath) permits the weaver to create a flower garden.
5. MAY — Time to explore lace weaves. After reading up on Atwater-Bronson lace for the June towel it will be a challenge to combine regular lace and turned lace in a plaited towel. It is the perfect one to tuck into a picnic basket.
6. JUNE — Weave an Atwater-Bronson lace towel to give to a bride.
7 JULY — Stars and stripes can be woven on a simple point twill (Rosepath) threading.
8. AUGUST — The hottest month of the year calls for the laciest of all laces: Huck lace or mock leno.
9. SEPTEMBER — The fall colors are introduced as supplementary warp in turned Monk's Belt.
10. OCTOBER — Bleached and unbleached linen are combined to give the M's and O's structure a warm homey look.
11. NOVEMBER — The colors of harvest are expressed in a crackle weave.
12. DECEMBER — A red warp, a white pattern weft and a Star of Bethlehem overshot set the mood for Christmas.

The warp for all the towels, except 12, is a 40/2 linen from Frederick J. Fawcett. The yardage of the linen is 6000 yds/lb (12092 m/kg). Towels 1, 3, 4, 6, 7, 11, have a solid bleached linen warp; towel 8 uses a solid unbleached linen warp; towel 10 uses both bleached and unbleached linen; towels 2, 5, 7, have a pattern warp in addition to the ground warp. The towels are sett approximately 19" (48 cm) wide in the reed, at 30 epi (120/10 cm). They are woven 38" (96 cm) long. Off the loom and hemmed they measure 10½" X 35¼" (47 X 89.5 cm). After washing the towels measure 18¼" X 33½" (46.4 X 85 cm).

All towels, except #12 have a 20/1 (or 40/2) linen groundweft from Frederick J. Fawcett.

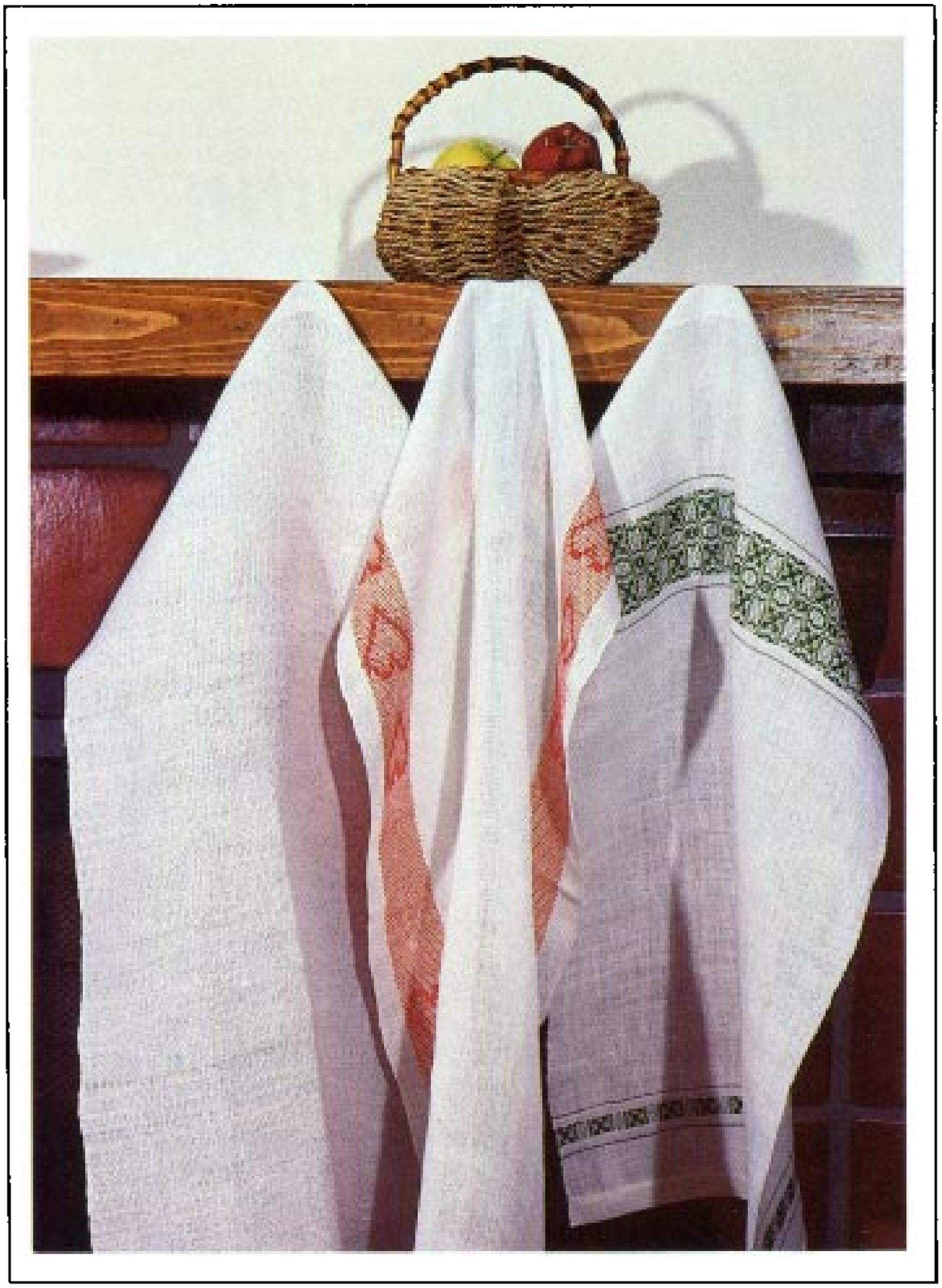
Each towel, if woven alone, requires about 1200 yards (1100 m) of material.

In towel #12, the warp and groundweft are cottolin from Borgs (200 yds/oz).

Towels 1, 3, 4, 6, 7, 11, may be woven on the same warp but only 3 and 7 use the same threading.

The selvedges can be worked by doubling the one or two outer warp threads both in the heddle and the reed or by setting them closer in the reed.

Whenever the towel has a horizontal border design, this design has been repeated at the other end of the towel but has been reversed and shortened.



January, February and March

JANUARY — SPOT BRONSON

Spot weaves are texture weaves and are usually woven with the same yarn for warp and weft. The warp is sett as for balanced plain weave. The spots are places where there are either warp floats or weft floats which are completely surrounded by plain weave. See Fig. 1. Huck and Spot Bronson are the most commonly known spot weaves. The threading of Spot Bronson can be easily identified by the fact that every other thread is threaded on the same shaft (usually, but not always, shaft 1). Lifting that shaft gives one of the tabby sheds. Lifting all the other shafts (2+3+4) gives the alternate tabby shed. In our example the spots are made with weft floats. The design is based on an old linen and was published in *Linen Heirlooms* by Constance Gallagher. This design is unusual because it combines spots with 5-span floats and spots with 7-span floats. Fig. 2 is a "short draft" showing how the spots are distributed in the threading. The single squares are 5-thread spots, the double squares are 7-thread spots. Fig. 3 gives the thread-by-thread draft.

Warp: 40/2 bleached linen.

Weft: 20/1 bleached linen.

Sett: 30 epi (120/10 m), double sleyed in a 15 dent (60/10 cm) reed.

Threading: See Fig. 3.

Total number of warp ends: 561.

Width in the reed: 18.7" (46.8 cm).

Tie-up: See Fig. 3.

Treadling: Weave as drawn in: e.g., number both the shafts and the treadles 1, 2, 3, 4, and use the treadles in the same order as the shafts were threaded. Repeat the central pattern as often as needed for the length of the towel.

FEBRUARY — TURNED SUMMER AND WINTER

Summer and Winter is a supplementary weft weave in which the pattern weft makes short floats on the front or on the back of a plain weave ground cloth. There are many treadling variations of Summer and Winter. The one that is most favored is to weave the pattern weft in pairs, e.g., weave a tabby pick, weave a pattern pick, weave the alternate tabby pick, weave *the same* pattern pick.

Turning a weave means that warp becomes weft and weft becomes warp, e.g., the entire interlacement is turned 90°. In Summer and Winter the plain weave ground remains unchanged but the supplementary pattern weft which was woven in pairs becomes a supplementary warp threaded in pairs. Pattern bands become pattern stripes and in these stripes a ground warp (weaving tabby) will alternate with a pattern warp (making 2 or 3 span floats). The ground warp is threaded on shafts 1 and 2 and is sett for a balanced plain weave across the entire width of the towel. In the pattern stripes the warp is sett twice as close because each pattern warp is sleyed with the adjacent ground warp.

The Valentines require pick-up but this is fast and easy on turned Summer and Winter.

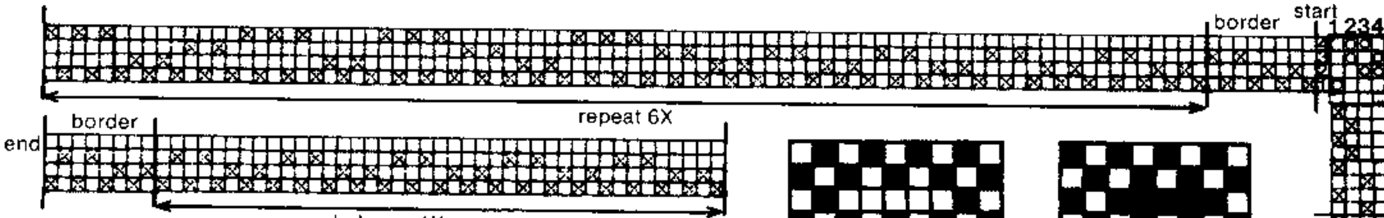
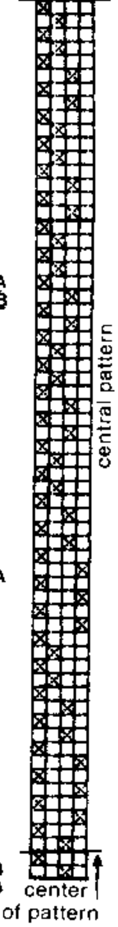


FIGURE 3



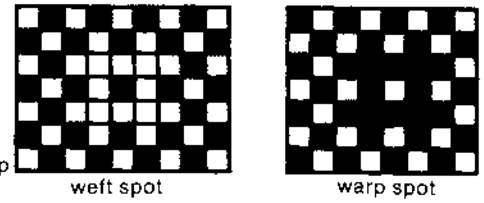


FIGURE 1

FIGURE 2

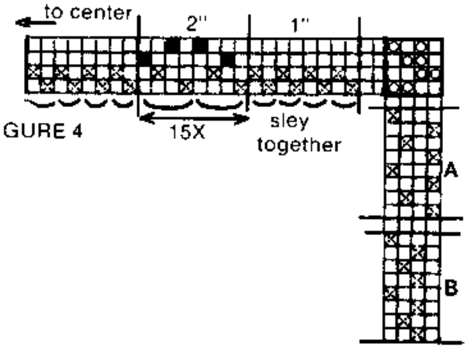


FIGURE 4

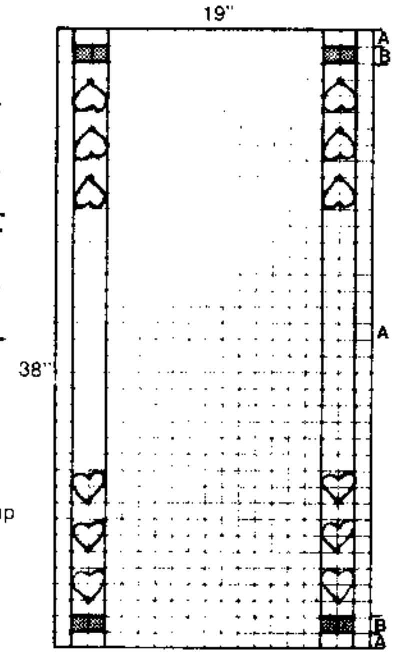


FIGURE 5

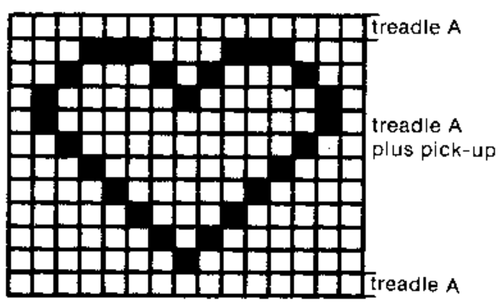


FIGURE 6. Pick-up pattern. Each square has 4 pattern warp ends.

Warp
ground: 40/2 bleached linen.
pattern: Red cottolin (20/2), 150 yards (137 m) needed.

Weft: 20/1 bleached linen.

Sett: 30 epi for the ground warp; 60 epi (240/10 cm) in the pattern stripes. Use a 15 dent (60/10 cm) reed.

Threading: See Figs. 4 and 5. Notice the denting for a 15 dent reed.

Weaving: To weave pattern floats on the surface, repeat treadling B. To weave pattern floats on the back, repeat treadling A.

Pick-up: See Fig. 6. Use a knitting needle or narrow pick-up stick.
Lift shafts 1 + 4, weave.
Lift shafts 3 + 4, pick up according to the pattern. Pick up 4 pattern ends for each black square of the design.
Lift shaft 2, weave. Remove the pick-up stick.
Lift shafts 1 + 3, weave.
Lift shafts 3 + 4, pick up the same pattern warp ends.
Lift shaft 2, weave. Remove the pick-up stick.
Repeat these 4 picks for each row of Fig. 6.

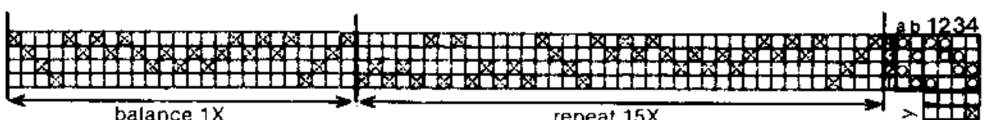
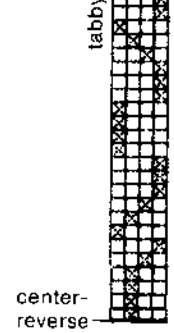


FIGURE 8



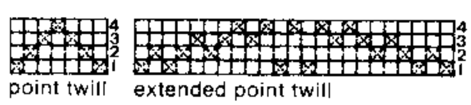


FIGURE 7

MARCH — MINIATURE OVERSHOT

The threading of miniature overshot is easily recognized by the fact that some sections are threaded on a twill (usually point twill) and some sections are threaded on an extended twill. See Fig. 7. Miniature overshot is often used for border designs on a plain weave ground cloth. These borders are woven by alternating a tabby pick and a pattern pick. The pattern picks are thrown in the $\frac{2}{2}$ twill sheds. Fig. 8 shows the threading, the tie-up and the treadling of the pattern picks only.

Warp: 40/2 bleached linen.

Weft
pattern: 5-strand cotton floss, green.
tabby: 20/1 linen.

Sett: 30 epi (120/10 cm).

Threading: See Fig. 8. Total number of warp ends: 595.

Width in the reed: 19.8" (49.6 cm).

Weaving: Treadle plain weave up to the border design. For the overshot pattern, alternate a pattern pick and a tabby pick.

April, May and June

MAY — JUNE — ATWATER-BRONSON LACE

From their names, one can very well guess that Spot Bronson (January towel) and Atwater-Bronson lace are two related weaves. Yet their appearance is very different. Spot Bronson produces an over-all texture effect while Atwater-Bronson is an open lacey weave that can be organized in blocks. In both weaves every other warp end is threaded on the same shaft (shaft 1). The role of shaft 2 is different for both weaves. In Spot Bronson, shafts 2, 3 and 4 play the same role and all three can generate spots. In Atwater-Bronson, shafts 3 and 4 are used to generate floats but the function of shaft 2 is to tie those floats down, preventing them from becoming too long. Now, not just a spot but an entire block may be threaded on shafts 1 and 3 (or 1 and 4) as long as the 1-3 sequence is interrupted at regular intervals by a warp thread on shaft 2 which will break up the long pattern float into smaller ones. Fig. 10 shows the threading for plain weave and for the two types of blocks (A and B) that can be woven on four shafts. With the tie-up shown in Fig. 10, the treadling proceeds as the warp is drawn in, e.g., treadles 1, 2, 3, 4, are used in the same order as the shafts 1, 2, 3, 4, have been threaded. By using treadle 5, instead of 3 or 4, lace will be woven in both A and B blocks at the same time. This feature is used in the June towel.

APRIL — POINT TWILL (ROSEPATH)

Note that the July towel is woven on the same threading.

Rosepath is a folkloristic name given to one of the four-shaft point twills. See Fig. 9. If woven as a twill, only the pattern treadles are used. However, to weave a colorful April garden on a white background, the border of the towel is woven as an overshot, i.e., by alternating a tabby pick and a pattern pick.

Threading: See Fig. 9. Total number of warp ends: 570.

Warp: 40/2 bleached linen.

Weft
pattern: 5-strand cotton floss, green and colors of Spring flowers.
tabby: 20/1 linen.

Sett: 30 epi (120/10 cm)

Width in the reed: 19" (47.5 cm)

Weaving: See Fig. 9. Start with 8" (20.3 cm) of plain weave. Weave the border by alternating a pattern pick and a tabby pick.

Sequence of pattern picks: Section I, II, I, II, I. Weave 7 tabby picks between each section.

MAY — TURNED ATWATER-BRONSON

The May towel is more complex than the June towel because it combines a lace block with weft floats (block A threaded on pattern shaft 3) with a lace block with warp floats (block B threaded on pattern shaft 4). The latter is called a "turned" block because the weft float has become a warp float. The weft floats in block A and the warp floats in block B have been emphasized by using a decorative thread symbolized by ■.

Warp: 40/2 bleached linen.

Weft: 40/2 bleached linen.

Pattern thread (warp and weft): 5-strand floss, pink (25 yards).

Sett: 30 epi (120/10 cm).

Threading: See Fig. 11. Total number of ends: 570.

Width in the reed: 19" (47.5 cm).

Tie-up and treadling: See Fig. 11.

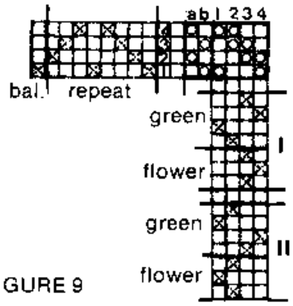


FIGURE 9

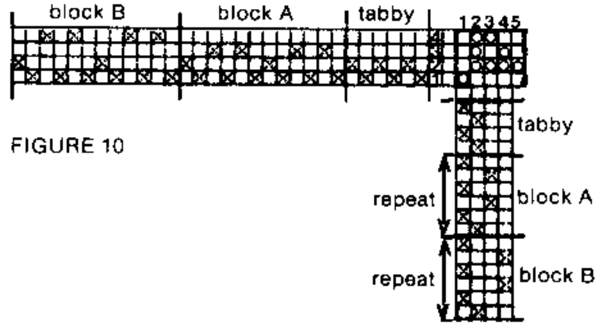


FIGURE 10

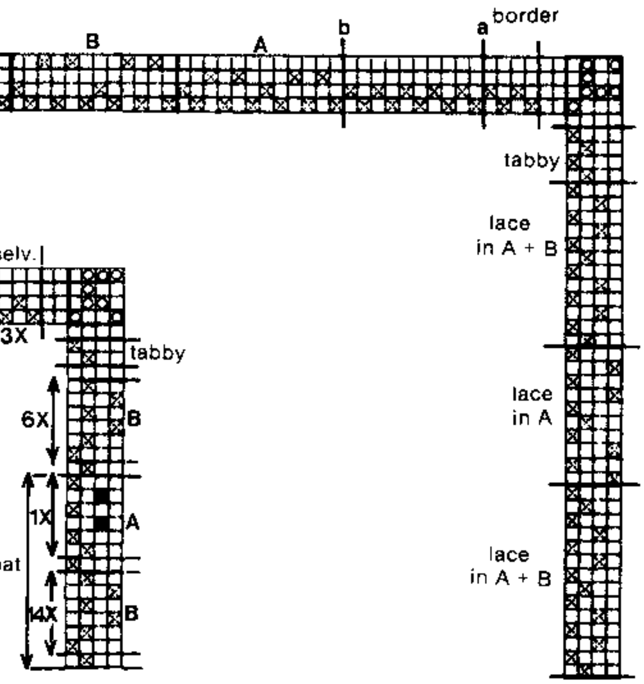


FIGURE 12

JUNE — LACE BLOCKS

The June towel has two lace blocks A and B with weft floats in both blocks.

Warp: 40/2 bleached linen.

Weft: 20/1 bleached linen.

Sett: 30 epi (120/10 cm).

Threading. See Figs. 12 and 13. Thread a-c 12 times (552 threads), a-b once (10 threads). Add borders (8 threads). Total number of warp ends: 570.

Width in the reed: 19" (47.5 cm).

Tie-up: See Fig. 12.

Weaving: Weave 2¼" (5.7 cm) of tabby to begin with. For the pattern, weave 30 tabby picks, weave lace in both blocks A+B, lace in A, lace in A+B. Repeat this pattern sequence 14 times. End with 2½" (6.35 cm) tabby.

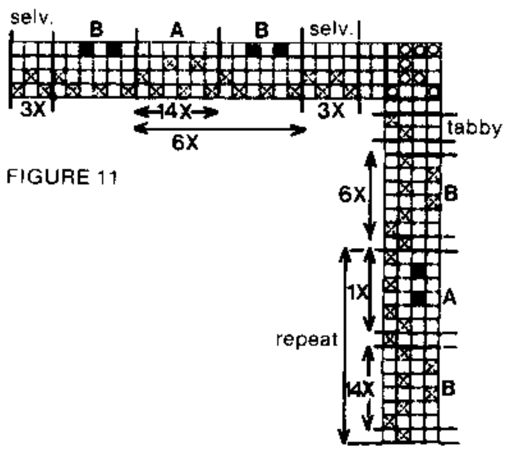


FIGURE 11

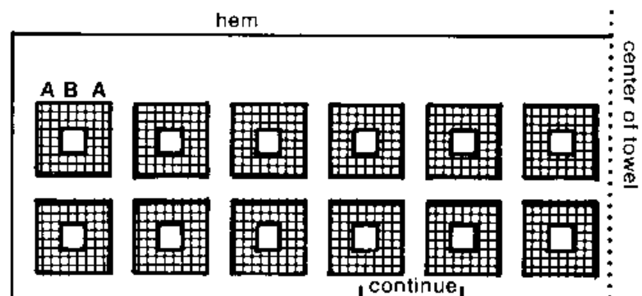


FIGURE 13

July, August and September

JULY — POINT TWILL (ROSEPATH)

Note that the April towel is woven on the same threading.

Fig. 14 shows one of the most versatile 4-shaft threadings and is used here to weave a pattern reminiscent of "Old Glory".

Warp: 40/2 bleached linen.

Weft
pattern: 5-strand floss in blue and red.
tabby: 20/1 bleached linen.

Sett: 30 epi (120/10 cm).

Width in the reed: 19" (47.5 cm).

Tie-up: Fig. 14 shows a practical tie-up for a 6-treadle loom. The sheds are opened by putting the feet on two treadles at once.

Weaving: Weave 8" (20.3 cm) of plain weave and end with the 2 + 4 tabby. For the stripes:

Lift 1 weave red		Repeat 3 times
Lift 1 + 3 2 + 4	tabby	
Lift 3 weave red		
Lift 1 + 3 2 + 4	tabby	

end with
Lift 1 weave red
Lift 1 + 3 / 2 + 4 tabby

For the stars:

Lift 1 + 2 blue	1 + 4 blue
1 + 3 tabby	1 + 3 tabby
2 + 3 blue	3 + 4 blue
2 + 4 tabby	2 + 4 tabby
2 + 3 blue	3 + 4 blue
1 + 3 tabby	1 + 3 tabby
1 + 2 blue	1 + 4 blue
2 + 4 tabby	2 + 4 tabby

Weave 26 picks of tabby.

Repeat the stripes, stars and tabby 3 times.

AUGUST — HUCK LACE

The towels of June and August are examples of the most common 4-shaft lace weaves. The June towel was woven in Atwater-Bronson lace which was related to Spot Bronson. The August towel is woven in Huck lace, a weave related to Huck which is also a spot weave. In fact, a Huck spot towel and a Huck lace towel may be woven on the same warp without changing the threading. Fig. 15 shows the drawdown for Huck spot and Huck lace. In Huck lace, the warp floats and weft floats pull the threads together and create open spaces along the lines where the fabric is interlaced on opposites.

Warp: 40/2 unbleached linen.

Weft: Same as warp.

Sett: 30 epi (120/10 cm).

Threading: See Fig. 16. Total number of warp ends: 564.

Width in the reed: 19" (47 cm) (approx.).

Tie-up and treadling;
For Huck spot squares: Fig. 16a.
For Huck lace squares: Fig. 16b.

SEPTEMBER — TURNED MONK'S BELT

Turned Monk's belt is a supplementary warp weave in which the ground weave is plain weave threaded on shafts 1 and 2 and the supplementary warp makes two pattern blocks and is threaded on shafts 3 and 4. Turned Monk's belt is further explained on p.37 of this issue.

Warp
ground: 40/2 unbleached linen.
pattern: 10/1 linen in early Fall colors.

Sett: 30 epi (120/10 cm) for the ground warp; 60 epi (240/10 cm) in the pattern stripes. Each supplementary warp end is sleyed with the adjacent ground end.

Threading: Fig. 17 shows the profile draft of the pattern stripe. There are two pattern blocks A and B. Fig. 18 shows the threading for each unit (black square) in the profile draft. Fig. 19 shows the position of the two pattern bands on the towel. Each square of the profile draft is equivalent to 1 dent of a 15 dent (60/10 cm) reed. The entire pattern covers 57 squares or dents and is thus 3.8" (9.5 cm) wide. 16 of the dents will hold the ground threads only (2 per dent); the other dents will hold the ground threads and the pattern threads for a total of 4 ends per dent.

Tie-up and treadling: See Fig. 20.

FIGURE 14

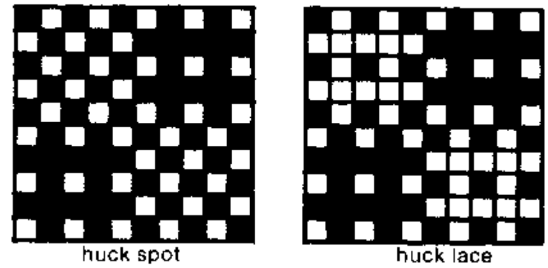


FIGURE 15
■ = warp up

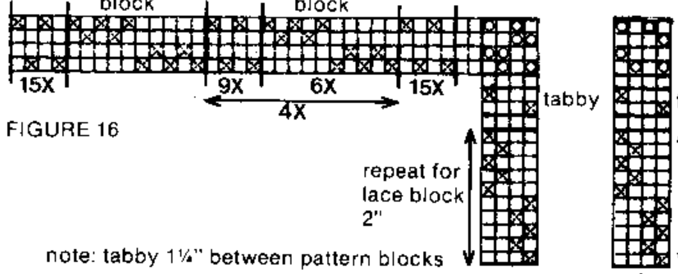


FIGURE 16

FIGURE 17

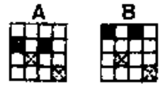


FIGURE 18

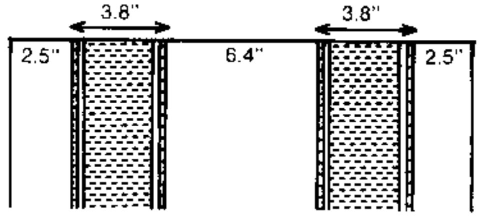


FIGURE 19

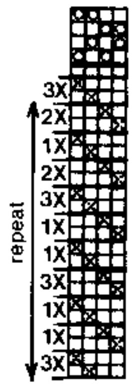


FIGURE 20

Color order of the warp:

med. green										4			2		2			4												12
dark green									6			6				6			6											24
yellow green								4			4			2			4			4										18
gold green							2																2							4
lt. brown						2		2														2		2			4			12
orange			2																										2	4
yellow		2																										2		4
bittersweet	4																													4
																														82

October, November and December

OCTOBER — M'S AND O'S

M's and O's is a texture weave with contrasting areas (blocks) of plain weave and areas of weft floats. In the areas of weft floats the weft will pack in easier than in the areas of plain weave. This causes the weft to deflect and gives a slight lacey appearance. The use of bleached and unbleached linen enhances the texture and produces a subtle plaid.

Warp: 40/2 linen, bleached ◇ and unbleached ■.

Weft: Same as warp.

Sett: 30 epi (120/10 cm).

Yarn requirements: 600 yds. (549 m) bleached, 700 yds. (640 m) unbleached.

Threading: Fig. 21 shows the profile draft of the two block pattern. Fig. 22 shows the threading for each unit (square) in the profile draft. There are a total of 71 units at 8 threads each. The total number of warp ends is 568.

Width in the reed: 19" (47.3 cm) (approx.).

Tie-up and treadling: See Fig. 23.

NOVEMBER — CRACKLE

Crackle weave is a 4-block weave. Each block consists of 1 or more repeats of a 3-shaft point twill.

block A $2^{3}2_{1}$ repeat

block B $3^{4}3_{2}$ repeat

block C $^{4}{}_{1}{}^{4}{}^{3}$ repeat

block D $_{1}{}^{2}{}_{1}{}^{4}$ repeat

Each block is balanced: Block A which starts on 1 should be balanced by adding a warp thread on shaft 1. Block B which starts on 2 should be balanced by adding a warp thread on shaft 2, etc.

Tabby is woven by alternately lifting shafts 1 + 3 and 2 + 4.

The pattern is woven by alternately weaving a pattern pick and a tabby pick. The pattern picks are thrown in the twill shed, e.g., shafts 1 + 2 up, which will give pattern floats in blocks A and D; shafts 2 + 3 up will give pattern floats in blocks B and A; shafts 3 + 4 up will give pattern floats in blocks C and B, shafts 4 + 1 up, will give pattern floats in blocks D and C. The same pattern pick may be repeated as long as it alternates with a tabby pick.

Warp: 40/2 bleached linen.

Weft
tabby: same as warp.
pattern: 10/1 linen in Fall colors.

Threading (credited to M.M. Atwater) is shown in Fig. 24.

Tie-up and treadling: See Fig. 25.

Weaving: Start with 7" of plain weave. For the pattern border, alternate a pick of tabby and a pattern pick. The treadling of Fig. 25 only shows the pattern picks.

Color order of the weft:

dark green	5										5
yellow		5								5	
bronze			5						5		
red-orange				5				5			
mustard					5		5				
orange						36					

	(small pattern)
8	orange

FIGURE 21

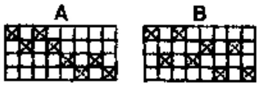


FIGURE 22

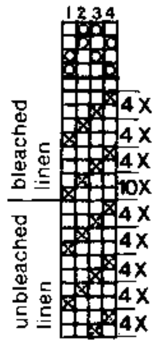


FIGURE 23

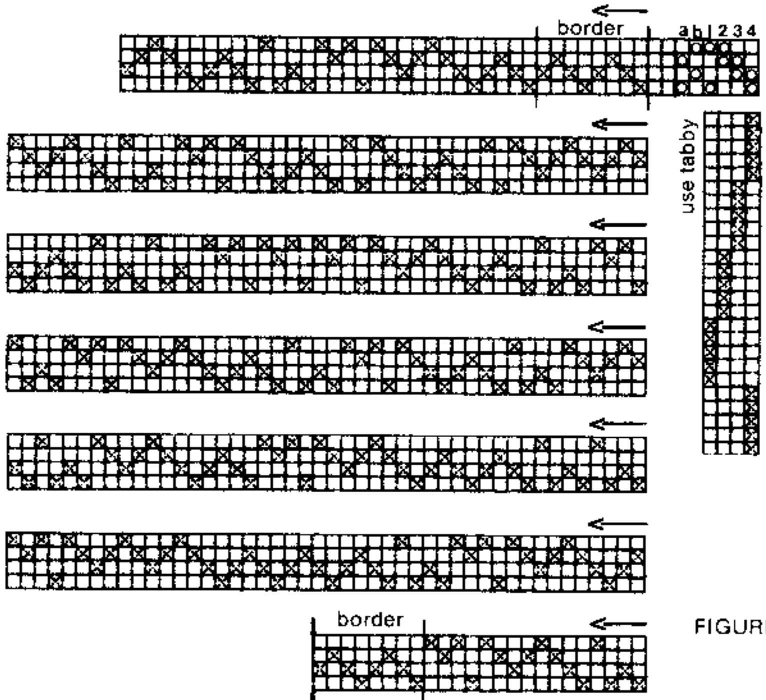


FIGURE 24, Threading and tie-up

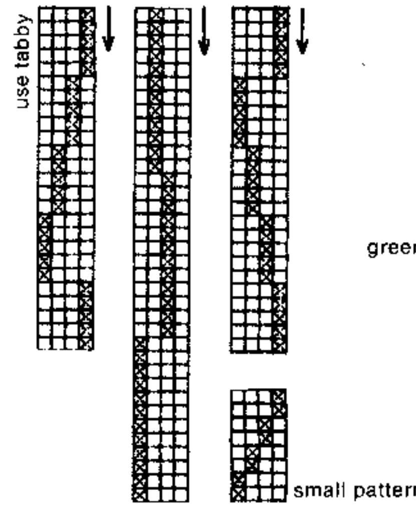
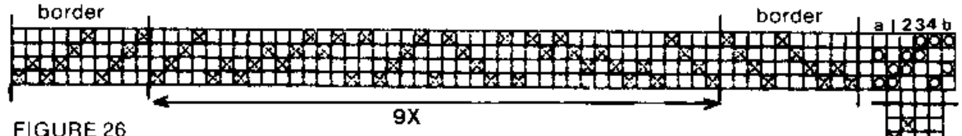


FIGURE 25, Treadling



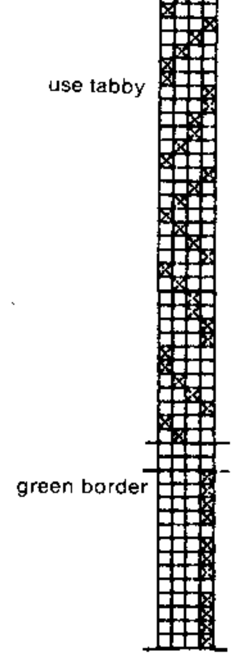


FIGURE 26

DECEMBER — MINIATURE OVERSHOT

The technique for the December towel is the same as for the March towel. However, the fibers and pattern are different.

Warp: 22/2 cottolin (Borgs) (200 yds/oz or 6450 m/kg); color red.

Weft
tabby: Same as warp.
pattern: 20 epi (80/10 cm).

Sett: 20 epi (80/10 cm).

Yarn requirements: 800 yds. (731.5 m) cottolin, 20 yds. (18.3 m) floss.

Threading, tie-up and treadling: See Fig. 26. Note that the treadling for the border only shows the pattern picks. These alternate with tabby picks.

The year is ended but the twelve towels will never wear out.

The weaving knowledge acquired from doing this project is a good basis for further experimenting with other fibers, other patterns, and other concepts. The towels shown are woven by Gloria Cyr and Jean Anstine. ■

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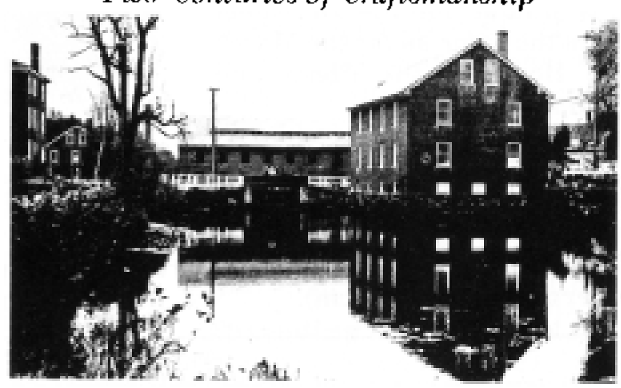

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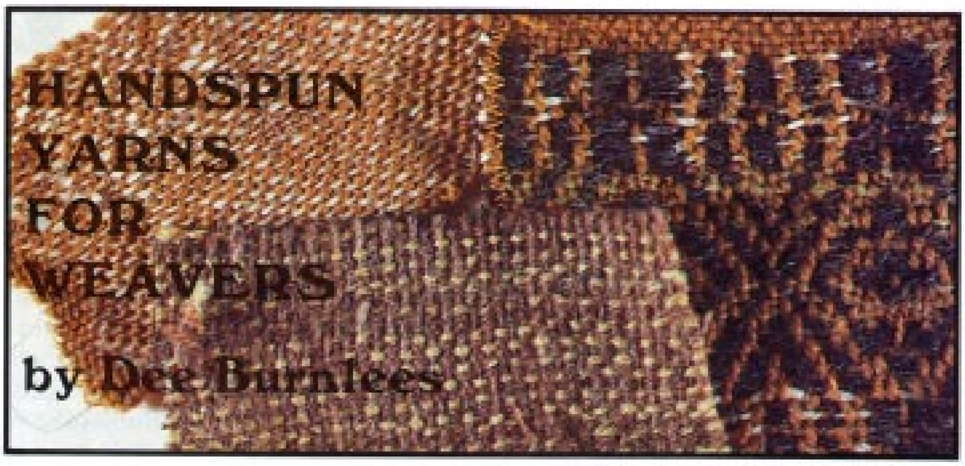


HANDSPUN YARNS FOR WEAVERS

by Dee Burnlees

What weaver hasn't thought about creating the yarns to be woven? A touch of handspun yarn in handweaving can add a unique touch. Shoppers are intrigued with the idea that the pattern band is made of real handspun.

Small quantities, such as one or two ounces, of handspun are best used for decorative pattern on an otherwise commercially made warp and weft. Fine two-ply handspun works nicely as the pattern weft with a singles weight tabby and warp in an overshot pattern such as 'Chariot Wheels". The effect of a band or so of this kind of pattern is much like Fairisle. This is effective on jackets, hats and skirts. The handspun yarn might be soft wool, shiny silk or a lovely textured cotton. The fabric design can start from what's on hand, or it can begin with a specific yarn plan for a project. Using handspun yarn for just a pattern stripe uses a minimum of yarn, and lets the rest of the fabric be made from commercial yarn. It is a way to produce lots of yardage without too much handspun.

Using commercially prepared yarn for the warp ensures an even tension throughout, with few broken threads. If handspun yarn is used for the warp, it needs extra twist in the spinning and in the plying. If it is still too weak to stand the strain of tension on the loom it can be dipped in warp dressing to strengthen it. The dressing will wash out afterwards. A 12/2 commercial Merino makes a suitable warp for handspun singles. A two ply 'homespun' type yarn is a good weight to use with heavier handspun yarns. When a commercial yarn warp is close in fiber and size to the handspun weft, the whole piece will appear handspun.

There are a number of factors to consider when planning a handspun weaving project.

