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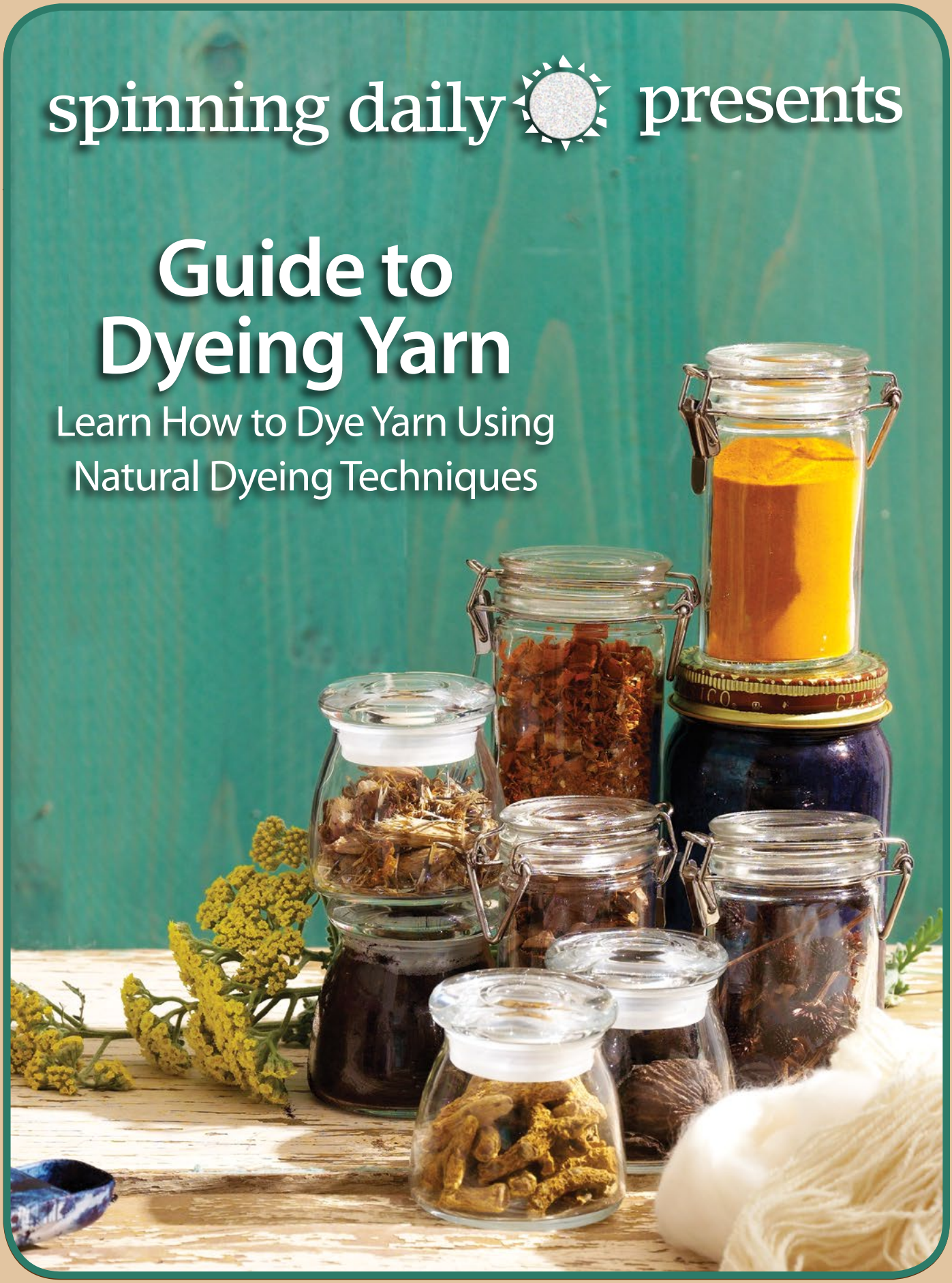
Guide to Dyeing Yarn

Learn How to Dye Yarn Using Natural Dyeing Techniques



For some of us, the pleasure of using natural dyes is the connection it gives us with the earth, using plants and fungi and minerals from the environment in our handmade projects. Others enjoy the challenge of finding, working with, and sometimes even growing unpredictable materials, then coaxing the desired hues. My favorite reason for using natural dyes is just plain lovely color. Sometimes subtle and always rich, the shades that skilled dyers achieve with natural dyestuffs are heart-breakingly lovely.

No matter what inspires you to delve into natural dyes, this free eBook has something for you. If you're interested in connecting with the earth, follow Lynn Ruggles as she combines her gardening and fiber passions, or join Brighid's Dyers as they harness alternative energy with solar dyeing. To test and improve your skills, begin with Dagmar Klos's thorough instructions. But whatever your reason, be sure to enjoy the range of natural colors on every page.

One of Interweave's oldest publications, *Spin·Off* inspires spinners to make beautiful yarn and find enchanting ways to use it. In addition to the quarterly magazine, we also host the spinning community spinningdaily.com, complete with blogs, forums, and free patterns. In our video workshop series, the living treasures of the spinning world share their knowledge. We're devoted to bringing you the best spinning teachers, newest spinning techniques, and most inspiring ideas—right to your mailbox, your computer, and your very fingertips.

