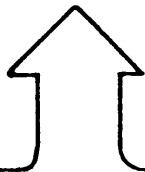


THE MINNESOTA WEAVER

FALL QUARTERLY 1982, Vol. I, No. 1

**COMING
UP**



MOTHER OF CREATIVE KNITTING

Mary Walker Phillips will be at the Weavers Guild in November to give two workshops. Both workshops will be for intermediate and advanced knitters. The dates are Tuesday-Thursday, November 2, 3, 4 and Friday-Sunday, November 5, 6, 7.

Mary Walker Phillips has changed our perceptions of an ancient and much practiced craft. She is one of those special people - the innovator - who has elevated knitting to the status of an independent art form. Her hangings and decorative pieces have been internationally exhibited. She has published three books on knitting and one on macrame.

The workshop will include stitch movement, double knitting (one color and two color, casting on), methods of increasing and decreasing in relation to pattern knitting, and much more.

We will have copies of Mary Thomas' book at the Guild for you to purchase and read before the workshop. We will also try to get copies of Mary Walker Phillips' book.



YARNS - NATURAL by Anna Smits

Choosing yarns is the most interesting preliminary step to weaving. There are two main groups of fibers - natural and man-made (synthetic). The hand weavers have a special attachment to natural fibers, which have more life and give more tactile satisfaction than their man-made counterparts. The natural fibers include animal and vegetable fibers.

Wool is the fiber from fleece of the sheep. The quality varies with the many different types and breeds of sheep as well as with the part of the body from which the fleece comes. Some fibers are fine, some coarse, and some long, some short. Fine wool fibers range from about two and one-half inches to five inches in length. Only pure Merino sheep or breeds with predominantly Merino blood produce fibers classified as fine wools.

The first fleece sheared from a lamb, when it is about 6-8 months old is called lamb's wool and is very soft. Sheep are generally shorn once a year in Spring. The shearer works with electric clippers, removing the whole fleece in one piece. The expert can shear as many as 200 sheep a day. The fleece is sent to the mill in bales ranging from 300-1000 pounds, depending upon the country. It is then sorted by experienced men who can determine the quality by quick touch. The best wool comes from the shoulders, back, and the sides. Wool from the lower part of the body and legs, called britch wool, is stiff, short, and coarse.

The sorted wool is scoured to remove animal grease and dirt. Then the wool is carded. Large brushes with wire bristles are used. The process leaves the wool smooth and fluffy and ready to be made into roving - a rope of wool suitable for spinning into yarn. The processing differs depending on whether the end product is to be woolen or worsted yarn. Woolen yarns are spun from the shorter fibers directly after carding and have a soft, fuzzy texture. Worsted yarns are made only from the best, finest, and longest fibers, which, after the carding process, are combed until all the fibers lie parallel. The spinning process twists the fibers into a continuous yarn, called single ply. Two, three, or four singles twisted together after spinning make 2-ply, 3-ply, 4-ply yarn.

In the natural state, wool ranges from white through grey and brown to black. Wool yarn is flexible. Its elasticity makes it wrinkle resistant, but also causes a high percentage of shrinkage. Wool fabric is very absorbent and is an excellent insulator.

The count of worsted is based on the standard of 560 yards spun from a pound of raw wool. When yarn is plied, the number of yards in a pound is reduced accordingly. Sometimes the fibers are classified as wool but come from other than sheep: camel, llama, alpaca, vicuna.

Mohair comes from the long-haired Angora goat. Mohair has a relatively smooth surface. It is lustrous and spins into thin yarn, which can be brushed to give a soft and luxurious finish. Mohair also has many of the qualities of sheep's wool - warmth, resilience, and wearability.

The history of silk began in China. The process of silk production became a carefully guarded state secret, not revealed to the West until the 16th century. From then on, silk raising and weaving spread through Europe and silk fabrics and garments have remained the ultimate in beauty and elegance. The life cycle of the silk moth is short but very complicated. The silk worms are fed on oak or mulberry leaves. They are fully grown in 30 days. They attach themselves to straw or twigs and start to spin themselves into cocoons. The worm has two vessels near its head; one contains the silk, the other the gummy substance called sericin. Both vessels are united by spinneret that leads to a small orifice below the mouth and flow as one filament. The cocoons are hard oval shells. Then the worms change into moths in 15 days. Each cocoon yields between 500-1600 yards of silk. The moth is killed by heat. Cocoons are dropped into boiling water to soften the sericin. The ends of the filaments are caught unwound and reeled together, making a smooth and fine thread. This is raw silk.

Cotton has long been a basic fabric fiber; it was used in India in 5000 B.C. Cotton seeds are planted in warm climates early in Spring. Plants grow into low bushy plants four feet high. The flowers open, wither, and fall off, leaving a small pod known as the cotton boll. When ripe, about two months later, the fluffy white

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FIBERS FOR THE FRAMELOOM

by Gloria Rither

INTRODUCTION

by Mary Skoy

In April 1978, Gloria Rither put together this comprehensive challenge to frame loom weavers to move into a use of a wide range of fibers for warp. Now with a choice of heddle sizes and the development of sophisticated multiple heddle techniques, we thought Gloria's article should be reprinted.

If you have a question about the suitability of a particular yarn, test it by passing it through the heddle hole. If it doesn't fit, try the slot and use a compatible smooth plied yarn in the holes.

Experiment with spacing the warp to avoid sticking. Experiment with two heddles for "double density" in the warp sett.

Don't be afraid of a few broken warp threads - just develop a quick repair method and a positive attitude. The final product can fill you with pride.

FIBERS FOR THE FRAMELOOM

by Gloria Rither

Frame loom weavers have found few limits to the rigid heddle loom. Tell a zealous frame loom weaver that double weave or waffle weave are floorloom weaves, and you'll soon see a twenty inch wide, two-layered, waffle-textured solution to the challenge. Solving technical problems of weave structures is part of the fun. But capturing the beauty of any fiber you want to use is another joy - one which