- Selection of Fleece: Down breeds for baby soft, medium long for wear.
- Preparation of Fleece: flick carded for worsted, drum carded for spongy woolen.
- Method of Spinning: woolen or worsted, hard twist for strength or soft twist for fluff.
- Method of Plying: a regular twist or a fancy two-color ply.
- Dyeing: natural dyes for soft muted tones, synthetic for brilliance.
- Warp yarn: fiber content, color, thickness, handspun or commercial.
- Sett of warp threads: close enough for a 50/50 plain weave as this uses the least weft yarn.
- Weft: one ply or two ply, color order.
- Assembly: loom controlled, or cut and sew method.

PROJECT

MATCHING DRESS AND JACKET YARDAGE

- Four pounds (1.81 kg) of Corriedale fleece.
- Flick carded so fabric won't 'pill.'
- Worsted spun singles.
- Dye three quarters of the singles in first sumac dyebath. Dye remaining quarter in a second, paler dyebath.
- Take half of the first dyebath yarn and ply it to make a darker two ply yarn for a heavier weight jacket. Set the twist of the two colors of singles and the darker two ply yarn.
- 5,000 yards (4,572 m) of 12/2 Merino warp twist commercial warp, colors close to weft.
- Prepare an 8 yard (7.31 m) warp of 600 threads, sett 20 threads per inch, (80/10 cm) two of one color, two of second color.
- Weave 4 yards (3.66 m) with the singles weft (two shots of one color and two of the other color, to create checks for the dress material. Weave 4 yards with the darker two ply, creating stripes for the jacket.
- Finish the web with the gentle cycle of the washing machine. Use the cut and sew method with your favorite dress and jacket pattern, using some of the jacket cloth for the collar and pockets. The jacket cloth will be heavier with dark stripes, while the dress cloth will be lightweight matching checks.

Controlling all the factors in making handspun fabric gives tremendous satisfaction, because you are involved in the whole process from conception to birth of a well-meshed web—a real web of handwork, from sheep to fleece, from yarn to dyepot, from loom to body.

ABOUT THE AUTHOR: I came to weaving through a very circuitous route. After a brief pioneer craft exposure, I took up dyeing with nature's bounty. Then I had to learn to spin in order to cope with my huge basket of dyed fleece and tops. Not being a knitter, I had to then learn to weave, so I could use my hard-won handspun yarn. I was always very pleased with the quality of fabric woven from handspun wefts. My yarn went far enough to complete sizeable projects. I have two skirts, a vest, a jacket and two stoles completed in handspun. We have a prominent spinning instructor, Dorothy Kirk, in our area, and she has inspired a number of our members to expand their use of handspun yarns. One of our members (Pottawatomi Spinners and Weavers Guild) is presently weaving a bedspread on a 100" (2.54 m) loom using her own handspun yarn she has nature dyed with milkweed. About half of our Guild members are spinners, and some also weave. ■

Jan Carter

A HANDSPUN, HANDWOVEN SADDLE BLANKET

by Jean Newsted

What do you do when your friend buys a horse? Since I am a spinner and weaver, I immediately started planning a handspun, handwoven saddle blanket. However, I soon realized that while I knew a fair amount about spinning and weaving, I knew virtually nothing about horses. I also suspected that many of the saddle blankets I had seen or read about were designed to display the skill of the weaver rather than enhance the comfort of the horse and its rider.

Thus, my first step was a visit to the horse and a conference with its trainer. One sunny May morning my friend and I drove out to the foothills of the Canadian Rockies. There at a lovely small ranch I met Cat Red Bailey, a chestnut-colored quarterhorse, and his trainer, an accomplished horsewoman who had some very definite ideas about saddle blankets. First, she always used a blanket in conjunction with a thick hair pad. A 30 inch (76 cm) square blanket would be used on top of the pad, while a 30 by 60 inch (76 x 152 cm) long blanket would be folded around it. Second, she wanted a large piece of leather on each side of the blanket where the cinch of the saddle is strapped around the horse. The cinch is tightly buckled, causing blankets to wear out in those two places.

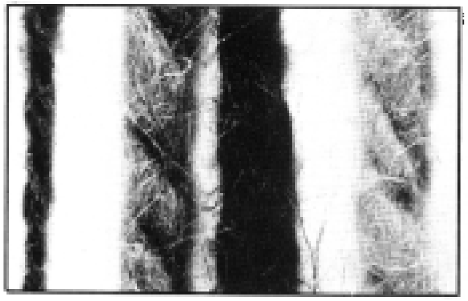
I was very excited on the ride home; colors and designs were spinning in my mind. The handsome chestnut color of the horse suggested colors in the brown and orange range, yet the seat of the saddle was a turquoise suede. Could I use turquoise with brown and orange? Why not? Then there was the concept of the hair pad, which meant that I could make a 30 inch square blanket that would never actually touch the horse. Why not make it reversible?

The next day I bought two Scottish Blackface fleeces. The Blackface is a coarse, kempy, long-stapled fleece, excellent for items like rugs and saddle blankets that get a lot of hard use. Spinners in southern Alberta are fortunate in having a carding mill nearby, so I brought my fleeces to the mill to be washed and carded into roving. A week later, my 8½ pounds (3.86 kg) of greasy fleece had become 4½ pounds (2.04 kg) of beautiful white roving.

By this time, I had planned my blanket. I would make a 30 inch square in a double-faced twill weave. I would spin the warp rather thin and the weft rather fat. The underside would be alternating shots of brown and orange to give an all-over tweedy striped effect, while the upper side would be a more elaborate striped pattern of brown, orange and a bit of turquoise. Since most of a saddle blanket is covered by the saddle, I would put the colored stripes primarily at the back, where they would show behind the saddle, and at the rear corners. See Photo 2.

I spun the warp first. The Scottish Blackface fleece spins naturally into a fine, firm warp thread. Using a 2-dent (20/10 cm) metric reed (5 to the inch), I planned a warp that would be 2 yards (1.83 m) long, 33½ inches 85 cm) wide, and 174 warp ends requiring 348 yards (318 m) of 2 ply spun yarn. I ended up with about 360 yards (329 m), or roughly 8 ounces (227 g) of two-ply yarn. See Photo 1.

For the weft I wanted a thick, softly



1. Warp and weft yarns, actual size.

spun wool that would pack in when woven to produce a firm, hard-wearing product. Because I tend to spin a fine yarn, it was harder for me to spin "fat." However, by using my mini-Louet wheel for spinning and then plying with the jumbo head on my Sleeping Beauty wheel, I managed to get a nice thick yarn quite easily. I spun all of the rest of my roving, about 4 pounds (1.8 kg), into weft yarn. See Photo 1.

Dyeing the yarn raised a few questions. Would I be able to produce the right mixture of green and blue to get turquoise? The main color of the upper side and half of the underside would be brown. Yet that would require far too many skeins in my dyepot at one time. Could I divide the skeins into front and back batches and obtain the same color from both? And could I guess the amount of yarn I would need for each batch? I was using acid dyes, following the directions from the supplier and praying at that point. Fortunately, all went well. There was sufficient yarn in each batch of brown for each side and the colors were very close. I also fiddled with blue and green until I created the perfect turquoise. Since I was dyeing deep colors I used much more of the dye powder than the directions called for. Miraculously, I now had a large basket filled with twelve lovely skeins of brown, eight of orange and three of turquoise.

After so much spinning and dyeing, the weaving was quick and straightforward. The threading was a standard twill, although the tie-up and treadling were a little more complicated. Double-faced twill requires eight treadles. My loom only has six treadles, so I used a practical tie-up and treadled with two feet. I also used a floating selvedge to keep the edges flat and straight. As I was using three colors on the top and two colors on the bottom, I found it helpful to use ski shuttles for the top yarns and stick shuttles for the bottom ones. This aided me in keeping the two layers separate, at least, in my mind. Obviously, it is important when weaving a double-faced article to keep the design fairly simple.

Warp: 2 ply handspun wool, 348 yards, color brown.

Weft: Thick 2 ply handspun wool, about 4 lbs. Colors: brown, orange, turquoise.

Sett: 5 epi or (20/10)

Width in the reed: 33½".

Length of the warp: 2 yards.

Pattern: See Fig. 1.

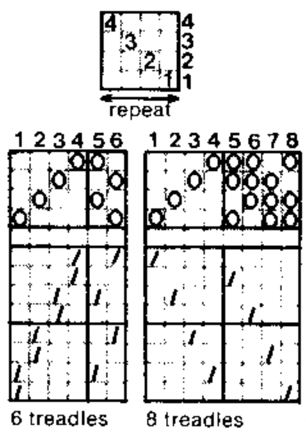
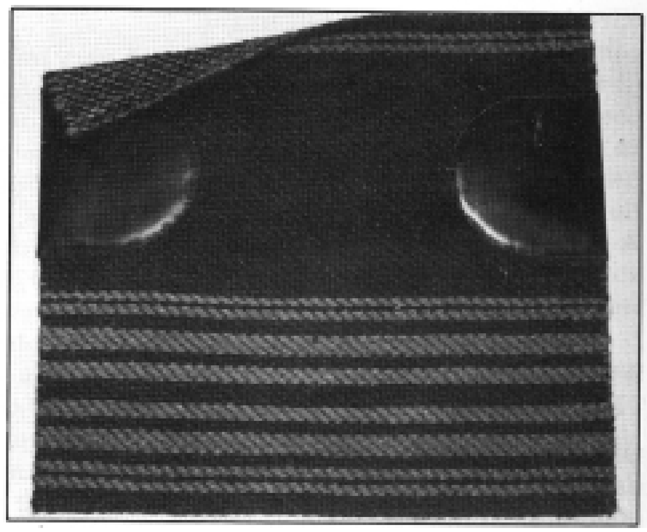


FIGURE 1



2. Saddle blanket, showing a corner of the reverse side.

As in all weaving, it seemed like the finishing was more time-consuming than the weaving. I finished the warp ends with the Philippine edge as described in *Finishes in the Ethnic Tradition*, by Suzanne Baizerman and Karen Searle, page 8, and then darned in the ends. I had not worked in the weft yarns as I went along because they were too thick. Thus, to finish, I carefully wove them around the edge of the blanket with a tapestry needle, then unplied the yarn and darned each single piece diagonally down the ribs of the twill. The finished size was 29½ inches by 31½ inches (76 x 80 cm). As Cat Red Bailey is a thin horse carrying a small saddle and rider, this was a good size. A large horse with a large saddle and rider would require a larger blanket.

Now for my leather patches. A trip to Tandy Leather produced a piece of 3-ounce (85 g) weight latigo leather which I cut and shaped into two long ovals, 18½ inches by 9½ inches (47 x 24 cm). These were dyed a deep rich brown with leather dye, following the directions on the bottle, and then waxed. I used an awl to make holes just over an eighth of an inch (3.2 mm) apart all around. Next, I folded each piece around the edge of the blanket, about 5 inches (12.7 cm) from the front end, and sewed the whole thing together with the two-needle saddle stitch, using the waxed thread and special needles that are sold for leather work. A visit to the public library to consult a basic book on leather work might be helpful if you have not had any previous experience with leather.

Well, it was finished! I had learned many things about horses, riding, saddles, blankets, spinning, weaving, dyeing, and leather. My friend and her horse moved to Montana and reported that they had won third prize in the Western Pleasure Class at the Montana State University Bobcat All Breed Horse Show. I like to think that my handspun, handwoven saddle blanket gave her those few extra winning points. ■

AN INTRODUCTION TO COMPUTERS FOR WEAVERS
by Earl W. Barrett

PART 3: WHAT'S INSIDE THE BOX? (CONT'D); MORE ON I/O

We begin where Part 2 left off, with a continuation of the discussion of computer memory.

The number of bytes that can be stored in a computer's ROM and RAM is a factor of merit; the more the better. This number is usually expressed as a decimal number followed by an upper-case K, as for example, 48K RAM. The K can be read as "kilobytes". "Kilo" normally denotes a decimal thousand (Greek: *khilioi* = 1000), but in the computer field it is defined as 1024 (2 to the 10th power) so that it comes out as a nice round number in binary (10000000000). This is because memory chips are built to hold a round binary number of bits. A 48K RAM will therefore actually store 49,152 (48 x 1024) bytes of information.

WHAT'S WHERE IN THE MEMORY?

Obviously, the central processor unit (CPU) must have some means of finding things in memory. To achieve this, each group of eight memory cells has an **address** assigned to it. The memory can be likened to the boxes in a large post office. A 48K memory thus consists of 1-byte (8-bit) units or **locations** with addresses (P.O. Boxes) ranging from 0 to 49,151 decimal. (Note that computers begin counting with zero, not one. Zero is a definite number to a computer, and should *never* be associated mentally with "nothing".) When the CPU has to read from, or write to, a memory location, it places the address (in binary, of course), on the **address bus.** This action causes only those eight particular memory cells to be connected to the **data bus.** Additional information is sent to the memory over the **control bus** to get these cells ready for a read or a write, as the case may be. Whenever the CPU has nothing else to do, it looks at the address in its **program counter,** places this address on the address bus, reads the contents of the location at that address (and perhaps the next one or two addresses also) to get its next instruction. We will be taking another look at this process when we talk about programming.

A very important characteristic of a computer is the maximum amount of memory it can address. This is determined by the design of the CPU and the number of **lines,** or **traces,** in the address bus. In the ancient days of microcomputers (circa 1975) both ROM and RAM chips were very expensive and didn't hold very many bits. So the designers of 8-bit CPUs settled on a 16-bit (16-trace) address bus, thinking that no micro could ever have more than the gigantic amount of 65,536 (=2 to the 16th power, 64K) bytes of memory. But as the years passed, the bit capacity of memory chips jumped from 1K to 4K to 16K to 64K and the price per bit fell drastically. The designers of the newer 16-bit CPUs took this into account by providing for a 20-bit, or, in some cases, a 24-bit address bus. This extends the address range to 1024K (1,048,576 bytes, 1 **megabyte**), or to 16384K (16,777,216 bytes, 16 megabytes).

It might seem as though owners of computers with 8-bit CPUs would see their machines becoming obsolete because of the 64K limit. While this will undoubtedly be true in the long run, most of the higher-quality 8-bit machines do allow adding on extra memory above the 64K limit by plugging RAM or ROM boards into some of their I/O sockets. The address problem is handled by a technique called **bank-switching.** The postal analogy here is the zip-code. Each **bank** of, say, 64K has a code which, when sent out by the CPU, assigns all available 64K addresses (postboxes) to that bank until further notice. When data are to be read from, or written to, another bank the new zip-code is sent out and the second bank may be addressed. Using this technique, many 8-bit micros can use as much as half a megabyte of RAM/ROM.

The main drawback to this kind of memory expansion is that running programs must set up the bank-selection (zip) codes. This poses no problem for users who do their own programming, but hampers those who rely on commercially-produced programs. Obviously, a commercial-program developer cannot know how much extra memory each user might have in his machine, so he/she writes the programs to fit within the maximum address space of that model computer as normally delivered from the factory. For most good 8-bit computers, this means 48K RAM; the remaining 16K addresses are reserved for ROM and I/O management. So a naive purchaser might buy a 256K RAM board to add to his nominal 48K machine and find that he is several hundred dollars out of pocket for memory that his commercial programs can never use.

ALL ROMS ARE NOT CREATED EQUAL

In the last installment, we saw that any practical computer must have some program stored in ROM so

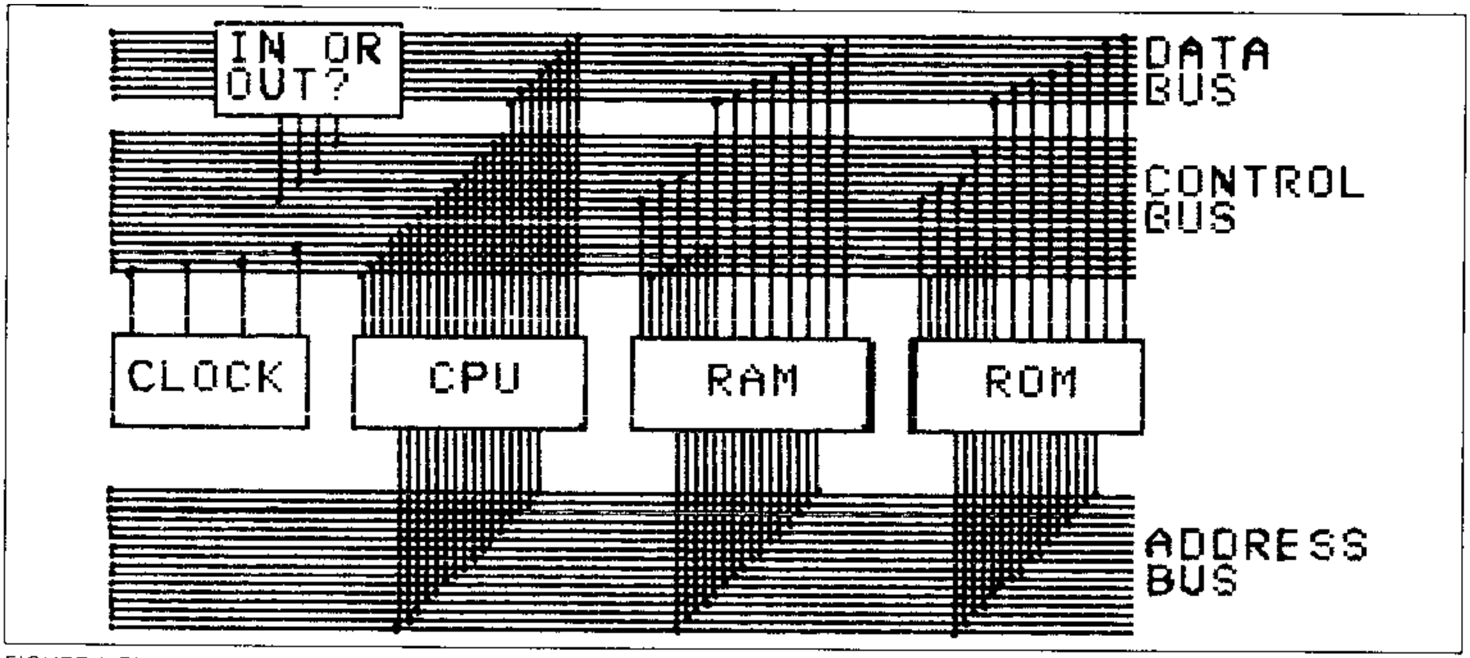


FIGURE 1. Block diagram of the major components of a microcomputer.

that (a) the computer is brought to a state of readiness when it is switched on, and (b) so that utility programs that are used frequently do not have to be loaded into memory from disk or cassette every time they are needed. These programs are stored in ROM chips that are installed in the computer at the factory, and constitute all or part of the **operating system** of that particular machine. These ROM chips are mass-produced to the specifications of the computer maker and can not be altered by the user.

Experienced computer users and hobbyists (known familiarly as **hackers**) frequently like to build their own peripheral devices, such as burglar alarm systems, sound generators, etc. Any peripheral needs an **interface board** to translate the information on the computer busses into desired actions by the peripheral devices. This almost always involves executing a specialized program created by the hacker. This program usually resides in ROM on the interface board and uses a part of the 64K address space that has been reserved for such use by the computer maker. Because having a single specialized ROM chip designed and built would be horribly expensive, special kinds of ROM chips have been devised which are mass-produced but contain no information initially. A user can buy a few of these and, using special equipment, put his own program into them.

These chips are named according to the way the information is put into, or removed from them. A **PROM (Programmable ROM)** is written to by burning out some of the incredibly fine electrical connections on the chip by controlled jolts of electricity. Once this is done, the information is cast in silicon and is unalterable. This means that any mistake made in the programming or while "burning in" the PROM means another chip down the tubes. To get around that, the **EPROM (Erasable PROM)** was invented. Instead of burning out connections, milder electrical voltages are applied so as to create patterns of trapped electrical charges ("electrets") in the chip that determine the 1-bits of the program. These charge patterns are stable for years, but can be erased by exposing the chip to strong ultraviolet light for half an hour or so. Again, special equipment is required to program and erase EPROMs, but they can be erased and corrected or re-used for other programs.

The last type of ROM is the **EEPROM (Electrically-Erasable PROM).** As the name implies, it can be erased electrically, without the need for ultraviolet irradiation, thereby saving time when corrections are needed. Special equipment is needed for programming and erasing; the computer cannot alter or erase any type of ROM.

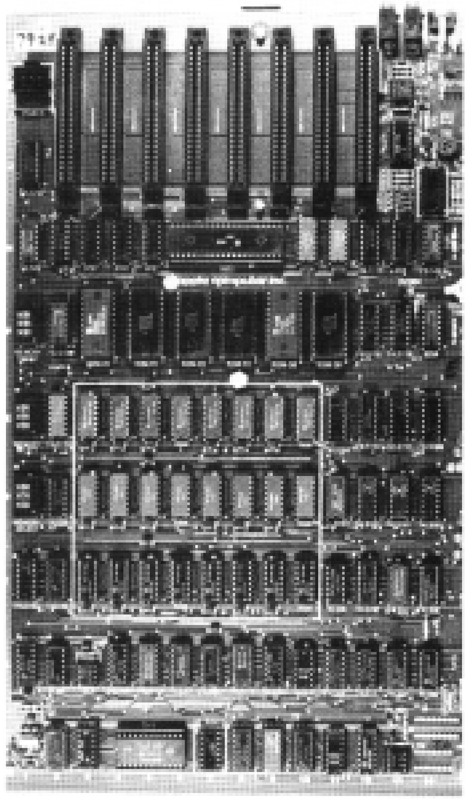
PUTTING IT ALL TOGETHER

Fig. 1 is a functional, or block diagram of the essentials of an 8-bit microcomputer. The 8-line data bus is at the top and the 16-line address bus is at the bottom. The control bus is drawn with 16 lines, but the actual number varies from one brand of computer to another. The essential functional units, clock, CPU, RAM, and ROM, are shown connected to the busses. The remaining box, labelled "IN OR OUT?", is shown straddling the data bus at the left. It is a "traffic cop" that determines whether the data is passed from left to right (input from a peripheral such as a disk drive) or the other way (output to a printer, for example).

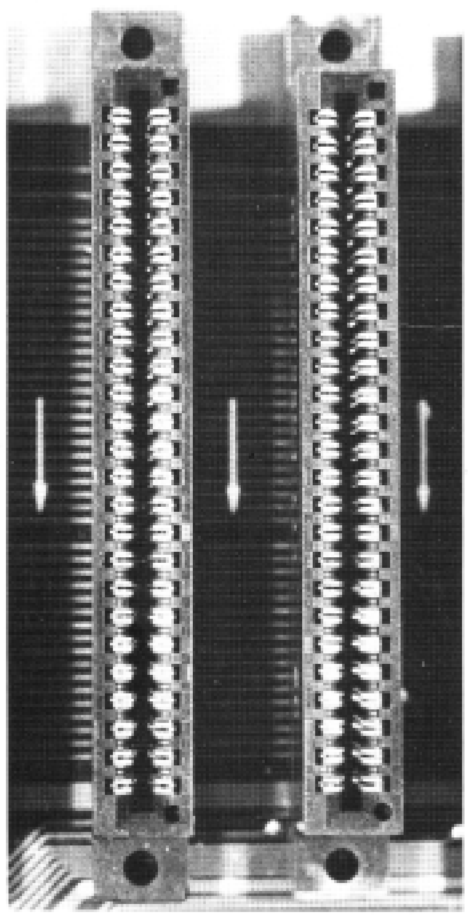
At the left edge of Fig. 1, all three busses are brought physically to a socket, or group of sockets wired in parallel, into which the interface boards for I/O devices may be plugged. This composite of the three busses (together with some other lines that distribute electrical power to all the chips and to peripherals that don't have their own power supplies (is called the **system bus.** The physical and electrical characteristics of the system bus sockets are matters of some importance, to be considered when buying a computer. Because the personal-computer industry is young, no complete set of industry standards has yet been established. The situation is reminiscent of the automobile industry in the days of my youth, when there were dozens of makes of cars with widely-varying placement of instruments and controls and radically-different stick-shift patterns. Some firms in the personal-computer industry have agreed to adopt the same system busses; this means that many peripherals made by other companies can be plugged into any of these standardized machines. Unfortunately, the computers that are of greatest utility to weavers do not have the standardized system bus. We will return to this point in a later installment on choosing a computer.

Photo 1 shows a physical layout corresponding to Fig. 1; namely, the motherboard of an Apple II computer. The large chip just below the row of sockets at the top is the CPU. The row of middle-size chips below the CPU are the ROMs that hold the startup and utility programs (the **system monitor**, not to be confused with the video monitor) as well as the resident **language interpreter.** Lower still, you can see three horizontal rows of eight small chips surrounded by a white border. These are the RAM chips; each row holds 16K bytes of information. The quartz plate and chips that comprise the clock are at the far lower left. The remainder of the chips handle various switching functions, generate the video signal, etc. The bus traces are on the underside of the board and so are not clearly visible.

The eight sockets at the top provide connection of the system I/O bus to the outside world. Photo 2 is a closeup of one of these sockets. There are



1. Physical embodiment of Fig. 1: Motherboard of an Apple II computer.



2. Two of the system bus sockets (I/O slots) of the Apple II. The bus traces are visible between the sockets.

25 contacts on each side of the slot, for a total of 50. Of these, eight are data-bus lines, 16 are address lines, eight are read-or-write signal lines, four provide electrical power, four carry clock pulses, and the remainder carry "handshaking" signals (so, for example, a printer can signal the CPU that it is ready to accept another character). The Apple bus is one of the non-standard ones; the proposed standard has 100 lines and so is often called the **S-100 bus.** Obviously, not all peripherals need all the lines, but providing a large number leaves room for future expansion.

Incidentally, the keyboard and video display are "privileged characters" among I/O devices; they can communicate with certain areas of RAM without having to relay through the CPU. This is because the latter can't anticipate when you will press a key, and because the entire RAM area where the video information is stored must be scanned every sixtieth of a second to refresh the picture on the screen.

I suspect that some of you may be feeling that I have told you more about a computer's insides than you ever wanted to know. Take heart, then, because we are now going to move on to other topics.

CHARACTERS TO BYTES: COMMUNICATION CODES

You are now aware that information inside the computer exists only in the form of electrical representations of binary numbers. Therefore, the simplest way (from the computer's viewpoint) for entering data would be by placing the voltages on the address and data busses by setting switches (up = 1, down = 0) for each of the 24 or 32 lines so as to poke the information into memory. Indeed, the first minicomputer I had to use in my laboratory required the user to enter about ten instructions in this way when it was first set up or had to be restarted from scratch. Unfortunately, if an error in a program caused that part of memory to be changed or erased, I had to do this manual entry all over again, to the accompaniment of considerable profanity. Nowadays, the startup instructions are in ROM, and the arrays of switches and lights that used to adorn the front panels of computers of a decade ago have vanished from the scene.

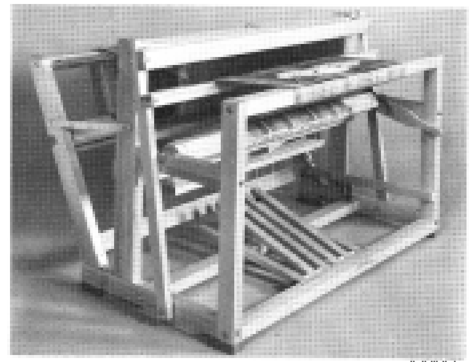
Because binary numbers are so clumsy for humans, there had to be a better way to enter data. Actually, the better way had already been in existence for fifty years or more (one might even say since about 1845, when Morse in the U.S. and Wheatstone in the U.K. introduced the telegraph). The need to send textual information electrically over long distances in a rapid and efficient manner, using a keyboard, led to the development of the teleprinter in the 1920's. On this machine, pressing a key produces a string of electric-current pulses that are unique to that character. But such a sequence of on-off currents is equivalent to a binary number sent one bit at a time. In such a system, each alphanumeric character translates into a binary number that is recognized at the receiving end and causes printing of the character. Such a set of characters and associated binary numbers constitutes a **communications code.** Over the past half-century, several such codes, all incompatible with each other, have been in use. Luckily, the microcomputer industry (in the U.S. at least) has pretty well agreed to a standard code. It is known as the **American Standard Code for Information Interchange,** or **ASCII** (pronounced "asskey") for short. In this code, each character is represented by eight bits, or one byte. This means that the maximum number of different characters that can be represented is 256 (2 to the 8th power). This is considerably more than any language (except ideographic languages such as Chinese or Japanese) can ever need. Usually, the most significant bit is reserved for error-checking purposes, so in practice there is room for only 128 characters. If we now represent the binary numbers by their decimal equivalents, the numbers 0 through 31 are special characters that handle standard functions on teleprinters but may be used ad-lib by computers. The ASCII codes 32 through 47 are punctuation and plus and minus signs; the codes 48 through 57 represent the digits 0 through 9, followed by more punctuation and math symbols in 58 through 64. The upper-case English alphabet uses codes 65 through 90, while 91 through 96 are more punctuation and special symbols (square brackets, underline, etc.). The lower-case letters are handled by codes 97 through 122 and the remaining five are more special symbols (curly braces, right arrow, etc.).

So what happens when you hit a key is that a **keyboard encoder,** usually in a special ROM, sends the corresponding 1-byte binary number to a reserved block of RAM called the **keyboard buffer.** These ASCII bytes are stored in sequence. The program that is accepting input directs the CPU to fetch these bytes in order, starting at the lowest buffer address, and use them for the program's purposes.

Non-keyboard inputs, such as from a joystick, are also converted into binary numbers by means of **analog-to-digital converters (ADCs).** If the binary numbers are restricted to be one byte in length, then this means that the computer can only recognize, or resolve, 256 distinct positions of the joystick in each direction. If a joystick is being used to provide input to a drafting program, the resolution is limited to 256 points both vertically and horizontally. This results in the "jaggies" (stair-steps on diagonal lines) that characterize microcomputer graphics.

Well, my Apple word processor tells me that this installment now contains 16,016 ASCII-character bytes, which is about all that Clotilde has alloted me for this chapter. Join me next time for a chat about computer languages and programming. Au revoir until then. ■

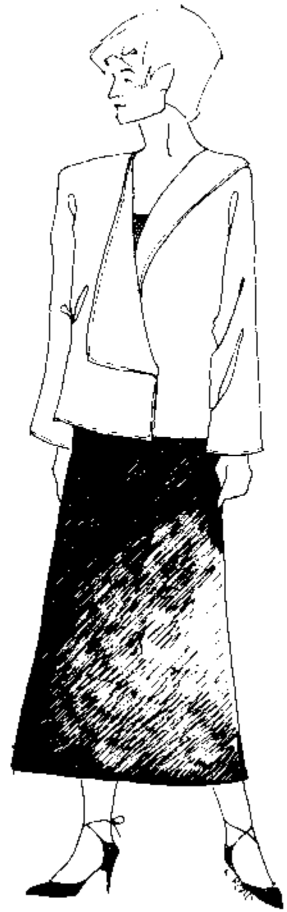
PRODUCT NEWS

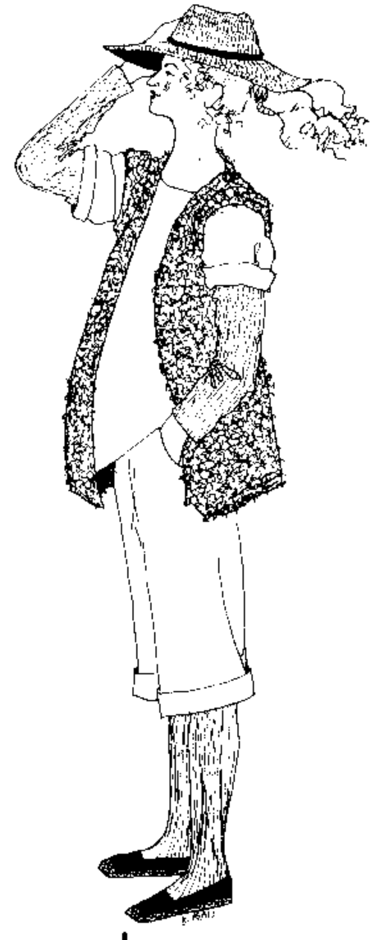


GLIMÅKRA has recently added a four-shaft jack loom to their line of weaving equipment. The loom is available in 36" and 48" weaving widths. The jack mechanism has parallel pull lams. The loom has a friction brake which allows accurate and even tension adjustments. The rear beam assembly folds for easy movement and storage.

Its use of Texsolv knotless heddles and linked loop treadle cords makes this loom one of the quietest jack looms available. For complete details write: Glimåkra Looms 'n Yarns, Inc., P.O. Box 16157, Rocky River, OH 44116, or P.O. Box 1271, Sonoma, CA 95476.

GREEN MOUNTAIN SPINNERY, P.O. Box 54, Putney, VT 05346, carries a good selection of 100% wool yarns in colonial colors (garnet, indigo and blends), and in natural shades. The finest is a single, yielding approximately 2000 yds/lb. The heaviest ("triple twist" and "bulky") yields 680 yds/lb. The yarns are suitable for knitting and weaving. Knit kits and patterns are available. Green Mountain Spinnery also sells carded fleece and roving. Sample cards are available. Wholesale inquiries are welcome. ■





fashion trends

by Susan Hick

At first glance one wonders just what the winter style scene sets forth which the weaver can use to advantage. A little research, however, reveals many fabrics and shapes perfect for the picking.

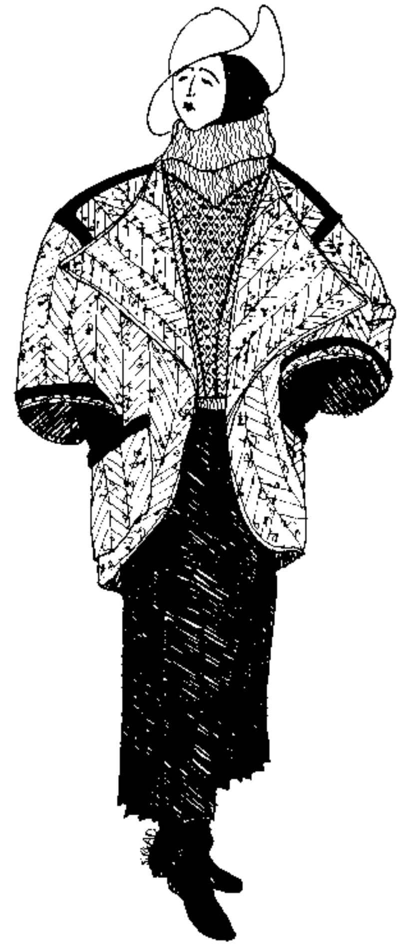
It's touted as the Year of the Sweater. Many will want to dig out their knitting needles. Others may just decide to sit this one out, and that could portend a very dull, unprofitable season. There is hope for all. Consider that the fashion press describes many of the knits as looking handwoven. Craft magazines are devising patterns so knitters and crocheters can achieve a handwoven appearance. Add the fact that the weaver's looser, slightly bulkier fabrics can drape and skim the body nicely and do lend themselves to knitted trimmings. Et voila, it becomes the Year of the Handwoven!

The general direction of shapes for clothing is a soft, eased-up fit. A little waist-nipping or light belting is sometimes in order. Picture a wedge, full at the top and tapering toward the hemline.

We've all been introduced to the tattered bag lady look. No need to go to such extremes. It translates into fashion as roomy, comfortable, and layered but still body-conscious by being draped or fitted to suggest the shape underneath. Lines are clean, though slightly oversized, especially in the coats that need to go over all those layers. The layers consist of blouses, sweaters, vests, jackets, pants, skirts—any or all of these.

Sweaters come in sets, long over short. Vests and jackets are cropped and boxy or grow to tunic lengths and can be back-pleated, bloused, or fly-away. Most long jackets seem to be blazers or slouchy cardigans. Skirts are slim, gently gathered, or have multiple gores to go as full as desired. Coachman-style coatdresses are back, as are the jacketed dress and the one that looks like a two-piece ensemble. Pants may be really baggy and cut short, but the best are the classic pleated trousers, rounded over the hips and tapered at the hem. Coats wrap as a bathrobe or are asymmetrically draped.

The use of menswear fabrics endures. While they are mostly the staid suiting fabrics we're used to seeing, there are some fun things



being done with them. Those of the traditional colorways are being mixed: a herringbone jacket with a twill-stripe skirt; a glen plaid and a small check; a pin-stripe plus a herringbone. Tweeds go with all, of course. Then one of these fabrics can be shot with a metallic. Any can be emphasized by grossly enlarging the pattern. Finally, change from the familiar hues to even outrageous colorations.

Follow up on the mixture theme. Plaids, checks, and stripes can all be artfully combined as long as the colors coordinate: blanket checks and a windowpane plaid; a wide stripe and a narrow stripe. Try ombred yarns in stripes and plaids for interesting effects. Experiment with "covert", a diagonal warp-faced worsted twill alternating contrasting colors in the warp resulting in a speckled-looking cloth.

Textures can be all over the fabric but must be carefully controlled, as, for example an undulating twill of wool warp and thick-and-thin cotton weft.

The luxury fibers to invest in are angora and cashmere. Mohair and merino wool are mentioned often. All those layers could become awfully steamy, so some fabrics can be worked in cotton. Brushing cotton adds warmth, making it quite acceptable for winter wear. Silk and rayon chenilles are soft and drape-y. Linen gives its characteristic crunch to wool or silk.

Rich hues for winter are best described as the jewels emerald, jade, aqua, topaz, lapis, amethyst, and ruby. No-frills black is slowly being replaced by brown (chocolate, walnut, cognac, mushroom) as a neutral. The pastels are rather grayed, perhaps to be accomplished with overdyeing. Add some rust, fuchsia, and teal to the palette, and there are no holds barred in mixing things up.

When putting it all together remember some of the little things that mean a lot. Shawl collars have returned. Dolman sleeves are still good. Elongate and square off a lapel. Exaggerate the wing of a collar. Try wide or narrow channel quilting instead of tucks with a too-bulky fabric.

Try inlaying an argyle plaid or a Fair Isle pattern across a front or down a sleeve. Applique on a shoulder. Trim with velvet. Think about smocking at the waist or at the shoulder around the armhole. Trapunto-stitch waistbands, belts, and hipbands. Art-deco motifs can outline a cardigan or dress a neckline.

It's possible to glitter with gold and silver embroidery or sequins and beads, even if the sparkles do sometimes seem overdone. Take it to the extreme by weaving in lapels or a belt, or lay in a faux jewel or bracelet.

Four-foot-long mufflers accent outfits, as do longer scarves and wider shawls.

If the room-at-the-top silhouettes don't sit right with you, don't overlook the current baby boom. No infant's parent could resist a bunting with coordinated carriage robe.