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Happy spinning,

Anne

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An Introduction to Natural Dyes

By Dagmar Klos

Once you start exploring the world of natural dyes, you'll find that dyestuff exists in areas you may have never thought to look—your garden, roadside (think weeds), and spice cabinet for starters.

While synthetic dyes have been around a little more than 150 years, natural dyes date to the beginnings of our textile history. Remember that textile that you saw in the museum or historical exhibition that was made before the 1850s? Remember what beautiful colors were in that piece? Those colors were the result of natural dyes. In fact, naturally dyed textiles have been around for 6,000 years and maybe more.

Mother Nature provides us with many and varied sources for color—plants (flowers, stems, leaves, roots, berries, fruits, seeds), trees and shrubs (leaves, twigs, bark, wood), lichen and moss, as well as bugs and shellfish. Many provide color and not always the color you think; for example, a red flower will usually yield a yellow color.

The three basic rules of dyeing are: know your dye, know your fiber, and know your water.

Know your dyes

Dyes are either natural (derived from natural resources) or synthetic (manufactured). I am focusing on natural dyes here, which include substantive dyes, mordant (or adjective) dyes, and vat dyes. Substantive dyes (also called direct dyes) readily impart color without the aid of a special dye substance (called an auxiliary). Substantive dyes are water soluble and include onion skins, black walnuts, saffron, black tea, and turmeric. These dyes have varying degrees of colorfastness.

Mordant dyes require the aid of an auxiliary substance (a mordant) that allows the dye to bond with the fiber. In some cases, it will improve the colorfastness and possibly change the color the dyestuff yields. For example, fiber dyed with dyer's greenweed (*Genista tinctoria*) and mordanted with alum yields a warm yellow; mordant-

ed with iron, it yields a sage green; mordanted with alum and iron, it yields an olive green. Alum sulfate, alum acetate, and iron are the only mordants that I use. Chrome, copper, and tin are toxic, and I choose to avoid them.

Vat dyes, like substantive dyes, need no mordant to help fix color to the fiber, but they are not water soluble and require a special process to dye the fiber. The blue dyes of indigo and woad and the purple of certain mollusks are vat dyes.

Know your fiber

Is it protein (animal) or cellulose (plant)? Protein fibers include alpaca, angora, camel, cashgora, cashmere, dog, llama, mohair, qiviut, silk, and wool. Cellulose fibers are cotton, hemp, jute, linen, nettle, paper, rayon, ramie, lyocell, and basketmaking materials such as rattan, willow, split wood, raffia, and sweetgrass. The type of fiber will indicate how it should be scoured and how it should be mordanted. Protein fibers can be harmed by substances with high pH (alkaline) such as soda ash (a common ingredient in household detergents).

Scouring

Scouring (or washing) is important for removing any dirt, lanolin, sizing, spinning oil, or other substance that may prevent thorough dye adherence. Orvus Paste, Synthrapol, mild unscented detergents, or neutral soaps are all common scouring agents. These products do not contain bleaches, brighteners, or any other additives, produce little foam, have a neutral pH, and are safe for both plant and animal fibers.

Fill a dyepot with enough hot water so the goods can move freely. Dissolve the scouring agent in a separate container with hot water and add it to the dyepot, stirring well. Place the goods in the dyepot, carefully rotating them and making sure they all get scoured. Rinse the goods well in water of the same temperature or slightly cooler, but be careful not to subject wool or silk to drastic temperature changes that can damage the fibers or cause felting. Do not allow the goods to cool down in the bath as this will redeposit dirt onto the goods. For cellulose fibers (especially cotton), use soda ash to help with the scouring process—add about ⅓ cup of soda ash for every 8 ounces of goods. Do not use soda ash on protein fibers as it will harm the fiber.

Mordanting

I use alum sulfate for protein fibers and alum acetate for cellulose fibers. Often your supplier will provide instructions for how much mordant to use. If you are eager to begin dyeing but have no alum, you can use pickling alum from your spice cabinet (it's food grade and therefore more expensive, but it will work). Use anywhere from 2.5 to 5 tablespoons per pound of fiber. Dissolve the alum in a small glass container of boiling water, add it to the dyepot, add the goods, and gradually bring the pot to a simmer, holding it at a simmer for an hour. Turn off the heat and let the pot cool overnight. In the morning, rinse the mordanted goods in water of the same temperature. Your goods are now ready to dye. You can save your mordanting water to use later (though you will have to refresh it with more mordant) or discard it safely (see the box above).

Know your water

While it is important to know your water, I always suggest that you first try the water that comes out of your tap. Are you happy with the color results? Each natural dye is unique and has its own idiosyncrasies: some work best in hard water, some in soft water, and with some, it doesn't seem to matter. In addition to being used as a mordant, iron is primarily known for its ability to sadden or modify color. If you have iron in your water, it will modify the color whether you want

Dyeing safely

Just because it's a natural dye doesn't mean there are no safety concerns. Protect yourself as well as the environment. For yourself, use safety glasses, rubber gloves, a nonpermeable apron, and a dust mask or respirator. For the environment, neutralize dyebaths if necessary before disposing. Use pH testing papers (see below) to test the pH levels of the dyebath. Add vinegar to a dyebath that is greater than 7 (basic) and ammonia to a dyebath that is lower than 7 (acidic) to neutralize it. Make sure to keep small children and animals away from your dye area. Keep your dye utensils and pots separate from your eating utensils and pots. Keep all food away from your dye area.