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BLENDED FABRICS

Nothing New

Lotus Stack

Textile Curator

Minneapolis Institute of Arts

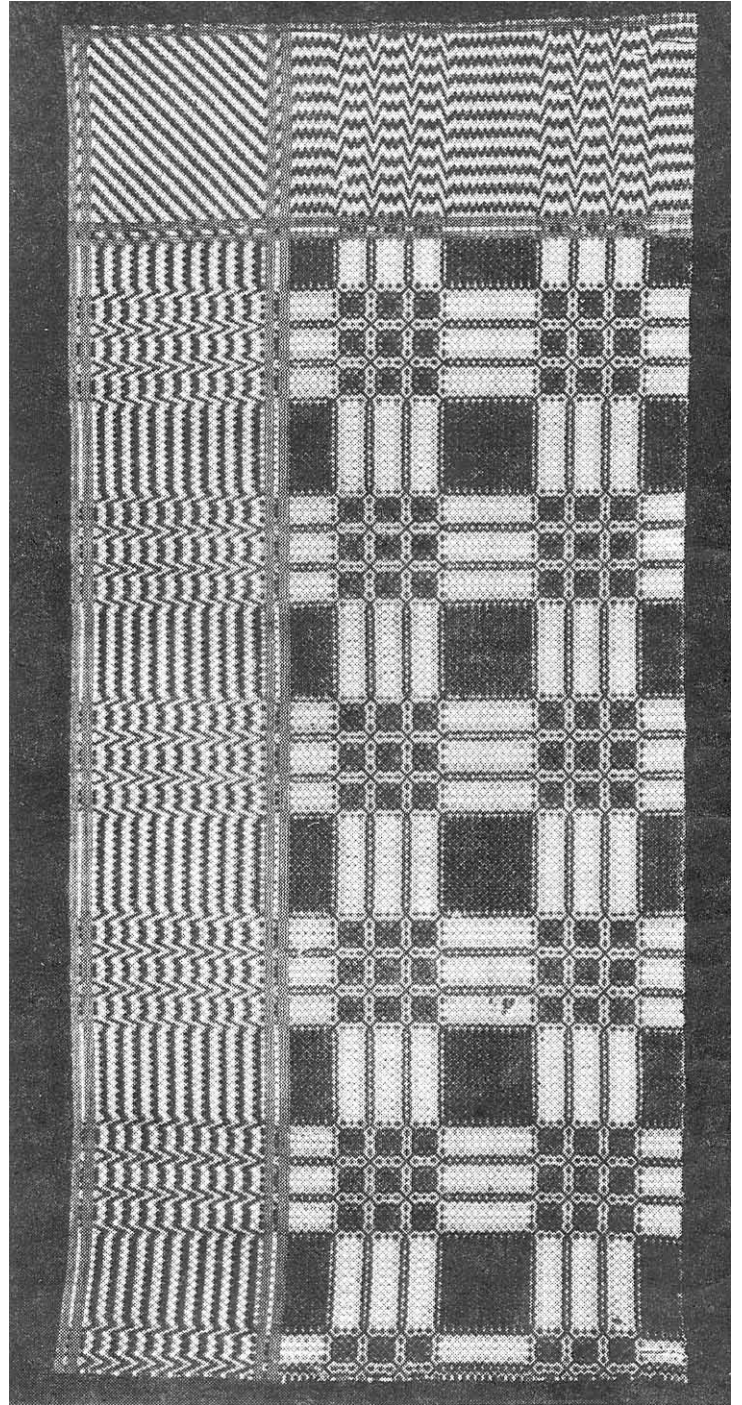
We tend to think of blended fabrics as a modern-day innovation, but actually 20th century application is just another addition to a tradition of long standing.

Early Roman writers make reference to cloth made of silk and cotton or silk and linen. The best known of the mixed textiles of antiquity however are the coptic tapestries made of linen and wool. The tradition continued in the middle ages among other places in the area in Germany around Krefield and Cologne which was famous for silk and linen union fabrics (see photo). Linen and cotton were used together in the famous "Perugia" towels (see photo) which were so popular during the fifteenth and sixteenth centuries. In America during the colonial period linsey-woolsey was a popular clothing fabric as well as being the yarns employed in the early coverlets.

It should also be noted that the concept of using two or more fiber-yarns in the same cloth has not been limited to the beneficiaries of the Greco-Roman tradition, i.e. "Western civilization", for we see wool (alpaca, llama, etc.) and cotton used in pre-Columbia South America, cotton and silk in Guatemala and of course in Asia there are many examples of silk used in combination with many fibers.

Thus we see that the development of blended fabrics is not limited to one time or place, but seems a universal happening. Recognizing this leads one to question the reason for this phenomena. The answer is most likely multi-faceted.

The most obvious reason to use two or more different fiber-yarns in a given structure would be to achieve a particular end-product. One would assume that the weaver would be considering a specific aesthetic as well as the final function for which the textile would be used.



MIA 24.26
American Coverlet
XIX Century, c1814
Linen and Wool
Gift of Sarah Bailey

A more empirical consideration would be the availability of materials. If only limited quantities of a particular fiber-yarn were obtainable, then using the special yarn on the surface supported by a more abundant unseen yarn was a way to make a little go a long way. Tied closely to the available supply of a particular material is the cost of individual yarns.

Economics has always been a factor in cloth production. It is interesting to note that practically all types of expensive textiles have their cheap imitations. Here again it is more economical to use the expensive fibers such as silk and fine grade wool, cotton, etc. where they show and use coarser yarns as an unseen structural support. The lesser nobility of Europe would often purchase such fabrics to drape their castle walls, rather than the pure silk damasks which were frequently sixty to seventy-five percent more expensive.

MIA 35.7.157

Dalmatic

Italian Velvet - XVI (silk)

German bands - XII or XIV
(linen and silk)

Bequest: John R. Van Derlip in memory
of ethel Morrison Van Derlip

As early as the XIII century workshops in Cologne, Germany specialized in weaving a unique braid which was used primarily on church vestments. The main or ground warp is of tightly twisted linen and only the weft and binder warp is silk which is mostly without twist. A leaf gold is used for the metal threads. This combination created a sturdy braid with a rich surface which proved very durable. It is assumed that this is the second use of these bands since they are somewhat older than the velvet dalmatic to which they are presently applied.



In some parts of the world there are also religious prohibitions which have been the inspiration for blended textiles. In some areas where Islamic culture dominates it is illegal to wear all silk clothing. In Central Asia where this is the case wonderful silk, warp-faced ikats have been woven with cotton weft! (see photo)

These are just a few of the many possible considerations for the creation of mixed textiles, but whatever the cause we are fortunate to have abundant examples of our predecessors combining two or more fiber/yarns in a single textile. However it is the twentieth century which offers weavers untold possibilities. New technology and the developing of synthetic fibers suddenly has expanded the opportunities for textile creation almost beyond our comprehension. It is exciting to be able to observe and for some participate in a new chapter in the ever on-going history of textiles.

For more information on the subject of mixed fabrics and the history of textiles in general CIBA Review is a wonderful and easy to read source. they are available at the libraries of the U of M - St. Paul Campus, and Minneapolis Institute of Arts as well as the Business and Science section of the Minneapolis Public Library.