So relax. It's our year after all! ■

RAINBOW DYEING
by Erica Rowe

Would you like to be able to transform a dirty, greasy fleece into a mass of vibrant colors? Achieve the rich resonance of natural dyes with the ease of chemistry? Create your own variegated yarns? All these things—and more—are possible with an innovative dyeing process called *Rainbow Dyeing.*

This creative and experimental method of dyeing with chemical dyes is much easier for craftspersons who do not like all the exact measures and scientific protocol that usually accompanies chemical dyeing procedures. Rainbow dyeing requires no elaborate dye preparation or measurements. The major requirement is a love of color and a desire to experiment. Basically, the fiber to be dyed is just barely covered with a water and vinegar mixture. Dry chemical dyes in powdered form are sprinkled over the top. From two to four different colors can be used. The fibers and dyes are not stirred at all. It is the circulation of the water brought about by *gentle* simmering which blends the colors. As a result, the fibers are dyed not only the colors actually added to the dye pot, but also reflect a continuum of shades in between.

The original idea for this unconventional use of chemical dyes came from a short paragraph in *The Web* in which Willemke Calvin of New Zealand reported that she had experimented with sprinkling dry chemical dyes on wet fleece with pleasing results.* This idea really appealed to Jean Steiber of Norwich, New York, who spent the entire next summer dyeing fleece after fleece in this manner.

"It was lots of fun," said Jean, who is a charter member of the Thistledown Handspinners Guild and registrar for nine of the ten annual guild seminars. "So naturally, I wanted to share it with everyone. I presented it at the 1977 seminar as a miniworkshop, and actually did the dyeing right there in front of everybody." Miniworkshops at the Thistledown Handspinners Seminar must have a title for the printed program, so Jean wracked her brains for a catchy name and *Rainbow Dyeing* was born. "It's exciting to see how it has spread," said Jean. "I see the name in various places and know it all started right here in Norwich." Now at the seminar, lots of people are selling rainbow-dyed carded fleece, ready to spin, and it is a very high demand item indeed. But there is no need to pay premium prices for the colorful fibers when it's easy and most fun to do yourself.

THE BASIC PROCESS BY JEAN STEIBER

"Any type of fleece may be used for this, such as grease fleece, roving, top, etc., but I prefer fleece in the grease or unwashed wool. Long staple is also preferred, but the shorter ones also work and are nice for making tweeds and novelty yarns.

"I usually start with a whole fleece, spreading it out on the floor and tearing or removing sections of fleece to fit the kettle I am using. As sections are removed, I pack them in layers with the dirt side down in cardboard boxes for ease in handling. (This is excluding the tag ends.) This method of dyeing is a good way to use up those extra-dirty fleeces you have despaired over.

"I then prepare the dye kettle using a large enamel preserving kettle, but any size may be used. Fill the kettle about one-fourth full of water, add one-half cup white vinegar, one-eighth cup Glauber's salt (or non-iodized table salt), and two or three squirts of liquid detergent. Stir to dissolve the salt and then place the section of dirty wool in the bath, with the dirty ends *down* in the kettle. Press the wool down with a wooden spoon to moisten and let cook for a few minutes to be sure the wool is wet. Hold the heat to a simmer as boiling will not give the mottled dyeing—you will still get a good dye job, but of one color only.

"Sprinkle the appropriate colors of Ciba (or similar commercial) dry dye on sections of the fleece as you desire and let simmer for one-half hour uncovered. As the dye bath simmers, the two colors will blend and form the "rainbow" fleece. Try to refrain from stirring the wool. The third color usually comes when the water simmers up through the wool in the center, like a volcano.

"Let the wool cool until it can be handled, then wash and rinse in warm water carefully to keep the fleece in one piece. Drape over a clothes line in the shade to dry or dry on screens."

Rainbow dyeing is a process which is essentially suited to innovative and creative persons because there are many, many ways to vary the process in the dyeing stages by using different color combinations and in the use of the fiber once it has been dyed. The kinds of fibers, their form, how they are processed, spun and used in the final project all have an effect on the final result of rainbow dyeing. As a result of workshops by Jean and others in the area, several textile artists in the Central New York region have been using rainbow dyeing, and some have become dyed-in-the-wool enthusiasts. Most are members of the following local guilds: The Seven Valley Weavers Guild, The Thistledown Handspinners Guild and The Black Sheep Hand-

*Calvin, W. 1976. Dyer's Sport. *The Web.* Quarterly Journal of the New Zealand Spinning, Weaving and Wool-crafts Society, Inc. p. 10-11.

spinners Guild. Some of them have been kind enough to share their experience and experiments with rainbow dyeing to provide you with new ideas and inspirations for your own projects.

THE COLORS

Jean prefers to use just two colors in her rainbow dyeing, always keeping in mind the color wheel. She suggests: red/yellow, yellow/blue, and blue/red. Jean lets the dye pot simmer to blend the dyes gently and create new colors from the two basic ones applied. This is certainly the safest type of color combination for those people who wish only timid experimentation, or who have an expensive luxury fiber they don't want ruined. More adventurous dyers can obtain spectacular results by adding three or even four different colors to the dyepot. The risk of the addition of so many dyes to the pot is that the colors may "mud together". "Turquoise/magenta/yellow made a beautifully colored fleece once, but the second time I tried it, it all turned green because I cooked it too long," explained Nancy Morey, an avid rainbow dyer who has turned her hobby into a business. Nancy sells the yarn she spins from rainbow dyed fleece. "I was really surprised to see how well rainbow-dyed handspun sell at shows and craft fairs," she said. Nancy also supplied custom-dyed yarns to out-of-state weavers. "The customer sends me a range of colors and I send back samples from which they can choose." Nancy's house is piled high with bags of fleece, rovings, and yarns all dyed in a rainbow dyepot. She likes to use a lot of colors. Some of her favorite color combinations: magenta/russet/yellow, magenta/purple/orangey-red, blue-black/medium blue/turquoise, and turquoise/brown.

Jean has experimented a little with using natural dyes instead of chemical ones. Her "natural" rainbow dyepot included cochineal, onion skins, and madder in a casserole dyeing variation of the rainbow technique in which the fibers are dyed in a glass casserole dish in the oven, instead of on the stove top. "I used only a vinegar mordant in the water and I got a variety of shades that ranged from pink to tan," said Jean. "There's a lot more room for experimentation here."

THE FIBERS

Jean prefers to use grease fleece for rainbow dyeing. "A fairly long staple is necessary to get the full effect. You can even get several different colors on individual fibers." Nancy recommends fleeces—like Finn, Romney and Border Leicester—whose sheen adds extra sparkle to complement your dye job. "And mohair is so lustrous that, rainbow-dyed, it's gorgeous," Nancy pointed out. Nancy and Jean, who has also dyed mohair, both treat the mohair fleeces the same as they do wool. Jean remembered dyeing a buck's fleece that was stiff and hard to handle. "The results were unbelievable—gorgeous colors and *so soft.*"

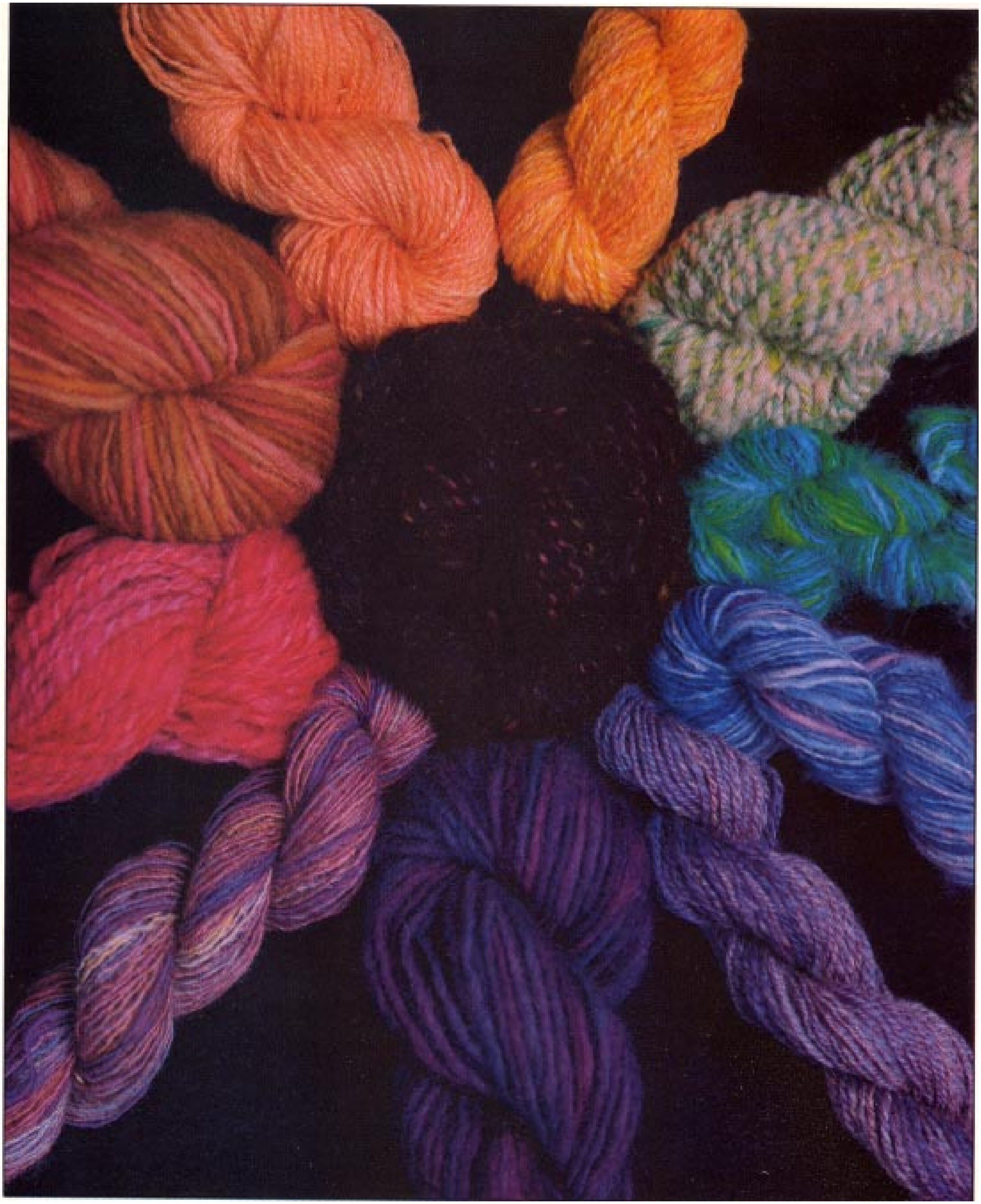
For cotton and silk, Nancy uses fiber-reactive dyes which require no heat. Nancy has found these fibers trickier than more traditional mammalian fibers. The dyes do not penetrate the cotton roving she likes to use, although she thinks that longer pre-soaking, perhaps with detergent, would help. The silk tends to lose its luster when dyed, which Nancy finds quite disappointing. She is currently working with her dye supplier on this problem. Nancy has done the most experimentation with fibers other than wool. She has mixed Angora and wool together (about 20%-80%) and dyed it in the fleece just as she dyes regular sheep fleeces. The result was highly colorful and incredibly soft.

Extremely bright colors can be obtained by dyeing unspun Angora in a rainbow dye pot. Unbleached rabbit wool is pure white and takes the chemical dyes with added brilliance. The basic dyeing process used is the same except that extra care must be taken not to disturb or agitate the wool, which felts easily. To reduce the opportunities for felting, keep the water level to a bare minimum, use absolutely no stirring, and omit the final washing and rinsing steps. Pour the dye liquid off, carefully, and gently replace it with clean water of the same temperature, and pour off again. A more complete washing and rinsing can be accomplished after the yarn has been spun. After the Angora wool is dry, it may appear matted, but if dyed properly, the fibers can be pulled apart with gentle teasing, returning the Angora to its original fluffy state. Angora will also require a long presoak (one hour) in warm soapy water in order to insure that it is thoroughly wetted before dyeing to avoid undyed portions of wool.

PROCESSING

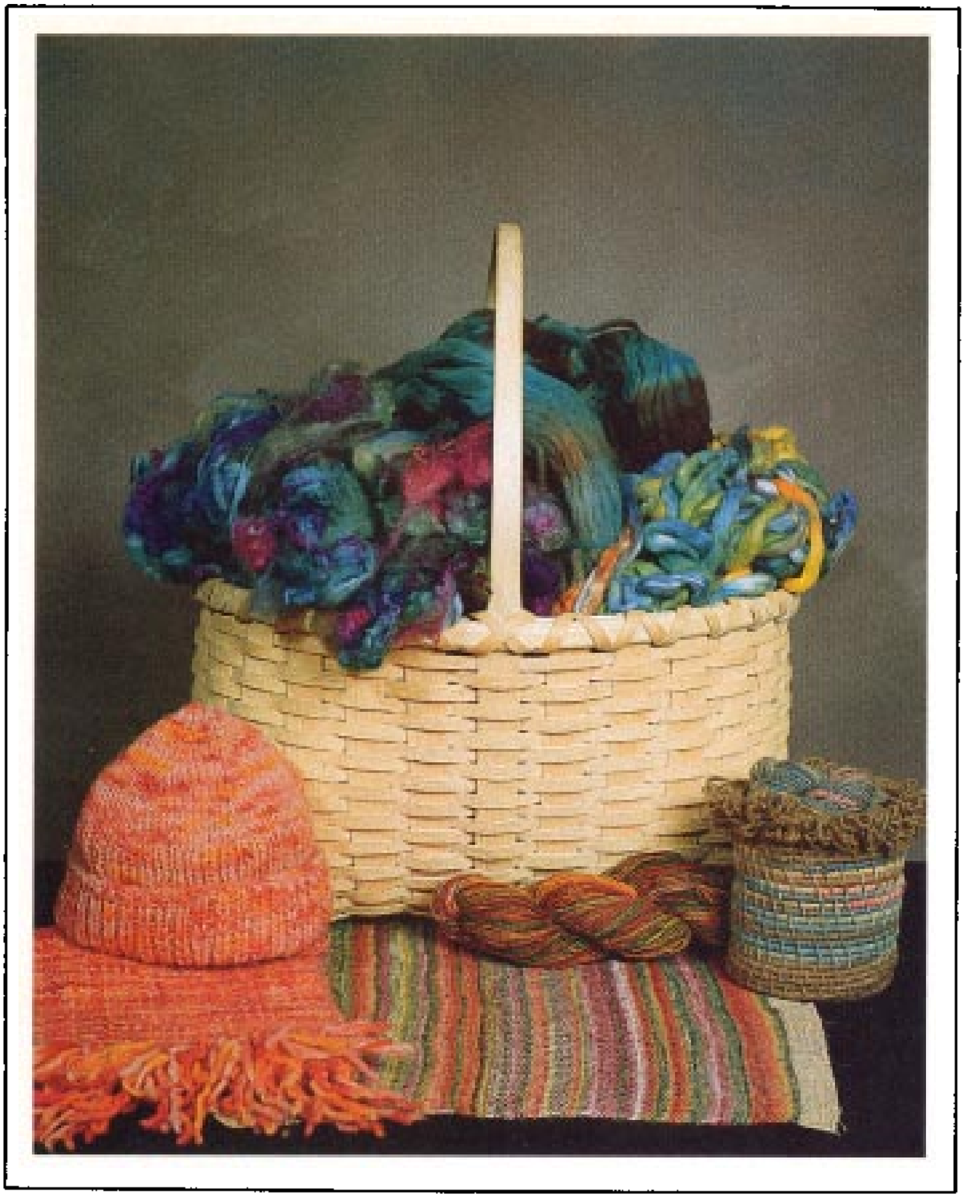
Both Jean and Nancy like to spin rainbow dyed fleeces, lock by lock, without carding. Jean likes the way it mixes up the colors and Nancy doesn't want to be bothered with the extra step of carding. However, individual colors could be sorted out and carded separately, and then spun either randomly or in order. Spinning the fibers lock by lock yields a single-ply yarn in which the colors appear randomly—similar to the way they appeared in the dyed fleece. Plying yarn spun in this manner sets different colors against each other in the yarn. This can appear tweedy or muddy, depending on the yarn. If the rainbow dyed fleece was dyed with varying shades of the same color, plying is quite attractive. Nancy prefers to leave her yarn as singles, but Gretchen Sachse of Ithaca rescued yarn which she said "looked ugly" as singles by plying it.

The alternative to spinning the colors separately or in a random manner is to card all of the colors together until they are thoroughly blended into a single shade. This is best done on a large commercial carder. If several fleeces are carded consecutively, there are one or two pounds of "transition fleece" with both colors. This transition fleece is



Vince Rowe

1. Rainbow-dyed skeins (clockwise from upper left): red/pink/brown wool singles by Nancy Morey, pink/orange two-ply wool, pink/orange/yellow two-ply wool by Jean Steiber, yellow/green/blue plied with white wool by Mary Anne Lynch, green/blue Angora singles by Erica Rowe, blue/pink wool singles, blue/lavender two-ply wool by Jean Steiber, blue/purple singles wool by Nancy Morey, blue/lavender/pink wool singles by Jean Steiber, red/pink two-ply wool by Nancy Morey, and (center) orange/red carded into dark wool, two-ply, by Mary Anne Lynch.



Vince Rowe

2. *Rainbow-dyeing (clockwise from upper left): Finn fleece and Angora wool dyed together in the fleece, wool pencil roving, cotton roving all by Nancy Morey, yarn-wrapped basket and skein and woven sampler with skein by Jean Steiber, knitted cap and woven scarf from the same yarn by Nancy Morey. Handwoven ash splint basket by Jeffrey Gale.*

a favorite of Jean's. There are two major advantages to arriving at a color by blending fibers, rather than by dyeing with a single color. First, it is possible to get colors and shades which are not available commercially. Second, the blending of several different dye colors results in a shade which has dimensions not present in the "one note" chemical dyes. "The results are almost good enough to win you away from natural dyeing altogether," said Jean.

Other variations can be obtained by blending, plying or knitting the rainbow-dyed fleece with undyed white or naturally colored fleece. Blending with white yields pastels or frosted colors, depending on how thoroughly the carding is done. Dark wool will tone down the sometimes electric bright colors of a rainbow-dyed fleece. Plying a rainbow-dyed yarn with a solid color gives a candy stripe appearance. By knitting together singles of rainbow-dyed yarn with singles of either white or dark yarn, one can achieve nearly the same effects without the additional steps of blending or plying.

One unusual use of rainbow-dyed fleeces is as a type of warehouse of colors. Mary Anne Lynch—a many time winner in the handspinning classes at the New York State Fair—sorts the rainbow-dyed fleece by color. "It gives me a large selection of colored fleece from which to choose when I am planning a project." Recently, Mary Anne was knitting a Peruvian-style hat in natural shades when she decided it really needed a bit of extra color to perk it up. She took some red fleece from a rainbow dye pot and blended it with some dark fleece. "It resulted in a very natural-looking Peruvian red and made the perfect color accent for the hat," said Mary Anne.

USING RAINBOW-DYED YARNS

If the yarn has been spun from thoroughly blended fibers so that it is essentially a single shade, it can be used as you would use any other handspun yarn. The multi-hued yarns favored by most rainbow-dyers can be somewhat trickier to use. The really nice thing about the yarns of many colors is that they can transform a garment made with a simple tabby weave or straight knit into a garment of great splendor and beauty. In fact, the colors are so outstanding that intricate patterns in either weaving or knitting would most likely be lost, unless the yarns were used very carefully.

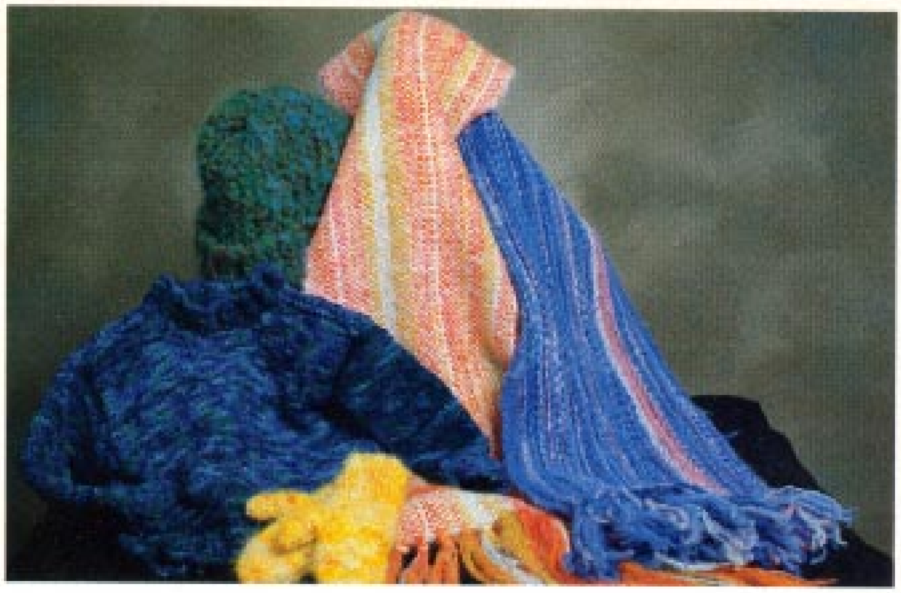
Rainbow-dyed yarns produce horizontal stripes in a woven fabric when used as the weft with a solid color warp. When the same rainbow-dyed yarn is used in both the warp and weft, the effect is somewhat tweedy. Mary Anne experimented with a rainbow-dyed warp in purple, blue, and pink, with a solid color weft. She thought that the lovely subtle color changes would show to better advantage in the warp rather than being doubled back on themselves as they are when used in the weft. "Instead, it looks as if it were woven with odds and ends," said Mary Anne. To rescue this scarf, Mary Anne plans to top dye the entire scarf with purple, as suggested by Brother Kim Malloy when he came to Ithaca for a workshop.

In addition, rainbow-dyed yarns are useful as accents—a stripe of rainbow-dyed yarn in a placement or a splash of color in a sweater or hat.

DYEING ROVING, YARNS, AND GARMENTS

Although rainbow-dyeing is generally used on unspun fibers, it has lots of potential for fibers in other forms as well. The roving can be dyed in the same manner as the fleeces, although there will not be so many options for color order or combinations when spinning, unless the fibers are recarded, which seems wasteful of pre-carded roving. There are even fewer options available when yarns are dyed by the rainbow method. "It could be disastrous, but you can also get something unique and interesting," said Mary Anne. One skein of yarn, dyed by the author in blue, red, and black, turned out to be quite an eyesore. Fortunately, its appearance improved tremendously upon knitting and eventually made an attractive hat. When dyeing yarns, Nancy likes best to "just sprinkle on the dyes any which way." However, she has also learned to reproduce the effect of commercial variegated yarns, by setting the roving or yarn into the dye pot so that it "snakes" back and forth and then sprinkling the dye in straight rows perpendicular to the rows of yarn.

One of the most daring of the rainbow experiments was carried out by weaver Lavinia Adler who rainbow dyed 4 handwoven mohair shawls. Lavinia owns a small shop in Binghamton where she sells her own handwoven items, yarns, books and looms. Last year Lavinia had a very large order for white handwoven mohair shawls, and ended up with extras. Finding that the overly-abundant white shawls did not sell well, she decided to try some rainbow dyes. "I took the plunge," said Lavinia, "and dyed four of them in four different color combinations." To be safe, she used only two colors for each scarf: magenta/yellow, purple/blue, light green/blue, and red/blue. She just sprinkled the colors randomly, not trying for any design, and three of the four shawls turned out beautifully. Already a customer has ordered a *king-sized* bed spread, woven of mohair yarns and rainbow-dyed like the magenta/yellow shawl.



Vince Rowe

3. Rainbow-dyed garments (clockwise from upper left): Knitted hat of Angora singles and bulky natural dark wool by Erica Rowe, woven mohair scarf and woven wool scarf by Mary Anne Lynch, Angora knitted with white wool singles into child's mittens by Erica Rowe, child's sweater, dyeing and spinning by Joan Johnston, knitted by Gretchen Sachse.

SAFETY NOTES

Chemical dyes are reactive chemicals and therefore are potentially dangerous. Great care should be taken when using them, especially to avoid inhalation of the powder. Damp newspapers spread over flat surfaces will help trap the stray dust which is "incredibly light and travels all over" according to Jean. Adequate ventilation is important. Nancy does all her dyeing in the summer months when she can keep doors and windows open. Of course, never use cooking pots or utensils for dyeing. For particularly sensitive people, or craftspeople who do a lot of dyeing, an air filtration face mask may be necessary. For further information consult the publication *Precautions for Craft Dyers* by Catherine L. Jenkins, The Center for Occupational Hazards, 5 Beekman Street, New York, NY 10038 (and also reprinted in the November 1982 issue of *The Web*). Let's keep chemical dyeing safe and fun and useful to ourselves as textile artists!

THE LAST SHOT

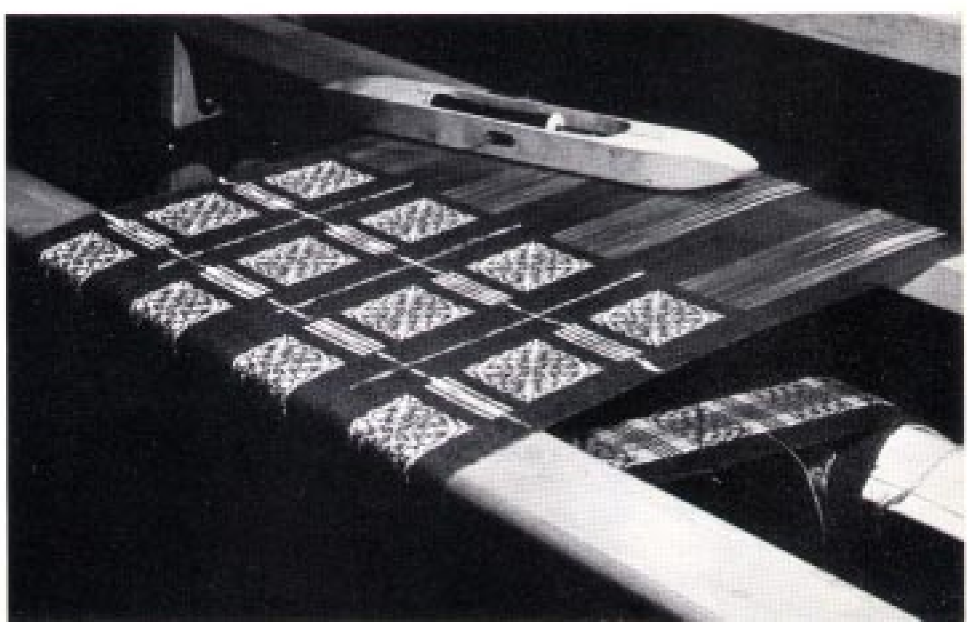
Rainbow dyeing produces spectacular results with the ease of chemicals but without all the rigamarole and exacting procedures. It's convenient for dyers with limited facilities, because an entire fleece can be dyed in bits and pieces without worrying about too much variation between dyepots. It's ideal for textile artists who like to "play" with colors. The unique multi-hued yarns, and blended colors cannot be produced in any other manner.

It's an experimental procedure, and therefore not suited to reproduction. It may be very difficult to make your rainbow-dyed yarn turn out exactly as you had planned. However, even the disasters can usually be "saved." The possibilities are endless and open up a whole new world of color experience for all of us.

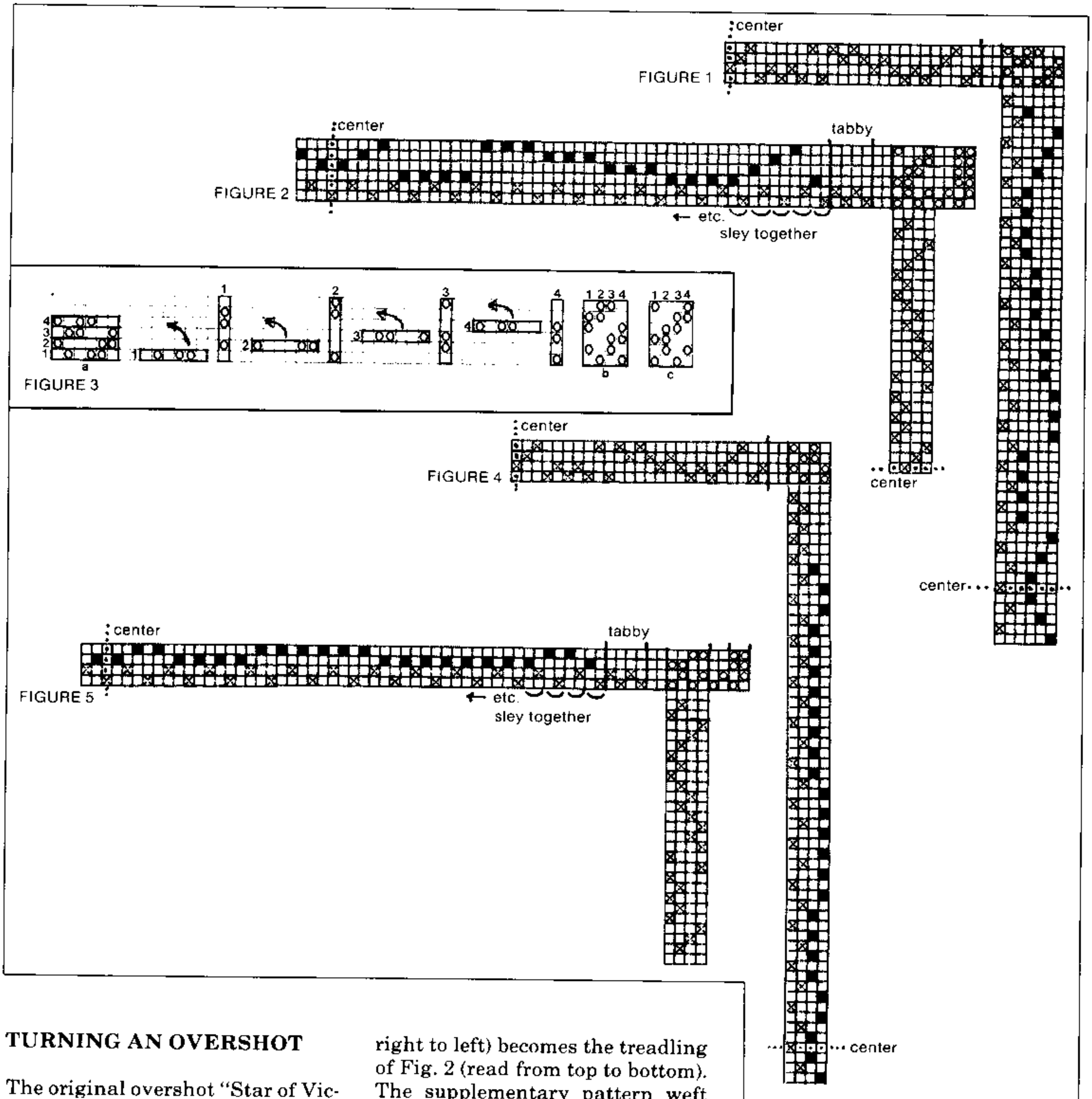
ABOUT THE AUTHOR: Erica Rowe lives and works on a small farm in Upstate New York where she raises Angora rabbits and Romney sheep. She belongs to the Black Sheep Handspinners Guild as well as the Seven Valley Weavers Guild. ■

MERRY CHRISTMAS!
by Clotilde Barrett

Handwoven Christmas cards are appreciated by everyone. They make people recall the "good old days" when life was less hectic and families would spend weeks together getting ready for the holidays: cleaning, cooking, decorating the house, making gifts and working on Christmas cards. Today time has become more precious and projects have to be fast. Weaving Christmas cards in "turned overshot" is the perfect solution. Your friends will think that you spent hours weaving their card yet I wove close to 200 of them in one day. One of the cards shown requires a 4-shaft loom, the other requires a 6-shaft loom. All but the draft is the same for both.



Textile glue is applied where the cards will be cut



TURNING AN OVERSHOT

The original overshot "Star of Victory," which is a Bertha Hayes pattern, is shown in Fig. 1. It is woven as the blocks are drawn in and the design should be squared out. The pattern picks appear as supplementary weft on a balanced plain weave ground.

Fig. 2 shows the same pattern "turned."

The treadling of Fig. 1 (read from top to bottom) becomes the threading of Fig. 2 (read from right to left). The threading of Fig. 1 (read from right to left) becomes the treadling of Fig. 2 (read from top to bottom). The supplementary pattern weft (squares) becomes the supplementary pattern warp. To turn the tie-up, turn each row of Fig. 3a into a column. Put the columns together as in Fig. 3b and take the "opposite" tie-up as in Fig. 3c. In Fig. 2 the ground warp threaded on shafts 1 and 2 should be sett as for a balanced plain weave. The pattern warp threaded on shafts 3, 4, 5 and 6 should be sleyed together with the adjacent ground warp. The fabric is woven with one shuttle carrying the ground weft.

TURNING MONKS BELT

The original "monks belt" is shown on Fig. 4. Note that the threading is the same as in Fig. 1 but the pattern is woven with only 2 opposite treadles.

Fig. 5 shows the same pattern "turned." Proceed as for the overshot described above. The new threading will only require 4 shafts.

INSTRUCTIONS FOR THE CHRISTMAS CARDS.

Warp

Ground warp: 16/2 or 20/2 mercerized cotton, color med. blue.

Pattern warp: 6-strand floss (Lily-colors dk. pink #461, lt. pink #204, med. pink #376). Add a thin metallic thread to each warp thread.

Length of the warp: 5½ yds or 5.03 m. (for about 200 cards).

Width of the warp: 16" (40.6 cm)

Sett of the ground warp: 24 epi (100/10 cm) in a 12 dent (50/10 cm) reed.

The pattern warp occurs only in 4 stripes, each 2" (51 mm) wide. See Photo 2. In these areas the pattern warp is also sett at 24 epi. In the pattern stripes there are thus 48 epi (24 ground, 24 pattern).

Distribution of the stripes: See Fig. 6.

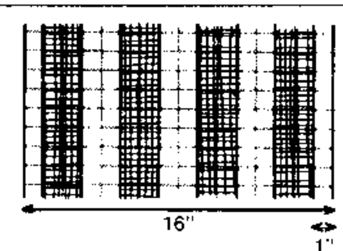


FIGURE 6

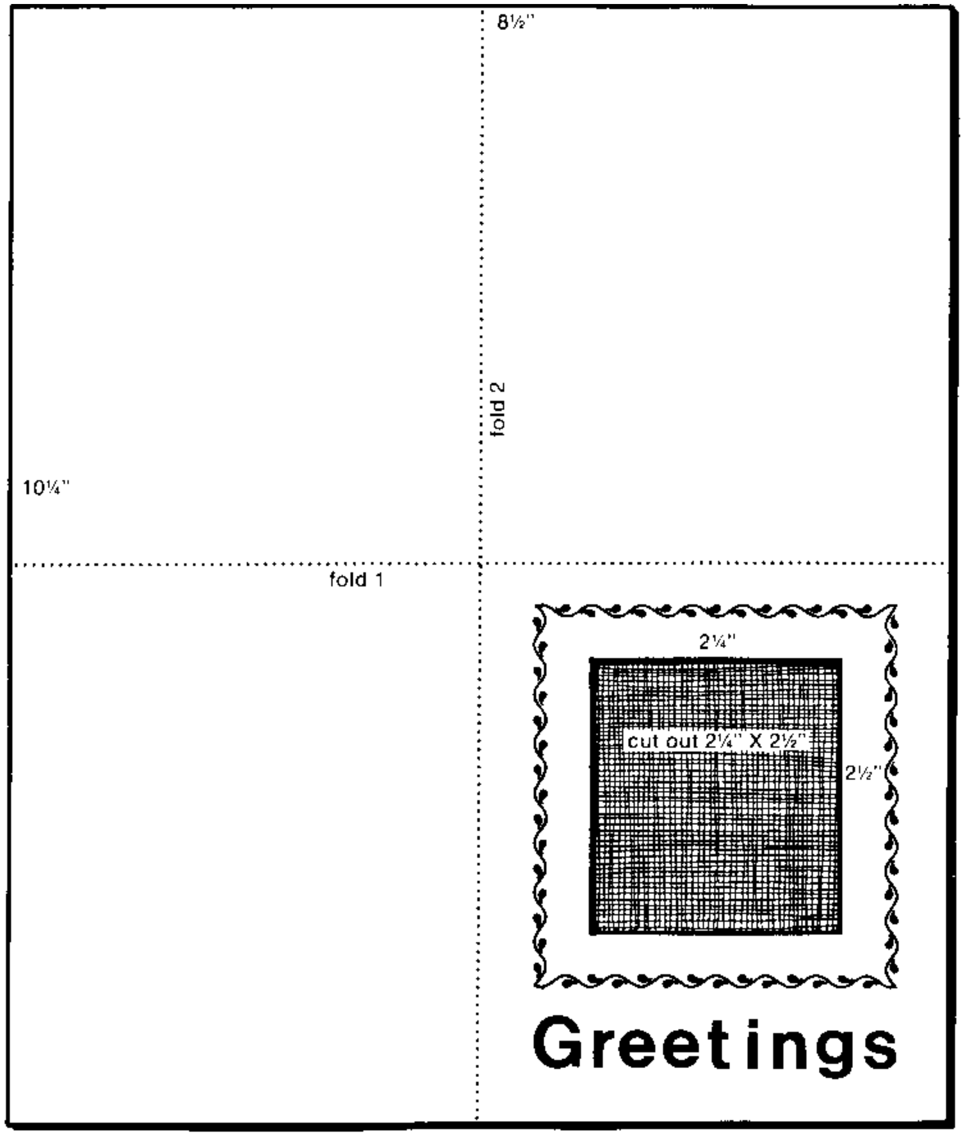


FIGURE 7. Cutting and folding plan.

Weft: Fine acrylic, color deep blue.

Warping procedure: Make the ground warp first: 24 x 16 or 384 ends. Sley it through the reed. Make a warp chain for each of the 4 pattern stripes; each chain has 48 warp threads.

Color order of the pattern warp:

LLLL MM LL MM LL MM DD MM DD MM DD: center

Wind a metallic thread together with each warp thread. Sley each warp chain together with the ground warp according to Fig. 6.

Pattern: Choose Fig. 2 or Fig. 5 and thread the ground warp and the pattern warp at the same time. Beam.

Weaving: Use only one shuttle. Weave the pattern as the blocks are drawn in; according to Fig. 2 or 5. Each stripe will weave one card. Between each set of cards, weave tabby by treadling shaft 1 and shaft 2 alternately.

As one weaves tabby, the pattern warp will float under the cloth and become slack. To avoid a tension problem weave the area *between* cards as follows:

Treadle shaft 1 up, shaft 2 up alternately for 12 picks.

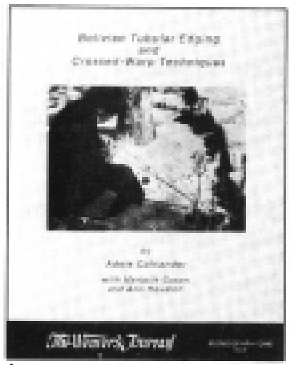
Treadle shafts 1, 3, 4, 5, 6 up; shafts 2, 3, 4, 5, 6 up; shaft 1 up, shaft 2 up; and repeat this sequence 3 times.