Materials list

- Safety glasses or goggles
- Rubber gloves
- Nonpermeable apron
- Dust mask or respirator
- Measuring spoons
- Pickle jars or other glass containers
- Stainless steel dyepots
- Stir stick or long spoon
- Strainer
- Heating system
- Access to hot and cold water
- Drop cloths
- Gram scale
- Dyestuff
- Mordant (for protein or cellulose fibers)
- Scouring agent (such as Orvus Paste or Synthrapol)
- Drying rack

Optional

- Ammonia
- Vinegar
- pH testing papers

What is pH?

The potential of hydrogen (or pH) indicates the concentration of hydrogen in a solution on a scale from 0 to 14, with 7 being neutral. The more hydrogen a substance contains, the more acidic it is (low pH, such as vinegar); the less hydrogen, the more alkaline it is (high pH, such as ammonia).

You can buy pH papers at pool or science-lab supply stores to test the pH level of your dyebath.

it to or not. Cochineal, a very sensitive dye, can shift from red to a purple if there are traces of iron in the water, even if your water is filtered. One simple way to test your water is to dye two samples of the same fiber (or test a variety of fibers in the same dyebath) and dye (use cochineal if you can) using tap water for one sample and distilled water for the other. Remember that chipped enamel pots can leach iron into your dyebath.

Where to dye

Doing your natural dyeing outside (weather permitting, of course) is always ideal. For years I did my dyeing in the kitchen, but I always cleared all work surfaces (countertops and tables) and covered them with newspapers or old textiles (sheets, tablecloths, towels, etc.). I made sure no food was out and used dedicated equipment for dyeing (meaning that I never used dyeing utensils and pots for cooking, ever). Keep your dyeing utensils and pots separate so that no mistakes can be made. Later I moved to the basement where I had a stove under a window with a ventilation fan. For indoor dyeing, gas or electric stoves allow you to control the temperatures easily. Hot plates work but can take a long time to heat a large dyepot. For outdoor dyeing, campstoves and propane-fueled crab or lobster pots work (as do butane-fueled portable cookstoves)—though the fuel will need to be replaced on occasion, and on windy days, they can take longer to heat the pot. Of course, there is always solar dyeing, which just requires sunny days and patience (see "Sun-Kissed Dyeing" by Jeannine Bakriges on page 12).

Preparing the dyestuff

When you begin, it is essential to have your dyestuff ready. For fleece or roving, a mesh bag helps to keep the fiber together. For yarn, make the skeins a reasonable length. I like working with 1- to 2-yard skeins that are tied with at least four figure-eight ties loosely looped crosswise along the length of the skein. Longer skeins can be troublesome and easy to tangle.

When dyeing, I like to scour and mordant one day, let the mordanted fiber sit in the dyebath overnight, and dye the next day because a well-wetted fiber takes the dye better. On the second day, prepare the dyepot.

If you have never dyed, start with flowers from your garden (or from a neighbor who is willing to share). I love dyeing with marigolds; I have a small sunny area that is devoted to French marigolds. Dyeing with just the flowers gives the clearest yellows. You can also dye with the leaves and stems, but the colors become muted.

Place a 5-gallon paint strainer into your dyepot, add the flowers, and then water, allowing the flowers to soak for a short while. Then gradually raise the heat to 150 to 180 degrees Fahrenheit for about an hour. You will see the flowers releasing color into the dyepot. Remove the strainer holding the flowers and set aside. If necessary, add more water to the dyepot and then add the goods. Gradually raise the temperature to a simmer and hold for an hour. Allow the fiber to cool down in the dyepot before removing it to avoid changing the temperature of the fiber dramatically, as this can cause wool fibers to felt. Remove the goods and allow them to dry completely.

Then rinse the fiber—I usually place the fiber into a bucket of cool water and let it soak for a minute or two, checking to see if any dye is coming off. If not, then I hang it up to dry again. If there is color released into the rinse water, I rinse the goods in warm water with a little Orvus Paste to remove the excess dye. If, after removing the fiber, the dyebath still has color, you can continue to use it until the color is exhausted. Or place the used flowers into an empty dyepot, add fresh water, and gently heat the dyebath again to release more color. You can achieve a gradation of yellows this way.

Understanding the basics of how to get color onto fiber allows you to continue to explore successfully. A dye playday can be a fun and rewarding experience, providing you with great colors for your projects. ⌘

Dagmar Klos of Chicago, Illinois, has been involved in and in love with textiles since early childhood when her grandmother taught her how to embroider. She has achieved the Handweavers Guild of America's Certificate of Excellence in Dyeing, she is the author of *The Dyer's Companion* (Interweave, 2005), and for eleven years, she copublished and coedited *The Turkey Red Journal* (a technical newsletter dedicated to natural dyes). Dagmar is the technical editor for *Spin·Off's* dye articles and teaches at the Fine Line Creative Arts Center in St. Charles, Illinois.

Resources

Cardon, Dominique. *Natural Dyes: Sources, Tradition, Technology and Science*. London: Archetype Publications, 2007.

Dean, Jenny. *Wild Color*. New York: Watson-Guptill Publications, 1999.

Klos, Dagmar. *The Dyer's Companion*. Loveland, Colorado: Interweave, 2005.

Lambert, Eva, and Tracy Kendall. *The Complete Guide to Natural Dyeing*. Loveland, Colorado: Interweave, 2010.