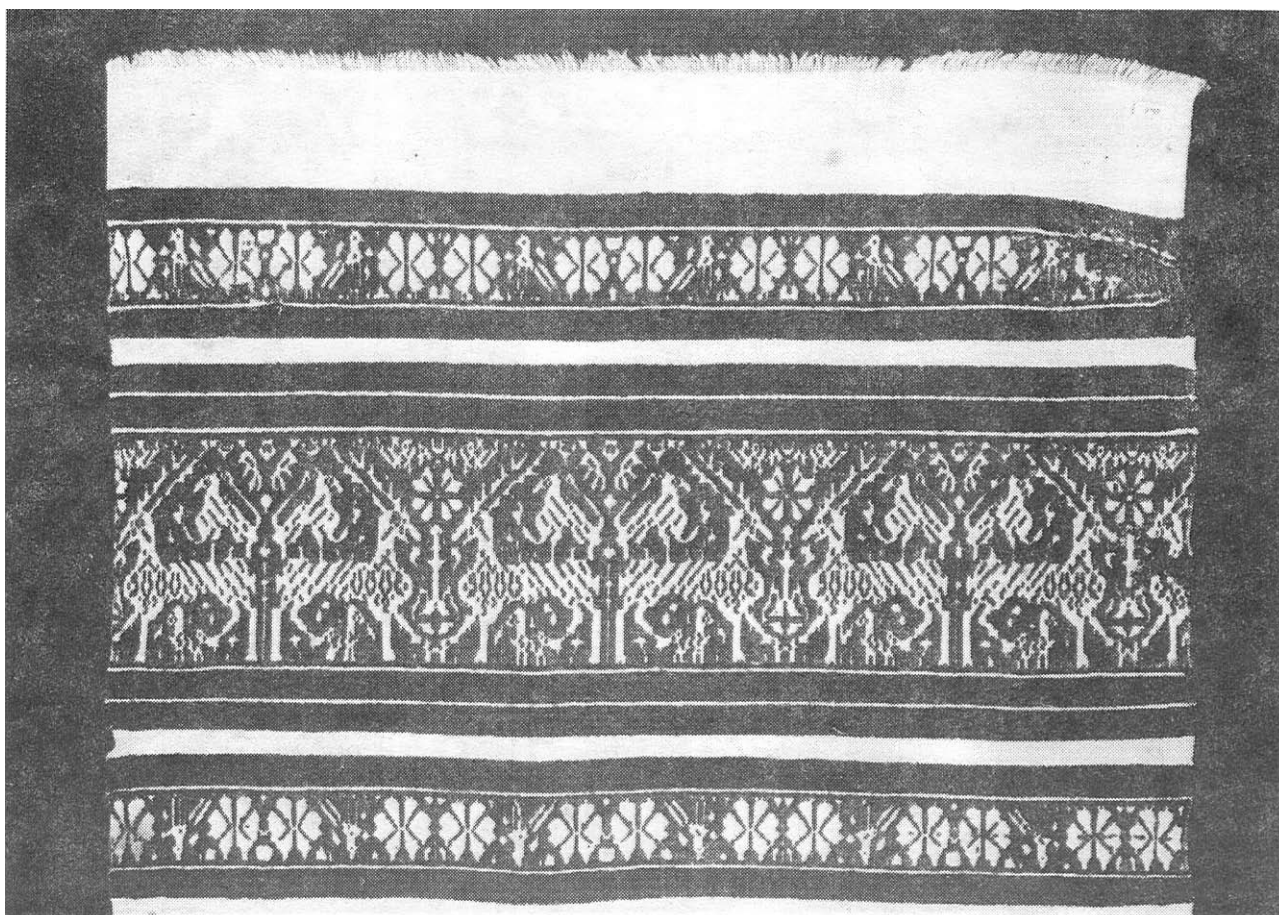
MIA 25.8

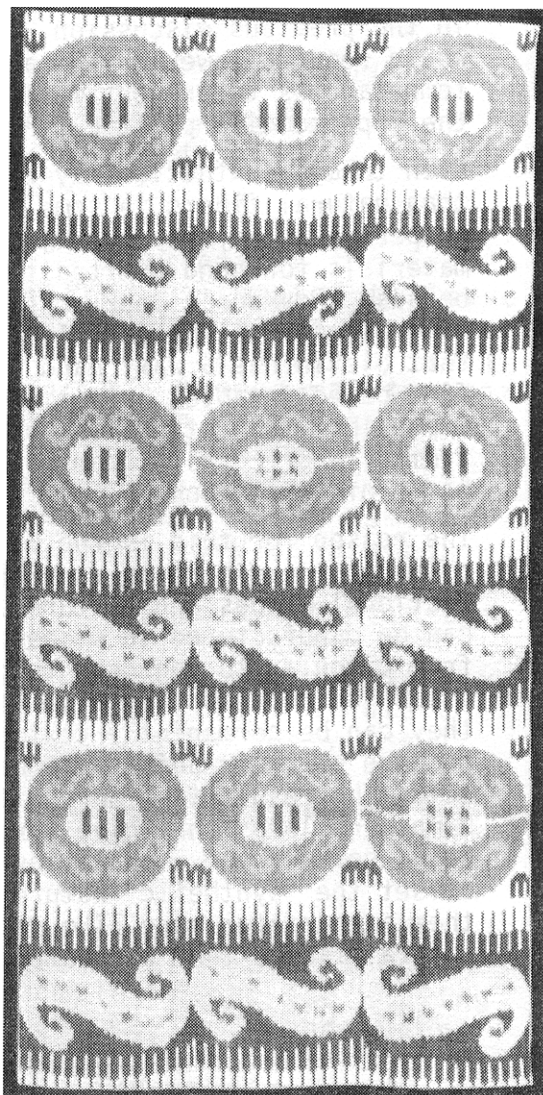
Italy, probably Umbrian or Perugia XVII

Linen and Cotton

Purchase Dunwoody Fund

The famous "Perugia" cloths which are seen occasionally in contemporary Italian paintings of the XV-XVII centuries were a twill based linen weave with supplementary cotton weft patterning. The Minneapolis Institute of Arts has several of these towels which are historically attributed to Perugia but which were undoubtedly woven in Umbria as well.





MIA 81.49.1
 U.S.S.R. (Central Asia) - Bukhara
 XIX Century
 Ikat silk and cotton
 Ethel Morrison Van Derlip Fund

The Uzbek who were located during the 19th and early 20th century in the Bukhara area developed a very distinctive warp ikat style. Because of certain religious prohibitions which forbid the wearing of all silk fabric, these textiles were made of silk warp and a totally covered cotton weft.

In the early part of the 20th century many members of the Uzbek group migrated to Afghanistan where they continued to dye and weave. However, today tradition is dying and these wonderful ikats are rarely produced.

all photographs by Gary Mortensen
 MIA Staff Photographer

HANDWEAVING/KNITTING WITH SYNTHETICS

by Cheryl Nelson

Why would anyone want to weave or knit with synthetic fibers? Isn't our steel, glass and plastic civilization artificial enough without adding another synthetic element?

The natural reaction to this is to seek out things made by hand, things which, in their materials and techniques, carry the implication of vitality, tradition and individuality. Thus, it is easy to understand the following quotes:

"Using natural fibers, however, is more in the spirit of handweaving. These fibers impart life and body and have good color." Clara Creager, Weaving. A Creative Approach for Beginners. p.38

"The handweaver has a special attachment to natural fibers which have more life and give more tactile satisfaction than their man-made counterparts." Elsa Regensteiner, The Art of Weaving. p.29

Regardless of one's philosophical bent for natural versus synthetic fibers, synthetics do have some qualities which merit their consideration as a material for hand crafted textiles.

Synthetic fibers are manufactured from chemicals as opposed to natural fibers which utilize natural fibrous materials such as cotton or wool, or synthetic regenerated fibers formed from natural fibrous materials which have been chemically modified. Examples of the last category are rayon and acetate. Synthetic fiber types that may be found in weaving and knitting yarns include rayon and acetate, the regenerated synthetics, and the true synthetics such as nylon, polyester, acrylic and olefin. All these fibers should be specified by their type on a package

label. Rayon will sometimes be identified as "viscose" (this is a process used to manufacture rayon, not a fiber) and olefin will sometimes be identified as "polypropylene" (this is a type of olefin). There are many tradenames which can be associated

with each fiber type; the critical factor to remember is which fiber type is present as that will affect the ultimate character of the textile.

Several physical properties of synthetic fibers are listed in Table 1 with wool and cotton included for purposes of comparison. The properties have been ranked on a continuum from poor to excellent rather than identified by a specific measurement of the property.