Treadle shaft 1 up, shaft 2 up alternately for 11 picks.

Finishing:

Cut the woven patterns apart. For the card, use light card stock sheets. Make sure that the finished card will fit in a standard size envelope. Cut out the windows. Printers can cut and print cards for you. Check their prices; the more cards you make, the more it becomes practical to have your cards die-cut.

Send your cards off with many good wishes. ■



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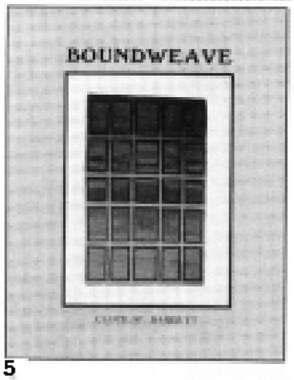

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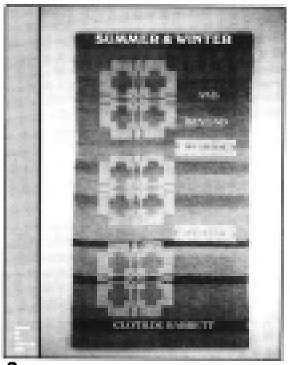
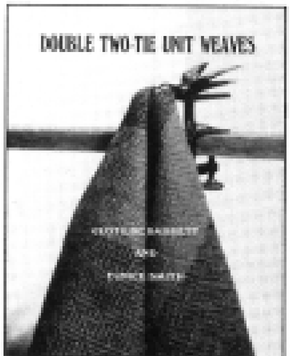


2



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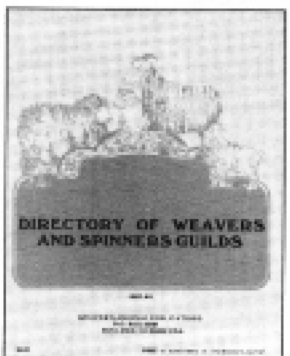

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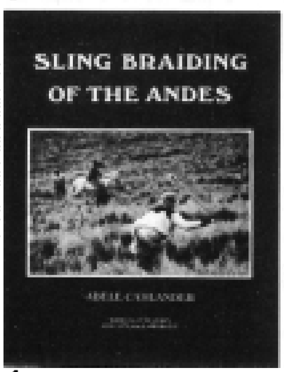

4

SEVERAL PUBLICATIONS OF INTEREST TO THE HANDWEAVER ARE IN THE PLANNING STAGE

PUBLICATIONS AVAILABLE

from

WEAVER'S JOURNAL PUBLICATIONS

1. BOLIVIAN TUBULAR EDGING AND CROSS-WARP TECHNIQUES
by Adele Cahlander

In this monograph the author teaches readers how to do the tubular edge trim in plain weave and in a more intricate crossed-warp technique. The crossed-warp technique is used to make flat bands and round tubes that are very colorful and decorative and require no special equipment. The clear drawings of the positions of the hand teach the weaver how to produce the Bolivian weaves.

2. SUMMER AND WINTER AND BEYOND—2nd revised edition
by Clotilde Barrett

This monograph deals first with the classical ways of weaving this versatile fabric structure including multiple shaft block design and polychrome weaves. Unusual interpretations are explored, including pick-up, turned S/W, and rugs. It includes a four shaft four block version of S/W suitable for rugs and also S/W boundweave techniques using new ways to explore pattern and color on four shaft looms. It exposes readers to many new ideas.

3. SHADOW WEAVE AND CORKSCREW WEAVE by Clotilde Barrett

The intricate designs produced by these weaves are the result of color effects applied to simple fabric structures. The patterns, based on twills, can be woven on looms with four shafts and up. The design principles are thoroughly explained so weavers can create their own original patterns. Corkscrew weave is included in this study because the threading draft of the weave is so closely related to shadow weave.

4. SLING BRAIDING OF THE ANDES by Adele Cahlander with Elayne Zorn

Slings have been used since before the time of David and Goliath. Shepherds used slings to guide their sheep and to protect the sheep from marauding animals. In the Andes, slings took on ceremonial importance as well. This monograph is the first true documentation on the way the slings were constructed. Step-by-step instructions with clear pattern diagrams and working sequences make it possible now to reproduce a vast number and variety of these interesting braids.

5. BOUNDWEAVE by Clotilde Barrett

This book explores the design potentials of twills, twill derivatives and some basic block weaves. *Boundweave* produces a weft faced fabric suitable for rugs and tapestries. It is a basic weave which can be explored on a 4-shaft loom. A multitude of patterns are possible by developing simple drafts and careful color selection of the weft. The principle of shaft switching is included. The text is beautifully illustrated with color, black/white photographs and line drawings.

6. DOUBLE TWO-TIE UNIT WEAVES by Clotilde Barrett and Eunice Smith

Double two-tie unit threading drafts give the 8-shaft weaver the best opportunity to experiment with a vast number of exciting weave structures without rethreading the loom. There are hundreds of variations of this threading system that can be woven. This book will help you to discover them all. The design theory is explained in a clear and comprehensive way. Each step is illustrated with complete drafts and samples. There are close to 100 photos of weave structures and projects, in color and black/white.

7. DIRECTORY OF WEAVERS AND SPINNERS GUILDS

An updated listing of guilds in the United States and in foreign countries. In the U.S. section the guilds are listed alphabetically within each state. Federations and organization of interest to weavers are also included.

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7. DIRECTORY OF WEAVERS AND SPINNERS GUILDS **@ $2.00** ______

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NAME DRAFT

It has become popular in recent years to take a name such as THE WEAVERS JOURNAL and to design an overshot draft that is related to it. Today, in the age of computers, it is no longer necessary to spend hours with pencil and graph paper to find out which draft you will come up with and how it is going to look.

Richard Clement of 1821 Emerson Drive, Deming, NM 88030, has designed a program for the TRS-80 that will give you the draft in a flash and will also print the draw-down. A slightly modified version is given in Listing 1. The listing has been adapted to the Apple II, with standard parallel printer interface card but by making the following changes the program is made compatible with the TRS-80 and Line Printer VIII.

```
30 CLEAR 6000
40 DEFINT B, I, J, Z
Delete lines 55 and 57
180 DIM A$ (80)
680 LPRINT "N$=";N$: LPRINT
 "T$=";T$: LPRINT"H$=";H$
 In 720, change end to THEN
 LPRINT CHR$ (239): REM
 BLACK SQUARE
In 730, change end to THEN
 LPRINT CHR$ (224): REM
 BLANK SPACE
750 LPRINT CHR$ (27); CHR$ (28);
 CHR$ (224)
770 LPRINT CHR$ (27); CHR$ (54)
Delete lines 780 through 800
```

```
]LIST

10  REM  PROGRAM "NAMEWEVE" BY R.
     CLEMENT
20  REM   THIS MODULE SUBSTITUTES
      THREAD NUMBERS FOR NAME LETT
     ERS
40  HOME
50  PRINT "ENTER NAME IN CAPS WITH
      NO SPACES": PRINT
52  INPUT N$
55  PRINT  CHR$ (4);"PR#1"
57  PRINT "80N"
60  PRINT "N$= ";N$
65 K$ = "": REM   NULL STRING
70  FOR Z = 1 TO  LEN (N$)
80 L$ =  MID$ (N$,Z,1)
90  IF L$ = "A" OR L$ = "E" OR L$ =
     "I" OR L$ = "M" OR L$ = "Q" OR
     L$ = "U" OR L$ = "Y" THEN P$ =
     "1"
100  IF L$ = "B" OR L$ = "F" OR L$
      = "J" OR L$ = "N" OR L$ = "R
     " OR L$ = "V" OR L$ = "Z" THEN
     P$ = "2"
110  IF L$ = "C" OR L$ = "G" OR L$
      = "K" OR L$ = "O" OR L$ = "S
     " OR L$ = "W" THEN P$ = "3"
120  IF L$ = "D" OR L$ = "H" OR L$
      = "L" OR L$ = "P" OR L$ = "T
     " OR L$ = "X" THEN P$ = "4"
130  LET K$ = K$ + P$
140  NEXT Z
150  REM  THIS MODULE ADJUSTS THRE
     ADING TO ODD & EVEN SEQUENCE
170  PRINT "K$= ";K$
180  DIM A$(80)
190  FOR B = 1 TO 2
200  FOR I = 1 TO  LEN (K$)
210 A$(I) =  MID$ (K$,I,1)
220  NEXT I
230  FOR I = 1 TO  LEN (K$)
235 V =  VAL (A$(I)) -  VAL (A$(I +
     1))
237 V1 =  VAL (A$(I))
240  IF  ABS (V) = 1 THEN 340
250  IF  ABS (V) = 3 THEN 340
260  IF V =  - 2 AND V1 = 1 THEN A
     $(I + 1) = "23"
270  IF V =  - 2 AND V1 = 2 THEN A
     $(I + 1) = "34"
280  IF V = 0 AND V1 = 1 THEN A$(I
      + 1) = "21"
290  IF V = 0 AND V1 = 2 THEN A$(I
      + 1) = "32"
300  IF V = 0 AND V1 = 3 THEN A$(I
      + 1) = "43"
310  IF V = 0 AND V1 = 4 THEN A$(I
      + 1) = "14"
320  IF V = 2 AND V1 = 3 THEN A$(I
      + 1) = "21"
330  IF V = 2 AND V1 = 4 THEN A$(I
      + 1) = "32"
340  NEXT I
350 T$ = ""
360  FOR I = 1 TO  LEN (K$)
370 T$ = T$ + A$(I)
380  NEXT I
390  PRINT "T$= ";T$
400 K$ = T$
410  NEXT B
415  REM  THIS MODULE CORRECTS EVE
     N PAIRINGS OF START AND FINIS
     H NUMBERS
420  FOR I = 1 TO  LEN (T$)
430 A$(I) =  MID$ (T$,I,1)
440  NEXT I
445 V1 =  VAL (A$(1))
446 V2 =  VAL (A$( LEN (T$)))
```

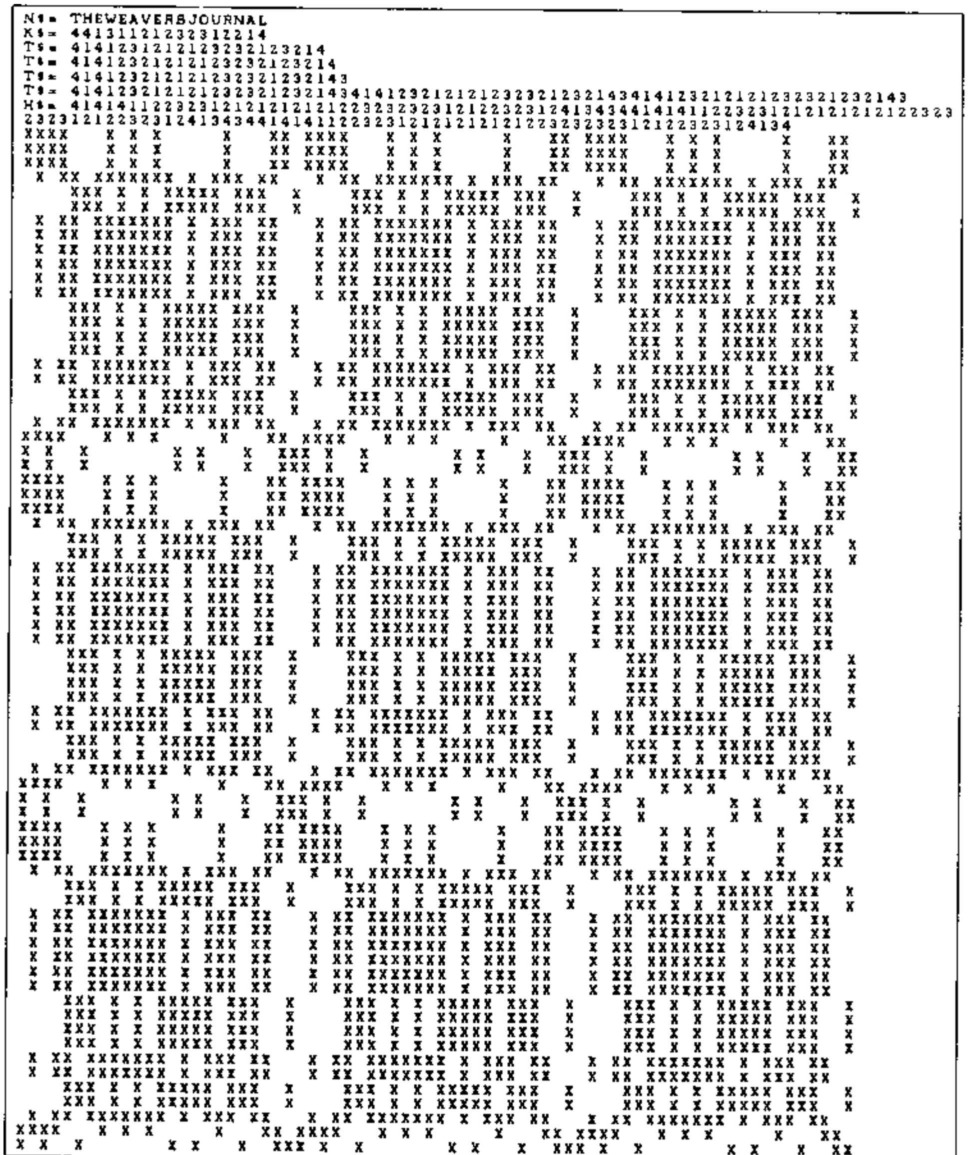


FIGURE 4

```
447 V = V1 - V2
450  IF  ABS (V) = 1 OR  ABS (V) =
     3 THEN 490
470  IF (V1 = 2 OR V1 = 4) AND (V2
      = 2 OR V2 = 4) THEN T$ = T$ +
     "3": GOTO 490
480  IF (V1 = 1 OR V1 = 3) AND (V2
      = 1 OR V2 = 3) THEN T$ = T$ +
     "2"
490  PRINT "T$= ";T$
500  REM  THIS MODULE ASSIGNS SHAF
     T LIFTS
520 T$ = T$ + T$ + T$
530  PRINT "T$= ";T$
540  FOR I = 1 TO  LEN (T$)
550 A$(I) =  MID$ (T$,I,2)
560  NEXT I
570 H$ = ""
580  FOR I = 1 TO  LEN (T$)
590  IF A$(I) = "12" OR A$(I) = "2
     1" THEN C$ = "12"
600  IF A$(I) = "23" OR A$(I) = "3
     2" THEN C$ = "23"
610  IF A$(I) = "34" OR A$(I) = "4
     3" THEN C$ = "34"
620  IF A$(I) = "41" OR A$(I) = "1
     4" THEN C$ = "41"
630  IF A$(I) = "1" OR A$(I) = "2"
      OR A$(I) = "3" OR A$(I) = "4
     " THEN C$ = ""
640 H$ = H$ + C$
650  NEXT I
660  PRINT "H$= ";H$
665  REM  H$ LISTS THE SHAFT LIFTS
      FOR A 'NORMAL' TIE-UP; TREAD
     LE 1 PICKS UP SHAFTS 1 & 2, 2
      PICKS UP 2 & 3, ETC.  THE TR
     EADLING IS 'TROMP AS WRIT'.
670  REM  THIS MODULE PRINTS THE P
     ATTERN.
695  FOR I = 1 TO  LEN (H$) STEP 2

700  FOR J = 1 TO  LEN (T$)
710 B$ =  MID$ (T$,J):C$ =  MID$ (
     H$,I):D$ =  MID$ (H$,I + 1)
720  IF  ASC (B$) =  ASC (C$) OR  ASC
     (B$) =  ASC (D$) THEN  PRINT
      CHR$ (88);
730  IF  ASC (B$) (  )  ASC (C$) AND
      ASC (B$) (  )  ASC (D$) THEN
      PRINT  CHR$ (32);
740  NEXT J
750  PRINT  CHR$ (0)
755  NEXT I
760  PRINT : PRINT
770  PRINT "40N". REM  RESTORE 40
     COLUMNS PRINT WIDTH
780  PRINT
790  PRINT  CHR$ (4);"PR#0"
800  END
```

HOW THE PROGRAM WORKS

First, each letter of the alphabet receives a number (1 to 4) which is then associated with a shaft.

A, E, I, M, Q, U, Y	are number 1
B, F, J, N, R, V, Z	are number 2
C, G, K, O, S, W	are number 3
D, H, L, P, T, X	are number 4

These commands are executed in lines 65 to 140 of the listing.

THE WEAVERS JOURNAL is thus transformed as shown in Fig. 1 (spaces are omitted).

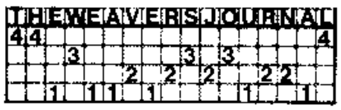


FIGURE 1

Fig. 1 looks like a 4-shaft threading. However, for this threading to be an overshot (twill derivative) it is necessary that the shafts be threaded in an even-odd order. The threading of Fig. 1 has to be modified accordingly. With the computer these adjustments are made by the commands listed in lines 150 to 410.

1 3 is replaced by 1 2 3
2 4 is replaced by 2 3 4

3 1 is replaced by 3 2 1
4 2 is replaced by 4 3 2

44 is replaced by 4 1 4
33 is replaced by 3 4 3
22 is replaced by 2 3 2
11 is replaced by 1 2 1.

Thus, Fig. 1 is modified to become Fig. 2. In the computer this is accomplished by means of lines 230-340.

Fig. 2 is one pattern repeat of the overshot name draft. However, this threading starts with 4 and ends with 4. If it is repeated, two 4's will be adjacent. The program also corrects this error (lines 415-480). If the repeat starts and ends with an even number, add a thread on shaft 3 at the end of the repeat. If the repeat starts and ends with an odd number, add a thread on shaft 2. See Fig. 3.

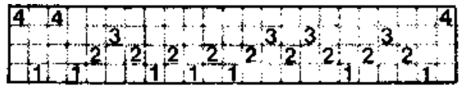


FIGURE 2

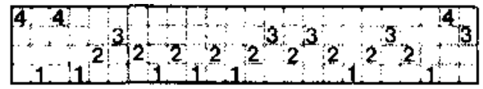


FIGURE 3

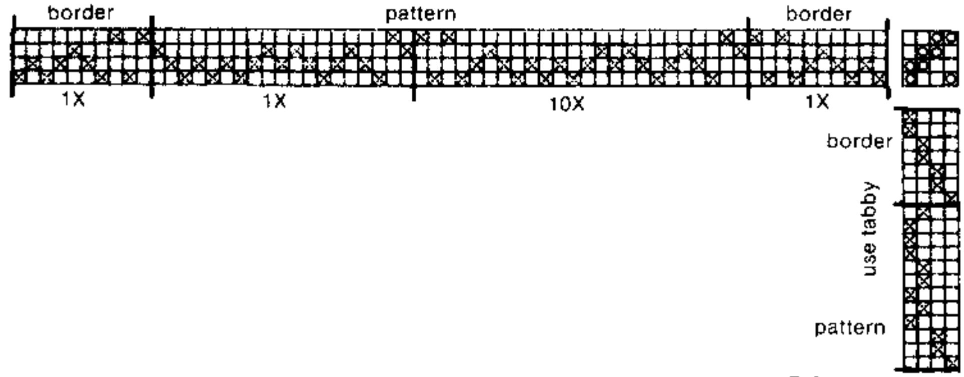


FIGURE 5

Now the draft is ready to be woven. Any type of overshot treadling may be used. The tie-up is the standard twill tie-up and the fabric is woven by alternating a tabby pick and a pattern pick.

The rest of the program produces and prints drawdowns. The original Clement program had two treadling variations, neither of which was "classic." In the present version the program has been changed to show the drawdown of the overshot "as the blocks are drawn in." See Fig. 4.

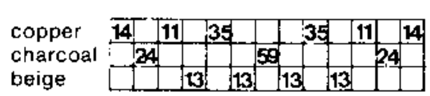
Pillows woven on THE WEAVERS JOURNAL draft

Warp: 3/12 worsted wool (Oregon Worsted's Nehalem—copper (338), charcoal (1625), beige (133). Note: This yarn comes to 270 yds. (246.9 m) per 2 oz (56.73 g) tube).

Weft
pattern: singles (Brown Sheep Co. natural). Note: This would be a great use for handspun yarns.
tabby : 3/10 worsted wool (Oregon Worsted's Nehalem—copper, charcoal, beige).

Sett: 12 epi (50/10 cm).

Color order of the warp:



Total number of warp ends: 279.

Width in reed: 23¼" (56 cm).

Length of warp: 3½ yds. (3.2 m).

Measurements.
For each pillow: 44" x 21¼" (111.8 cm x 54 cm).
After handwashing: 42" x 20½" (106.7 cm x 52 cm).

Treadling order: See Fig. 5.

Tabby color sequence for pillow 1:

1 border sequence, 4 pattern repeats	beige
1 pattern repeat	copper
1 pattern repeat	charcoal
1 pattern repeat	copper
2 pattern repeat	beige
1 pattern repeat	rust
5 pattern repeat	beige (center)

Tabby color sequence for pillow 2:

1 border sequence, 5 pattern repeats	beige
5 pattern repeats	copper
5 pattern repeats	charcoal
5 pattern repeats	copper
5 pattern repeats	beige
1 border sequence	beige

Finishing: On the sewing machine, zig zag each warp edge. Use ½" (12.5 mm) seam allowance; sew together the 3 sides, leaving a hole large enough to turn and stuff. Turn and stuff with polyester fiberfill. Hand sew together the opening. ■

Andrea Green

1. Window Covering, Andrea Green, 1982, 37" by 93" (94 by 236 cm). From the collection of Clyde and Sharon Jones.

TRANSPARENT WEAVING WITH HANDSPUN COTTON WEFT

by Andrea Green

A weaver who can also spin has the option of being able to create a yarn which will exactly fit the requirements of a piece when no purchased yarn will do. Semi-transparent window coverings and room dividers can feature the interesting yarn textures that are visible when light shines through the fabric. A widely spaced warp in a variety of textures and fibers is woven with very fine weft for transparent areas and a handspun thick and thin cotton weft in opaque areas. Photo 1 shows a window covering. It is hung with bamboo poles top and bottom and can be raised or lowered with pulleys to cover either the wall or the ceiling of the greenhouse-like alcove. By spinning the cotton weft oneself, the relative size of the thick and thin areas and their spacing can be controlled.

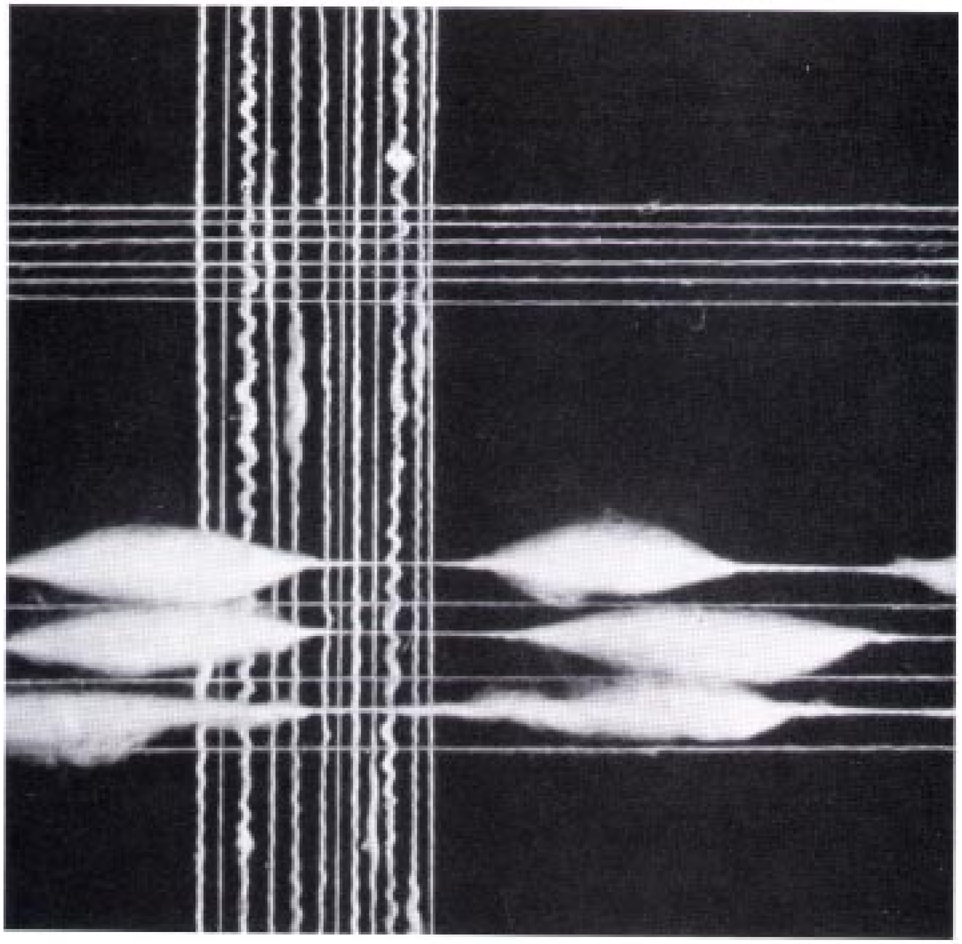
SPINNING THE WEFT

Cotton which has the seeds removed and has been combed is easiest to spin. I use a wheel with a large orifice but with spinning ratios suitable to medium and fine yarns. On a double drive-band wheel, a good ratio of bobbin to flyer pulley circumference is 1:1.4.

Carol Havey

2. Spinning the cotton weft.

The tension should be as light as possible. A two-handed spinning method is necessary for a thick and thin yarn. Gently fluff a handful of cotton. Holding the mass of cotton in the left hand, draw out a large group of fibers from deep in the drafting zone with the right hand and pull it away from the mass until the drafting zone has very few fibers in it. Then gently slide the right-hand fingers away from the orifice over the lump of fibers and along the fewer fibers in the drafting zone. This lets the twist run past the thick part into a fine area of yarn and relieves the strain of the pull of the wheel on the fibers until they are twisted so the yarn won't pull apart. Repeat this sequence with a regular rhythm. In Photo 2, the spinner is just about to slide her fingers over the slub into the thin area of yarn. The yarn can



Carol Havey

3. *Warp and weft yarns.*

beat, open the same shed and put in a pick of the inlay yarn across any or all of the warp according to the design. Then weave the same sequence in the second tabby shed. For a more elegant selvedge, the inlaid weft should not be woven entirely to the selvedge. Instead, bring out the heavier weft between the second and third doubled ends. The evenly spaced slubs of the handspun weft tend to group together into subtle patterns. The thinner areas of this weft let light shine through to highlight the texture. The detail in Photo 4 shows the pattern caused by the accidental grouping of the slubs. A comparison of Photos 1 and 4 will illustrate how the pieces change from day to night. During the day, the opaque areas are darker and the transparent areas are light. This appearance is reversed at night. Because of the wide spacing of the warp and the coarseness of the weave, simple designs featuring large areas of opaque and transparent weaving are most successful.

be used directly off the wheel without setting the twist. It is delicate and must be handled gently until it is safely woven in.

Some cotton has a slightly "sticky" feel and will spin easily. If, however, the cotton is too slippery to hold together, a core yarn may be needed. Place a cone of fine white yarn on the floor at your feet. Let the fine yarn travel up through the mass of cotton in your hand and into the orifice. Spin around the core yarn as described above.

WEAVING

A variety of smooth and textured yarns in linen, cotton, silk, and rayon are sett at 8 epi (30/10 cm), threaded and sleyed randomly, and woven in plain weave. The last three ends of each side are doubled to add some strength and make a neater selvedge. A fine weft is woven at about 8 ppi throughout the piece with the thicker handspun yarn inlaid wherever desired. Photo 3 shows the yarns that may be used in one piece. The vertical yarns are a random arrangement of warp yarns with six different textures. The horizontal yarn at top is 16/1 linen used for the ground weave. Below is the handspun cotton inlay alternating with the linen ground weft. For inlay weaving, open the first plain weave shed, put in a pick of the ground weave yarn,

Carol Havey

4. *Detail showing the effect of the handspun cotton weft.*

FINISHING

Handwash each piece in cold water with any mild soap, squeeze gently, and dry flat. Press with a cool iron, steaming to block if necessary. Machine hem the ends of each piece. Slide ¼" (6.4 mm) hardwood dowels through the hems. To attach the dowels invisibly to bamboo poles, drill two fine holes through the bamboo at each attachment point, tie fishing line around the dowels to line up with the pairs of holes, thread the two ends of each piece of line through the holes with a needle and tie the

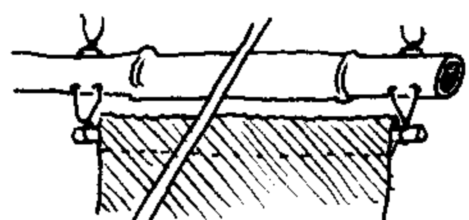


FIGURE 1

ends together. See Figure 1. Or put larger hardwood dowels in the hems and hang directly without any visible poles. ■

OLWEN'S BUFFALO

by Olwen MacGregor

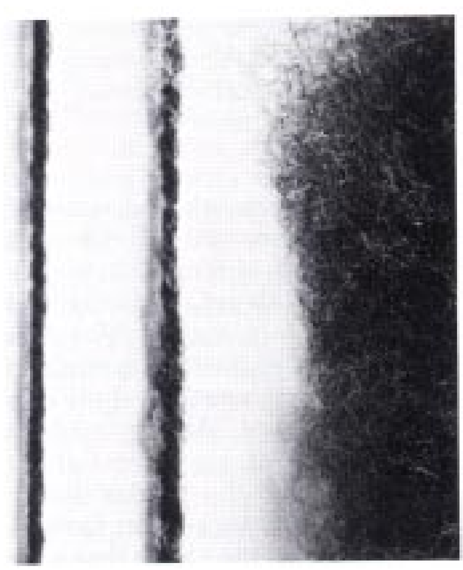
As a hobbyist, I have been weaving for about seven years, and have enjoyed the articles that my loom and I have created: blankets, placemats, and, more recently, wearing apparel. It always adds to my satisfaction with a job well done when these articles are sold at our yearly guild sale—to say nothing of adding those precious dollars to the "kitty" for purchase of more yarns. Before I discovered weaving my greatest pleasure had been the knitting and crocheting of toys. Much to my delight I found toys in a "McCall's How To Weave It" book, purchased very early in my weaving career and I promptly made all four animals described therein. Handspun wool was used freely in making these animals. This I liked, since spinning is also one of the things I do and enjoy and many of my articles feature handspun weft. The toys were very successful at our guild sale that year; this gave me the incentive to continue making toys. Most of the material I wove from then on included an "extra" piece from which to make a toy. Any of the patterns purchased commercially could be adapted to woven material.

The desire to do something of "my own," something different yet capable of passing on the joy I feel when making toys, prompted the creation of Olwen's Buffalo. To create and assemble my little beastie takes many hours. Not the spinning, nor the weaving, but the many, many french knots I work on the finished piece to give the effect of the hair on its shoulders and hump. The horns are crocheted from handspun wool, the nose and mouth embroidered in six strand cotton. The eyes are buttons, sewn on with linen thread to ensure that no little fingers can pull them off. The whole animal is stuffed with non-allergenic fiber fill.

The first buffalo was two dimensional, of a size to fit into the curve of a small arm at bedtime. It has grown a little since. I have added a center body, giving him four legs on which to stand. In a way, I suppose he has now become a soft sculpture.

GENERAL DIRECTIONS FOR OLWEN'S BUFFALO

- Enlarge pattern, by copying on paper ruled in 1" squares. See Fig. 1.
- Before cutting out two body pieces, place enlarged template on material, tack around outside of template, then zig-zag around tacking before cutting to avoid raveling. Place underbody on fold of material.
- Tack underbody to body pieces—sew—¼" (6.4 mm) seam is allowed on all seams. Press.
- Sew from underbody B, around beard shape, and head to top of hump; leave about a three inch (7.6 cm) opening on hump for stuffing of animal. Sew to back legs A. Turn.
- Stuff firmly through three inch opening on hump, and through bottom of legs. Sew opening on hump.
- Cut out rounds of material to fit bottoms of legs, tack into place before finishing in self wool.
- For tail, sew strands of wool through X marked on pattern, enough to make it fairly thick, then wrap to within 2" (51 mm) of end, leaving end fluffed.
- Attach buttons with linen thread as indicated. Felt eyes can be used if preferred.
- Crochet strip in white wool for horns, stuff lightly as you sew into shape, attach as shown.
- Now cover with french knots to outline as shown on pattern.



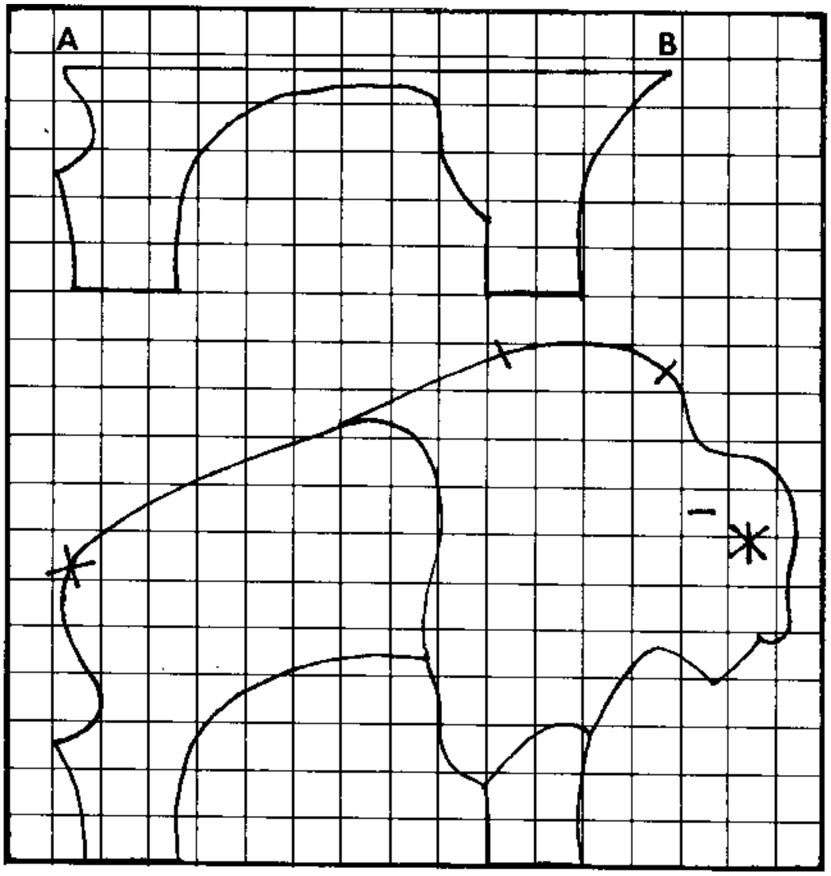


FIGURE 1 □ - 1" square

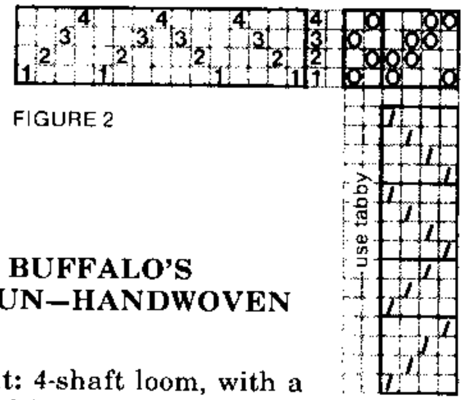


FIGURE 2

OLWEN'S BUFFALO'S HANDSPUN—HANDWOVEN FABRIC

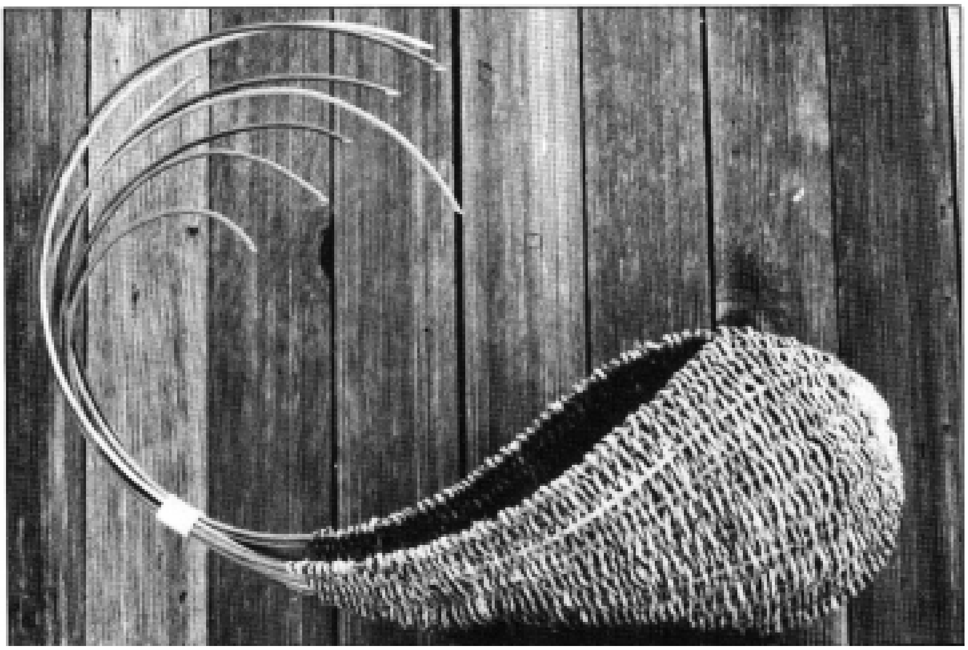
Equipment: 4-shaft loom, with a weaving width of at least 17" (43.2 cm).

Warp: Acrylic Sports yarn, color brown.

Weft: Two ply handspun wool from a brown carded fleece.

Pattern: Point twill. See Fig. 2. Treadle diamonds (goose eyes) and chevrons.
Sett: 10 epi in a 10 dent reed (40/10 cm).

The length of the warp will depend on how many animals one intends to make. ■



John Graser

1. "Crest", onion basket of reeds and date stems, by Marie E. Graser

ONION BASKET
by Marie E. Graser

Wicker work basketry has traditionally been thought of as functional objects, such as egg baskets, laundry baskets, waste baskets and the like, but it can also be explored in more sculptural forms. The onion basket, named for its shape, as well as its use, is one type. It can be used to store onions, to hold dry flower arrangements, or just to be enjoyed for its bulbous form.

The onion basket is easy to make and needs only a few materials and tools to complete. A pair of wire cutters, a utility knife and a heavy rubber band are all the tools that are needed. For the spokes you will need #7 round reed. Cut 10 pieces 24" (61 cm) long and one piece 12" (30.5 cm) long. You need an odd number of reeds to weave in the round. First, soak the reed in hot water for 30 minutes, then pat the reeds with a terry cloth towel to remove excess water and cover them with the towel to "cure" for a few minutes.