Liles, J. N. *The Art and Craft of Natural Dyeing: Traditional Recipes for Modern Use*. Knoxville, Tennessee: University of Tennessee Press, 1990.

Wipplinger, Michele. *Natural Dye Instruction Booklet*. Seattle, Washington: Earthues, 2005.

DVDs

Indigo: A World of Blue. Vancouver, British Columbia: Maiwa Productions, 2005.

In Search of Lost Colour: The Story of Natural Dyes. Vancouver, British Columbia: Maiwa Productions, 2007.

Websites

www.earthues.com
www.maiwa.com
www.pburch.net/dyeing

Color from Weeds

Finding an unexpected dye garden in my backyard

BY LYNN RUGGLES

When I signed up for a Master Gardener class offered by the University of Idaho, I envisioned a beautifully landscaped yard, a kaleidoscope of flowers blooming throughout the summer, and winter days perusing garden catalogs. Instead, I found weeds.

One of the first books I was introduced to was *Weeds of the West* (University of Wyoming, 1996) that I used to identify the bounteous crop of undesirables in my own backyard. A few months later, a friend asked me a question about natural dyeing, and as I searched my bookshelf for an answer, I rediscovered Anne Bliss's book, *North American Dye Plants* (Interweave, 1993). I had never used the book since I didn't recognize any of the plants. As I flipped the pages of the book, however, I realized that with my newfound knowledge of weeds, many of Anne's plants were now familiar to me.

Thus began a two-year exploration of dyeing with weeds. To start, I made a list of potential dye candidates from plants I had already identified. As it was already July, I began with plants that bloomed in the late summer and were listed in the book as nonfading or lightfast. I wanted to avoid fugitive dyes, which produce a nice color but fade if exposed to bright light. I did all my dyeing in August and September.

My first dye list included twenty-four plants, although I actually dyed with only about twenty of them that summer. The following spring, I added twenty-four more plants to my list, this time choosing spring and early-summer bloomers. I was surprised when many of the fall plants produced a very dark color, as I'd been led to believe that natural dyes were pale imitations of chemical dyes; with the spring plants, though, the colors produced *were* pale imitations of their fall companions.

Mordanting

To dye with plant material, a mordant is used to bond the dye to the fiber. I chose to dye two skeins with each plant, using one of two mordants on each skein: alum or copper. These were listed in the dye books as the least toxic though copper is considered mildly poisonous by some sources, and fortuitously, I already had the chemicals in my cabinet. I used *A Dyer's Manual* (Ashmans, 1982) as my primary dye reference for the mordants.

For my initial samples, I used an unlabeled, worsted, two-ply millspun yarn that was stamped Crewel Needlepoint inside the cone. The yarn had a slight off-white color and was very lustrous (I suspect a Leicester breed). I wound off small skeins and weighed them. Twenty-four skeins weighed 4 ounces (the amount of fiber called for in the mordant instructions). I wound off two sets of twenty-four, one for each mordant. I marked the alum skeins with a tie of red cotton cording in case the dyed colors for the two mordants were too similar to tell them apart.

I mixed up the mordant solution according to the instructions and cooked half my skeins in each mordant. After rinsing, the alum skeins had not changed color, but the copper skeins were a light green. After dyeing, for most of the colors, the alum skeins were lighter than the copper ones.

I used a 4-quart roasting pan for dyeing that has a dial gauge so that it is easy to control the temperature. I did all of my dyeing outside on my back porch because the cooked plants often had a very strong odor.

Harvesting plants for the dyepot

I harvested the plants at the peak of their growth cycle: they had reached their full height and most had blooming flowers on the stems while some plants were nonflowering. I used the stems, leaves, and flowers and cut them in pieces to fit into my pan. I added water to cover the plants, weighted down with a metal mesh basket to hold them underwater. They were cooked at

Dyeing safely

Follow the safety precautions on the labels for handling mordants. Always wear a dust mask and gloves and work in a still room or box when handling mordant powders to avoid inhaling the particles. Protect your skin and eyes from mordant solutions. Never use your dye equipment for food preparation. Make sure your workspace is safe and take special precautions if you have young children or pets in your household.

200 degrees Fahrenheit until the leaves darkened and looked like cooked spinach. This usually took about an hour, but in some cases, I left the heat on for up to three hours. At that point, even if the leaves didn't look dark, I unplugged the cord and let the solution cool in the pan, allowing the plants to steep longer.

When cool, I strained the liquid through a large strainer and poured it back into the roasting pan. I added two skeins of yarn, one for each mordant. I cooked this for an hour, let it cool, then rinsed the skeins in water with a drop of dish soap and hung them to dry.

Results

In comparing the results, one thing in particular stands out: the first-year results are significantly darker than those from the second year for both mordants. I thought of several explanations: in year two, we had little precipitation in the spring, which is usually our wet season, so plants did not grow as well; spring plants have not had as much time as late-summer plants to develop, so there isn't as much dye material in the plants; or perhaps my mordanting technique was different between the two batches of yarn.

I was able to rule out the last one because I had some leftover mordanted skeins from the first year which were the ones I started dyeing with the second year. None of them were as dark as the first-year colors, and subsequent batches using the newer batch of yarns were similarly light. Determining what caused the differences in colors was an investigation that I did not pursue; I just accepted what I got.