Table 1

Comparison of Some Fiber Physical Properties

	Strength	Abrasion Resistance	Sunlight Resistance	Care and Cleaning
Cotton	Good	Fair	Fair to Good	Washable; may shrink; may need ironing
Wool	Fair	Fair to Good	Poor	Dryclean unless specified "washable"
Rayon	Fair to Good	Poor to Fair	Fair	Washable, with care; may shrink
Acetate	Fair	Fair	Fair	Wash or dryclean; heat sensitive
Nylon	Excellent	Excellent	Fair	Washable; easy care
Polyester	Good to Excellent	Excellent	Good	Washable; easy care
Acrylic	Good	Good	Good	Washable; easy care
Olefin	Excellent	Good to Excellent	Fair	Washable; heat sensitive

While metallic yarns were not included in the previous discussion, they too would require lower drying and ironing temperatures to prevent melting of their protective plastic finish.

Even though synthetics may rank higher than natural fibers in some physical properties, they may be rejected as materials for hand crafted textiles because they don't look or feel the same as natural fibers. It is true that olefin has a waxy hand which some find objectionable, but it is virtually impossible to distinguish some polyester from silk or acrylic from wool on the basis of touch alone.

The reason for this is the adaptability of synthetic fibers to varying cross-sectional shapes and textures. They can be manufactured in shapes that vary from circular to dog bone to pentagonal in cross section. In addition they can be permanently textured because of their ability to be heat set. The result is fibers with kinks, bumps and loops that give yarns loft, bulk, softer hand - qualities which offset the "synthetic" nature and give them a character more like that of natural fibers they simulate.

In terms of strength, synthetics are generally higher than natural or regenerated fibers which is important in withstanding the tension and friction of weaving. Rayon varies somewhat depending on whether it is regular rayon or a high tenacity rayon. Some rayons must be handled carefully during wet cleaning because of their low wet strength.

Sunlight resistance is important if a textile item will be used in a sunny place. All fibers except fiberglass and saran are subject to degradation by sunlight; synthetic fibers which have delusterants added to reduce their shiny appearance are more subject to deterioration than bright fibers because they will absorb more sunlight.

Of the synthetics, olefin is especially subject to oil stains; acrylic, nylon and polyester are also sensitive to oil stains. Heat sensitivity of olefin and acetate requires cooler drying and, if necessary, ironing temperatures.

It needs to be pointed out that fiber is only one factor influencing a fabric. Yarn construction and fabric weave or knit also play a major role in the final appearance of a textile. But with higher strength, ease of care and a variety of textures, synthetic fibers can compete quite well with natural fibers. It is possible to create fibers which can imitate very closely those made from natural fibers and can also be attractive to the hand, eye, and psyche.

Cherilyn Nelson is an Extension Specialist in Textiles and Clothing at the University of Minnesota. While her professional interests range from the energy aspects of textile products to archaeological textiles, in her free time she is a quilter, weaver, and batik.

NATURAL DYES: WOOL AND BEYOND

by Connie J. Magoffin

Natural dyes bring to mind natural fibers, the most commonly dyed being wool, silk, cotton, and linen. All can be dyed in the unspun, yarn, and fiber form. Those of us who dye with natural dyes are most familiar with dyeing on wool. It is usually less expensive, more readily available and easier to dye than any of the other natural fibers. The five mordants normally used for dyeing with natural dyes are alum, chrome, tin, copper and iron. The purpose of the mordant is not only to aid in the development of the color in the fiber, but also to increase its wash and light fastness.

Although I am becoming more comfortable with the techniques of natural dyeing on wool, I have had somewhat limited experience with dyeing the other natural fibers. My advanced dye class has for several years had, as part of the curriculum, a dyeing session with 15-20 different fibers dyed in one pot together with an alum mordant and usually onion skin as the dye. Since the fibers are mordanted and dyed together, it is easy to see how readily the protein fibers such as wool, silk, mohair, rabbit and dog take the color in comparison to the cellulose fibers such as cotton, linen and jute. The purpose of this session is to encourage students to experiment with dyeing natural fibers other than the usual wool. Following similar dyeing procedures, even such materials as reed, grasses, paper and feathers can be dyed. Great care in handling some materials is obviously needed. Thus far, nylon is the only synthetic fiber I have dyed successfully.*

This one-pot procedure described above does not, however, take into account the fact that even though they are all natural fibers, we can not handle all these fibers in the same manner in order to obtain successful results. Silk, a protein fiber, dyes beautifully with natural

dyes. Silk scarves make a wonderful, one-of-a-kind gift. While care should be taken in handling all fibers during mordanting and dyeing, with both silk and wool temperature shock and the matting and tangling of yarns is the major concern. Many sources warn against using high temperatures for silk, some even recommending cold mordant baths (which can also be used with wool). Different proportions of dyestuff to fiber, after mordanting, cautions in handling and for sensitivity to acids and alkalis appear often in silk dyeing recipes.

Cotton and linen are cellulose fibers. It is much more difficult to achieve intense colors on cellulose fibers because they have fewer dye sites available. Linen has an even harder structure than cotton. The most apparent difference in the handling of these fibers when dyeing is in the mordanting process. Most sources recommend a 4-day alum-tannic acid-alum procedure rather than the standard alum process we use for wool and silk.

In the past few years there has been much interest in dyeing cotton, particularly for its use in making garments. Consequently, there has also been concern about its fastness properties. Recently I tested both alum mordanted cotton (which I shall refer to as A-cotton) and alum-tannic acid-alum mordanted cotton (A-T-A cotton) for lightfastness. (I have not yet set up a satisfactory wash fastness test for myself). I dyed both samples of mordanted cotton in 4 dyes to obtain yellow (turmeric), orange (madder), red (cochineal), and blue (indigo). I then top-dyed a second yellow with blue to obtain green and a second red with blue to obtain purple. The first obvious observation was that the colors on the A-T-A cotton were richer or darker. I suspect this was due both to the coloring from the tannic acid, a tan, and to the fact that this process supposedly allows more dye sites to be available.

Each sample was then light tested for 10 days. (When time permits,

cont'd on page 11

SYNTHETIC DYES ON NATURAL
AND SYNTHETIC FIBERS
by Jan Carter

To appreciate the great contribution synthetic dyes have made to the art and science of dyeing, one must become aware of the severely limited conditions under which dyers worked before 1856, when Perkin discovered "mauve", the synthetic purple dye, synthesized accidentally from aniline, the coal-tar derivative. Before 1856, sources for red and blue natural dye were few but for yellow, abundant. By mixing these primaries and varying the dyeing process, natural dyers accomplished the formidable task of producing innumerable color qualities from relatively few available dyestuffs. These dyestuffs were difficult to process in dyeing since most required mordanting not only for dye/fiber affinity but also for acceptable fastness properties. Processing these impure natural dyes most often produced the characteristic dull colors of the subtractive mix of composite colorants.

By contrast, the new pure synthetic dyes were easy to process, had great coloring power and were very high in chroma. Early synthetic dyes may have been "fugitive" but fastness improved as the industry grew. It took only one generation for these new synthetic dyes to supplant natural dyes. Some considered the new brilliancy hideous, but it was the brilliance and ease of application which caused synthetic dyes to replace natural dyes for many uses. With the acceptance of the new expanded and highly saturated color palettes grew a new aesthetic. The "Eye-Dazzler" Navajo

tapestry, with its juxtaposed, highly saturated colors exploding from the surface, may be the greatest tribute to synthetic dyes to date.