Weavers could use #2 round reed, however, other possibilities for weavers are fine strand caning, date palm stems, fine sea grass, sisal, or similar materials. Soak the #2 reed in hot water for 5-10 minutes. (Date stems need to be soaked for 30 minutes or more; fine strand cane soaks for 15 minutes.) Sea grass and sisal are woven dry. Pat the weaver reed with a terry cloth towel to remove excess moisture and cover the reed with the towel until needed.

To construct the basket, take 5 of the #7 spokes and cut a slit lengthwise 1" (25.4 mm) long, through the center of each reed. The remaining 5 #7 spokes are slipped through the slit of the first group of spokes. (See Fig. 1). The two groups of spokes will be at right angles to each other. Put each spoke as close to its adjacent spokes as near as possible but don't overlap them.

FIGURE 1. Reeds in slit

Tuck an end of a #2 round reed (or substitute) weaver alongside one of the spokes that are in a slit. Weave over the upper group of the spokes that were split (Group 1), then under the reeds to the right (Group 2), over the opposite side of the split reeds (Group 3), then under the reeds to the left (Group 4). Continue for two more rounds. Next, bend the weaver over the top of the left (Group 4), and return in the opposite direction in reverse. Go under the lower reeds (Group 3), over the right (Group 2), and under (Group 1). Repeat two more times. (See Fig. 2). Be sure to weave tightly but don't allow the spokes to overlap each other.

Make a long tapered point on the extra spoke and insert the point into the woven spokes. Divide the spokes into pairs, (except that the new spoke will be single) and fan out. With the weaver go over a pair and under a pair in a plain weave for three rows. Then fan out the spokes into single spokes and continue weaving a plain weave, only now you will be going over one, under one for the rest of your weaving. (See Fig. 3).

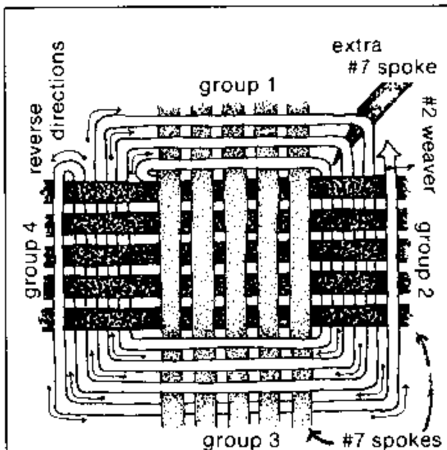


FIGURE 2. Reed layout

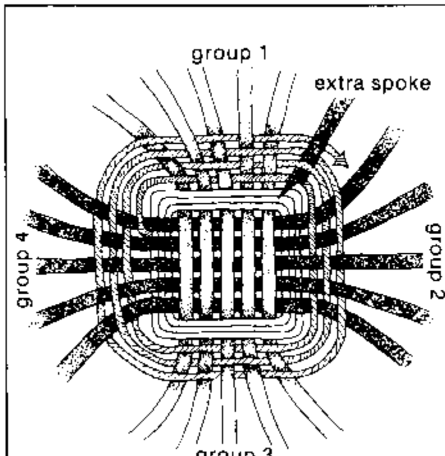
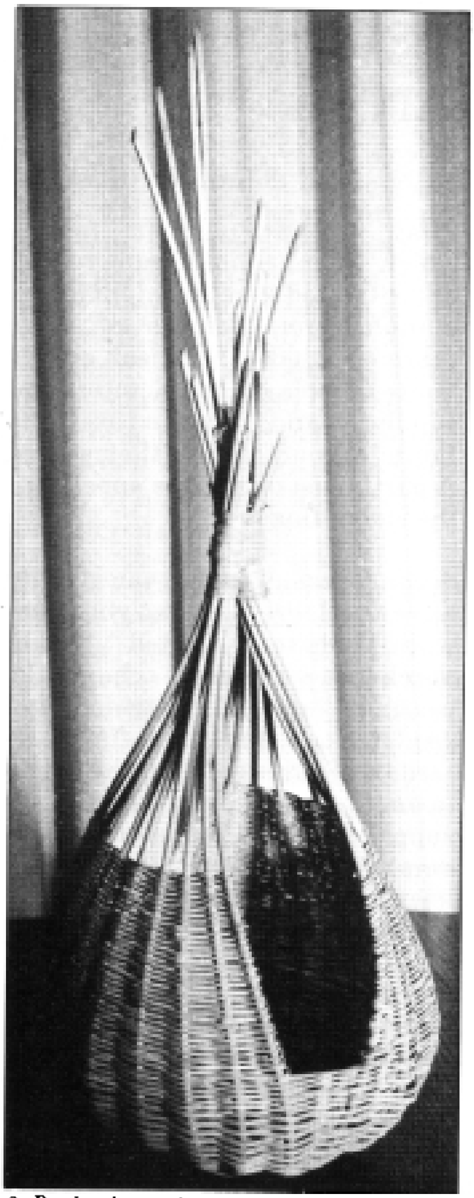


FIGURE 3. Weaving in pairs and singles



Thula Earl

2. *Basket by author*

This basket traditionally has a round bottom. However if you wish a flat bottom, you will need to keep the spokes at the bottom flat and not let them round up on you as you weave. When you have woven the bottom 3" (76 mm) or so, take the loose ends at the top and form them into an onion shape. Put a heavy rubber band tightly over the ends. The spokes will naturally bend upwards. If they dry out, moisten them by dipping them into a bucket of warm water for a few minutes. Don't over soak or they will become water-logged.

As you look at your form, you can see that by dividing the spokes into groups, slits can be left in the form. One, two or three slits are best if you want to leave an opening for your onions or dry flower arrangements. (See Fig. 4). Weave to the slit opening, go around the spoke where you want the opening to be, then return going around the basket to the other side of the slit. Weave around that spoke and return in the other direction. Continue weaving up the basket in the same manner. If you have two or three openings planned for your basket, you will have to weave between the slit openings. As you get nearer the top of the basket your weaving will become narrower.

When you can no longer weave, wrap the weaver around the group of spokes for several inches and slip the end of the weaver down alongside the spokes to conceal it. Add a loop if you want to hang your basket. Cut the ends of the spokes off at different heights for more variety and point them if you like. (See Fig. 5).

If you want a round-bottom basket to sit upright, add several large beads to the bottom for the basket to rest upon. (See Fig. 6). Or make a donut ring of #7 reeds and wrap the ring with #2 weaver. Add to the bottom of the basket. (See Fig. 7).

You can dye your reeds with ordinary household dyes for more color variation. For variation you can make roots on the bottom of your onion basket by adding strands of cut raffia or sisal and tying them to the bottom of the basket.

Add some colorful onions or dry flower arrangement to your basket and enjoy!

ABOUT THE AUTHOR: Marie E. Graser has contributed several articles on basketry to The Weaver's Journal. *Her interest in basketry was sparked by an active participation in archeological work and early experiences as a Girl Scout. Marie is a member of the South Coast Weaving Guild, Handweavers Guild of America, South Central California Handweavers Guild, and Wild and Wooly Weavers.*

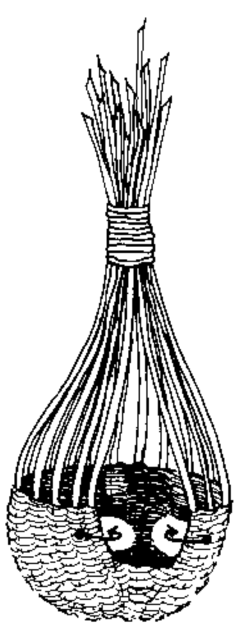


FIGURE 4. Slit

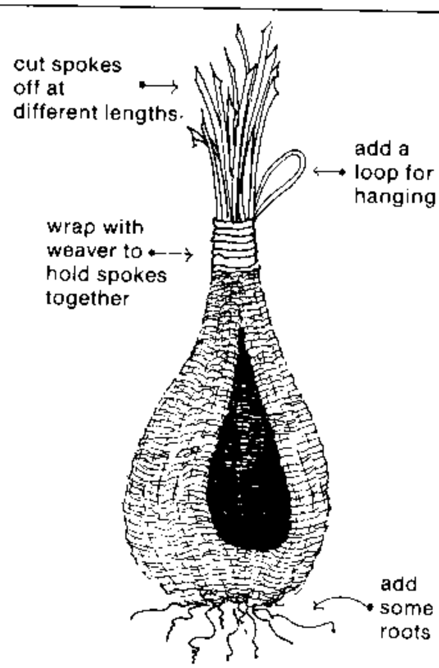


FIGURE 5. Onion basket

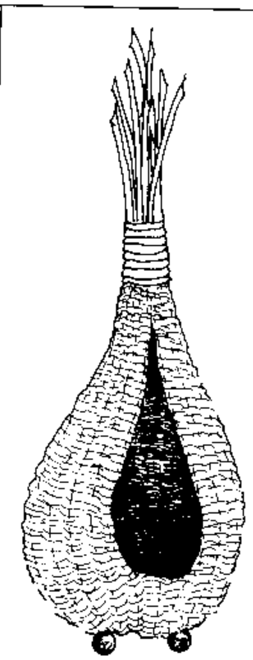


FIGURE 6. Bead legs

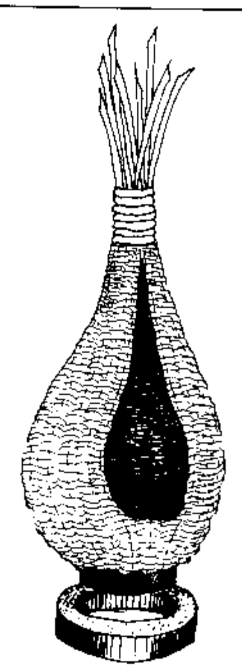


FIGURE 7. Ring base

THINGS TO KNOW AND TELL ABOUT FLAME RETARDANTS
by Stephen Pater

In recent months I have received numerous requests from artists and craftspersons who have questions about flame retardants. Most frequently they ask how to make fibers flame retardant, or how to test for it, or who is concerned about the flame retardant qualities of their work. I hope the following information is useful to artists and craftspeople who wish to add this margin of safety to their displays or fiber products.

WHO REQUIRES FLAME RETARDANTS?

If anyone is concerned with the flame retardant (FR) properties of your fibers or textiles, most likely they will be local fire prevention officials or fire marshals. These inspectors are usually attached to the fire department having jurisdiction or to the state fire marshal's office. Such officials are guided by several national codes which may also have been adopted, modified, or expanded upon by state or local governments.

The two most influential codes are the "Life Safety Code", published by the National Fire Protection Association (NFPA), and the "Uniform Building Code" (UBC). Both codes have sections dealing with flame retardants, and establish standards which materials or treatments must meet in terms of flame spread, smoke density, and fuel contribution. Commercially manufactured textiles for display or wall covering use need to have 0 (zero) or extremely low ratings in all three categories. Flame spread classifications, for example, work like this:

NFPA Class	UBC Class	Flame Spread
A	I	0 through 25
B	II	26 through 75
C	III	76 through 200
D	---	201 through 500
E	---	Over 500

A textile that has a flame spread rate of 3 would be a Class A (or I) flame retardant fabric, and would be more acceptable than a fabric of a 32 (Class B) rating. Note that some fire prevention officials will not allow the use of fabrics that are not Class A.

TESTS FOR FLAME RETARDANCY

Laboratory tests for flame retardancy are also standardized. The NFPA, Underwriters Laboratories (UL), and other testing organizations all have published laboratory standards for testing flame-retardant materials and coatings.

While it is unlikely that you will be asked to submit your work for laboratory testing, it is not unusual to be asked to show a certificate of flame retardancy (issued by the vendor of the fabric) or to be asked to submit a sample of your fabric for a field test.

The most commonly-performed field test consists of holding a lit cigarette lighter under the edge of the test fabric (held vertically) for ten or twelve seconds. The flame is then removed. If the fabric only smokes and burns out, and does not continue to glow, the material is judged acceptable. If you have any doubts about the acceptability of this test in your locality, be sure to call the fire prevention office having jurisdiction. Most cities with large fire departments have at least one fire prevention officer who is willing to advise you.

HOW TO ACHIEVE FLAME RETARDANCY

If you need to have flame-retardant display materials, or if you need to treat your own fiber pieces, you have several choices.

First, you can purchase fabrics which are inherently flame retardant or treated to be retardant by the manufacturer. Sources of these fabrics include theatrical supply houses, display manufacturers and suppliers, and, in some cases, the fabric manufacturers themselves. A partial list of sources appears at the end of this article.

Second, assuming that you already have the fabric, or that your own work needs to be treated, you can purchase ready-made chemicals, coatings and paints which will render your materials flame retardant. Sources of such chemicals in small quantities include theatre supply and display materials vendors. A partial list of sources follows below. Most of them will ship by mail or UPS.

Typical of these off-the-shelf solutions is ammonium sulfamate, available from S. Wolf's Sons in New York. Ten pounds (4.5 kg) of ammonium sulfamate is dissolved in five gallons (18.9 liters) of warm water, poured into a large sprayer capable of fine spray (a garden sprayer works well for large pieces), and sprayed onto the back of the material. If your piece has considerable thickness, you may need to spray both sides. You can adjust the formula above to get the quantity you need; just keep the same proportions. Dampen the fabric thoroughly. Sometimes immersion is the answer; wet thoroughly, squeeze out excess liquid and let dry completely. Since proportions of chemical to water vary with the manufacturer, ask your supplier for specific directions.

Some flame retardants work on almost all textiles. Firetect's (address below) Safe-T-Guard, for example, is a fine product usable on almost all types of natural and synthetic fibers. Unfortunately, it is only available in five gallon quantities and is easier to find on the West Coast then it is east of the Rockies.

Third, if you cannot locate a convenient supply of flame retardants, you can fabricate your own. In three gallons (11.4 liters) of warm water, completely dissolve four pounds (1.81 kg) of borax and four pounds of powdered sal ammoniac (ammonium chloride). You can obtain these from a chemical supply house or a well-stocked pharmacy. Spray or immerse as above and let dry thoroughly.

Fourth, craftspeople living in or near a large city may find a company which specializes in rendering fabrics flame retardant. Most often treatment is by immersion. Be cautious when choosing this option as these companies may not have experience with handwoven, one-of-a-kind objects.

From well-stocked local paint stores you can purchase intumescent paints which bubble up or swell in the presence of heat and provide a temporary shield against burning. These interior paints are best used on wood and related materials and are not recommended for fibers application.

CAUTIONS AND COMMENTS

Whether you choose to do the work yourself or send your fabric out, first make use of test swatches to check for color changes, change of hand, etc. Fire retardants occasionally cause color changes in dyes and paints when these colorants are applied over flame retardant treated fibers. Try to do your dye work first, followed by the retardant treatment. When treating painted fabrics, do not paint both sides of the fabric as the flame retardant will not penetrate the sealed surfaces and will provide little benefit.

Fabrics and fiber pieces that are not inherently flame retardant should be tested regularly, as most treatments lose effectiveness over time. After dry cleaning or washing, fabric should be re-treated.

Finally, note that the home-made solution above and some commercial flame retardants do not work well on synthetic fabrics. When in doubt, consult your supplier, or conduct the flame test as described above. Generally speaking, manmade fibers are more difficult and expensive to treat than are natural fibers such as wool or cotton. Some synthetic materials are nearly impossible to flame retard properly and it is best to avoid using them.

As a rule, flame retardants are not toxic or dangerous. Some, however, are skin irritants and should be handled with appropriate care.

In the interest of promoting fire safety in the art and crafts markets, I will be happy to discuss flame retardants with any reader who may have questions about them. I can be reached at 617-452-2267, in Lowell, Massachusetts.

Suppliers of Flame Retardants

See: Theatrical Supplier or Display Supplies in your Yellow Pages, or contact one of the following suppliers.

S. Wolf's Sons, 771 Ninth Ave., New York, NY 10019 (212-265-2066)

Mid-West Scenic and Stage Equipment Co., 224 W. Bruce St., Milwaukee, WI 53204 (414-276-2707)

Olesen Co. 1535 Ivar Ave., Hollywood, CA 90028 (213-461-4631)

Fire Tect, 3235 Whiteside St., Los Angeles, CA 90063 (213-268-1151)

Ballantyne Flameproofing Co., 2722 N. Lincoln Ave., Chicago, IL (312-348-7770)

Suppliers of Flame Retardant Fabrics

First three above, plus

Dazians, Inc. 40 E. 29 St., New York, NY 10016 (212-686-5300) (also Chicago, Boston, Los Angeles, San Francisco, Washington D.C.)

Architex International Inc. 625 W. Jackson Blvd. Chicago, IL 60606 (312-454-1333)

M.H. Lazarus & Co., 516 W. 34 St., New York, NY 10001 (212-736-6300)

Frankel Associates, 321 S. Robertson Blvd., Los Angeles, CA 90048 (213-878-1421)

Rose Brand Textile Fabrics, 517 W. 35 St., New York, NY 10001 (212-594-7424 or 800-223-1624)

ABOUT THE AUTHOR: Mr. Pater is president of Stephen Pater and Associates, of Lowell, MA. His firm designs and constructs props and special effects for film, television and stage productions. In addition to this production work, Stephen Pater also designs and fabricates custom portable exhibits for trade and industrial shows. Stephen holds an MFA degree in Theatre Design and Technical Theatre from Ohio University. Prior to organizing his present company, he served as an instructor at several universities (Wisconsin, Ohio and Maryland); he also held the position of technical director at regional theatres in Wisconsin and Massachusetts. Stephen's wife, Diane McGeen, is a weaver well-known for her line of practical clothing combining traditional weaves and unusual fibers. ■

YARN COUNTS

by Walter Hausner

Each spinning system—and fiber—has its own specific system of designating yarn size. The most common systems are the English cotton count, the Bradford worsted count, the metric system and the denier count.

The cotton system: The count number expresses the number of skeins (each measuring 840 yards), that weigh 1 lb. To calculate the yield you multiply 840 by the count and divide by the ply. Thus 10/1 means a single ply yarn of 10 x 840 ÷ 1 or 8400 yds. per lb. A 10/2 is a two ply yarn yielding 10 x 840 ÷ 2 or 4200 yds.

The worsted system also known as Bradford system has units of 560 yd. skeins. In this system (and this only) we write the ply first and then the count, followed by the letter "s". 2/12s means 12 x 560 ÷ 2 or 3360 yds per lb.

The metric system used in Europe for all spun yarns irrespective of spinning system expresses the number of skeins each measuring 1000 m weighing 1 kg or the number of m/g (meters per gram).

The yarn count for all spun yarn with the exception of jute is expressed by a number of fixed lengths (skeins) per unit weight. You obtain the yield per unit weight by multiplying the appropriate skein length by the count and dividing by the number of plies.

The following are the skein lengths for the most commonly used systems:

Cotton system—cc - 840 yds.
Worsted system—wc - 560 yds.
Linen—lea - 300 yds.
Woolen spun—run - 1600 yds.

The weight unit for all these counts is the pound (lb).

The jute system is a weight system. It gives the weight (in lbs.) per unit length (14400 yds.), i.e., the weight in lbs. of 14400 yds. of yarn. The unit of measurement is the "Spyndle," 14400 yds. weighing 1 lb. The weight would be called "pound Jute" or Jute spun". An 8 lb. yarn would be a yarn of which 14400 yds. weigh 8 lbs. One lb. of such yarn would yield 2800 yds. (14400:8).

All continuous filament yarns, such as silk and endless filament manmade fibers, are expressed by the DENIER (Den). This is a weight system. It gives the weight (in grams) per unit length (9000 m). Thus the count is expressed by the number of grams that 9000 meters weigh. The word denier is derived from the old Roman coin *denarius* which was still in use in western Europe almost to the end of the 19th century. The higher the number of Den the heavier the yarn. Filament silk, or, as it should be correctly called, filiature silk is normally indicated by two figures 20/22, 40/44, 80/88, etc. These two figures represent the allowable tolerance between high and low average and always refer to raw silk. The dyed silk that most handweavers use is usually 25-30% lighter than the descriptive denier. The reason is that the silk glue has been removed and the silk does not feel like straw but has the typical soft silk feel.

Each crop of silk cocoons contains also a percentage of double cocoons that are difficult to reel and give an uneven slubby yarn. This is called "douppione silk". The most popular counts are 50/70, 100/120, and 20/250 Den. As you can see the margin between high and low average is substantially more than 10%.

Man made filament yarn counts are also expressed in denier. The full description consists usually of 3 groups of figures. The count/the number of filaments in the yarn/turns per unit with direction of twist. A typical example would be 40/34/2.5S which means 40 Den/34 filaments/2.5 turns "S" per inch (In Europe turns per meter are quoted). Another typical description would be 300/4DPF/.5Z, meaning 300 Den/4 Den per filament (=75 filaments)/½ turn per inch "Z" in Z twist.

When you deal with textured filament yarns it is necessary to ascertain whether the Den given is the starting or final denier. This is not done uniformly in this country. Most producers quote the starting Den. The final Den count may be 15-20% higher, i.e., heavier.

In recent years a new "international" count system has started to come into use. This is called D'TEX and is a weight system. It originated as the "TEX" system which gives the weight in grams (g) of 1000 meters (m) of yarn. This system was adopted in parts of Europe but was found unwieldy, requiring 3 decimals to adequately express fine yarns. International standard societies modified the D'TEX system: 1 Tex equals 10 D'TEX or the weight in grams of 100 meters of yarn.

Twisted novelty yarns (and also some spun novelties) are usually designated as yards per pound (yds/lb), in Europe, meters per kilogram (m/kg). 1000 yds/lb equals 2016 m/kg.

Note: For those who like highly technical information on the subject and equivalents calculated to 4 decimals, I recommend ASTM-D 2260 published by The American Society for Testing and Materials.

ABOUT THE AUTHOR: Walter Hausner was born and educated in Vienna, Austria. He is a graduate of the College of Textile Technology in Vienna and worked in handweaving establishments in Austria and Czechoslovakia. He spent the years of World War II in Great Britain, where he worked in the textile import-export trade and was also a cotton buyer at the Liverpool Cotton Exchange.

He came to the United States in 1948 and worked in the textile industry. During his career he has worked as a weaver, foreman, designer, production assistant, quality control man, production manager and yarn buyer. He now lives in New Jersey and is a weaver and textile designer. ■

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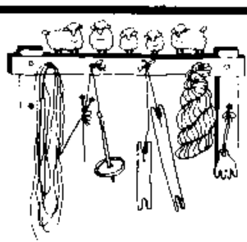

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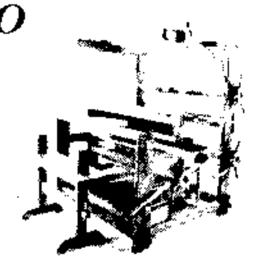

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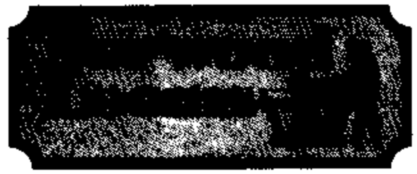

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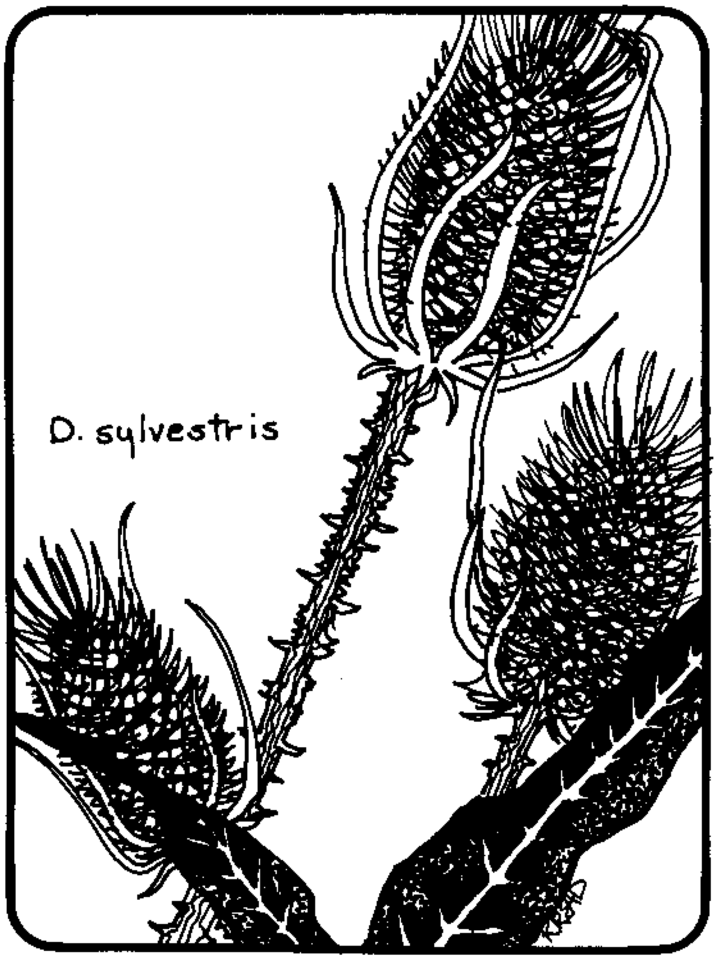
DIPSACUS FULLONUM: FULLER'S TEASEL

Let's talk about D. fullonum, the teasel of commerce known as *Fuller's teasel* as distinguished from the ordinary wild teasel, D. sylvestris, the spikes of which are so successfully used in dried flower arrangements.

D. fullonum is biennial forming a plant the first year and during the second year grows into a bush, sending out branches about 6 feet high. At the end of each branch a teasel forms. The head of the main stalk forms the largest and strongest teasel, called the king. It is a male teasel and only one king is produced on a plant, although there may be from 20 to 30 female teasels known as queens, coming from the lateral branches of the queen stalks are buttons. The male teasel sheds pollen over all; without this pollen, fertile seeds will not be produced. If the king is removed before the blossoming season the other teasels will attain a larger size and, for commerical purposes, be every bit as good as the king but the seed they produce will not germinate. At the juncture of the branches with the main stalk, a cup is formed, holding a quart or more of water. As this cup is above ground, it can be filled only during a rainstorm. Without this supply of water, perfect teasels cannot be produced.



Each kind (king, queen, button) were used in finishing various kinds of cloth. The long, strong-hooked teasels were needed for blankets and deep-napped woolens. The buttons were used for the manufacture of material such as broadcloth.

Although D. fullonum was a native of France, it was also grown in Germany and England. The lime in the land was absorbed by the plants and transformed the hooks into hard, perfect points. The hooks had to be strong enough, yet sufficiently elastic, to "give" in places where they would otherwise tear the cloth. In the late 1800's teasel was successfully grown as a crop in the northern part of New York state. It grows well from seed and has become naturalized in northeastern United States from plantings once grown commercially for the heads.

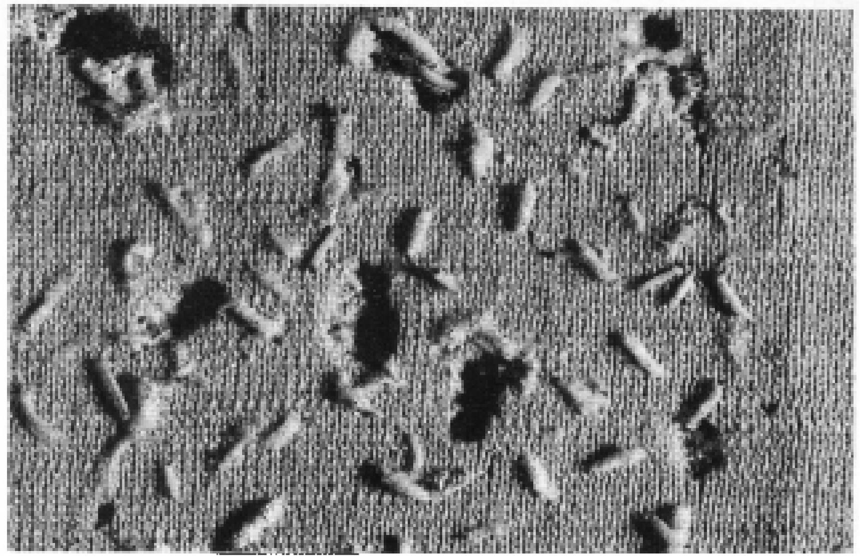
Centuries ago a number of teasels were fixed in a small wooden frame. This frame was worked over the surface of the dampened cloth in the direction of the warp and then of the weft. After being used for some time they became filled with wool fibers and it was necessary to clean them. This was done by children with combs. With the advent of machinery, the teasel heads were arranged upon a cylinder in such a manner that the cloth, moving slowly in one direction, passed over them while the cylinder revolved more rapidly in the opposite direction. Thus the recurved hooks caught on the wool fibers causing them to project from the surface of the cloth and form a nap. Fine woolen cloth was sheared to give uniform length. After the teasels had been used for some time the small spaces between the bracts became filled with loose fibers of wool. The frames containing them were removed from the cylinder and reversed so the other side could be used. When both sides were filled they were removed and the loose fibers cleaned out by machinery.

Investigation seems to prove D. fullonum and D. sylvestris don't even belong to the same family since the wild teasel flowers out in a pink blossom while the Fuller's teasel has a white blossom. D. fullonum has recurved hooks. The bracts on the flower heads of D. sylvestris are straight, soft spines that may extend beyond the heads.

Researched by E. Rigby and H Liebherr.

This article is a reprint from the newsletter of the Spindle & Dyepot Guild. Newsletter #83, April 1982. Reprinted with permission.

MOTHPROOFING WOOL



1. Clothes moth larvae. All photos courtesy of Ciba-Geigy.

This article was first published in LA NAVETTE, Tissage, Tapisserie, Filage et Teinture Vegetale, No 20, Automne 1982. Republished here with permission of Gilbert Delahaye, editor/publisher. Translated by Clotilde Barrett.

Clothes moths! Can you recognize them? . . . You have probably seen, more than once, these small sand-colored moths fluttering in all directions and have given chase to those tiny insects who are big wool eaters. You tried swatting them with all your might (these smart little moths don't let themselves be caught easily). When finally you managed to crush one between the palms of your hands, you went on, doing your daily chores, thinking: One less! . . .

But it is not the moth that is responsible for the holes that you find in your woolens! What you saw flying was probably a male who is relatively harmless. He does not even eat and is already resigned to die when he appears in the open. The female clothes moth, heavy with the weight of her eggs, is too lazy to fly. One rarely sees her fluttering around.

In fact, it is the larva (a little worm a few millimeters long) that is responsible for the moth damage to cloth. The larva is ravenous for keratin, of which there is plenty in wool, but also in fur, hair and feathers. The larvae eat constantly, grow fast and go into their chrysalis stage. Within the cocoon, the chrysalis is transformed in a few weeks into a moth which has nothing else to do than to reproduce and lay eggs. This is their life cycle. Warmth, humidity and darkness are favorable conditions and speed up the life cycle.

One should not believe that clothes moths only reproduce in woolens. Moths lay their eggs elsewhere, in dark corners where they can hatch undisturbed (between floor boards, in cupboards, in furniture). After a few days the tiny larva leaves the egg and starts searching for food. Beware of any wool that lies in its path.

AN EATER WITH A BIG APPETITE

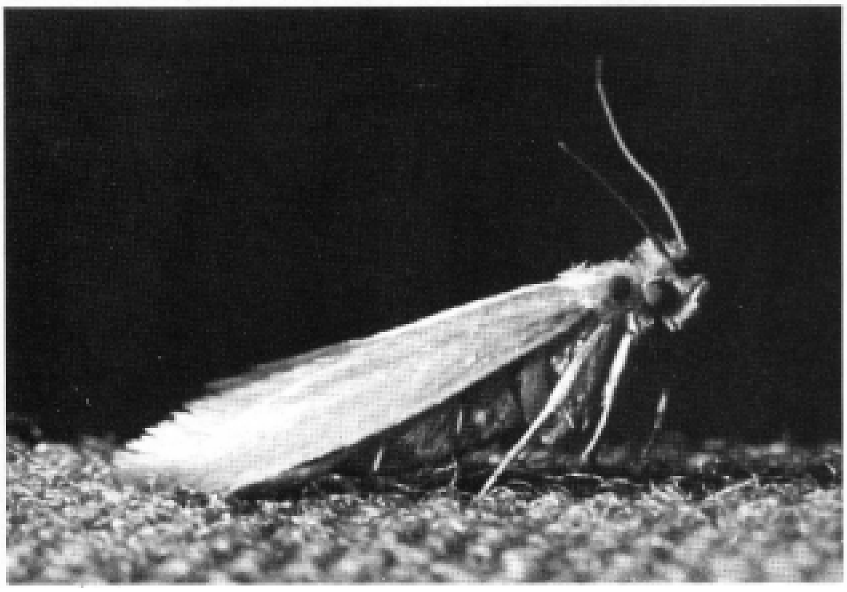
Do you know how much wool the descendants of a single clothes moth (that in a warm year produces 3 to 4 generations) can eat in one year? 23 kg (50.4 lb) of wool! Enough to make 65 lady's sweaters, 12 man's coats or 15 blankets! Furthermore, the larva of the moth does not just damage pure wool but also the various wool blends, cloth with mixed fibers which include wool and furs. Protection is thus a necessity. It has to be efficient and yet may not be harmful to man. It has to be practical without any unpleasant side effects.

THE ANTIMOTH ARSENAL

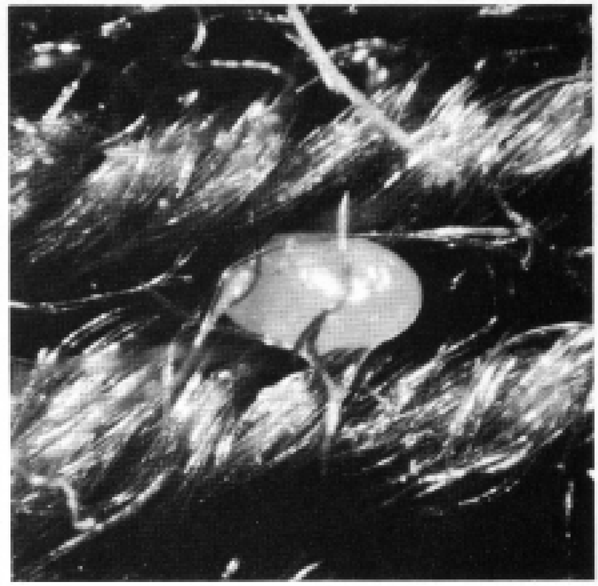
At weddings and funerals you probably have noticed aging couples whose clothing (which just comes out of the closet for such occasions) emits a smell of mothballs that can be detected 15 meters away. It is because the naphthalene has such an unpleasant odor that it is associated with "old clothes".

The fight against moths did not just begin today with the use of commercially available products. Already in antiquity, Pliny wrote seriously that woolen clothing would be guarded against moths if it was draped over a coffin! Cato used a broth prepared with olives to coat the inside of his closets and chests. According to other authors, certain aromatic herbs have the property of repelling the insects: rosemary, myrtle, wormwood, iris, lavender, anise, lemon peel. We all can remember the little bundle of lavender stuck in the closets of our grandmothers.

There are several other ways to keep the clothes moths from invading our goods. We must regularly beat and brush our cushions, mattresses, drapes, wallhangings, etc.; vacuum clean them, store them wrapped in newspaper. Furs must be stored in cool places. Use mothballs or pellets which have a highly volatile chemical that easily evaporates to destroy the damaging insects. All of this takes time and money (these products are short lived and have to be replaced regularly). Furthermore, one usually only tends to worry about clothes moths after they start appearing in the open and by then it is too late because the damage has been done.



2. Clothes moth, enlarged



3. Clothes moth egg, enlarged

IS THERE AN EFFECTIVE AND LASTING PROTECTION AGAINST CLOTHES MOTHS?

Yes, today, thanks to the scientific research and the joint achievements of chemistry, biology and technology, two effective and lasting products have been put on the market by Bayer (Germany) and Ciba-Geigy (Switzerland): They are EULAN (from the former) and MITIN (from the latter). These products are easy to use and it would be erroneous to believe that they are only for industrial use. Both Eulan U.33 and Mitin FF are not only effective on keratin fibers but also on polyamides, horsehair, feathers, etc.

MUST ONE MOTHPROOF WOOLENS?

Fiber artists who work with wool, no matter at what stage, should be concerned about the permanence of their creations, which would be impossible without an effective mothproofing agent.

How many tapestries have I seen which the moths have turned into sieves? The craftsmen and the manufacturers of past centuries had the excuse of not knowing about the modern efficient products. But now that the mothproofing arsenal has been perfected, we cannot ignore it. Yet, how many weavers and fiber artists, still today, manipulate their wool by dyeing it, by spinning it or just by weaving it without worrying about the final product and what will become of it! They probably think that once the piece is sold, there is no longer a need to worry. In short, to say it frankly, they wash their hands of it. But the moths rejoice and "lick their chops" . . .

I hear occasionally from the same craftspeople that "wool in the grease does not get attacked by clothes moths"! This is true if one believes the 18th century encyclopedists who wrote "it is a fact that wool in the grease is impregnable to worms and that it thus can be preserved for years and that it is no less true that worms devour it most often when it is absolutely clean".[1] The alkalies which are present in the grease while the wool is still in bales may repel moths, but they are volatile and tend to disappear in the air when the wool is being worked. The wool thus loses the natural property of repelling moths that it used to have. Let's be aware also that wool which is kept too long in the greasy state risks being exposed to heat and that the fermentation which takes place under these conditions tends to produce a rusty color which is hard to get rid of later.

1 Encyclopedie Méthodique des Arts et Métiers. Editions Panckoucke, Paris 1788.

HOW TO MOTHPROOF WOOLENS?

WITH EULAN U.33

This product, made by Bayer (address at the end of article) comes in the form of a light-brown viscous liquid. It is miscible with water in any proportion. It is stable toward the salts present in hard water, toward alkalies and toward oxidizing and reducing agents. One can thus combine it with the process of bleaching wool. One can also add it to the dyebath even at boiling temperatures but must hold the boiling temperature for 30 minutes. The best way is to dissolve Eulan U.33 in water when the dyebath is being prepared, before it is heated, thus at about 20° C.

If one wants to mothproof without bleaching or dyeing (for instance if one wants to mothproof natural wool, colored skeins, a blanket, a garment, fabric for the interior, etc.), one adds to a neutral bath the Eulan which has previously been diluted with cold water in a volume ratio of 5 to 10 parts water to 1 part Eulan. The weight ratio of Eulan to wool is 1 to 1½ parts Eulan to 100 parts wool.

For example: To treat 1 kg (1000 g or 2.2 lb) of wool, dissolve 10 to 15 g (0.35 to 0.53 oz) Eulan U.33 in 100 to 150 g (3.5 to 5.30 oz) water and pour this solution into the treatment bath. The amount of water in the bath is irrelevant as long as the wool to be treated is submerged. The container should, of course, be appropriate in size to the amount of wool to be treated. One ought not to "drown" the wool.