The first summer, I also wanted to dye enough yarn to complete a large project (Crocheted Star Scarf at the right). I had a large skein of off-white, lustrous handspun white yarn (breed unknown, another Leicester perhaps) that I divided into smaller skeins. I dyed the additional skeins in the leftover liquid after the sample skeins were removed. All of these yarns were mordanted with alum, and as I expected, colors in most of these yarns came out very light. I also dyed a few millspun white sock yarns. There was one millspun Merino/nylon blend yarn that was significantly darker than the rest.

The second summer, I added unspun fiber to my dyepots. I chose different fibers to see how well each accepted the colors. When dyeing fiber, it is critical to filter out any small plant bits in the liquid so that this debris does not get tangled up in the fiber. After cooking the plants, I strained the liquid first through my large strainer, then a second time through a fine tea strainer before adding the fiber to the dyepot.

The fiber samples I used were locks from various fleeces and combed top from several different fibers and fiber blends. I dyed these using four plants: milkweed, tansy, echinacea, and walnut, all with a copper mordant. One of my nylon blends and the longer locks from the luster wools dyed the darkest; these were the 90/10 Merino/nylon blend, the Lincoln locks, and the Corriedale top. All the other fibers were much lighter and very similar in color.

This year's dyeing is done, and I have used up my sample yarn. I have not run out of plants, however, so there may be more colors in my future. ⌘

When the weeding is done, **Lynn Ruggles**, of Boise, Idaho, is concocting very smelly potions from her compost pile. Her friends sometimes detect an earthy smell when she spins green fibers into earth-tone yarns. Instead of searching out new fibers, she is now on a quest for new botanical specimens.

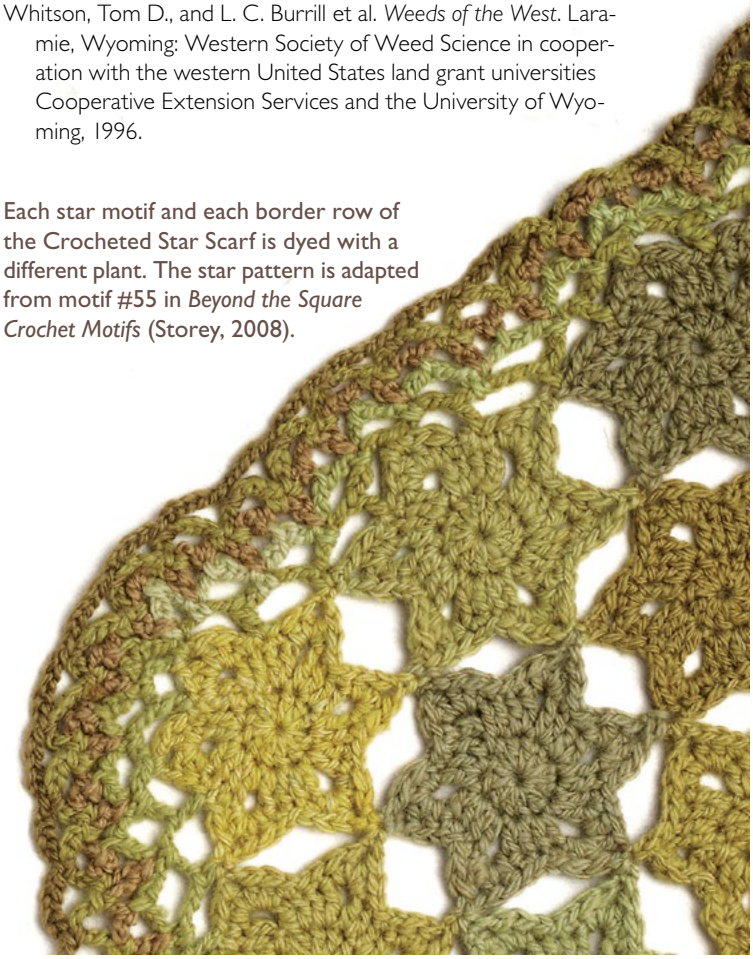
Resources

Bliss, Anne. *North American Dye Plants*. Loveland, Colorado: Interweave, 1993.

Eckman, Edie. *Beyond the Square Crochet Motifs*. North Adams, Massachusetts: Storey, 2008.

Goodwin, Jill. *A Dyer's Manual*. Hessle, East Yorkshire, United Kingdom: Ashmans, 1982.

Whitson, Tom D., and L. C. Burrill et al. *Weeds of the West*. Laramie, Wyoming: Western Society of Weed Science in cooperation with the western United States land grant universities Cooperative Extension Services and the University of Wyoming, 1996.



Each star motif and each border row of the Crocheted Star Scarf is dyed with a different plant. The star pattern is adapted from motif #55 in *Beyond the Square Crochet Motifs* (Storey, 2008).

Dyeing with Black Walnuts

by Elizabeth Fahey

It is October on our homestead in upstate New York. The surrounding hills are scarlet and gold with maple trees in their autumn glory. Rosy red apples peep out from under the leaves on the orchard trees. Pumpkins glow orange under the vines, and the squash are ripe for the picking. The days are crisp and the nights are nippy. The woolly coats on the sheep have grown thick and warm to keep out the coming cold. The squirrels hurry and scurry about filling their holes with nuts for the winter. A feeling of urgency is in the air. We, too, are busy bringing in the harvest and preparing for a snug winter in our log cabin.