Now that the synthetic dye-stuff industry has been established for over a hundred years, dyes for every kind of material in bright, pure and durable colors are available. These chemically engineered colorants may be classified by chemical classification (azo, acid, basic, anthraquinone, sulfur, etc.) denoting characteristic

chemical groups, or by dyeing process classification (acid, vat, direct, disperse, reactive) Classification according to dyeing process has more utility for most dyers who are concerned about optimizing the conditions of dyeing to achieve exhaustion, reproduceability, and fastness.

The forces which bind dye to fiber may be physical or chemical. In order to achieve this bonding, molecular dye structures have been engineered specifically for attraction to one of the three main fiber classes (protein, cellulosic, synthetic). There are specific dyes for specific fibers such as: Basic Dyes/Acrylic Fibers, Reactive, Direct, Vat Dyes/Cellulosic Fibers, Disperse Dyes/Synthetic Fibers. "Household Dyes" (Putnam, Cushing, Rit, Keystone, Dylon) have no such specificity and result in waste.

Synthetic dyes travel a long circuitous route reaching the dyer, who must choose for end use with little information other than vague hue description bearing an obscure

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NATURAL DYES: WOOL AND BEYOND

This article was not intended to be a how-to, but to offer thoughts on the possibilities of dyeing with natural dyes on different fibers. Although books are great resources and my constantly expanding library attests to the fact that each book can offer its own unique approach to dyeing, there is no "ultimate" natural dye book. For those of you who have not yet experienced the joy of dyeing with natural dyes, I would, however recommend the Brooklyn Botanic Garden handbooks, #46 Dye Plans and Dyeing and #72 Natural Plant Dyeing, as an inexpensive introduction.** As friends and students of mine know, my philosophy of dyeing is to experiment, try any idea, technique, mordant, dye plant, don't tie yourself just to information from books (or teachers), but keep records of every detail so that you can do it again!

Wool and natural dyes are a supreme match. However, just as there are many mordants to choose from and a seemingly limitless supply of different natural dye stuffs, there are also numerous natural fibers out there waiting to be colored for use in garment making, basketry, stitchery, knitting, quilting, papermaking, painting, for whatever or wherever your imagination may wander.

*For those who are interested, Test Fabrics offers woven fabric swatches which can be used in a dye bath to test the dyeing potential of many different fibers at the same time. While they offer swatches that include synthetic and natural fibers together, the multifiber fabric #1 includes natural fibers and regenerated man-made fibers such as acetate and viscose rayon. The fabric is available from Test Fabrics Inc., P.O. Drawer 0, 200 Blackford Ave., Middlesex, N.J. 08846. It is approximately \$9/yd.

**For prices and postage (approx. \$3 each, write: Brooklyn Botanic Garden, 1000 Washington Ave., Brooklyn, N.Y. 11225.

I light test for one month or longer.) The colors on the A-T-A cotton proved to be substantially faster. While there was visible fading in all 12 samples, there was considerably more fading on the 6 A-cotton samples. As would be anticipated, the indigo faded the least, turmeric the most. (Yellows are historically the least fast dyes.) While the 4-day method of mordanting on cotton (A-T-A) involves much more labor, for cases where lightfastness is a concern, it is definitely worth the trouble.

I have also done lightfast tests on silk, cotton and linen fabrics with all 5 mordants, each dyed with walnut, choccineal, madder, onion, and indigo. The standard alum procedure was used, not the A-T-A method. No general conclusions could be drawn. In some cases the dye, such as walnut, overwhelmed the fiber and mordant. In other cases a specific mordant on a specific fiber with a specific dye was more fast than the others. It is important to remember that it is the combination of fiber, mordant, dye and procedure that contributes to a successful dyeing experience. Decide the use to which you will put your dyed fiber, experiment and test your results.



cont'd

SYNTHETIC DYES ON NATURAL AND SYNTHETIC FIBERS

code name, very general dyeing instructions, and little if any reference to fastness. Privileged to have the availability of an apparently infinite number of synthetic dyestuffs, today's dyer may feel bewildered in choosing since characteristics of a dye which determine suitability for end use are not clear. Some factors to be considered in dye selection for end use are availability, specificity, cost, color gamut, application, and fastness.

AVAILABILITY depends upon dye distribution. Pylam Products (95-10 218th St., Queens Village, N.Y. 11429) supplies all classes of dyes by Trade-mark in one pound and five pound quantities, giving Colour Index (C.I.) Names such as Acid Yellow 17. Colour Index is a valuable and comprehensive reference publication for manufacturers and users of colorants. It consists of six volumes. Volumes 1-3 classify colorants according to dyeing process (application), list for each dye various types of fastness ratings, dyeing procedures, descriptive hue information, and more. Volume 4 contains chemical constitutions (molecular structures). Volume 5 contains Trademarks (commercial names) of colorants arranged alphabetically. In order to know more completely the specificity of a dye and its dyeing and performance characteristics, C.I. Name must be furnished by the supplier. Cerulean Blue, Ltd., P.O. Box

5126, Seattle, WA 98105 will supply C.I. information for dyes sold in one to sixteen ounce quantities but be prepared to pay for the increase in cost over Pylam due to small quantity packaging.

SPECIFICITY A primary consideration in choosing a dye is its affinity for the material to be dyed (substrate). Dye affinity for fiber depends upon the chemistry of the dye and the chemistry of the substrate. For example, C.I. acid dyes process in dyeing with acid to promote the proper charge on wool which will then be attracted to the unlike charges on the acid dye. Acid dyes may be chosen for good light-fastness as required for wall-hangings (Level Acid dyes, LAD, processing at pH 3.5) or for good washfastness as required in some garments (milling Acid dyes, MAD, processing at pH approximately 5.5-3.5).

COST Dyeing with synthetic dyes is cost effective. Most acid dyeings at 2% "owf" (on the weight of fiber) produce "medium shades", depending on dye coloring power and saturation. One pound of acid dye at 2% dyeing will dye 50 pounds wool. Averaging the cost per pound of dye on the high side at \$30/pound, this is less than \$1 dye/pound wool. To keep dyeing cost minimum, three pure primaries for each of three dye classes respectively specific to each of the three fiber classes may be chosen, that is, three primary dye colors each (red, blue, yellow for an "artists' palette") in Acid Dyes (LAD and/or MAD) for wool and silk, Reactive Dyes for cotton, rayon, etc., Disperse Dyes for polyester, acrylic, etc. Using the three primary colors of each dye class, secondaries, tertiaries, and innumerable other colors of

varying saturation may be obtained for different percentages of dyeings. Since a true black is difficult to achieve through subtractive mix of primaries, black dye may be purchased. Some dyers prefer to obtain desaturated colors by mixing with black rather than with complements.

COLOR GAMUT Because these three dye classes, Acid, Reactive, and Disperse have been engineered for broad color gamuts, colors of maximum chroma are available in each of the primaries. Any dullness in a primary dye used in mixing will enhance dullness in the subtractively mixed dye. Suppliers who furnish C.I. Names

for their dyes are helpful because they have investigated available dyes and have chosen to stock those which process fairly easily and have high coloring power, producing colors of high chroma. Volume 1, C.I. contains a Hue Indicator Chart which is used to determine color quality of a C.I. named dye.