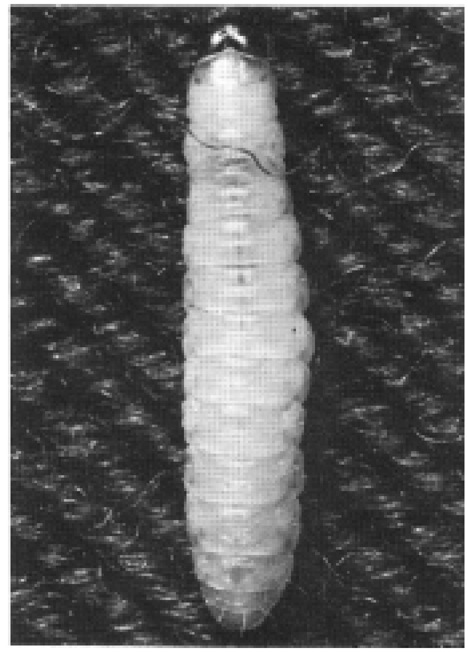
Raise the temperature of the bath to 35° C or 40° C (95 ° or 104° F) and hold this temperature for 10 minutes. Then add 60% acetic acid in the amount of 1% of the weight of wool—dilute the acid in a little water before adding—and continue the treatment for 15 minutes at this temperature. The pH of the bath should be about 5 or 6. No need to rinse.

With MITIN FF

This produce made by Ciba-Geigy comes as an odorless white powder. One makes a clear odorless solution of this powder by sprinkling it in boiling soft water in a weight ratio of 1 to 40 or 50, by stirring and by bringing it back to a boil. As with Eulan U.33, the process of mothproofing with Mitin FF is compatible with the dye process and with the bleaching process. There is one restriction: do not use hard water.

For a dyebath or for any other treatment, the weight ratio of Mitin to fiber is 1%. One adds the dissolved Mitin to the bath at 30° to 40° C (86° to 104° F) before any other additions (such as in the case of a chemical dye process). Mix briefly and then add the dye products. With vegetable dyeing one may add the dissolved Mitin FF to the dyebath when the temperature reaches 30° C or 40° C without any problems.

If one prepares a bath for the sole purpose of mothproofing wool, whether it is in the form of roving, skeins or by the piece, one adds a solution of Mitin FF (at a 1% weight ratio) to the treatment bath which has been warmed up to 30° C to 40° C. Then, after 15 minutes, one adds 85% formic acid in the amount of 2% of the wool weight or 80% acetic acid in the amount of 3% of the wool weight. Bring the heat to 60° C to 90° C (140° to 194° F) for 30 minutes and let the solution cool down.



4. Clothes moth larva, enlarged

HOW DO THESE MOTHPROOFING TECHNIQUES LAST?

One can say that the goods treated with either Eulan U.33 or Mitin FF are protected once and for all against clothes moths. Light, repeated washings, sweat, sea water, ironing, dry cleaning and the application of solvents have no effect on the protection.

If one takes into account the small amount of work and the small investment in the product as compared to the damage which moths can inflict upon hard to replace and valuable objects such as tapestries, one can hardly understand the reluctance some fiber artists might have to protect their woolens. Perhaps it is simply because these products—designed for industry—are not readily available (in drugstores for instance). Maybe too, there is a lack of available information.

EULAN U 33 is available in the U.S. under the name of EDOLAN U HIGHLY CONC. Inquire at Mobay Chemical, Dyes and Pigments Division, P.O. Drawer 2955, Rock Hill, S.C. 29730. Their technical data sheet (#1086) covers this product in detail. Selling price is $9.22/lb. in 132 lb. drums. For smaller quantities, there is a repacking charge. It is important that safety goggles and protective gloves be worn when using the product and handling the specimens. EDOLAN U HIGHLY CONC. provides protection against the larvae of moths, fur beetles (Anthrenus) and carpet beetles (Attagenus).

MITIN FF is available in the U.S. from Textile Chemical dealers and distributors. For further information, write to Ciba Geigy, Ardsley, NY 10502.

MITTIN FF is available in CANADA at the following addresses: Dyehouse, P.O. Box 4057 Wesmont, Quebec, H3Y 1W7, CANADA; Handcraft Wools, P.O. Box 378, Streetsville, Ontario, L5M 2B9, CANADA.■

BOOK REVIEWS

THE COMPLETE SPINNING BOOK by Candace Crockett 1977. Published by Watson-Guptill Publications, 1515 Broadway, New York NY 10036. 8" x 11" format, hardcover, 215 pp., $24.50. ISBN 0 8230 0860 0.

This book was first published 6 years ago but was never included in the Book Reviews of this Journal. With the growing interest in spinning, it seems appropriate to bring as many books as possible to the attention of our readers so that they can make choices with regard to contents and price.

This book is lavishly illustrated with black/white photos and drawings. It is a pleasure to leaf through the pages. The text is very well written and informative. This book is of high quality throughout.

The author begins with notes on the history of spinning. The first spinning lessons are on the drop spindle, using wool. Next, the reader becomes familiar with the spinning wheel. Many types are clearly illustrated and documented by means of informative captions. The advice on purchasing a wheel and caring for it is very useful. There are also plans and instructions for building a spinning wheel, which is of special value to the home wood worker. The author teaches how to spin on a wheel. The information is basic and geared to beginners. Some unusual yarn structures and designs are mentioned but not really taught.

The book includes a chapter on fiber preparation and some very good information on fibers: wool and other animal fibers, plant fibers and silk.

This is a book to enjoy and the pleasures of reading it will certainly have a positive impact on the spinner's attitude toward learning a new skill.

THE ART OF SPINNING IN THE GREASE, THE PIONEER WAY by Doris Spath Bieck 1982. Published by H. Bieck, Box 111, Giltner, NE 68841. 5½" x 8½" format, 44 pp., paperback, $5.95.

This book is subtitled "The Sharing of my Hobby For Forty-five Years". This is accomplished with great generosity. The author learned to spin from her grandmother, a German immigrant. In appreciation for her ancestors, her goal is to teach others through demonstrations, lessons and advice. The spinning lesson in this booklet is on a drop spindle (home made if one wishes), and with fleece in the grease. The author stresses rhythm and enjoyment.

The major part of this publication is a useful handbook on setting up spinning demonstrations. There are many tips to assure successful and rewarding results. The booklet also includes heritage patterns for 4-needle stockings and gloves.

It is an unusual little book, somewhat reminiscent of a family scrapbook, with notes on what and what not to do during spinning demonstrations.

THE SHEEP BOOK: A Handbook for the Modern Shepherd by Ron Parker, foreword by Garrison Keilor. Scribners, $17.95, ISBN 0-684017811-0.

This book is probably the most important book on sheep raising published today. It is required reading for anyone starting out in the business and it is a valuable book for anyone who raises sheep.

The author, Ron Parker, was a university professor when he decided to move his family to the country and raise sheep. After seven years experience, he has written the book he would have liked to have had when he started. He has arranged the book to follow the yearly cycle of the ewe, from building and rebuilding to lambing and weaning. It is a good plan and should make it easier for the reader to find needed information again quickly.

The Sheep Book is so packed with practical information that it will be referred to again and again. Parker emphasizes preventive medicine and shows how it will save the sheep grower time and money. His hints on how to produce cleaner fleeces will appeal to anyone interested in spinning. He speaks from knowledge, for his fleeces have been described as being as clean as though the sheep had been kept in the house.

The heart of the book, however, is an insistence on records. He names each of his sheep and keeps accurate records of the breeding and health history of each of them. These records enable him to make decisions based on facts and to run his farm as a business.

At the end of the book, Parker has added appendices of marketing information, a list of approved and unapproved drugs and feed, nutritional needs of sheep, and even a listing of woolen mills and tanning companies. In fact, there are so many nuggets of information in this book that it is mind-boggling. (He even gives income tax tips!) Add to this that the book is easy to read and understand and you have a book to be prized.

Mary Derr

NATIONAL WOOLCRAFTS FESTIVAL—TARANAKI 1983 PATTERN BOOK. 6" x 8" format, 36 pp. $2.50 (New Zealand currency) c/o Verneice Kilsby, Ahuroa Rd., Rd. 22, Stratford, New Zealand.

This booklet of knitting patterns was published by the festival committee to raise funds to cover the cost of the festival. It contains patterns for shawls, sweaters, baby clothes and toys, about 27 in all. The patterns shown with B/W photographs are very simple and require only a minimum amount of instruction. The instructions are included and clearly written.

All the patterns in this book are particularly well suited for handspun wool.

This is a very successful project and deserves the support of hand spinners from all over the world.

Book reviews are by Clotilde Barrett unless otherwise noted.

THE SWEATER WORKSHOP by Jacqueline Fee 1983. Published by Interweave Press, Inc., 306 N. Washington Ave., Loveland, CO 80537. 8½" x 11" format, spiral bound, 183 pp., $15.00. ISBN 0 934026 12 2.

This book is for the independent knitter, who is willing to make an effort to learn, but who then wants to knit garments without any further fuss or bother.

The learning process is based on the execution of a sampler. It is an oddly shaped object but it assembles all the techniques of knitting, shaping and structuring, that are needed to become a master in the art of sweater knitting. The yarn requirements for the sampler are basic and can be found in any store, even a dime store. The knitting is done on circular needles. The techniques are simple and easy to understand. The text is aimed at beginners and no previous knitting experience is needed. The layout of the book underscores important messages, enlivens the instructions and offers good illustrations.

Next comes a chapter on materials and equipment.

Now the reader is ready to plan a sweater and execute it. There are complete and detailed instructions to weave a basic sweater.

The last chapter explains sweater variations and allows the knitter to be creative and start knitting without any further need for instruction books.

This book is well conceived and successfully executed. It will be welcomed by anyone who ever wanted to knit but did not quite know how to tackle it.

THE MANUAL OF BRAIDING by Noémi Speiser 1983. Published by Noémi Speiser, Augustiner gasse 3, CH-4051 Basel, Switzerland. 8¼" x 11¾" format, 240 pp., paperbound, 44. Swiss Francs plus 5.15 Swiss Francs for P/H.

Braiding is here defined as "long and narrow fabrics constructed of threads which run on zig zag or helical courses, interlacing, twining and occasionally, interlinking". These include the products of many cultures, many different hand manipulations encompassing many structures and patterns.

The author has researched braids for over twelve years and has become known world wide as an authority in this field. In this book she has organized her knowledge on braids so as to establish fundamental rules and principles from which the various braid structures can be derived in a logical manner. By learning about braids from this book, the reader can easily discover new examples and explore new variations.

The subject of braiding is treated from the most elementary principles of the crossing of two elements to very complex spatial movements of large numbers of strands. The author deals with structures as well as with the hand and finger manipulations which will accomplish them. For some of the braids, special tools and equipment are used whose function is clearly explained.

The book is conceived as a textbook and the author warns that "single chapters, taken out of context, are necessarily incomplete and therefore all but useless". In spite of this, I found that the book works well as a reference book too. The glossary and the detailed table of contents are of great help for this purpose.

It is worthwhile to pause and to study the table of contents carefully. A reader who embarks on an intensive study of braids with the help of this book will start, as the author suggests, at the very beginning and work his way through the book. The table of contents will act as a guide and show the reader the direction in which he/she is heading. The succession of chapters is carefully planned.

The course begins with a brief chapter on mounting the strands and finishing the braids. Next come the basic structures and manipulations of strands on which later the more complex ones will be based. Both aspects are accorded equal importance, are explained in great detail and are illustrated by very clear line drawings done by the author. In fact, the visual presentations of the braids, as much the structure as the movement of the strands, are so eloquent that they allow the braider to proceed with only a casual glance at the text. However, the text is important too as it emphasizes the laws and general principles on which each type of braid is based and permits the reader to explore other examples and patterns.

A comprehensive study of braids of this scope has never been published before. Therefore, this book is not only a good publication for study but also a valuable reference for braid structures, concepts and terminology.

LE FLÊCHÉ AUTHENTIQUE DU QUÉBEC by Véronique Hamelin © 1983, Les Editions Leméac, Inc. Available from the author, 2912 rue Summerside, Ste. Foye, Quebec, Canada G1W 2G1. 6" x 9" format, 256 pp. paperback, price unknown. ISBN 2 7609 5353 X.

The braided sashes of Quebec are finger-woven and do not require a loom or any other equipment. The author, in an historical introduction, claims that the Quebec tradition has unique characteristics. These can be seen in traditional belts but lend themselves also to contemporary interpretations. The author teaches traditional techniques but uses a finger manipulation that enables the weaver to handle wider pieces with ease, to become more creative and to adapt the technique to coats, wallhangings and other decorative textile projects.

The author recommends using an additional center thread which acts as a guide to determine which strand should move to the right or to the left. The technique works probably very easily if one has a chance to watch it being done. The author tries to give the reader lots of visual aid by means of an elaborate series of photographs which are accompanied by lengthy descriptions of the finger positions and manipulations of the strands. I would have preferred line drawings and more precise graphic illustrations of finger movements. As it is, the book refuses to stay open and lay flat. Weighing the pages down obstructs the text. The pages have to be turned frequently, but one's hands are tied down by the manipulations of the strands. The text is lengthy and cumbersome, even for the person who reads French. The photos are clear but not as easy to follow as line drawings might be.

Once the basic technique is mastered, the author shows how to create intricate and beautiful patterns through a series of lessons.

There are step by step recipes for many projects such as belts, neck ornaments, neckties and bags.

Finally, the weaver learns to increase and do other manipulations which can lead to large and complex projects.

THE CRAFT OF HAWAIIAN LAUHALA WEAVING by Adren J. Bird, Steven Goldsberry and J. Puninani Kaneloa Bird © 1982. University of Hawaii Press, 2840 Kolowalu St., Honolulu, HI 96822, 9½" x 7¼" format, 154 pp., paperback. $12.95, ISBN 0 8248 0814 2.

THE STORY OF LAUHALA by Edna Williamson Stall © 1953. Distributed by Petroglyph Press, Ltd., 211 Kinoole St., Hilo, HI 96720 5¼" x 9" format, 61 pp., paperback $2.95.

The lauhala is the leaf of the hala, of the genus Pandanus, which is found in the tropical Pacific islands. After the leaves are prepared and cured they can be stored and shipped. Unlike the coconut palm plaiting which has to be done with fresh fronds, the lauhala weaving techniques can be practised anywhere and at any time. In fact, any flat strips of flexible materials, such as paper strips, may be substituted to learn the craft.

The preparation of the lauhala requires special skills that can only be acquired through practice. From the selection of the tree through the rolling of the prepared leaves into self-contained disks there are many steps which have to be well-executed lest the end product be one of poor craftsmanship. The first book, published by Hawaii Press, goes into minute details on how to prepare lauhala. Each step is well-illustrated with a clear photograph. The second book describes how it is done but does not give step-by-step instruction.

After the rolls of lauhala are prepared (or purchased) the weaver still has to split the leaves into strips whose width will vary according to the project. The book by Bird/Bird/Goldsberry gives instructions for many projects, each one clearly illustrated. Anyone interested in plaiting will find this book very useful and will easily find substitutes for lauhala. The book by Edna Stall has different qualities. It shows the advantages, comfort and practicality of lauhala products and kindles a great appreciation for the hala trees whose products have been so important to the survival and the well being of the people of Hawaii.

Two great books for basket makers, plaiters and people interested in material culture.

THE STRUCTURE OF WEAVING by Ann Sutton © 1982. Published by Lark Books, 50 College St., Asheville, NC 28801. 8½" x 12" format, 192 pp. hardcover, $27.95. ISBN 0 937274 08 9.

Let's start out by saying that this is a "beautiful book," richly illustrated with large color and black and white photographs. The woven samples are shown in their actual size. The graphics also are done with meticulous care.

The book is an inspiration to weave nice cloth and also a weaver's instruction book. The usual first chapters, found in almost all weaving manuals, which deal with looms, fibers, colors, dressing the loom are not included. The author starts out with the theory of drafting and fabric analysis. A good clear and simple approach. The following chapters deal with weave structures. I like the chapter on plain weave the best. The samples are beautiful; the drafting for color-and-weave effects is explained; basket weaves are included. The beauty of plain weave fabric is shown in its many variations.

The chapter on twill includes up to 8-shaft weaves. From the point of view of fabric structure, the book remains rather elementary but will give the reader a good basis for further explorations of twills. The same can be said of the short chapter on satins.

The remaining 60 pages cover floats, mock lenos, honeycomb, cords and double weave. Approximately 80% of these pages are taken up by photos of samples and by captions about them. The text in these 5 chapters is minimal and does not allow any of these weave structures to be explored.

The weaver who needs visual stimulation will enjoy this book and look through its pages over and over again. The weaver who looks for a textbook about weave structures will not be entirely satisfied.

LOOKING AT TWILLS by Leslie Voiers © 1983. Published by Harrisville Designs, Inc., Harrisville, NH 03450. 54 loose leaf sheets bound into a ringbinder, $36.50.

This is a very special handbook for the study of twills. It is designed for the serious beginner weaver and gives a thorough basic understanding of this important structure. The drafts are clear, the text is well organized and most important, the book is illustrated with real handwoven swatches. All the basic twills are discussed: straight twill, point twills, multi-pointed twills, skip twills, broken twills and undulating twills. The examples use 4 to 8 shafts but the theory can easily be extended to more shafts.

With the aid of this book the weaver will learn to draft and learn how to visually relate the draft to the woven cloth. Also, the theory of cloth analysis is well explained.

The fact that real woven swatches are included makes this book very expensive. However, for those who have trouble mastering this very basic and important weave, this little bit of luxury may be very worthwhile. In the index one can find all the necessary data to duplicate the swatches. This may encourage the beginner to start an in-depth study of twills and to apply these weave structures to some projects which are guaranteed to be successful.

WEAVING: CONVERSION OF YARN TO FABRIC by P. R. Lord and M. H. Mohamed © 1973. Second edition, © 1982. Merrow Publishing Co., Ltd., I.S.A. Building, Shildon, Co., Durham, England. 5½" x 8" format, 394 pp., paperbound, £9.50 ($19.80) plus 90 p. ($2.00) P/H. ISBN 0 900 54178 4.

There is, among handweavers, a renewed interest in older books which were written for the weaving industry rather than for the textile craftsman. Therefore, I wanted to see if this recent publication, which is a textbook for students in the textile industry, would contain the same type of information that is being sought in these older books. Handweavers are looking for more information on compound weaves, multi-shaft interlacements, complex patterning systems, special devices for the loom, etc. By and large, the answer is *no*.

This book contains very little about fabric structures. The table of contents reads a lot like the first chapters of any basic handweaving book: winding the yarn, warping, yarn sizing, threading, tying on a new warp, shedding, beating, etc. It all sounds very familiar and to some extent the text is quite understandable. However, the equipment, the problems and the priorities of industrial weaving are so different from ours that a lot of the information given in the book does not apply to us. Nevertheless, I personally found the book interesting and fascinating, perhaps because I have always been interested in what's happening on the other side of the fence.

From this book the reader can glean quite a bit of information on weaving, even some handweaving, and furthermore learn about the shuttleless loom and other such wonders that provide us with the textiles we use every day.

This book really belongs to the domain of industrial weaving.

JAPANESE IKAT WEAVING by Jun and Noriko Tomita © 1982. Published by Routledge & Kegan Paul Ltd., 9 Park Street, Boston, MA 02108. 88 pp., 6¼" x 9¾" format, paperbound, $8.95. ISBN 0 7100 9043 9.

This book *must* find its way to the library of all textile artists interested in ikat (kasuri), Japanese textiles or indigo dyeing. The content and the organization of the material is excellent.

Ikat has been produced in many corners of the world, yet Japanese ikat is unique. This book teaches the many aspects and variations as they have been practiced in the past and are still being done today. The authors start by giving an historical background. There follows a classification of Kasuri, 1. by the direction in which the tied-dyed yarn is applied, 2. by color, 3. by technique, 4. by place of production, 5. by design. The clear order of this reference material sets the tone of the book.

Chapter 3 deals with the uses of kasuri in Japan.

The main part of the book deals with 3 techniques: 1. weft kasuri, 2. warp kasuri, 3. indigo dyeing. Each technique is explained in easy to follow steps clarifying every detail of the operation and showing the many alternative methods practiced in Japan. The line drawings are very clear and the illustrations provide plenty of guidance.

This is a great book to have and it should be noted that it contains an entire chapter on indigo dyeing, both natural and synthetic.

JAVANESE BATIKS by Susan MacMillan Arensberg. Published by the Museum of Fine Arts, Boston, MA. Distributed by Charles E. Tuttle Co., Inc. Rutland, VT 05701. 8" x 9½" format, 64 pp., paperbound, $7.00. ISBN 0 87846 128 0.

The Museum of Fine Arts in Boston includes about 300 pieces of Javanese batiks. A representative sampling of these is illustrated in this book. The photos are beautiful and many are in color. All the batiks date probably from the 19th or 20th c. The text which accompanies this picture book is very educational. The process of the 3-color wax resist technique is illustrated with 7 samples which show different stages of completion. The author writes about the history of batik, the preparation of the cotton, the tools to apply the wax, the dyes and above all, the designs. Traditionally, batiked fabric in Java is only used for clothing and different articles of dress are described. The designs fall under several categories, some restricted to use only by the court. Influences from China, Europe and other areas are brought to light.

This little book is to be treasured by textile collectors and those interested in surface decoration of woven fabric.

BATIK, THE ART AND CRAFT by Ila Keller © 1966 Published by Charles E. Tuttle Co., Inc., of Rutland, VT 05701 and Tokyo, Japan. Ninth printing 1981. 8½" x 8" format, hardcover, 76 pp. ISBN 0 8048 0059 6.

This book has basically two parts. One deals with Indonesian batik, the other is a step by step instruction book on the contemporary craft as it can be practiced in the Western world. These two sections bring to light the contrast between the skills and craftsmanship of people to whom batik is an age old tradition and of craftsmen who use the technique as another medium to express graphic images and designs.

The chapter, "Batik in Indonesia" gives some interesting cultural background of the technique. It deals mostly with design and the methods of applying wax. "Modern Batik Method" is the "how-to" section and is mainly oriented for beginners. The author gives all the necessary instructions for getting started and for advancing to more complex multicolored designs. The instructions are quite clear and easy to follow.

The book is carefully laid out and beautifully illustrated with traditional and contemporary batiks, some in color.

In 1966, when it was first printed, this book must have been a rare find for those interested in learning the technique. Today, when there is a larger choice of books on this subject, the batik artist will have to check the book out more carefully to see if his/her special interests are covered. However, for beginners, it will always remain a good introduction to the craft.

HAWAII DYE PLANTS AND DYE RECIPES by Val Frieling Krohn. Drawings by Jay Wilson © 1978, 1980. Published by The University Press of Hawaii, 2840 Kolowalu St., Honolulu, HI 96822. 8½" x 11" format, 136 pp., paperbound, $8.95. ISBN 0 8248 0698 0.

This is a nice book to add to your library of dye books, even if the plants of Hawaii do not grow in your backyard.

The plan of this book and the layout is very well conceived. The illustrations are exquisite. The information on preparing the yarn, on mordants, on extracting the dye and on dyeing is rather standard and applicable to all plants. It is perhaps better organized than some other dye books. A big bonus here is the chapter on the dyes of old Hawaii which includes the preparation and dyeing of tapa cloth.

The chapter on Hawaii dye plants and dye recipes is captivating and interesting. It is not necessary to have banana trees growing around you to enjoy reading about them. One learns how the tree had special spiritual importance to the ancient Hawaiians, how the leaves produce fiber (manila hemp) and that the leaves dye wool.

The author writes with the same knowledge and interest about the other plants.

A colored chart of dye samples shows the intensity of the dyes obtained.

COCONUT PALM FROND WEAVING by William H. Goodloe © 1972. Charles E. Tuttle Co., Inc., P.O. Drawer F, Rutland VT, USA 05701. 4¼" x 7¼" format, 132 pp., paperback, $3.95. ISBN 0 8048 1016 3.

WEAVING WITH COCONUT PALM by George B. Stevenson © 1970, 1973. Distributed by Banyan Books, Inc., P.O. Box 431160, Miami, FL 33143, 5½" x 8½" format, 31 pp., paperback, $2.00.

Both these booklets give instructions for making various useful and decorative items with palm fronds. They include baskets, hats, mats, bags, birds, flowers and fish. The first one goes into more elaborate projects and into more detail of constructions. W. Goodloe also starts with a few introductory chapters about the origin and history of the coconut palm. He dicusses the leaf and helps the reader in harvesting the right materials. He writes about curing and finishing the plaited projects.

Coconut palm leaves have to be worked while the fronds are still fresh. This craft is therefore the privilege only of those living in the tropics. Yet I found the reading fascinating and was amazed to discover that one large leaf can weave up to six complete hats.

The drawings in both booklets are very clear and the reader should have no problems making the projects with the directions given.

THE INFLUENCE OF OTTOMAN TURKISH TEXTILES AND COSTUMES IN EASTERN EUROPE by Veronika Gervers © 1980, Royal Ontario Museum, 100 Queen's Park, Toronto, Canada, M5S 2C6. 7" x 10" format, 168 pp. paperbound, $10.00. ISBN 0 88854 2585.

The Royal Ontario Museum publishes two series in the fields of history, technology and art: this book is #4 in their series of "Monographs." "Papers" are a numbered series of primarily shorter original publications.

The rich resources of the ROM provide lots of reference and illustrative material for research on scholarly and very specific topics such as the one dealt with in this study. The text is well documented, annotated and illustrated.

There are examples of costumes, some richly embroidered, some adorned with braided edgings, some with tapestry-woven ornaments. The decorations all seem to relate to Turkish predecessors.

Of special interest to weavers are the illustrations of flat woven rugs and of towels with exquisite woven ornaments.

This book proves once more the richness and historical importance of old and traditional textiles. It shows how museums can be a stimulating source of inspiration.

ART AND CRAFT CATALYST 1983. Formerly: National Calendar of indoor-outdoor art fairs and festivals. Published by Henry Niles, 5323 New Haven, Fort Wayne, IN 46803. 8½" x 11" format, 29 pp. Single copy $3.50.

A bi-monthly publication of current fairs and shows with a chronological listing. A small fee is charged for the listing. Display and other forms of advertising are accepted. A subscription to this periodical is $14.00/year. For a weaver, this guide to attend fairs, festivals and shows might be interesting to consult, but he/she will find that the opportunities listed are not abundant, as least not in the vicinity of Colorado. Perhaps a group of textile artists interested in doing the fairs circuit might want to share a subscription and encourage the publisher to try to have more listings of interest to them.

OPPHÄMTA OCH DAMAST MED SKÄLBLAD ELLER DRAGVÄVSTOL by Lillemor Johansson © 1982. Published by LTs förlag, AB Boktryck, Helsingborg, Sweden. Distributed in the US by Glimåkra Looms 'n Yarns, Inc., P O. Box 16157, Rocky River OH 44116 7" x 9" format, hardcover. 166 pp. ISBN 91 36 01781 7.

The book is written in Swedish and the title translates as "Opphamta and damasks with pattern shed stick or drawloom."

As with most weavers, I have only a slight familiarity with Swedish weaving terms and can sometimes catch the meaning of an entire sentence. Thus, I was not able to read this book cover to cover but I must admit I have enjoyed it immensely and I have reaped a great deal of information from it.

The complex patterning dealt with in this book is technically very simple and uses the principle of the long-eyed heddles. The ground weave, usually plain weave, twill or satin is done on a regular loom. The pattern sheds are formed with supplementary devices such as shed sticks, heddle bars, pattern shafts or by pulling up individual warp threads. The techniques date back to before Christ and are of great historical importance.

The author starts with an historical introduction and explains the principles of patterning with clear drawings and photos.

Opphämpta and Smålandsväv are supplementary weft patterning techniques. The former has its pattern shafts behind the ground shafts, the latter has its pattern shafts in front of the ground shafts. Damask patterning is obtained by contrasting areas of weft floats with areas of warp floats.

The techniques, the function of each part of the loom, the set-up, every step of these weaves is explained and illustrated. It would be nice to be able to read the text fluently but the processes involved can easily be followed through the drafts, drawings and photos. There are many beautiful patterns and step by step instructions for projects.

This is a book that won't gather dust on your shelf. It will be consulted over and over again, for it is truly a classic on a subject that has been neglected in the current weaving literature.

GROOT PLANTAARDIG VERFBOEK by Let van de Vrande © 1980. Published by Cantecleer bv de Bilt, Postbus 24 3730 AA de Bilt, Netherlands 7½" x 10" format, hardcover, 143 pp ISBN 90 213 0741 3.

Although this vegetal dye book is written in Dutch there are many ways that this publication can be enjoyed by all. The two main ingredients for vegetal dyeing are plants and chemicals. The chemicals are identified by their Dutch name but also by their Latin one and their formula. Their description and use is clear, straightforward and very informative. The plants are beautifully illustrated with color photographs. The botanical name as well as the French, German and English names are included.

The general work process is to make 18 numbered skeins of 2-ply wool (1-ply handspun, 1-ply commercially spun), for each plant and to prepare 7 liquors which include mordants and a developer. By following the clearly explained procedure, the dyer arrives at 18 different colors for each plant. Each of these has been derived very methodically so that each recipe can be duplicated.

For each plant, a large selection of these dyed skeins is illustrated in color.

This book goes into greater depths than most of the vegetal dyebooks. There is a good chapter on the history of dyeing. There are thought provoking chapters on the knowledge of plants, on cultivating a dye plant garden, on color, on wool and other animal fibers. The author discusses the gathering and preparation of the plants as well as preparing the fibers for dyeing. The process of dyeing is clearly explained.

Besides the plants of the Netherlands, which are mostly common also in the US, the author discusses dyeing with plant material that is often purchased at a dye store or plants that are known all over the world for their dye properties. One chapter alone is devoted to indigo.

The last chapter goes into further details for preparing wool for the dye experiments.

At the end there are a series of pages with very useful information: a plant calendar listing 114 plants, a bibliography, a list of suppliers, a listing of botanical gardens (in Holland) and an index

The book stands out because of the author's concern for good methodology in the process of vegetal dyeing.

THE BULLETIN OF THE NEEDLE AND BOBBIN CLUB. For subscriptions, inquire with Mrs. John W. Christensen, 788 Ponus Ridge, New Canaan, CT 06840. Price unknown.

If I understand correctly, the club itself is rather exclusive and can only be joined by being sponsored. However, since 1916, the club has published semi annual bulletins to which one can subscribe. Back issues (some are out of print) can be purchased.

The scope of the bulletin is wide and includes all kinds of textiles. However, the emphasis is on lace and embroidery.

I received a complete listing of the contents of the back issues and also the two numbers (published together as one) of Vol. 65, which is dated 1982. The content of this issue is as follows: *John Nelham's Needlework Panel* by Margaret Swain; *John Nelham, Embroiderer* by John L. Nevinson; *The Knitting Craft in Europe From the 13th to the 18th* C by Dr. Irena Turnau; *Quilting and Patchwork* by Shiela Betterton. There are also booknotes.

Each article is well researched and annotated in scholarly fashion. The writers have excellent resources for their documentation and for their illustrations.

These bulletins are the kind of publications to which textile researchers should have easy access. Unfortunately, unless one subscribes, this is not the case. ■

1. Sisal fibers drying in the sun. Photo courtesy of Ciba-Geigy

PLANT FIBERS

A large variety of natural plant fibers have been used by different cultures throughout history. Most have come from plant stems and leaves, some from seeds. Some plant fibers such as linen and cotton are well-known to the handweaver, but the information on the minor textile fibers is scanty.

Although most vegetable fibers are not available to the spinner and handweaver in forms that they can use, they are worth knowing and studying because of their historical and ethnological importance.

One of the best sources of information on these fibers is the bimonthly publication of the Ciba Co. (now Ciba-Geigy). Ciba Review was published for about 25 years, since the late 1930's. Ciba-Geigy has given their permission to quote entire sections from the Ciba Review and has also provided transparencies to illustrate some of the fibers. The Ciba Reviews consulted for this project, date from 1949 to 1957. Although some information may be outdated, most of the text is as valid now as it was then.

Plant fibers are classified as bast or soft fibers, leaf or hard fibers and miscellaneous fibers that do not belong to either of the above and which include the seed fibers. The arrangement of the fibers as seen in the cross-section differs in the leaves of the monocotyledons (source of hard fibers) from that of the stems of the dycotyledons (source of soft fibers), and hence, the methods of fiber extraction are different.

HARD FIBERS

Hard fibers is the term applied most widely to the leaf and structural fibers derived from tropical and subtropical plants (monocotyledons) and mainly used for cordage, mats, sacking and similar textiles.

"Hard" fibers is a misnomer in so far as the textile fibers included in the term are no harder than the "soft" types, though thicker and stiffer. They include the various types of agaves (sisal and henequem), abaca (Manila hemp or banana plant fibers), *Phormium* (New Zealand flax) and the *Bromeliaceae* (pineapple family fibers). These fibers have their natural homes in widely separated areas. Long before the arrival of the Europeans, cordage and mats were made by the natives, in Mexico from agave fibers, in the Philippines from abaca and in New Zealand from *Phormium tenax*. As in so many other instances, these attainments of ancient aboriginal civilizations have been developed by the white people and made available to the world. Attempts to cultivate the hard fiber plants outside their original habitat have been attended with little success in the case of abaca and *Phormium*, while the agaves, particularly sisal, have conquered new territories, in Africa and tropical Asia.

After 1946 the quantities of fiber produced could no longer satisfy the demand and efforts were made to obtain material from other fibers, e.g., the *Bromeliaceae* in Brazil and Argentina, and the various kinds of yucca (bear grass) in the U.S.

However, to the many problems besetting the world trade of hard fibers a new one was added: the rapid development of synthetic fibers. The results of this threat are obvious today. The production of hard fibers has declined greatly.

2. *Agave sisalana or sisal. Photo courtesy of Ciba-Geigy*

AGAVES

All species of agaves have some characteristics in common: the fleshy, longish or lanceolate leaves end in a sharp point and usually bear spines on their margins. They form a rosette which for the first few years rests on the ground. During many years new leaves are regularly formed which are arranged in a spiral. In sisal (*A. sisalana*), the leaves may attain lengths of from two to five feet. With progressing age and with consecutive formation of a stem, the lower leaves begin to die off unless, as in cultivated plants, they were previously cut away. Older specimens thus bear their leaf-rosette at the top of a stem of varying height. Able to form a stem, sisal gives rise to many suckers, and possesses coarse, fleshy leaves of green or bluish-green, with very few, if any, spines on the margins. The latter point is of importance to cultivators, as spiny leaves render the cutting operation troublesome.

Young leaves assume first a vertical, but in the course of time a more or less horizontal position. During its lifetime a sisal plant produces an average of three-hundred leaves. The length of the leaves is strongly influenced by soil and climate and this is of great importance for sisal planters; indeed, leaves must be at least 18" long to be of use in fiber production, since the price of the fibers is determined by their length.

Inflorescences appear very late (after 5, 10 or more years) and attain heights of 7 feet or more. After flowering the plant dies.

The MAGUEY plant, (*A. cantala Roxb.*) forms short stems and produces numerous suckers. Its leaves end in a sharp point and have many spines on the margins. In Mexico, its native country, the species no longer grows spontaneously. It is cultivated in Indonesia, India and the Philippines.

HENEQUEM (*A. fourcroydes Lemaire*) has a stem up to 14 feet high. The bluish-green leaves end in a sharp point and have marginal spines ½" long. It is the most important fiber plant in Mexico today.

There are many Mexican agaves whose fibers are marketed under various names, e.g., the zapupe agaves, the mezcal agaves, the Tula istle yielding the "istle" fiber.

THE CULTIVATION OF THE AGAVES

As early as 1528, the Spanish Pater Motolinia noticed agaves foremost among the cultivated plants in Mexico. According to him, the natives used agave fibers to make sewing thread, twine, cords, straps and harness and even clothes and shoes. The intact leaves served as roof covering and for building water pipes. The Aztecs also made paper from agave fibers.

Maguey (*A. cantala*) reached the Philippine Islands at an early date via India and was grown there and in Java on a large scale.

In its native country of Mexico, henequem (*A. fourcroydes*) is cultivated chiefly in Yucatan.

Of all the agaves, sisal has attained the greatest importance as a cultivated plant, the fact that its leaves are devoid, or nearly devoid, of marginal spines proving one of the numerous points in its favor.

ABACA

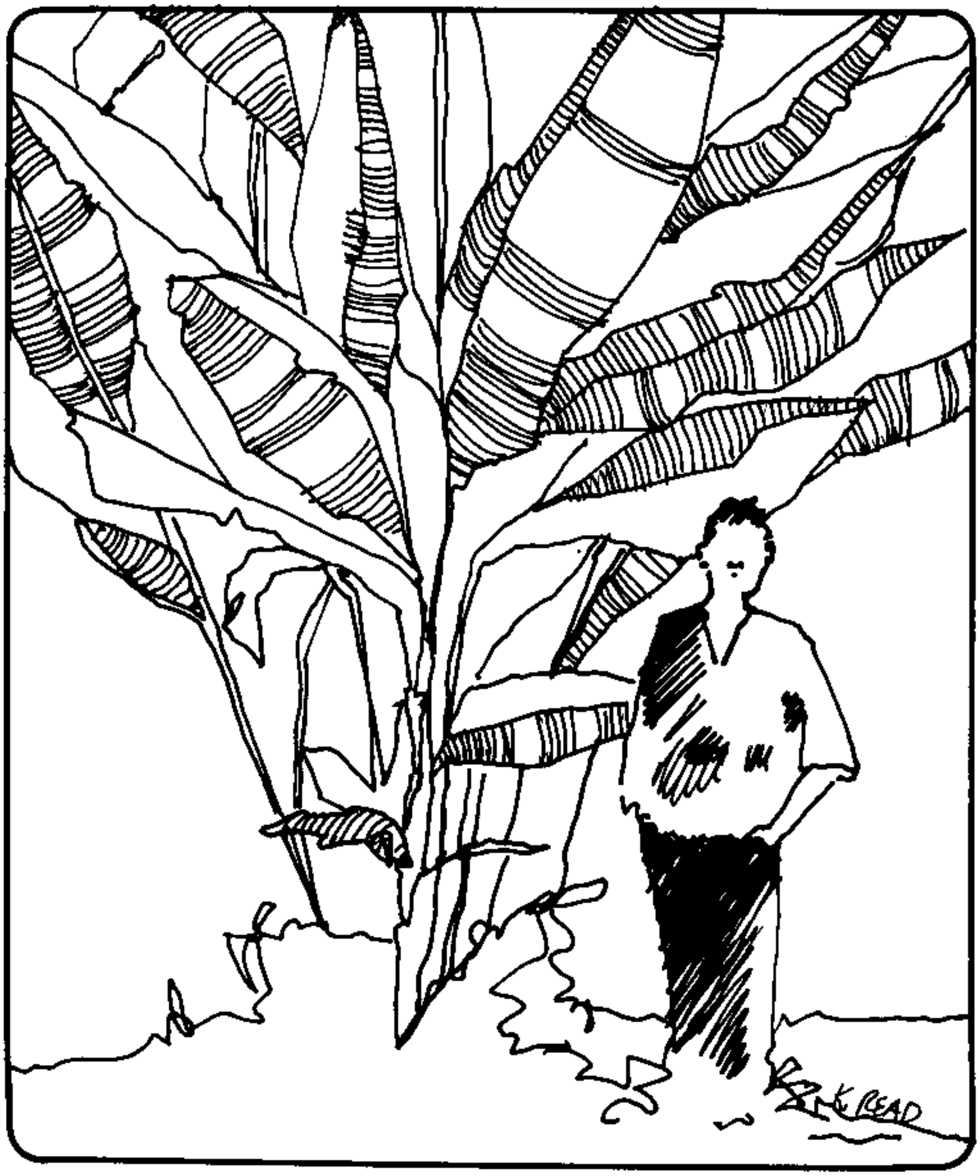
In the town of Davao on Mindanao, the main center of Philippine abaca culture, natives from the neighboring rural districts may often be seen dressed in handwoven clothes made from abaca fiber supplied by *Musa Textilis*, a banana plant. Early accounts of this Philippine fiber date from the 17th century. These wild plants, naturalist Georg E. Rumphius wrote, always had an owner who guarded them jealously, nobody being allowed to cut such a tree without his permission. Apparently the natives wove the fibers obtained from the *Musa Textilis* into two kinds of cloth, both known as "koffo" and of a natural whitish color somewhat like unbleached linen. The coarse kind was dyed black, red and yellow, the fine and glossy type left white or painted with designs of many different flowers and figures. Anchor cables and sacking were also made from the fiber.