One morning, I awake to the world white with frost. The tomato and cucumber vines lay dead in the garden. A blazing sun rises in a cloudless blue sky. As its rays touch the frosted leaves on the black walnut trees, the blackened leaves cascade to the ground. Like gigantic hailstones, the nuts fall, too, some hitting our log cabin roof and reverberating like thunder. This is the day for collecting the nuts. We fill buckets and buckets with the round green nuts. Each nut is surrounded by a thick green husk, making it about the size of an apple. The bitter-flavored husks do not appeal to the squirrels, so they willingly leave the black walnuts to us while they rob the hazelnut bushes.

Preparing the husks

We smash each husk off with a hammer and lay the nuts out to dry on a screen before stashing them away in sacks, to crack as a tasty treat on winter days. As we handle the fresh nuts and husks, our hands are stained dark brown and our fingernails are black. The substantive dye in the black walnut husk is ready to ooze out and stain anything it touches. This is the dye that is my delight. Every fall, I make a big batch of it to dye the yarn for the thick, woolly socks that I knit to keep our feet toasty warm. The husks contain tannin, which acts as its own mordant to make the color fast. Rather than fading with time, the color seems to darken slightly. It is extremely light- and colorfast.

Homesteader, Elizabeth Fahey, dyes wool with walnuts over an open fire to make her family handspun, handknitted, naturally dyed socks.

I love walnut dye for the beautiful shade of brown I get from it and because I don't have to use a mordant with it. I am uncomfortable using substances that have cautions of "do not inhale, do not touch, do not swallow." Too many dye plants require such mordants. I am not careful. I never wear gloves and I can't imagine myself in goggles, a face mask, or even an apron. I want to be intimately connected with everything I do—feeling it, smelling it, and sometimes even tasting it. Black walnut allows me to do that. I suggest wearing old clothes (black walnut stains everything permanently) and recommend gloves for those who would rather not have stained hands and black fingernails (it will wash off with time—give it a month).

Preparing the dyebath

I start off the dyeing process by putting the husks into an old pillowcase. I usually use about 5 gallons of husks in each dyebath. Next, I place the pillowcase in an 8-gallon pot and pour water into the pillowcase full of husks until the pot is full. Then I tie the pillowcase firmly shut with a sturdy piece of yarn. If I were to place the pillowcase into a full pot of water, the pillowcase would float like a bubble, and the husks would not be completely immersed in water.

I soak the husks for a week or two, and most of the dye oozes out into the water. The process would be the same if I were to dye with walnut twigs. The twigs as well as the leaves give nice shades of brown and, like the husks, require no mordant. The leaves, however, need to be soaked only overnight.

1) Elizabeth smashes each black walnut with a hammer to remove the green husk that is used for dyeing. **2)** Elizabeth puts the walnut husks in an old pillowcase, places the pillowcase in a bucket, and fills it with water before tying it closed and letting it soak for a week or two. **3)** Elizabeth spinning on her Ashford Elizabeth spinning wheel. **4)** Elizabeth getting ready to put the yarn into the prepared dyebath. **5)** Yarn dyed with black walnut husks, hung up to dry. **6)** Elizabeth's sisters Anna Marie, Francesca, and Rose knitting, spinning, and carding wool. Anna Marie is knitting socks with hand-spun yarn dyed with black walnuts.

Working over an outdoor fire

After the husks have soaked for a week or two, I build an outdoor fire in a small stone fireplace and set the pot with the pillowcase of husks directly on top of it to boil for an hour. I feed the fire with sticks to keep it going. The first time I ever made walnut dye, I put the pot on our woodstove. I put some yarn that I had spun in the grease in the dyebath to simmer. I hadn't yet learned that the wool needs to be washed before dyeing. As the dyebath simmered on the woodstove, the strong smell of sheep's wool combined with the smell of the walnut dye filled the cabin. Everyone who came in remarked about how bad it smelled.

Since then, I have always done my dyeing over an outdoor fire, where the strong smells are more acceptable. I have grown to love the odor of sheep and the smell of the different dye plants, because I connect them with the joys of creating yarn and coloring it with the vibrant hues of nature. My family, of course, much prefers the smell of baking bread in the house to a dyepot simmering on the stove. Outdoor dyeing not only keeps the smell out of the house, but it keeps the mess out, too. You don't have to worry about drips or spills staining the floors or countertops.

Washing the wool

I enjoy working outdoors with my wool as much as possible. I take my wool down to our natural spring to wash, as I do with our family laundry. I fill three 5-gallon buckets with water from the spring and dissolve some wool-safe laundry detergent in the first bucket. I place the dirty wool in the sudsy water and let it sit for a while to loosen up the dirt. Then I gently squeeze the wool to remove most of the dirty water and rinse it twice in the other two buckets of water. While this method is all you need to wash clothes and get them clean, wool is usually so dirty that it would take another wash and some more rinses to get it really clean. But I am not usually concerned about getting my wool super clean. While some dyes may be finicky about adhering to wool with some dirt or grease still in it, black walnut is not. It even adhered to my unwashed yarn, though I would not recommend dyeing unwashed wool because the color was uneven.

Dyeing yarn and wool

Once my husks have boiled for an hour, I remove the pot from the fire and let it cool. I take the pillowcase out of the pot and place it in a large stainless steel bowl or basin and let the dye drip off the pillowcase and husks so that none of the dye will be wasted. I pour the dye that has collected in the bottom of the bowl back into the dyepot. Sometimes I jump on the pillowcase in order to get as much dye out as possible. Then I empty the husks out onto the compost pile. The husks have lost their green color and are now black.