APPLICATION of dye to fiber varies with dye class. In all dye applications, affinity of dye for fiber is a function of temperature, constitution, dye concentration, volume of dyebath relative to weight of fiber, and concentration of numerous additives. Through precision dyeing, using equipment for measuring to 0.1 gram and 0.1 milliliter, colors may be reproduced. Precision dyeing requires knowledge of the specific dyeing processes and the time/Temperature dependencies of the individual dyes which are revealed through experimentation by withdrawing samples at different time/Temperatures

during dyeing and making the respective visual assessments of depths of shade. Dyeing to the same level of exhaustion each time insures reproducible results, all other variables constant.

FASTNESS for end use is an important consideration even though artists are not (yet) liable for the performance aspects of their product. Handcrafted textiles are potential museum artifacts and will hopefully last for posterity. It is extremely important to choose dyes which can be processed for good fastness properties. C.I. lists ratings for a dye's fastness to light, perspiration, washing, etc. Besides poor choice of dye, a factor which contributes to poor fastness is improper dyeing. If sufficient time has not been allowed during processing for the dye to be sorbed inside fiber, fastness to light and to washing may be poor. Mechanical and chemical procedures during dyeing also have implications for fastness. To insure good fastness, one must choose a dye with these specific properties and process that dye properly over the time/Temperature range

of dyeing.

The factors which influence dye selection are many. Trade-off decisions based on product use must be made. Having so decided, dyes can be used at those percentages which yield primary colors of maximum chroma to produce innumerable colors to use in aesthetically pleasing color relationships. Dyeing with synthetic dyes is more an exact science than the fascinating art of natural dyeing.

Processing synthetic dyes is fairly simple once one becomes acquainted with the chemistry of the dyeing process. Dyeing with synthetic dyes is conserving of time and energy and affords the dyer little of the frustration involved in pouring dye down the drain, watching colors wash off or fade in light. Now the textile artist may experience not only the satisfaction of exercising control over the dyeing process but also the gratification of color reproduceability through precision dyeing.

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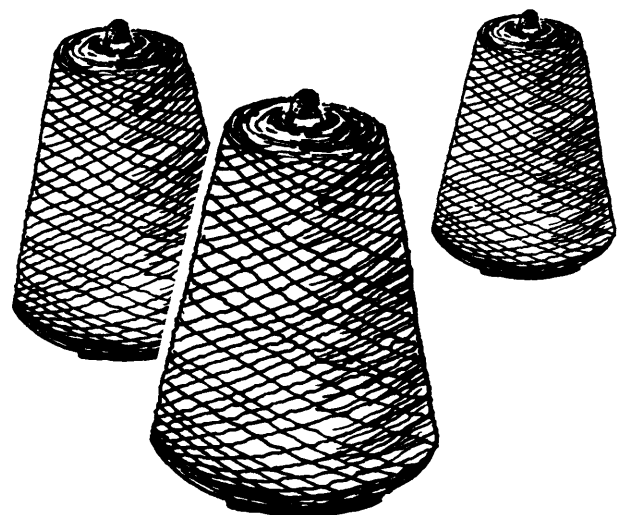
bolts burst open and the cotton inside them is ready to be picked. The seeds have to be separated from the lint, a process done by the cotton gin. The lint is packed in bales of about 500 pounds. The cotton is cleaned and fibers are separated by machine. Then the cotton is made into roving from which cotton yarn is spun.

Cotton yarn or finished cotton products are frequently mercerized - a process of immersion in caustic soda solution - which makes the fiber stronger, more lustrous, and more receptive to dyes. Fine cotton, which has smooth silky texture, is woven from extra long staple. No other fiber has quite the versatility and wearability of cotton, and wide ranges of cotton yarns in size and color are available to the weaver.

Linen is the fiber of the flax plant. Flax is grown from seeds seeded close together so that the plants grow long stalks, branching only at the top. The plant extends down to the roots; the plants must be pulled up for harvesting. The fibrous stalks are retted - soaked in water to rot away the woody core and dissolve the gums that hold the fiber together. Then the fibers are dried and sent to the mill, where the woody stalks are separated from the desired fiber. The fibers are hackled, cleaned, and straightened by combing, carded and spun into yarn. The short fibers are spun into irregular yarn, called tow; the longest fibers are combed and spun into strong, smooth yarn called linen.

Flax is composed largely of cellulose, which makes a smooth fiber with good luster. It is not elastic and therefore linen fabric wrinkles easily. It is very strong and a nice natural color.

The yardage count of linen is based on the lea, a unit of 300 yards spun from one pound of raw flax. Linen is imported from Ireland, Belgium, France. Then there are jute, hemp, and ranne yarns. All these fibers are strong and lustrous - good yarns for the weaver.



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FIBERS FOR THE FRAMELOOM

requires "contrivance, ingenuity, and perfect knowledge."*

It isn't long before the frame-loom weaver is tempted to leave off the trusty cotton carpet warp and try the array of available yarns. A good way to start designing with a variety of threads is to use several sizes of the same fiber. Or combine various twists of the same fiber. Then, try combining various fibers. Whatever the yarn choice, study it, for the threads will keep their character; will have their way. After recognizing the nature and structure of the yarns, you can add a little contrivance and ingenuity to solve the weaving problems the yarns create.

The suggestions below are arranged by characteristics. For example, hints for weaving with wool may be found under "hairy," "stretchy," and "fragile," depending on its spin.

stretchy: wool, some synthetics, knitting yarns

Wind warp snugly, but not stretched.
Use a cotton thread at the edge to keep the selvage neat.
Wind onto the warp beam with firm, but not tight tension.
Weave with a slightly loose warp tension.
Bubble the weft to ensure comfortable weft tension.
Be careful that a stretched weft is not trapped in the

* Three attributes of the skilled weaver in Joseph France's Weaver's Complete Guide, 1814

warp before it is beaten down or narrowing will result.

Take care in passing the shuttle to avoid snagging the warp.

Release tension at the end of each weaving session.

Weave off as soon as possible to keep the elasticity.

When combining yarns of differing stretch, wind onto the warp beam carefully, not allowing the stretchier one too much tension or seersucker will result in the web.

stubborn: linen, cords, jute

Wind the warp tightly on the warping board and shuttle.

Be especially careful to roll onto the warp beam with even tension.

Wet linen before tying onto the cloth beam for even tension.

Retie any loose warp ends to get a snug tension across the loom.

Be careful not to snag warps during the weaving.

Leave less of a weft angle as there is less give in the weft. Never rest the shuttle on top of the warp.

Release the tension at the end of a weaving session.

nubby, loopy: some wools, cottons, novelties

Whatever will fit through the holes and slots comfortably is suitable.

If nubs are too large for the holes, try threading the yarn only in the slots alternating with a smoother yarn in the holes.

If the beater can't be pulled down, use a shed stick to beat each pick. Especially watch the weft tension and spacing of the warp as threads tend to get

out of line. Try to use beater occasionally if possible.

If the nubs are too large for both holes and slots, some strands may be carried up during the weaving to add interest to the warp. Leave a space for the large yarns in the heddle; tie them to the cloth beam in place, and weave them vertically by hand every pick or two.

hairy: wool, linen, mohair, some synthetics

Design a warp with smooth threads to alternate with the hairy threads to prevent locked sheds. To help open the shed, tap the warp from the top on the up shed and from the bottom on the down shed. Threads will pop into position.