The name "Manila hemp" generally used for the plant and fiber, is a double misnomer. Abaca has nothing to do with true hemp and, though native to the Philippines, is not grown in Manila.

Abaca fiber bundles range in length from 6' to 12'. The abaca fiber excels all other plant fibers in tensile strength. Another great advantage, apart from its lightness, is its resistance to water, salt water in particular. Hence, for over a hundred years, abaca has been in great demand for marine uses.

As soon as the large inflorescence emerges, the time for harvesting has come. The false stalks are generally cut when they are two or three years old, as by then a number of suckers have developed which will themselves be ready for cutting two or three years later. Harvesting requires skill, for some stems are thick, others thin, and young shoots must not be damaged in the cutting. The cuts are applied just above the ground and obliquely in order to allow running off of rain water and to protect the root stock from rotting. The outermost sheaths yield only low-quality fiber, those lying further in, brownish or streaky and the innermost sheaths, pure white fibers. So as to facilitate stripping, the sheaths are cut on the spot to the length required by the machines (usually 5'). Sorting of the sheaths and subsequent operations are carried out either in the field or in the decorticating centers.

Experiments have been carried out to make use of the fibers of the edible bananas. As only the freshgrown portions of stalk were extracted and with the least possible delay, these plants produced a fiber in no way inferior to good-quality abaca.



Abaca or banana tree

3. Banana tree, right, in Kijoka, Okinawa

Photo 3, taken by Dorothy Miller, author of *"Indigo From Seed to Dye"* shows a banana tree (at right) growing in a garden in Kijoka, Okinawa. She explains, "The banana stalk is cut and the outer bark peeled. The core is stripped into fibers. These fibers are boiled, separated, and hung over a bamboo pole to dry. The fibers are split into fine threads and joined by a weaver's knot, end to end. They are reeled onto a spool and are given a slight twist on the Japanese spinning wheel before being warped or put on a shuttle for weaving. The photo shows the banana fibers being measured for a warp. The warp will be sent to the women who do the tying of the fibers in an ikat pattern (Ichiri, Okinawan term). The fibers are then dyed in root or native plant dyes or in indigo before being warped onto the warp beam of the Japanese loom".

NEW ZEALAND FLAX

Phormium tenax yielded one of the most important fibers for New Zealand's native population, the Maori.

The genus *Phormium* belongs to the family *Liliaceae*. New Zealand flax has a creeping rootstock which sends up numerous shoots. Each of these forms a fan-shaped cluster of up to eight closely packed leaves. Yellowish or bluish-green, they are folded lengthwise along the midrib and are about 3' long, 1" to 4" broad and often split at the tip. Eventually, a long inflorescence rises from the center of the cluster, on which many waxy, red flowers arranged in panicles appear during the summer months (Nov. to Jan.).

New Zealand flax

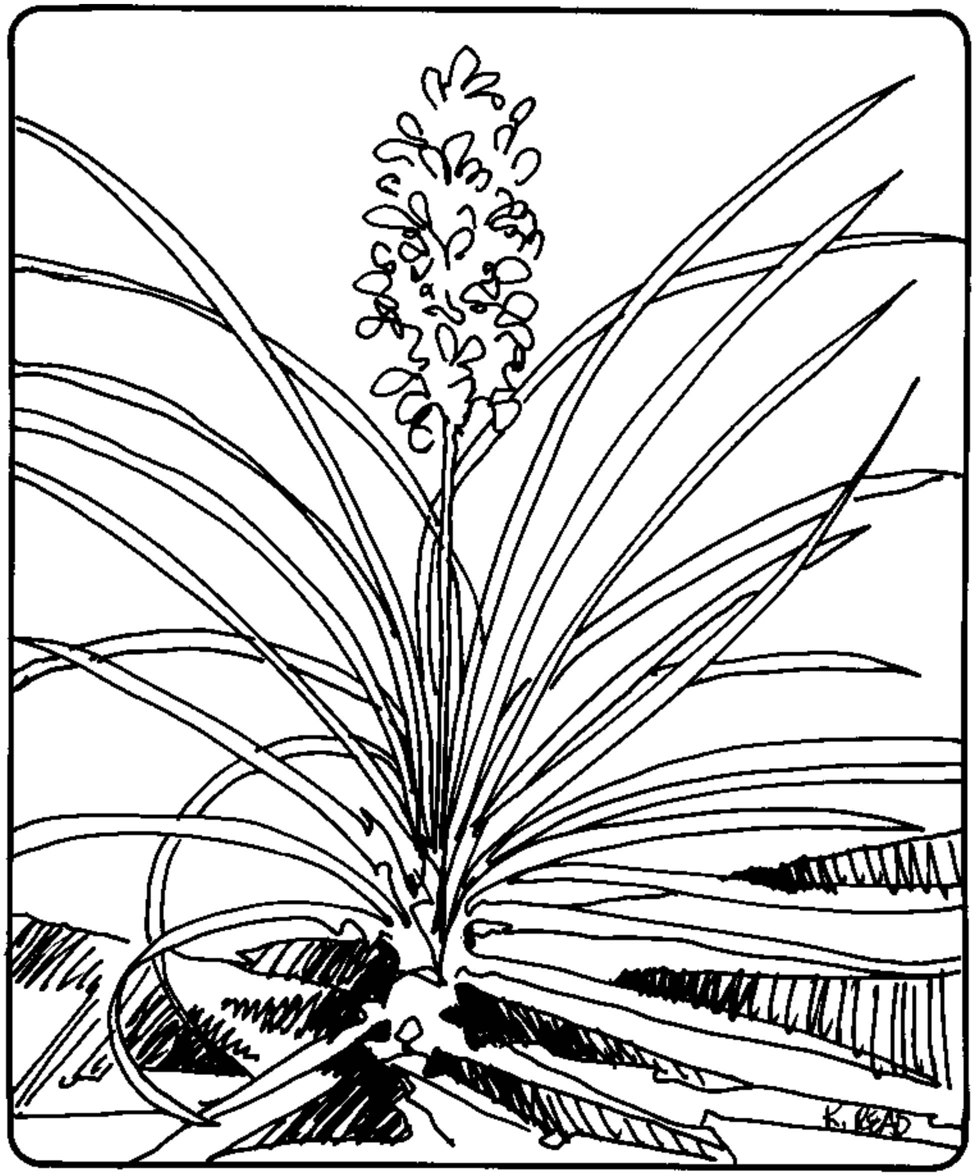
Two species of *Phormium* are found in New Zealand, *Phormium tenax* and *Phormium contensai*. The latter is known as "mountain flax" and has little commercial value.

Phormium tenax grows spontaneously throughout New Zealand and on the Norfolk Islands to the northwest. The Maori also transplanted it to the Auckland Islands in the south. The densest populations are found in the Manawater valley of North Island.

The Maori do not grow *Phormium*. They exploit the natural resources. Cultivation is restricted to big plantations. Generally 5 to 6 years will elapse before the first satisfactory crop of leaves can be brought in. As all the leaves must be cut, another 4 or 5 years will pass before the remaining stools have produced enough new leaves worth harvesting in their turn.

The leaves are cut with a sickle-shaped knife about 6"-8" above ground level, laid in bundles and transported on field railways.

After stripping, the fibers are treated in washing machines, plaited into strands and bleached on the fields. Subsequently, they are moved by conveyor belt to a scutching drum, in which revolving hammers remove all remaining tissues and short fibers. This process corresponds to the scutching of hemp and flax. Finally, the fibers are hanked and pressed into bales.



Piña or pineapple plant

BROMELIACEAE FIBERS

The pineapple family (*Bromeliaceae*) comprises stemless plants with long rigid leaves growing rosette-like from a central base. Their original home is in the tropical and subtropical regions of South America.

Scraping off the underside of the leaves is sufficient to produce fairly good fibers which must be thoroughly washed and, if necessary, separated so as to be ready for spinning.

Piña cloth is made only in the Philippines. It is woven with the unspun fibers taken from the leaves of the pineapple plant. The fibers are knotted together. The fine fabric is made into handkerchiefs, luncheon sets and other small items. These are often elaborately embroidered. The native dress of the Philippines includes piña shirts and blouses. An account of how *Bromeliaceae* fibers are used in the Philippines is given in the Piña article, p. 77 of this issue.

Maguey, piña, sisal and abaca are some of the 14 plant fibers included in the "Miniature Specimens of Philippine Fibers". They are available through the Ministry of Agriculture, Fiber Development Authority, Philfinance Bld., Benavidez St., Legaspi Village, Makati Metro Manila. Tel. 817-72-56 Approximately $12.00 (U.S.).

SOFT FIBERS

The fibers obtained from the stems of dicotyledanous plants are usually soft and flexible, hence the name "soft fibers," distinguishing them from the fibers obtained from the monocotyledons which belong to the hard fiber group. Soft fibers are also called bast fibers and include flax (*Linum usitatissium*), true hemp (*Cannabis sativa*), jute (*Corchorus*), ramie (*Boehmeria*) as well as other fibers from the stems of the nettle family (*Urticaceae*) and many jute and hemp substitutes that go by various names and/or misnomers such as Indian flax, Chinese jute, Indian hemp, sunn hemp, roselle hemp (*Hibiscus*), kenof (*Hibiscus*), Congo jute (*Urena*), etc.

Soft fibers of special importance to ethnologists are the paper mulberry tree (Broussonetia papyrifera) whose fibers are used to make tapa cloth in the Pacific Islands and olona (*Touchardia latifolia*) used by the native Hawaiians for rope and fishing twine. North American Indians used nettle fibers for that same purpose.

The fiber bundles, often several feet long, lie between the outer bark and the woody central cylinder of the plant stem. Their function is to give strength and flexibility to the stem. They are composed of many overlapping fiber cells, which are true plant fibers, held together by gummy substances.

Stalks are cut off close to the base or pulled up. The fibers are usually freed from the stalks by retting or by decortification. Retting is a biological rotting process aided by the bacteria in the stems and in the water. Decortification is a hand or mechanical peeling or scraping operation.

Because the individual plant fibers are mostly too short to be spun sucessfully, the retting process has to be strictly controlled to leave enough of the adhesive substances to allow the bast to be removed as fiber bundles from the remainder of the stem and not be broken up into plant fibers.

With flax and ramie however, the fiber bundles are usually separated into fiber cells or true plant fibers.

Most bast fibers are quite strong and are widely used in the manufacture of ropes, twines and sacking material.

Although many plants are potentially sources of bast fibers, only a few are cultivated for that purpose, mainly because such crops require a large supply of cheap labor and use land needed for food crops. Although improved cultivation and time-saving processing methods have been developed, the economic development of many soft fibers has its setbacks: 1. the US Department of Agriculture forbids the cultivation of hemp; 2. the gradual replacement of plant fibers by synthetics for twine and packing material.

In Japan, a number of bast fibers, including hemp, flax and ramie are referred to as *asa*. Handwoven asa is used for paste resist dyeing.

In the nettle family, both the "sting" and "stingless" varieties are used. Ramie is obtained from a "stingless" nettle but several species of "sting" nettles are cultivated in Europe and other locations. They yield a good fiber whose quality varies according to the method of retting employed. The fibers are mostly used for cordage and sailcloth.

RAMIE

"Apart from cotton fabrics, which are very widely used, the Chinese in summer employ nettle cloth for their robes. The material valued most and not found elsewhere goes by the name of 'co pu' because it is prepared from a shrub known to the people as 'co' and indiginous to Fukien province . . ." Thus a French Jesuit, Louis Lecomte, wrote in his *Nouveaux Mémoires sur l'état présent de la Chine*. (Paris

4. Illustration of a ramie plant in Hooker's Journal of Botany and Kew Garden Miscellany, Vol. 1, 1849. Courtesy of Ciba-Geigy

1697). He went on to describe the preparation of the fibers of this remarkable fabric:

"When the stalks begin to dry, they are cut and the sheaves allowed to rot in water as is done with hemp. The first skin is then removed and discarded; the second, however, which is much finer, is separated into fine strands and used for the manufacture of cloth without previous breaking or spinning. The resulting fabric is translucent, rather fine, but so fresh and light as to give a feeling that one is wearing nothing at all."

A great naturalist, George Eberhard Rumphius (1627-1702) gave a description and illustration of the plant in his *Herbarium Amboinense*, printed posthumously between 1741 and 1755. He named it *Ramium majus*, a name derived from *ramie* or *rame*, the general term for the fiber in the Malay, Javanese and Makassar languages. The name gradually passed into all European languages as the designation for the *chu* plant.

In the Indonesian archipelago, the extracted fibers were used for cords for fishing nets. Because of the close commercial and political relations between China and Java, it is almost certain that the Chinese introduced the plant into the archipelago, for it is nowhere found as a native plant in Indonesia.

In 1753, Linnaeus designated the plant *Urtica nivea*, in accordance with his system of binomial nomenclature.

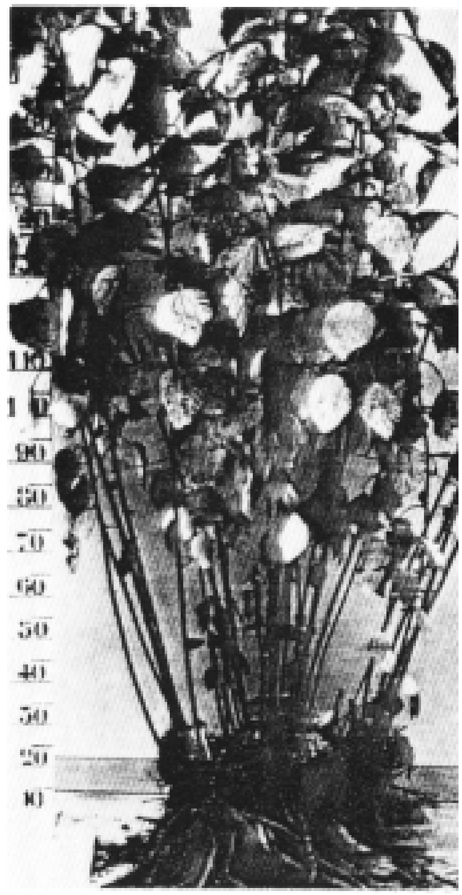
The genus *Boehmeria*, to which ramie is now assigned, comprises about 200 species. Nikolaus Josephus Jacquin, professor of chemistry and botany in Vienna, first established this genus in *Selectarum stirpium Americanarum Historia* (1763), for a nettle plant collected in Martinique. Jacquin chose the name in honor of Georg Rudoph Böhmer, who left an account of yarns and cloths produced from European stinging nettles. Nine years later, Jacquin wrote a full description of the ramie plants cultivated in the botanical garden of Vienna. This fiber plant was also represented in the Jardin des Plantes in Paris in the eighteenth century.

The fiber was imported into Europe as bast ribbons during the ninteenth century and magnificent Chinese cloths were traded as *China grass cloth* or *China linen*. In 1808, William Roxburgh, superintendent of the botanical gardens at Calcutta, brought ramie seedlings from Sumatra, where the plant was cultivated by the natives, to Calcutta, where it was completely unknown. He thought these plants exhibited different characteristics from Linneaus' *Urtica nivea*, and proposed a new species, *Urtica tenacissima*. In 1889, G. Watt in his *Dictionary of the Economic Products of India* pointed out eighteen wild species of Boehmeria, all of which were known as Rhea, which also became the accepted term for ramie in many areas.

In 1810, Francis Hamilton Buchanan shipped three bales of raw ramie fiber to Leeds. Rope manufactured experimentally from this fiber was several times stronger than hempen cordage. Woven fabrics were less satisfactory. The new consignment for 1816 prompted the first English machines for processing ramie (rhea) to be sent to India.

Farel of Montpellier (1815) and Poppenheim of Combes la Ville were the first in France to plant ramie commercially. In England, the first ramie spinning mill began operation in Leeds in 1840; and mills on the outskirts of Paris were built some time later. In due course, German spinners at Zittau in Saxony became interested in ramie. Joseph Decaisne (1807-1882) of the Jardin des Plantes in Paris became a pioneer of ramie cultivation and sent ramie material for planting to Algeria and Guyana. He interested a number of spinners in the new fiber. He also insisted on the need to distinguish between the fibers of *Boehmeria utilis (B. tenacissima)* and those from *Boehmeria nivea*.

The World Exhibitions in London in 1851 stimulated interest in ramie, for the fiber's outstanding properties (including tenacity, luster, length, etc.) were exhibited in a most attractive light. The primary processing of the crude fibers into bast ribbons proved difficult at first. The pectins cementing the fibers together cannot be removed by the conventional retting methods used for flax, hemp and jute. It was such a problem that inventors began work on decortication machines. As early as 1889 the East India Company offered a prize of 5,000 pounds for an efficient machine not prohibitive in cost. The long fibers also made it necessary to adapt spinning equipment. The higher cost of ramie made it impossible to substitute it for the traditional and proven fibers where articles of daily use such as underwear, apparel or cordage were concerned. In spite of the vast sums spent on patents, experimental work and other operations, ramie remains a rare fiber.



5. Ramie plant at the right stage for cutting. The figures refer to centimetres. Courtesy of Ciba-Geigy

Though the ramie plant, *Boehmeria nivea*, is a member of the nettle family, it does not have the stinging hairs of European nettles. It is a shrub with a heavy perennial root stock which sends up numerous short-lived stems which are annual in a temperate climate. The plant has alternately arranged leaves and both stems and leaves are covered with non-stinging hairs. Both male and female flowers are found on the same stem.

Ramie grows best in warm sunny areas where rainfall is plentiful without danger of waterlogging. Ramie has been grown extensively in China, Japan, Argentina, the Philippine Islands, Indonesia, Russia, France, Italy and the United States. In Japan, where the plains are reserved for rice and other food crops, ramie is relegated to cultivable mountain sides. The strong root system of the ramie plants anchors the soil and prevents erosion.

The land is plowed and fertilizers applied before the ramie rhizomes are planted. Holes are dug about 3 to 4 feet apart and three or four pieces of ramie root are buried in each. Planting can be done either in the spring or autumn. In the first and second years, no crops are gathered for fiber production but the stalks of the young plants are cut back to promote more new shoots.

Harvesting is done for the first time in the third year and three cuttings are made annually (tropical plants give as many as 6 cuttings) in June, August and October. The June cutting occurs after the new shoots of the August cutting have appeared and the August cutting after the new shoots of the October cutting are seen.

To prepare the fibers, the leaves of the plant are beaten off, the stem split lengthwise and the bark stripped from it downwards. The resulting bast ribbons are soaked in water and then the green outer skin is removed by scraping. The ribbons are passed between a bamboo or iron ring worn on the worker's thumb and a wooden knife held in the hand. By this means, the outer skin is removed and the ribbons remain with almost no foreign matter adhering to them. In the evening, the ribbons are hung up on bamboo rods in an underground chamber in which a charcoal fire burns. In the morning, they are brought into the sun and air for final drying. Without further processing, these fiber ribbons are bundled for sale at home or abroad as China grass, to be used by ramie spinners in Europe and America.

In China, fiber ribbons to be used in local textile industry were degummed by the growers. The bundles of fiber ribbons were subjected to dew retting on the roofs of houses and then dried in the sun and air, with care taken to keep them from the rain whenever possible. In some areas, the bundles were put through a wet retting process. They were first steeped in water, then placed in water set with mulberry wood, and lastly in lime water. A

6. Cannabis sativa or hemp. Photo courtesy of Ciba-Geigy

bleach, carried out in water with an addition of straw ash, imparted a white color and a high degree of suppleness to the fiber.

Fabrics made of ramie fibers are lustrous white and are stronger than flax, hemp or cotton. They take dyes easily. The fabrics are easily laundered, become stronger when wet, and do not lose their shape or shrink. They are quick drying and become brighter and more shining with repeated washings. They have a high resistence to micro-organisms and will not mildew. They do not change color when exposed to the sun for long periods of time.

Ramie cannot be spun to counts finer than 40's and the fiber is more expensive than cotton, flax or hemp. This limits its use. Ramie is used principally for blended yarns. In the past, ramie was used to make gas mantles. It is outstandingly suited to use for light, sturdy fabrics. It is used to make sheets, table linen, towels, apron and shirting material, and tropical suitings. Ramie fabrics are also used for blinds and sun shades, tent and sail cloth, parachute harness belts, rubber-lined fire hose, and certain types of filter cloth.

HEMP

Hemp fiber comes from the stem of *Cannabis sativa*, a plant with a long history as a narcotic. The plant is the source of hashish and is no longer legally grown in most countries.

Hemp probably originated in India and western Asia. The fiber is not mentioned in the Old Testament and was not known to the Egyptians or Phoenicians. Nor were there traces of hemp in the Swiss lake-dwellings or in the Po Valley. It was probably unknown in the later Stone Age, in the Bronze Period and perhaps even in the Iron Age.

Hemp is believed to have originated in the marshy regions southwest of the Caspian Sea near Lenkoran. It spread to south Russia, Siberia and the regions of the Ural Mountains. It appears in India and China at an early date. The hemp plant is mentioned in *Shu King*, a collection of historical documents said to go back to the 23rd century BC, but probably compiled in its present form between the 8th and 5th centuries. When Tsai Lun invented paper, hemp was one of the most important raw materials.

In Japan, hemp is believed to be the oldest cultivated textile plant, for hemp as a textile fiber has entered into Japanese mythology. According to an old legend, a girl from a simple family fastened the end of a ball of hemp to the garment of her lover when he bade her goodbye without telling her his name and rank. The thread led her to the temple of Mirva and thus revealed the divine origin of the stranger.

The routes by which hemp came to Europe are cloudy. It is believed to have spread over the country of the Scythians on the Black Sea to Thracia. It was the Thracians who first recognized the plant as a textile raw material. Herodotus reported that they wore garments made from hemp that could be mistaken for linen.

It was not until 170 AD that there is mention of hemp among the Greeks. At that time, Pausanias reported that the inhabitants of the district of Elis grew hemp. Among the Roman writers, Lucilius, around 100 BC, is the first to mention hemp fibers as material for a rope which was hung around the neck of a prisoner.

In certain fertile parts of Italy,

hemp grew luxuriantly. In the land of the Sabines in the region of Reate the plants were reported to be as high as trees. The fiber, taken from between the bark and core of the stalk, was called *mesa*. It was used to make ropes, ships cables, nets and cloths of particular strength. However, the hemp fibers from the Orient were considered best for nets. Hemp was not used much by the Romans because they already had a Spanish and North African esparto grass which was a textile material equal to hemp.

Hemp was cultivated in Gaul, especially in the valley of the Rhone. When Hiero II of Syracuse built his splendid ship of state (about 306-215 BC) with funds from his subject countries, he ordered hemp from Gaul for the manufacture of ropes. How hemp reached western Europe from the shores of the Black Sea is not known, though it is believed that the Celtic people spread hemp and its uses from tribe to tribe from Pannonia to Gaul.

Hemp is mentioned less frequently in the Middle Ages. In the time of Charlemagne, hemp cultivation was highly recommended. However, since clothes of hemp were considered a sign of poverty, hemp fibers were used mainly as a raw material for the making of ropes, large quantities of which were needed for the rigging of sailing ships.

Russia has had large plantings of hemp since the 16th and 17th centuries. Novgorod, Pskov and the Ukraine are still famous for their hemp. Hemp was also grown in Germany, and to a lesser extent in England and Holland. It was cultivated on a large scale in France, especially in Auvergne, Limoges and Burgundy. In the 18th century, the best hemp came from Bologna in Italy, where ropes and sail cloth were made and large amounts of unspun fiber was exported abroad.

Hemp is grown from seed in soft, rich and rather moist soil. It sprouts in 12 days after planting and is a robust, tough plant that grows from three to ten feet tall. It adapts readily to different altitudes but needs warm temperatures and matures slowly. The seed is sown in mid-April and harvested in August or September, when the male plants are picked two or three weeks before the female plants. The male plant is shorter and thinner in the stalk than the stronger female plant. Harvesting is difficult because of the strong and stupefying smell of the plants which cause the workers to develop violent headaches.

To prepare hemp fibers, the stalks are retted for from ten days to three weeks. The retting water, though poisonous to fish, was often used to exterminate insects and to drive worms out of the earth. After retting, the stalks are dried, in the open or under cover, and stripped. The bast is stripped off with the fingers from each stalk. Then the hemp goes through a breaking process, in which the fibers are stripped from the stalk. The fibers must now be beaten to soften them and make them more pliable. They are plaited into tight round bundles which are beaten with a short wooden mallet on a flat stone or the hard floor of the barn. Next the hemp is swingled, a process to remove the last stalk splinters from the fibers. Then the fibers are separated, combed, sometimes with a rough and then a fine comb, and are then ready for spinning and weaving.

In America, the hemp was partially retted and then the fibers were processed by machinery. Hemp fiber is used to make twine, rope, cables and bags. It is an ingredient in some grades of paper and in plastics. Hemp fabric is used as carpet backing, canvas textiles and to make hats.

Hemp is still grown in northern Japan and Thailand for its fibers which are used to make fabrics. However, jute and synthetic fibers have replaced many of the uses of hemp.

JUTE

Jute is a bast fiber that comes from *Corchorus capsularis* and *Corchorus olitorius*. The name comes from the Indian word *jhot* meaning entangled. It is a fine silky fiber which can be spun into fabric, though it is inferior to other textiles.

The plant came from India originally and was cultivated in China and Malaya, too. The C. olitorius is grown in all parts of the tropics. In India, the plant has been used as both a vegetable and for plant fiber for many centuries.

Jute first reached England at the close of the eighteenth century when the botanist and ship's surgeon for the East India Company, William Roxburgh, shipped a bale of cotton enclosed in jute fabric to London.

Early attempts to spin jute fibers with flax by machinery were unsuccessful because of the strength and toughness of the jute fibers. This was solved by pulling the jute in flax carders before it was put into the weaving device. When the flax harvest of 1833 was poor, jute was mixed with flax fibers. However, customers complained that the fabric was of poor quality which stopped its use. Only after a method was found of preparing the fibers with water and whale oil was the use of jute in weaving successful.

The jute industry in Scotland was centered around Dundee. With its success, the Dutch decided to use jute bags as a cheap packaging material for the coffee exported from their colonies. The Crimean War in 1854 and the American Civil War in 1862 did much to establish the prosperity of the jute industry. During the Crimean War, Russia's heavy exports of flax and hemp were stopped and in the Civil War the Federal armies of the North were denied the cotton supplies from the South, when they had urgent need of containers for moving stores and supplies.

As the jute industry flourished in Scotland, important jute processing centers developed in France, Italy, Germany, Holland and Belgium.

In 1854 George Aukland, an English coffee planter, took the first jute spinning machine to India and a year later the first jute spinning mill was founded near Calcutta. The first mechanical looms were built in Calcutta in 1859. From that time on, the Calcutta jute industry outdistanced that in Scotland in the number of spindles and looms. Indian jute was cheaper and more abundant. The partitioning of India after World War II, however, resulted in a shortage of jute bags and Brazil became a leader of the industry. Pakistan and India soon resumed their position as the leading jute producers.

Few regions of the world provide the conditions of soil and climate needed to grow jute. It needs a tropical climate with ample rainfall. *C. capsularis* may be grown both in low-lying, occasionally flooded areas as well as at higher levels, while the less frequent *C. olitorius* does not tolerate excessive humidity in the ground and is therefore restricted to higher country. Jute is grown from seed but needs no cultivation during its growing season except for thinning. The plants grow 10 to 12 feet tall and mature in three months. They are harvested when the flowers begin to show, before the seeds form. If taken after the seeds form, the fiber is heavier, harsher and stronger. The stalks are harvested with a bill hook, sorted into three piles of different lengths, and tied into bundles that can be carried. The stalks are retted in stagnant water and covered with jungle plants, cow dung and clods of dirt. When retting is complete, the fibers are stripped from the stalks by loosening them with the fingers. The fibers, which are beige to brown in color, are wrung out and hung on a line to dry. They are then exported in 300 lb. bales to other countries, where they are processed like flax and spun into coarse fabric.

7. Corchorus or jute. Photo courtesy of Ciba-Geigy

Jute fibers are harsh and brittle since they have a low wax content and are somewhat lignified, so the fibers must be softened in order to use them. Water and oil are added and the fibers go through many rollers before the fibers are soft and pliable. Jute yarn used as a warp must be sized with a film of starch or other substance to protect it during weaving. When it is new, the fabric made of jute is usually golden brown and shiny.

Jute fabric is, however, very susceptible to mildew and other bacteria. It is also weakened by prolonged exposure to sunlight. The fibers have some natural resistance to micro-organisms but this is weakened by exposure to the sun or after acid or alkaline treatment. Bleaching helps retain the resistance to sunlight.

The main use of jute is to make bags for packaging such commodities as cement, sand, stones, fertilizers, heavy chemicals, potatoes, coffee, sugar, corn, etc. Before the introduction of synthetics, jute bags were the most efficient and the cheapest packaging available. They can be used again and again, taking different wares on each leg of the trip. Jute is used for cordage, which is cheaper but less durable than hemp. It is also used for fabrics of great beauty, for it takes dyes well and needs no scouring. However, since jute fabrics cannot be laundered or dry cleaned without special treatment, its use for fabrics is limited. Jute fabric is also used for carpet backing and the fibers for carpet thread. It provides the backing cloth for linoleum, wall covering, webbing for the furniture industry and tailor's padding. However, jute still remains the weakest and least durable of the plant fibers, even though it is the cheapest.

The articles on ramie, hemp and jute were prepared by Mary Derr ■

PIÑA

by Lysbeth Wallace

In 1951 I was appointed as a Handweaving Expert by the Technical Assistance Administration of the United Nations, which, I believe, is now known as the Department of Technical Co-operation for Development. Three entities were involved in the project: Prisco (Price Stabilization Corporation), the Philippine government agency that requested the technical assistance; the Mutual Security Agency, the U.S. government agency who was also providing technical expertise; and the U.N. Much of the information used in this article is taken from my book, *Handweaving in the Philippines*, published by the U.N. in 1953. My assignment was to encourage and revive handweaving as a home or cottage industry, patterned after Ghandi's efforts in India. My "duty" country was the Philippine Islands. Much of our activity was conducted at a large workshop in Manila; however, many field trips were made to the weaving centers throughout the islands. There we saw all kinds of materials being woven under all kinds of conditions: looms in huts, under houses, backstrap looms, every width, many fibers, many hand knotted, some spun, but usually imported or spun in a mill.

My first field trip was made soon after I arrived in the Philippines and it was also my first introduction to piña, the name the Filipinos gave to both the fiber and the cloth woven from it. I flew to the Island of Panay which is one of a group of islands known as the Visayas that are located south of Manila, which is located on the Island of Luzon. Panay is divided into provinces, as are the other islands in the Philippines. In two of these provinces, Capiz and Iloilo, a great deal of weaving was done. Along with the usual cotton and Jusi (silk), indigenous fibers such as abaca, single strand buri-raffia, and piña were used to weave floor mats, rugs and dress material. In the province of Capiz there were the towns of Calibo, Capiz and Numancia plus the small offshore island of Batan, (not to be confused with the more famous one known as Bataan.) In a barrio (neighborhood or suburb) of Calibo, piña was woven. The pineapple leaves used were actually the wild pineapple and the leaves measured approximately 30 inches high. After the gathering of these leaves the next step was to strip the fibrous strands from the leaf. This was done by using the sharp edge of a broken plate. This half of a plate provided a convenient and readily-available tool that could be handled with ease. We saw this process done in a small nipa hut. These strands were then tied in bunches and hung outside on a line to dry. The next process is one that boggles the mind. Each strand of 30 inches was meticulously hand knotted. These knots were so fine that they were barely visible to the naked eye and only by feeling carefully could one detect their existence. At that time the fiber could not be spun into a continuous thread; this painstaking and laborious process was the only one used. The fiber is so thin that it closely resembles the fine thread spun by a spider to weave her web. The story we heard over and over again was that it took one month of hand knotting to produce enough continuous pineapple fiber to weave one yard of piña material. One must be aware that this cloth is a very fine weave with about 60 E.P.I. (240/10 cm) and about 60 picks per inch. From 1950 to 1953 there were approximately 3,000 weavers in Capiz Province. Of that number only 100 wove items of piña, mostly placemats and napkins with inlaid designs using cotton yarn. I have a tray mat and cock-

Lysbeth Wallace

1. Women scraping or stripping wild pineapple leaves. Iloilo, Panay Island Philippines, 1951.

MSA and PRISCO

2. Girls scraping or stripping wild pineapple leaves. Iloilo, 1951.

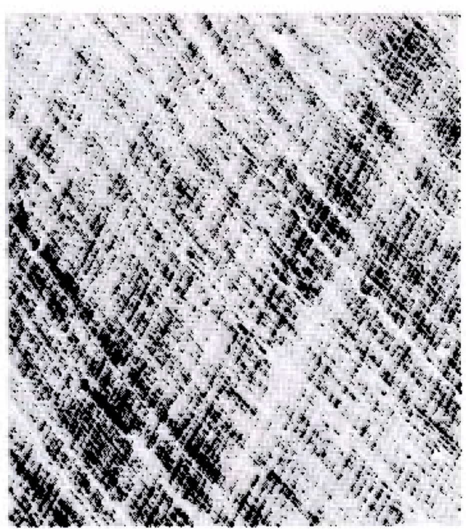
Lysbeth Wallace

3. Piña or pineapple fibers drying in the sun, Iloilo, 1951.

tail napkins with a cockfight as a motif using red and black cotton yarn, but the designs were embroidered rather than inlaid. There were over 4,000 weavers in the province of Iloilo, and in the town of Dumangas, barrio of Talusan, weavers produced a limited quantity of extremely fine piña cloth. It was reported to be by far the best quality woven. The fabric was 36 inches (91.4 cm) wide and woven in 50 yard (45.7 m) bolts. Sad to say, even in the early 1950s there were only about 50 weavers of piña left in this landlocked village. This piña yardage was probably used for the large embroidered tablecloths everyone could get "prewar" and the mestizah dresses and the famous men's shirt called the barong-tagalog. All of the above were beautifully embroidered. Interestingly enough we never saw any of the embroidery workers although we tried diligently to do so. The barong-tagalog also woven in cotton and jusi, was very much in evidence when we were there. Worn by the men at all the formal receptions and balls, they were cool and always worn outside the trousers: perfect for that hot humid climate.

Some months later after this field trip, in an attempt to speed up the process of winding the warp and dressing the loom, we brought several of the piña weavers to our Manila workshop. We tried to wind a long piña warp on the loom with weighted tension boxes (see photograph), but the pineapple fiber tended to break and we were unable

4. Pineapple fiber. The longer fibers in the bundle measure 52".



5. Piña cloth showing the various size fibers and the knots.

Lysbeth Wallace

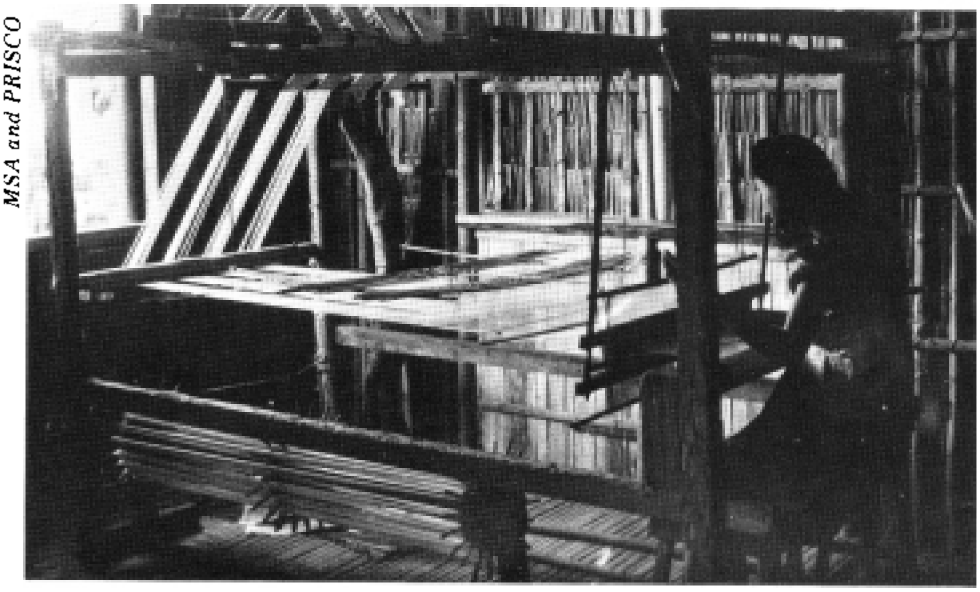
6. Winding piña warp on loom using tension boxes and raddle, Manila, 1951.