When black walnuts are harvested, if the husks are left too long on the nut, they will turn black and mushy. Once they are black, they are no longer good for dyeing. The greener the husk is, the stronger the dye will be. I have also heard that the nuts taste better if the husks are removed while they are still green.

Now that the pillowcase is out of the pot, the dyebath is ready for the wool. I usually dye about 3 pounds of wool in my 8-gallon stainless steel pot. I prefer to dye the yarn because it is easier to handle than fleece, but sometimes I don't have any spun yet, so I have to dye in the fleece.

One handy trick I learned when dyeing yarn is to tie the skeins in five or six places before dyeing. This prevents the yarn from getting tangled. When I first started dyeing my yarn, I only tied the skein with the two loose ends of the yarn when I took it off the niddy-noddy—and I had quite a chore of untangling the yarn after I dyed it.

After placing the wool in the dyebath, I put the pot back on the fire to simmer for an hour. Some of the wool tends to stick up above the surface of the dyebath and needs to be poked down and stirred gently once in a while so that it will dye evenly. By this time, it is getting late in the day. The embers of my fire glow in the gathering darkness, and the air is getting chilly. I remove my pot from the fire and let it sit until morning. I always feel excited about getting back to my wool the next day to see how it came out. With a feeling of expectancy that quickly turns to delight, I fish my beautiful brown skeins out of the dyebath. I gently squeeze them out and rinse them in a succession of buckets to remove the excess dye.

I hang my skeins up to dry. I lay fleece out in the sun to dry on a sheet or hang it up in baskets.

Sometimes I reuse the dyebath for one or two smaller batches of wool, to obtain a lighter shade of brown. I reheat the dyebath and go through the same steps.

Now for a blissful winter of sitting by the fireplace, spinning soft brown yarn on my handspindle and knitting thick, woolly socks to keep our feet toasty warm. ⌘

Elizabeth Fahey lives on a homestead in Oxford, New York, with her parents and some of her brothers and sisters. She spends a lot of time spinning and knitting. Her wool socks are in big demand among her family and friends. She also loves writing, gardening, and arranging flowers for her home and church.

In Hot Water

Experiments with natural springs and vegetable dyes

By Glenna Dean

It was the second of December, a Sunday, and 34° F. At the baths in the village of Ojo Caliente in northern New Mexico, my friends, Carol Ellick and Loni Viklund, and I could see our breath as we walked from the car past remnants of snow piled in the shadows of cottonwoods to which the last brown leaves were clinging—trees that had blazed yellow against the clear turquoise sky just a few weeks earlier. People in flip-flops and skimpy Speedos sauntered past on the walkway to the main bathhouse, their terry-cloth robes offering scant comfort from the frosty air. Others neck-deep in an outdoor pool waved and smiled as we stared. Ah, but these are hot springs, I told myself.

Ojo Caliente (O-ho Calee-EN-tay, Spanish for hot spring) is said to have been named by sixteenth-century conquistadors who came to the area centuries after the ancients, ancestors to today's Pueblo peoples, had built large pueblos and terraced cornfields nearby. According to literature handed out by the spa, Antonio Joseph founded Ojo's first health spa with overnight lodging in 1880.

I had come to these unpretentious springs to run a natural dye experiment. I wanted to find out if natural hot-spring waters contain dissolved substances that can both fix a plant dye onto fiber and affect its color.

Cotton was grown, spun, and worn as clothing in New Mexico centuries before the time of Columbus.[1] Museum collections of Anasazi striped blankets dating to the 1300s exhibit stripes woven in still-bright yellow, white, black, and red cotton yarns. I wanted to know how cotton could be dyed so that colors remain bright after some 700 years, especially since cotton remains so resistant to colorfast dyes, even with modern technology, that its genetics are being altered to produce colored lint in the boll.

Most dyeplants work well on animal fibers, so I decided to rig my first dyeing experiment for success. I knew that dog hair was a common animal fiber used in pre-Columbian New Mexico, before Spanish settlers brought sheep, so a friend collected fur for me from her Great Pyrenees, Yeska (the "Big Y"). Using my old Ashford Traditional and a short draw, I first spun a semiworsted yarn from the combed fur with no additional preparation and then plied it to yield a two-ply yarn at about 1,350 yards per pound. The dog fur was reasonably clean so I did not scour it before making small skeins that weighed 2 grams each.

Back at the spa, I half-filled one-gallon glass jars from the lithia spring (100° F by my thermometer) and the arsenic tap (102° F), and asked an outdoor bather to take another jar to the iron-spring pipe (98° F). Loni had to swim completely across another pool to half-fill a jar at the soda-spring pipe (95° F). I half-filled a fifth jar with 80° F well water from a drinking fountain located near the entrance as a sort of control sample. I then added a 2-gram skein of dry, unwashed "Big Y" chiengora to each jar, along with 10 grams of dried dodder (*Cuscuta* sp.). Dodder is a parasitic plant that lacks chlorophyll and yields a pure yellow to protein fibers (large infestations of dodder look like orange spaghetti thrown on the side of the road). The plant also dries into thin threads that I thought would rehydrate quickly during the time frame of our spa visit (4 hours). I purposefully used much more dyestuff for the amount of yarn than I ordinarily would use to make sure that lack of dye wouldn't be a problem in the experiment. Normally I use at least a two to one ratio of dyestuff to yarn, but don't worry about being too precise. My favorite natural dye books include Jim Liles's *Art and Craft of Natural Dyeing*, Karen Casselman's *Craft of the Dyer*, Ida Grae's *Nature's Colors*, Trudy Van Stralen's *Indigo, Madder, and Marigold*, and Rita Buchanan's *A Weaver's Garden* and *A Dyer's Garden*.