For the down shed, insert a shed stick behind the heddle and stand it on edge to help open the warp. Wet roughspun linen warps to keep the fibers smooth.

A light coating of hairspray, fixative, or spray starch help to control stray fibers.

Watch for the accumulation of loose fibers near the heddle. Some of these may be carefully lifted off the warp.

fragile: homespun, single ply, roughspun

Single ply yarns break easily and tangle.

Make the warp carefully. Handle the warp as little as possible. Add a commercial twisted, plied thread or two at the selvage for strength.

Weave with a snug but not tight warp tension.

Leave the weft comfortably relaxed.

Beat carefully; press rather than beat the yarn into place.

Release the tension at the end of the weaving session to prevent wear.

Wind the web onto the cloth beam with paper to keep pegs from damaging the piece.

thin yarns: cottolin, any thin strand

Sley double in holes and slots.

Crowd several warps in areas of the heddle and skip dent others for a textural effect. Weave with a double strand.

heavy, lumpy: any thick yarns

If heavy weft (or rya areas) create thick areas in the cloth which in turn cause uneven tension on the warp, pad the low areas of the web on the cloth beam to equalize the tension.

If heavy weft causes the cloth beam to become too bulky to roll, unhook the cloth from the cloth beam, lay the project in the lap, and hook back onto the pegs along the fell. Pack in extra weft at this point that can be adjusted when the piece is off the loom.

wiry: metal, nylon, plastic

Wind the warp as tightly as possible on the warping board, the warp beam, and the shuttle. Tape across the warp beam loops to prevent slipping.

Tie or twist the ends onto the cloth beam and tape down.

Weave with a small angle. Keep the selvage comfortable without loops or pulled in edges.

Wind onto the cloth beam with paper to prevent the pegs from poking through the web.

HEATHERING by Marcie Archer

Usually when people spin and dye their own yarn, they spin white fleece, and then dye the spun yarn. The result is a solid colored yarn. The way to get lots of colors with this method is by mixing the dyes.

Another method, called heathering, is to dye the fleece first, before it is spun, and then to create the color variations by mixing the colored fleece during the carding process.

The heathered colors will look different from colors obtained by mixing dyes. When mixing colored substances such as dyes or paints, the mixed color is entirely a new color - even if you look closely you can't pick out the colors it was made from. Heathering is a type of mixing called "visual mix" in which the new color looks like a solid color when seen from a distance, but when seen more closely you can pick out the colors which make it up.

To begin heathering you need to dye some basic colors to give you a good selection of blending possibilities. The simplest way to start is with black, white, and three primary colors: either red, blue, and yellow; or magenta, turquoise, and yellow. These are two different sets of primary colors which will give you different blended colors depending on which set you use, and depending on exactly which red or which blue, etc. you use. The most obvious difference between the two sets of

primaries is that red, blue, and yellow will give you more orange oranges, and duller greens. Magenta, turquoise, and yellow will make brighter greens but duller oranges. You can use either chemical or natural dyed wool, although chemically dyed colors tend to be brighter and more predictable, and thus lend themselves more to blending. You will find that colors soften and get dull very quickly as soon as you begin to blend them.

To blend the colored fleece, put a small amount of wool of several colors on your hand cards. Card until the colors are as blended as you like. With only a little carding the yarn will be streaked with solid colors and with more blended areas. The more carding you do, the more uniform the new color will be.

If you measure the amount of wool of each color that you put on the cards, you will be able to reproduce the color blends you make. Or you can look at the color you blend, compare it visually with the color you want it to look like, and then add little bits of colored fleece until it looks right. It is very difficult, using handcards, to get skeins of yarn which are completely uniform in color. So enjoy the variation! You can make beautiful variegated yarns in which each color fades gradually into the next.

To get an idea of the way color blending works you could begin with a series of experiments. Blend black and white fleece together to make a series of greys going from dark to light. Next, mix two of the primary colors together to make a series of steps between them. Do the same with all three pairs of

STUDY GROUPS

WGM STUDY GROUPS

by Sonja Irlbeck

After you leave school, you often don't plan on returning to a formal learning situation. Do you remember graduating and thinking you never wanted to see the inside of another classroom? But there are a lot of things to learn that you don't have to return to the old classroom for. "Continuing education" and "life long learning" are two phrases that have been coined in recent times about new forms of education. Many organizations are meeting this need for society through continuing education programs.

The WGM supports the idea of "continuing education" through study groups. What is a study group? People interested in similar topics who get together periodically to share expertise and experiences. The group may have a narrow focus or a general goal it pursues. It may meet often or seldom. It may be very structured or loosely organized. But study groups supply motivation to their members to keep learning about weaving and related topics.

WGM study groups currently cover topics from A to W--or from aklaeev to weaving on Wednesday! The list that follows provides names, description, and the contact person for the group. If one interests you, give the contact person a call and see how easily and enjoyably you can continue your education!

AKLAE VEVERS meet to work on their projects of Norwegian geometric tapestry. This group meets monthly, the third Thursday evening of the month at the Guild. Members already know the basic techniques of aklae and work on individual projects. Contact: Mildred Carselle, 452-2614.

DYE GARDEN studies natural dyeing techniques and usually meets the third Tuesday evening of each month in members' homes. Members can choose to report on natural dye topics. This group has projects to earn money to put in a dye garden at the U of M Arboretum. All levels of dyeing experience are found in this group. Contact Connie Magoffin, 822-8358.

DRIEKE TREADLERS is for spinners and weavers. The name comes from the German phrase meaning "3 corners", which includes the north, west, and south corners of the twin cities. These members meet the first Monday of the month in the mornings and bring a bag lunch. The meetings are held in members' homes. The idea behind this group is to have a day set aside for fiber crafts. Contact Tracy Manniko, 475-2912.

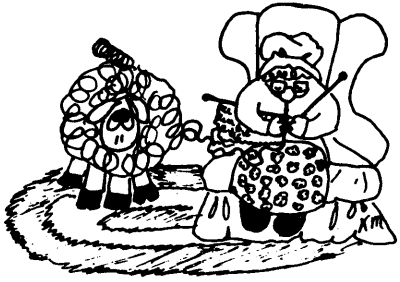
ECLECTIC WEAVERS changes their focus each year. For 1982-83 the focus will be surface design and texture in garments. This group meets in the morning of the third Monday of the month in members' homes. Contact Mary Johnson, 698-3292.

FLOOR LOOM WEAVERS studied double weave techniques in 1981-82 and will be studying multiharness weaving in 1982-83. Their resource will be More than Four by Laughlin. This group meets the second Monday of the month in the mornings at the Guild. Contact Paul O'Conner, 646-3520.

HAMLIN WEAVERS explore the ranges of frame loom weaving. The weavers in this group are very experienced, and some members have belonged since the group began in the late '60s--it has quite a set of roots. For the fall they will be exploring warp faced weaving. They meet bimonthly, on Wednesday mornings at Hamline United Methodist Church. Contact Judy Freeburg, 941-7127.

KNITTING STUDY GROUP keeps people in stitches (!) the third Monday of each month at the Guild in the evenings. Members take turns researching and

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explaining a knitting technique, and all members work on their projects. Contact Shirley Herrick, 571-7846.