MSA and PRISCO

7. Filipina lady winding piña warp on horizontal reel, Iloilo, 1951.

to maintain an even tension in the warp. We also tried multiple winding on a vertical warping reel by using a paddle made of bamboo. I recall we had very little success winding piña this way. In the long run we felt that the piña weavers of Panay knew exactly how to handle their unique fiber better than we could. The photograph of the lovely white-haired Filipina delicately handling the fine strands of pineapple fiber and winding it on a horizontal warping reel illustrates the best tried and proven process for winding a piña warp. Incidentally, the small pebbles seen on top of the nest of pineapple strands kept them from tangling. On our field trip, we also saw pina strands nested in a gourd-like bowl as well as halves of dried coconut shells, with sand used as the tangle-preventative. As they knotted the fiber, the weavers let the knotted portion fall into these containers and poured sand over them to weight them down as well as to prevent tangling while they were wound on the warping reel. As this was the first of the many field trips I was to make during my two year stay in the Philippines, it is etched in my memory; possibly because we had to climb a slippery ladder, constructed of round bamboo poles of about 3 to 4 inches diameter, into a bamboo and fiber hut, (nipahut) where young girls were scraping the fibers from the wild pineapple leaves. In the photograph of the weaver at the piña loom, you can see the split bamboo used for flooring in the hut. I was fascinated by the use of the broken plate and the scraping process in general, but was also wondering if I would spend the rest of my life in that hut on the island of Panay in the far away Philippines. I had foolishly worn high heels and almost didn't make it up the ladder, so the descent promised to be a challenge. Fortunately, cooler heads reigned and suggested that I go down backwards (others were tripping down the other way). I made it to the ground without incident.

In 1978, Charlotte Coffman, who lived with her husband in the Philippines, contacted me about my book on handweaving in the Philippines, as she is research scholar in textiles. We made arrangements to meet that summer when she was home on leave. Strangely enough both of our hometowns are in Kentucky and only 45 miles apart. She brought me up to date on the weaving activity in the Philippines. She told me then that piña was no longer being woven and to hang on to my small collection of handwoven piña items, as they are very rare and almost nonexistent. Not only was piña not being woven, but neither was jusi, (taken from the Chinese characters hu hsi) the diaphanous silk fabric that was replacing piña even before World War II. Jusi was certainly the more prevalent of the two when I was there. Of course there had been a serious lack of silk during the war since the major supply came from either China or Japan. When the Bamboo Curtain closed on China, Japan was the only source. That fact was kept from most of the weavers because feelings were still high in 1951 as a result of the Japanese occupation of the Philippines during the War in the Pacific. The weavers certainly preferred the silk to piña because it was a continuously-spun thread and was easier to warp and to weave. In addition it was dyed in many beautiful colors. Jusi was used extensively for the lovely ballgowns and ternos (the Philippine dress) that were so prevalent at every major social function in the Philippines. There were many of those in the early 1950s when I was lucky enough to be there and I have many of those jusi gowns hanging in my closet now.



MSA and PRISCO

8. Woman weaving piña, Iloilo, 1951.

The fact that piña is no longer being woven is a sad and deplorable development, but it is certainly understandable when one contemplates the time consumed in just preparing the fiber for weaving, let alone the process of weaving so fine a fabric. But one always hopes that some way can be found to perpetuate so delicate and lovely a textile and so rare an art form. My few examples have retained their sheer gossamer quality and their lovely natural beige color for over thirty years. I washed some of the pieces recently and they are even more beautiful than ever. ■

WEAVING WITH RAMIE

Commercially spun ramie yarns are not readily available to the handweaver. The main sources of yarns are the Philippines (Ramitex, located in Bulacan), China and Japan. Retail suppliers that can be contacted in the U.S. are Robin & Russ Handweavers, 533 N. Adams St., McMinnville, OR 97128 and Straw Into Gold, 3006 San Pablo Ave., Berkeley, CA 94702.

Three projects (placemats, a lady's blouse and a man's shirt) were woven to test ramie as a fiber for handweaving. Different types of ramie yarns were used but all of these can easily be substituted with linen, cotton or cottolin if ramie is not available.

Weaving with ramie presented pros and cons. The yarn is lustrous and strong. Its natural color is a beautiful off-white. It bleaches to a snow white and takes the dyes well.

All the yarns tested had a slight unevenness in the spin which gave it the non-mechanical look which weavers appreciate.

The yarn is hard and weaves into a crisp fabric that is cool for summer clothing and very suitable for household articles such as placemats and window coverings.

The heavier yarns (those sett at 15 epi) gave no problems warping or weaving. They are most suitable for plain weave and combinations of plain weave and floats such as spot weaves and M's and O's. The thinner yarns gave some problems in the reed. Presumably this was due to the spinning process rather than to the properties of ramie itself. The 40/2 ramie was sett 30 epi in a 15 dent reed, double sleyed. The slight irregularities in the yarn prevented the 2 threads in the same dent to freely slide past each other, causing sticking and preventing clear sheds. The 16/2 ramie was sett 18 epi in an 18 dent reed. This time the irregularities in the yarn caused the yarn to be pinched in a dent, forcing the weaver to beat an extra time to clear the shed. These inconveniences slow down the weaving process.

The yarn feels only slightly more elastic than linen, less than cottolin and cotton.

Weft take-up and shrinkage are less than for other fibers. A cloth woven 24" in the reed was 23½" wide off the loom. Note however, that a template was used. After washing, the cloth shrunk to 22" in width, less than 10% total. Ramie cloth washes well but does require ironing.

PLACEMAT IN M's AND O's

Warp: 16/3 natural, unmercerized ramie (1600 yds/lb). (Robin & Russ).

Weft: 51 x 4 x 3 (12 ply) ramie (800 yds/lb) (Robin & Russ).

Sett: 15 epi.

Length of each placemat: 18" + fringe.

Width in the reed: 14".

Yarn requirements: 2 lbs of warp ramie and 1 lb of weft ramie yield approximately 8 mats.

Profile draft and pattern: See Fig. 1. One square of graph paper stands for 4 threads (warp and weft). Where the pattern is white, the cloth is in plain weave, where the pattern is black, the weave is a succession of alternate 2-span floats (a variation of basket weave called a rib weave).

Threading: Fig. 2 shows the threading units to be substituted in the profile draft. Fig. 3 shows the complete threading and tie-up.

Treadling: Weave the fabric as the blocks are drawn-in. From top to bottom. Treadle the "plain weave in A" sequence 8 times, "plain weave in B" sequence 1 time, A (1 time); B (1 time), A (2 times); B (4 times), etc.

Finishing: Hemstitch the placemats while they are on the loom. Leave 2" of unwoven warp between each placemat.

1. Ramie placemats woven by Maxine Wendler

2. Ramie blouse woven by Clotilde Barrett

LADY'S BLOUSE IN 4-SHAFT HUCK LACE (MOCK LENO)

Warp: 40/2 bleached white mercerized ramie, 6,000 yds/lb. (Robin & Russ).

Weft:
For the lace weave cloth: same as warp.
For the tabby cloth: 20/3 cotton.

The tabby cloth is used for the cuffs, collar and front band. These pieces need to be softer and more pliable and therefore were woven with a cotton weft.

Amount of ramie needed: 1 lb.

Amount of cotton needed: 2 oz.

Width in the reed: 24" (size 14 blouse).

Length of the warp: 5 yds.

Sett: 30 epi in a 15 dent reed.

Threading, tie-up and treadling: See Fig. 4. Weave 12" plain weave with cotton weft. Weave remaining warp in lace weave with ramie weft. Use as many picks per inch as ends per inch. For lace weave, beat hard after every 3rd pick. When the cloth is washed for the first time, avoid wrinkling and wringing as this will tend to set permanent wrinkles in the cloth.

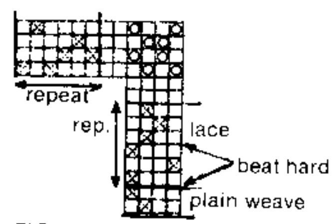


FIGURE 4

Garment construction: Use any suitable commercial pattern. Use flat-felled seams or encase the raw edges in "Seams Great" or any other gauzy seam binding available at fabric stores.

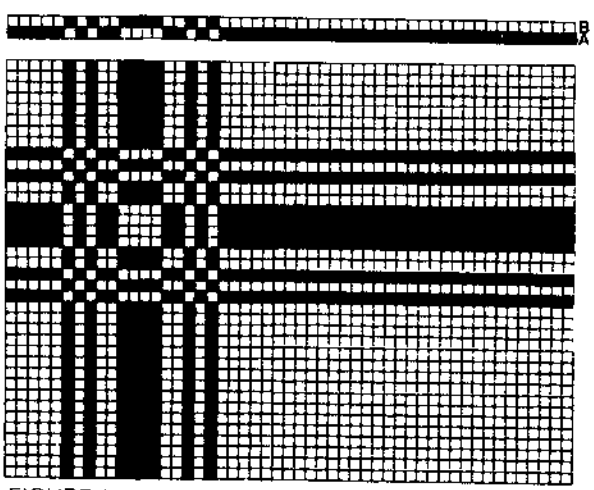


FIGURE 1 corner section of mat

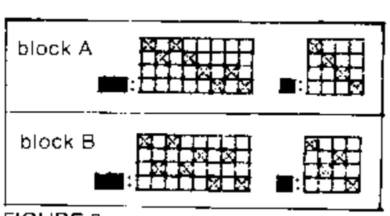


FIGURE 2

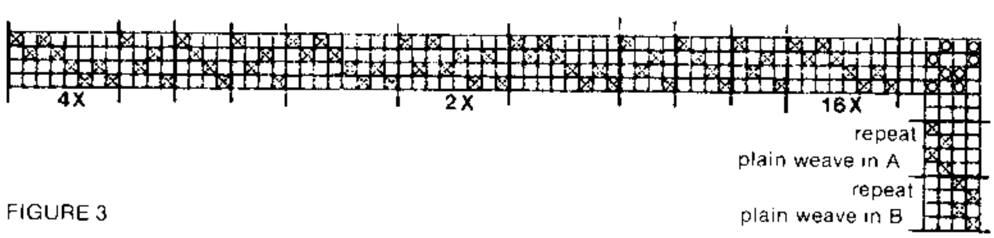
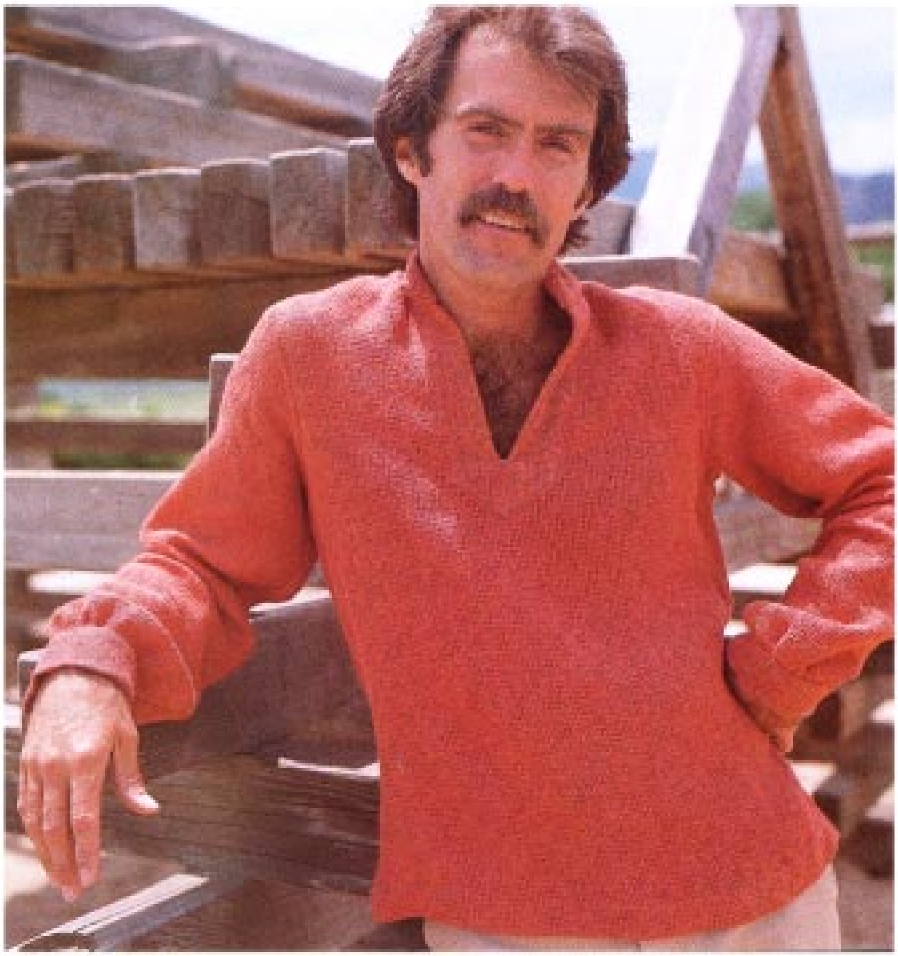


FIGURE 3



Jan Carter

3. Man's shirt woven by Clotilde Barrett

MAN'S SHIRT IN MULTI-SHAFT MOCK LENO

The threading system for a 4-shaft huck lace is shown in Fig. 4. It has a repeat of 6 threads (2 groups of 3). Repeats of 10 threads (and others) may also be used for this technique. See Fig. 5. Note that tabby stripes and/or selvedges may be added as shown in Fig. 5.

With a repeat of 6 threads, each group of 3 may be woven as plain weave (Fig. 6a), with a warp float (Fig. 6b) or with a weft float (Fig. 6c). Therefore it is possible to weave several structures on a huck threading.

1. Plain weave (Fig. 7a).
2. Huck spot weave (Fig. 7b)—the floats (warp or weft) are surrounded by plain weave.
3. Huck lace (mock leno) (Fig. 7c)—warp floats are next to weft floats which allows them to pull the group of 3 threads together and create open spaces.

In order to extend the concept of huck from the well-known 4-shaft weave to the more versatile multi-shaft system one should look upon the draft of Fig. 4 as having two ground shafts (1 and 2) and two pattern shafts (3 and 4) which can be extended to more. Note that ground shaft 1 combines with even pattern shafts (4, 6, 8, etc.) and that ground shaft 2 combines with odd pattern shafts (3, 5, 7, etc.). Fig. 8 is a typical 8-shaft huck threading draft. Groups of 3 threads on shaft 1 and even pattern shafts alternate with groups of 3 threads on shaft 2 and odd pattern shafts. In Fig. 8 the pattern shafts are in point twill order.

As with 4-shaft huck, each group of 3 threads can be woven as plain weave, with a warp float or with a weft float.

When adjacent groups weave tabby and floats, the entire 6 x 6 unit weaves spot weave.

When adjacent groups weave warp floats and weft floats the entire 6 x 6 unit weaves mock leno.

When huck is threaded on more than 2 pattern shafts, many combinations of these textures can be woven at the same time and thus create patterning that combines spots, mock leno and plain weave.

THE TIE-UP

Fig. 10 shows the base tie-up for an 8-shaft weave. The pattern shafts have not yet been tied. The treadling sequence will be tabby (a), treadle A (ground shaft 2 + selected pattern shafts), tabby (a), tabby (b), treadle B (ground shaft 1 + selected pattern shafts) tabby (b). Repeat, selecting the pattern shafts as dictated by the design. In order to select the correct pattern shafts, the following rules must be observed:

With ground shaft 2 (treadle A)

Shaft 2 + odd pattern shaft produces a warp float.

Where the odd pattern shaft is not tied, there will be plain weave.

Shaft 2 + even pattern shaft produces plain weave.

Where the even pattern shaft is not tied, there will be a weft float.

With ground shaft 1 (treadle B)

Shaft 1 + odd pattern shaft produces plain weave.

Where the old pattern shaft is not tied there will be a weft float.

Shaft 1 + even pattern shaft produces a warp float.

Where the even pattern shaft is not tied, there will be plain weave.

Fig. 11 shows the complete tie-up for the pattern shown in Photos 4 and 5. Note that a group weaving a warp float and a group weaving a weft float must be adjacent to each other in order to produce lace.

Warp: 16/2 ramie, rust (Robin & Russ).

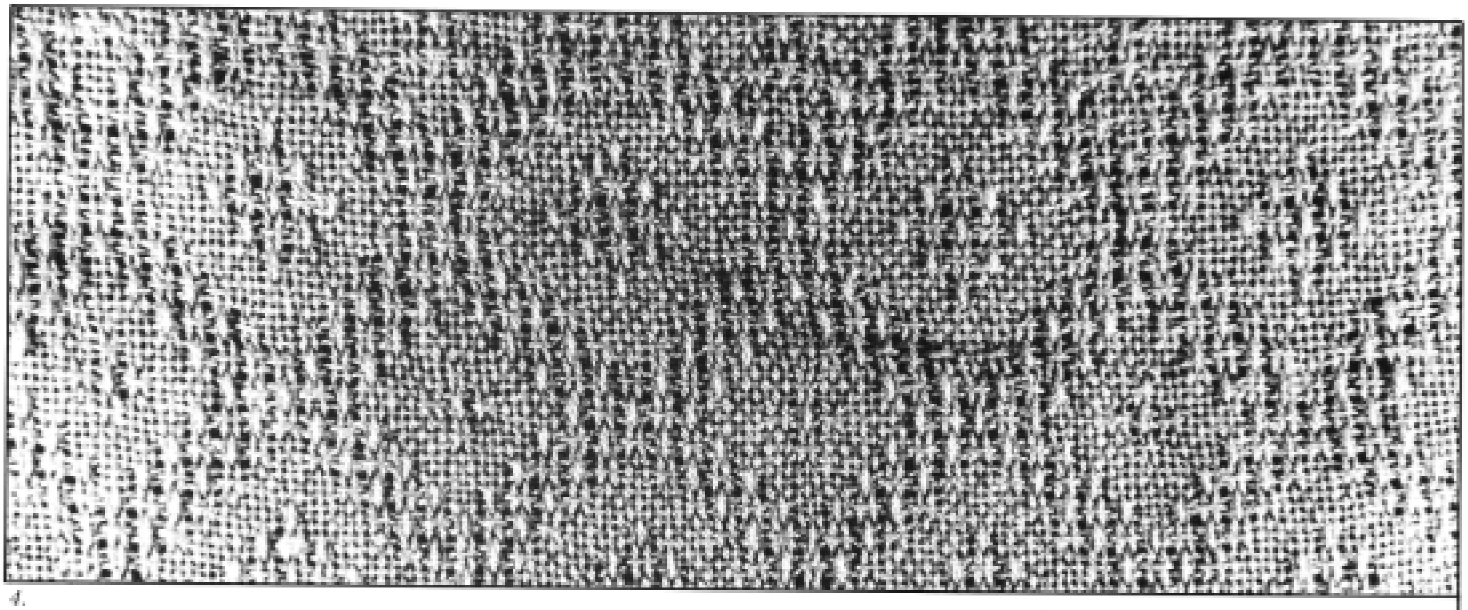
Weft: Same as warp.

Yarn requirements: 2 lbs.

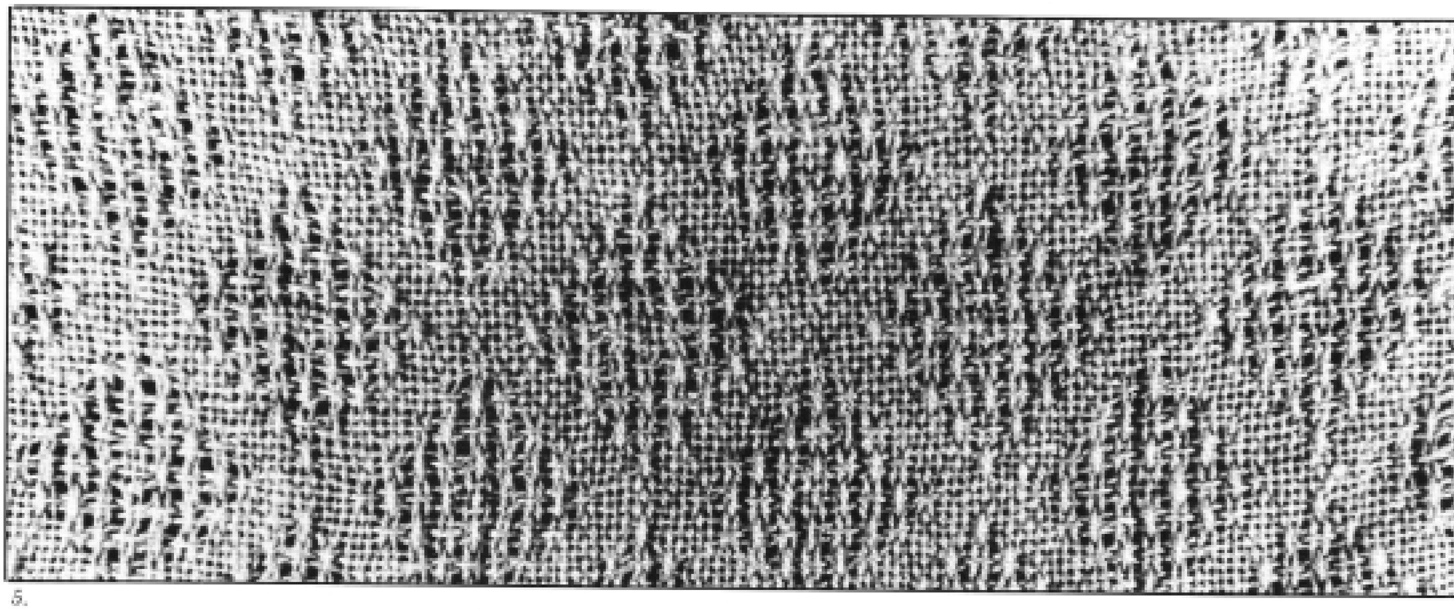
Sett: 18 epi.

Width in the reed: 24".

Length of the warp: 5¼ yds.



4.



5.

Threading: See Fig. 9.

Tie-up: See Fig. 11.

Treadling: a A^1 a, b B^1 b, a A^2 a, b B^2 b, a A^3 a, b B^3 b, a A^1 a, b B^3 b, a A^3 a, b B^2 b, a A^2 a, b B^1 b, repeat.

Alternate pattern (see Photo 5): a A^1 a, b B^1 b, a A^2 a, b B^2 b, a A^2 a, b B^1 b, a A^1 a, b B^3 b, a A^3 a, b B^2 b, a A^3 a, b B^3 b,

The trim was woven in tabby with a fine metallic thread added to the weft.

Finishing: Wash in hot water, but the first time around avoid heavy agitation and hard wringing so as not to set permanent wrinkles.

Garment pattern: Modified kaftan.

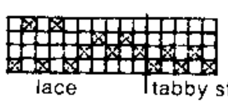


FIGURE 5

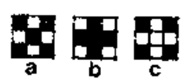


FIGURE 6

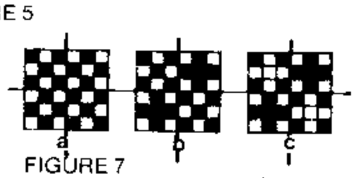


FIGURE 7

FIGURE 8

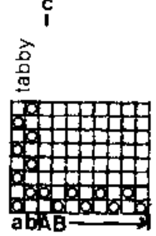


FIGURE 10

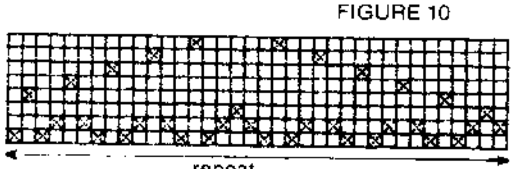


FIGURE 9

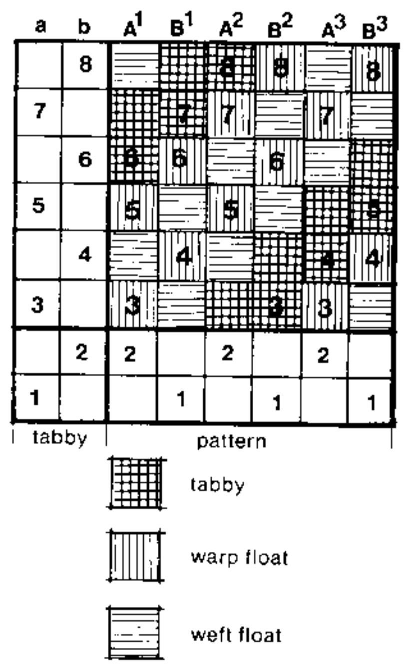


FIGURE 11

COMING EVENTS

ALABAMA

Montgomery. Oct. 15-16 1983. An Alabama Fiber Arts weekend. Co-sponsored by The Montgomery Spinners and Weavers Guild and Huntingdon College. Held in Dalchamps Student Center on the Huntingdon campus. Discussion groups, mini workshops, clothesline show, fashion show. For more information contact: Julia Waefler, P.O. Box 1646, Montogomery, AL 36102

ARIZONA

Phoenix. The Arizona Commission on the Arts is accepting entries from artists from the western states for the Roster Art in Public Places. Applications must be postmarked by Nov. 1, 1983. Artist must be over 18 and a resident of one of the following states: Arizona, New Mexico, California, Nevada, Colorado, Utah, Wyoming, Idaho, Montana, Oregon, Washington. The Roster will consist of portfolios representing 100 artists from the western states. The Roster will be presented to communities, governmental agencies and businesses throughout Arizona as an illustration of the high quality of art available for commission or purchase as art in places of public access. For more information, send postcard request to: Deborah Whitehurst, Art in Public Places Program, Arizona Commission on the Arts, 2024 North 7th Street, Suite 201, Phoenix, AZ 85006.

CALIFORNIA

Culver City. Nov. 6, 1983. Annual Fashion Show and Sale "Weavers-Go-Round II." Fashion show. Commercial displays. Demonstrations. Sponsored by the Southern California Handweavers' Guild. For information contact Alice Devendorf 7850 McDonnell Ave., Los Angeles, CA 90045 or Isobelle Silverman, 17434 Superior Ave., Northridge, CA 91325

Eureka. The Center for Textile Arts, a new textile center in Humboldt County is offering classes, workshops, lectures and tours the year round. For information write: The Center for Textile Arts, 326 Fifth Street, Eureka, CA 95501.

COLORADO

Denver. Nov. 1983. *Craft Range* and Sebastian-Moore Gallery co-sponsor regional crafts invitational in Denver. The exhibition will feature the work of one major regional craftsperson, and will include the work of 20-30 additional craftspeople. Held at Sebastian-Moore Gallery, 1411 Market, near Larimer Square, Denver, CO. For more information contact: Craft Range, 1440 Larimer, Denver, CO 80202.

ILLINOIS

Chicago. Ruth Volid Gallery, 225 W. Illinois, Chicago, IL 60610, features outstanding collections of contemporary traditional & ethnic fibre arts, selected paintings, objects d'art and site specific installations to the trade. Private collector inquiries welcome. Artists represented by the Ruth Volid Gallery include: Ken Weaver, Jane Knight, Laura Foster Nicholson, Joy Rushfelt, Marilyn Grisham and Gary Frantz.

Chicago. Nov 6, 1982-Jan. 2, 1983. Magdalena Abakanowicz retrospective to premiere in Chicago. This retrospective surveys her work of the last 20 years, from her monumental, three-dimensional woven sculptures of the mid 1960's to early 1970's — the *Abakans* — at The Cultural Center, to her cycles of sculptures based on the human figure dating from the 1970's to the present and collectively called the *Alterations* — at the Museum of Contemporary Art. A recent group of large drawings will complement the sculptures. The installations at each location will be conceived of as total environmental works of art by the artist who will travel from Poland to execute them personally.

Subsequent to its premiere at the Museum of Contemporary Art and The Cultural Center, "Magdalena Abakanowicz" will tour to:

Portland Art Museum and Portland Center for the Visual Arts, Oregon - Feb. 28-Apr. 22, 1984
Dallas Museum of Fine Arts, Texas - Jun. 21-Aug. 19, 1984
Frederick S. Wright Art Gallery, the University of California
Los Angeles - Sep. 23-Nov. 11, 1984
Following its North American tour, the exhibition will be presented at distinguished museums in Japan.

IOWA

Ames. Dec 4, 1983-Jan 29, 1984. "Clay/Fiber/Paper-as-Medium/84" for artists within 500-mile radius of Ames, IA. Judge Naomi Whiting Towner. For information send SASE to: Clay/Fiber/Paper-as-Medium/84, The Octagon Center for the Arts, Fifth and Douglas, Ames, IA 50010

MASSACHUSETTS

Boston. Nov. 4, 5, 1983. The Weavers' Guild of Boston Annual Exhibit and Sale. Held at The Josiah Smith Barn, Weston Center, Weston, MA. For more information write: Florence Feldman-Wood, 51 Chetwynd Rd., Somerville, MA 02144

MINNESOTA

St. Paul. Sep. 29-Oct. 28, 1983. Traditions/Transitions Two, a juried fiber art exhibition sponsored by the Weavers Guild of Minnesota in association with the College of St. Catherine. Held at the Catherine G. Murphy Gallery, College of St. Catherine, St. Paul, MN. Francoise Grossen, juror and one woman show. For information write: Weavers Guild of Minnesota, 2402 University Ave., St. Paul, MN 55114.

St. Paul. June 3-6, 1984. "Byways in Fiber" - an Exploration of Ethnic Diversity. Guest speakers: Walter Nottingham, Noel Bennett, Anita Mayer. Workshops, seminars, exhibits, gallery shows and tours, fashion show, demonstrations. For more information contact: Weavers Guild of Minnesota, 2402 University Ave., St. Paul, MN 55114

MONTANA

Somers. Oct. 1-30 1983. "WOVEN ART '83" juried exhibition held at The Weaver's Nest & Art Gallery, Hwy 93 S., Box 252 Somers, MT 59932. Juror: Margret Burlew and Debra Goldthorp. Awards. Sale. The show is to celebrate National Spinning & Weaving week.

NEW MEXICO

Los Alamos. Oct. 28-Nov. 20, 1983. Fuller Lodge Art Center. Los Alamos will have an ALL-MEDIA, juried "Aspen Exhibit" open to Northern New Mexico artists and craftsmen in any media. Artists encouraged to use Aspen "theme." Interested artists send SASE to: Fuller Lodge Art Center, P.O. Box 790, Los Alamos, NM 87544.

Las Cruces. Mar. 1-25 1984. "Handwoven 1984" sponsored in conjunction with the New Mexico Weavers Conference and juried by Clotilde Barrett will hang at the New Mexico State University Museum, Las Cruces, NM 88003. Residents from New Mexico, Arizona, Colorado, Utah, Texas and Oklahoma are eligible to enter. For prospectus write: Helen Garner, 1105 Calle del Encanto, Las Cruces, NM 88005.

Las Cruces. Mar. 23-25, 1984. Second New Mexico Weavers Conference hosted by Mesilla Valley Weavers Guild. Juried by: Clotilde Barrett. Workshops, seminars, fashion show, commercial exhibits. For more information contact: Nancy Soreng, 1105 Calle del Encanto, Las Cruces, NM 88005

NEW YORK

New York City. Oct. 28-30, 1983. Two-day workshop and lecture on "Overshot" by Michael Rupp. Held at the Crafts Students League, YWCA of New York, 610 Lexington Ave., New York City. For information contact: Patricia Epstein, 581 Carlton Ave., Brooklyn, NY 11238

NORTH CAROLINA

Brasstown. Oct. 1, 2, 1983. Tenth Annual Fall Festival, "Echoes of Mountain Felicity" held at The John C. Campbell Folk School, Brasstown, located between Murphy and Hayesville, NC off U.S. 64. Festival Barn will be packed with handiwork of some 50 artists and craftsmen, selected on a juried basis.

OKLAHOMA

Bartlesville. Nov. 17-Dec. 4, 1983. "Autumn Leaves — Autumn Weaves" An exhibition of handweavings by guild members held at The Bartlesville Community Center. Sponsored by The Silver Lake Weaver's Guild. For more information contact: Liz Papanastasopoulos, 319 S. Quapaw, Bartlesville, OK 74003.

OREGON

Medford. Oct. 12, 1983. A slide presentation "A Tour of My Studio" by Peter Collingwood, of England sponsored by The Saturday Handweavers will be held at the Rogue Valley Manor. For more information contact: Terri Zensen, 2722 Rosewood St., Medford, OR 97504.

Medford. Nov. 5, 1983. Annual sale of handwoven items sponsored by the Rogue Valley Handweavers Guild, held at the Red Lion in Medford. For more information contact: Terri Zensen, 2722 Rosewood, St., Medford, OR 97504.

Chiloquin. AMERICAN TAPESTRY ALLIANCE Competition "Waters of the World" theme. Open to all, for an original tapestry design. $10 fee each entry. Panel jury. Deadline Jan. 15, 1984. For details write: American Tapestry Alliance, Route 2, Box 570-D, Chiloquin, OR 97624.

PENNSYLVANIA

Monroeville. Sep. 30-Oct. 2, 1983. Eastern Great Lakes Fiber Conference. Held at West Wing of Expo Mart. Fashion show. Exhibits. Commercial Exhibits. For information write: Peggy Cost-Peltz, 101 E. Pittsburgh St., Delmont, PA 15626

Philadelphia. Sep. 12-Oct. 8 1983. "Carpet Treasures" by Stanley Bulbach. The Woodmere Art Gallery, 9201 Germantown Ave., Philadelphia, PA.

Washington Crossing State Park. Nov. 18-20, 1983. Seventh Annual Show and Sale of The Handweavers of Bucks County "Living with Fibers" held at the Memorial Building, Washington Crossing State Park (located along the Delaware River on Pennsylvania Rte 32, just north of Rte 532). Featured will be the creative efforts of HWBC members in the designing and execution of functional and decorative handwoven articles for the home. Exhibits, demonstrations. For more information write: Ginny Beyer, 460 New Road, Churchville, PA 18966

TENNESSEE

Gatlinburg. Exhibitions at Arrowmont School of Arts and Crafts. Jun. 5-Aug. 19, 1983—Arrowmont Faculty "Mixed Media" Aug. 22-Sep. 20, 1983— Arrowmont Permanent Art Collection Exhibitions. Sep. 26-Oct. 29, 1983 - "Focus" the Artist: exhibition of surface design work. Sep. 26-Oct. 29, 1983—"From the Collection of " an exhibition of historic surface work from the collection of contemporary surface design artists.

Gatlinburg. Sep. 26-Oct. 1, 1983. "Surface Design '83/The Artist in Focus." Major presentations and workshops by Lenore Davis, Ana Lisa Hedstrom, Ina Kozel, Edward Lambert, Pamela Scheinman & Shigeko Spear. Demonstrations. Exhibits. For more information write: Arrowmont School of Arts & Crafts, P.O. Box 567, Gatlinburg, TN 37738.

Gatlinburg. Nov. 5, 1983-Jan. 7, 1984. National juried exhibition sponsored by Arrowmont School. 2 and 3 dimensional media. Slide entries due Sept. 10. Juror: F. Clark Stewart, Professor of Art, University of Tennessee. Write: Arrowmont School, Box 567, Gatlinburg, TN 37738

VERMONT

Middlebury. Oct. 8-Nov. 5, 1983. Exhibit: Julia Watson, handpainted silk and Caroline McKinney, porcelain: Nov. 12-Dec. 31, 1983. Exhibit: Warm Comforts for Long Winters. Objects by Frog Hollow members. Held at Vermont State Craft Center at Frog Hollow, Middlebury, VT 05753.

CANADA

Toronto, Ontario. Nov. 3-29, 1983. "Tapestries and Fibre Hangings" exhibition and sale sponsored by the Toronto Guild of Spinners and Weavers in conjunction with "Fibre Fair" held at Heliconian Hall, 35 Hazelton Ave., Toronto, Ontario. Textured yarns, distinctive designs, rugs tapestries, etc. For more information contact: Irene Hunter, 22 Rose Park Dr., Toronto, Ontario, Canada M4T 1R1

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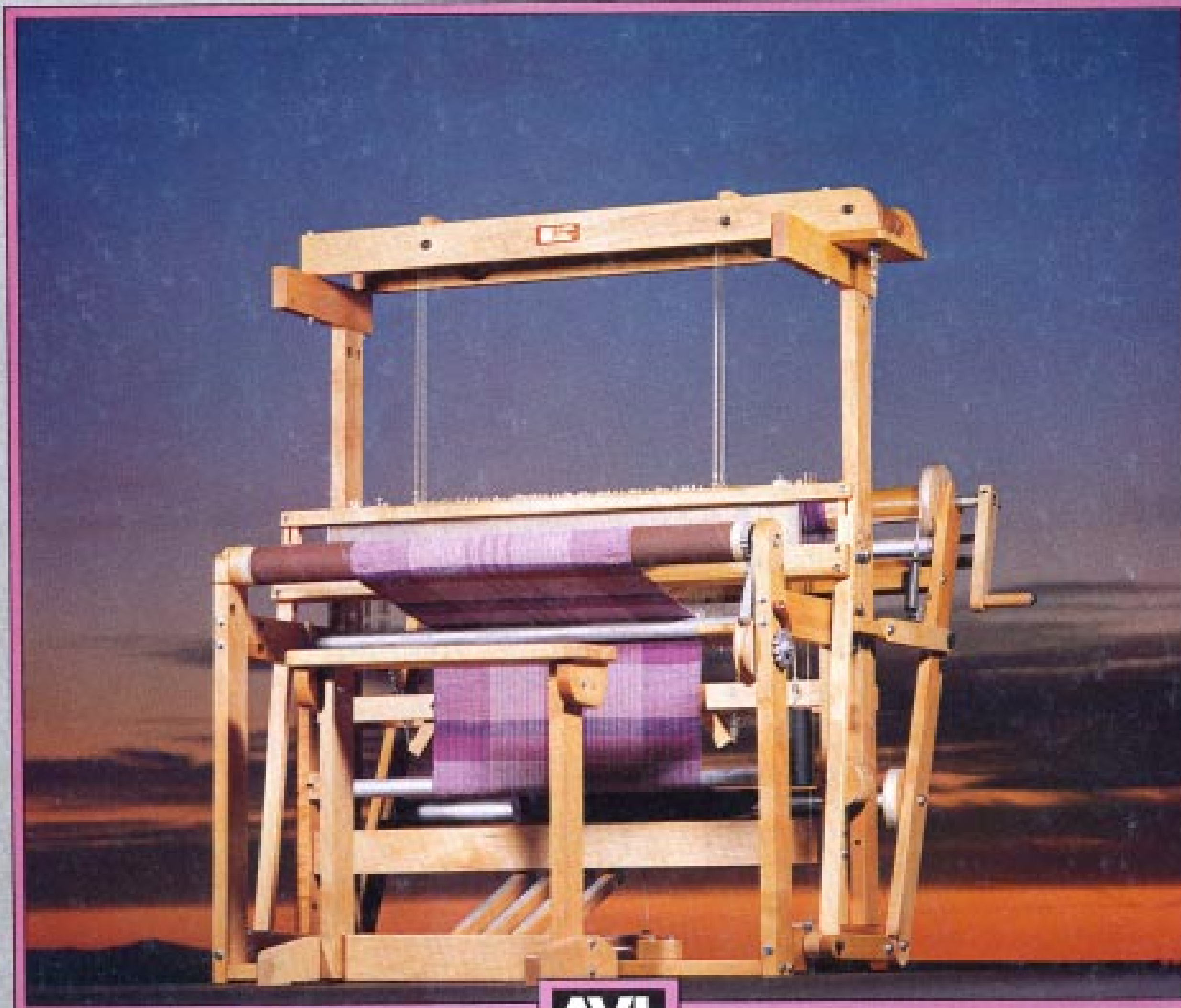

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