NORSKE VEVERS study Norwegian weaving techniques and meet every other Thursday morning in members' homes. This group is a very established group with weavers experienced in various Norwegian weaving techniques. Contact Marie Nodland, 644-7824.

SPINNERS concentrates on spinning techniques and meeting together for comradeship while spinning. This group meets monthly in members' homes, spinning fiber (and tales....). Contact Ethel Pettengill, 489-1463.

WEDNESDAY WEAVERS is a loosely organized group of frame loom weavers from the St. Anthony Park area. They meet each Wednesday morning in members' homes to continue their weaving projects. Contact Elaine Phillips, 646-0253.

WHITE BEAR WEAVERS is also a loose group of frame and floor loom weavers who meet to share techniques and completed projects. Members come from the northeast quadrant of the twin cities (all the way to New Richmond...) and meet the first Tuesday evening of the month at a local bank. Contact Phyllis Pladsen, 429-7377.

To paraphrase an old Beatles' tune, "Will you still be learning...when you're 94?" Join the fun in study groups! If there are other study groups that are not listed in this article, please call the Guild so you can be added to the list.

HEATHERING

primaries. Now you have a hue circle (color wheel), and a grey scale. You can continue this kind of experimentation indefinitely; mixing the hues with greys, with each other, etc. If you save samples of these experiments you will be able to reproduce these colors when you want them, and you will be well on your way to making beautiful, unusual yarns.

To learn about and explore heathering further, you can take Marcie's Color Through Spinning Class.

The class is on Thursdays, October 7 - November 4, 6:30 - 9:30 pm.



FIBER SOURCE COMMITTEE

With fall in the air, woolly thoughts come to mind and weavers start to plan fall projects and Christmas gifts. This fall the Fiber Source Committee is featuring some of the loveliest yarns available.

September 15 - October 15
Harrisville

With their complete line of colors in single, two ply, and heavy weight wools, Harrisville yarns delight the eye. To get a good discount, we need a 50 pound order.

October 15 - November 15
Borg of Lund

Borg yarns are some of the finest to be found. They offer a superior color selection in many weights in a wide variety of fibers, including wool and linen.

November 15 - December 15
Henry's Attic

Henry's Attic sells a wide assortment of fibers and yarns in natural colors. Wool yarns include about every weight and variety possible, from simple plied yarns to boucle, loopy and thick and thin yarns. They have recently added some new fibers and now offer several varieties of silk, a wet-spun linen, and several cotton yarns.

* * *

The following is a review of Instructions for Ordering for group buying...reprinted as a review for WGM members, and to introduce new WGM members to the system.....

The order sheets and sample folders are stored in the yarn cupboards in the main WGM room.

1. Fill out a separate sheet for each company.
2. Be sure your name, address, and phone number are on each sheet.
3. Payment must accompany your order. If ordering from more than one company, one check for all the orders is fine. Make checks payable to Weavers Guild of Minnesota Fiber Source Committee.
4. Most orders take about a month if the item is in stock. However, orders requiring a specific amount to get a discount will be held until that amount is reached.
5. You will be notified when the order can be picked up.
6. Make a duplicate for your own records if you need one.

We do not include Fawcett wool in the group buying as no quantity discount is offered other than purchasing a pound of a color rather than a 2-ounce tube. You are better off ordering this yourself or with others interested in the same colors.

When ordering, remind others of group buying opportunities; orders grow faster this way.

If you wish to get up a group order for items not already included in WGM group buying, we would be happy to include this information in the Weaver.

* * *

FIRST MEETING OF FIBER SOURCE COMMITTEE IS TUESDAY, SEPTEMBER 21st AT 7PM.

BMFM

Thanks to Susan Brown, we have an exciting array of By-Member-For-Member workshops for the 1982-83 year. Below is a calendar for the workshops and a description of the October and November workshops. Please pre-register for these Thursday classes.

Oct 21 7pm Finishing Fabrics
Rose Allen
Nov 18 10am Card Weaving Karen
Searle
Dec 9 (tentative) Fiber Jewelry
Jean Lodge
Jan 20 1pm Tabby Inlay Linda
Maschwitz
Feb 17 10am Seminole Quilts
Mary Johnson
Mar 17 1pm Rag Rugs Paula Pfaff
April 21 6-9pm Wicker Baskets
Susan Brown
May 19 1pm Dyeing with Natural
Dyes Ann Heironymus
or Connie Magoffin

BMFM Workshop Oct 21 7pm
Finishing Your Handwoven
Fabrics Rose Allen

Learn what you can do to your fabric between the loom and the finished project. Techniques for finishing various types of fabrics will be demonstrated. Bring some fabric that needs finishing (perhaps some of those "problems" in your closet) and examples of fabrics you have finished to share. Any questions - call Rose Mary Allen - 224-7729

BMFM Workshop Nov 18 9:30-12
Card Weaving Karen Searle

Set up and weave a narrow band in the card weaving technique, which produces unusual textures and a different pattern on each side. Cards may be purchased from the instructor. Students should bring 3 colors (about 1 oz. each) in perle cotton, carpet warp, or other smooth, strong yarn, a scissors, and a small shuttle. (You may wish to wear a belt with a buckle for ease in attaching the backstrap-style card loom).

BMFM Workshop March 17 1pm
Rag Rugs Paula Pfaff

Bring your questions, old rag rugs for sharing, and rags to cut. We'll discuss the practical details of rag types, cutting, methods of joining strips, and weaving methods. No materials fee.

BMFM Workshop April 21 6-9pm
Wicker Baskets Susan Brown

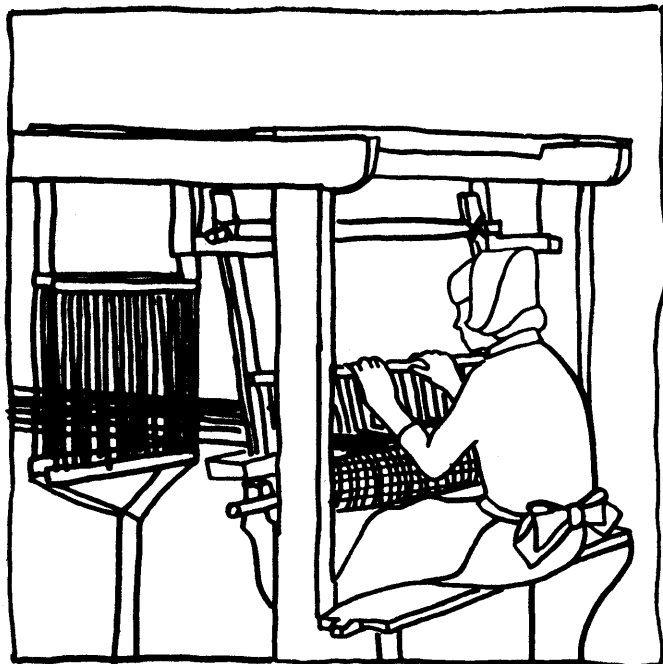
Learn how to make beautiful natural baskets! We will be using commercial reed which grows on islands in the South Pacific. These baskets are made using a basic weaving technique and can be completed in a three hour session. Sign up at the Guild by Tuesday, April 19th. The reed and glycerin will be supplied for a fee of approximately \$4.50 per person. The other materials needed are: towel, bucket (larger is better) scissors, awl or screw driver, plastic garbage bag. Limit of 12 people! Sign up soon!

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