While Carol and Loni enjoyed the springs, I tended the dye jars that floated gently in the tub of hot arsenic water that I drained and refilled as the water cooled. The water temperature averaged about 100° F. All the mineral waters felt different from ordinary water, but the arsenic water was especially smooth and slick to the touch. By the time our visit to the spa was up, the dye had steeped in all the jars, and I hoped that color transfer was underway. I wrapped the jars in towels to keep them warm during the journey back to my home in Santa Fe.

What was usually a ninety-minute drive stretched into three hours as we shopped and ate our way back to town. So I filled my home bathtub with 110° F water to bring the dye jars back up from the 80° F to which they had cooled during the trip. Later that evening my husband Tim suggested that I place the jars in a large insulated cooler filled with hot water to reduce the amount of water needed; the cooler's lid would also keep the water hot longer.

[1] Dean, Glenna. "Would history have been different if we'd known about Anasazi cotton?" *Spin·Off* 23, 3 (Fall 1997), 60–62.

1) Dried dodder (Cuscuta sp.), the dyeplant for this experiment.

2) The arsenic-water spring tap.

3) The lithia-water spring.

4) The iron-water spring (the pipe is in the rock wall to the right of the woman with the water bottle).

5) Yeska, the Great Pyrenees.

6) The soda-water spring (the pipes are in the back wall).

The jars stayed at temperatures between 80° F and 95° F for the next four days as I drained and refilled the cooler each morning before I left for work and each evening around supper time. The dye waters gradually turned varying shades of reddish brown, except for the well-water control, which was a cloudy yellow. The well water gave a pH reading of 5 to 6 (acid), while all the mineral-water dyebaths gave pH readings of 7 to 8 (neutral).

I took the dye jars from their hot-water bath at 8:00 AM on the fourth day (company was coming, and we needed the bathtub), and I waited until I came home from work before removing the skeins from the jars and tagging them with paper labels. The dyebaths, unopened since the yarns and plant material went into them, smelled like a science experiment gone bad. The arsenic and lithia waters were the worst, a cross between stagnant pond water and the sulfurous air at the Yellowstone National Park geyser field. An insubstantial layer of what looked to be mold floated at the edges of the lithia dyebath, while a thin sticklike material floated on the arsenic dyebath. Something seemed to be growing on the surface of the well-water bath, too. I pulled out my microscope from my former career in archaeobotany and found in all the jars teensy moving rods that raced across the field of view at 1,000 magnification—life a millionth-of-a-meter small that had been cultured from unsterilized plant material and dog fur during the days in the warm waters.

The dyed yarns, bristling with dodder fragments like porcupines, had taken on color during their stay in the dyebaths—the first sign of success! I left them to dry without rinsing in the hope of producing maximum color. When the yarns dried, differences in color became apparent. The arsenic- and lithia-dyed yarns were the darkest shade of yellow, followed by the soda-dyed yarn; all three had a definite greenish cast. Yellow plant dyes commonly shift to greens in the presence of iron, so the green here suggested that the arsenic, lithia, and soda waters all contain iron. Yet, contrary to my expectations of a dark olive green, the iron-dyed yarn was a noticeably lighter yellow than the others, but it also had a greenish cast. To top it all off, the well-water control skein was a surprising rosy beige, which suggested that the color came not from dodder but perhaps from minerals in the acidic water. The colors did not diminish when they were rinsed with tap water and dried. They did soften when I soaked them briefly in yucca-root suds a year later in an attempt to tame the overpowering "for-pity's-sake-please-throw-me-out" odor of the yarns. Beaten to a foam in water, the roots of Yucca elata, "soaptree yucca," the state plant of New Mexico, yield a nondetergent cleanser known as amole. The concoction has been used since pre-Columbian times by traditional weavers and dyers as a cleaner. Over the next three years, the yarns gradually assumed rosy-beige-brown shades that probably reflect iron dissolved in all the mineral waters and imply that any of the waters would have produced the same effect over time.

The five dye jars after four days' incubation in the bathtub. Left to right: arsenic water, lithia water, soda water, iron water, and well water.

The dyed, dried, unrinsed skeins. Left to right and top to bottom: well water, undyed control skein, lithia water, iron water, soda water, and arsenic water.

These results justify my original thought: natural hot-spring waters contain dissolved substances that can both fix a plant dye onto a protein fiber and affect its color. Thus this working hypothesis seems reasonable: ancient people could have used hot mineral waters as part of their dye techniques.

Why do these findings hold interest for the archaeologist? Any dyer who works with plants knows that a mordant is needed to fix the dye to plant or animal fiber—except for dyes that already act as mordants. Examples of these "package deals" are barks and nuts, which often contain the mordant tannin, and dyes that

incorporate self-mordanting lichens. Of the mordants, alum is the most commonly used and is widely available today in various forms. In the past, what is called "native alum" was collected from certain localities in New Mexico and Arizona for use in dyeing. Without tannin, acid, or alum, few plant dyes will affix to animal or plant fibers—the yarns won't retain the color. But as this experiment shows, dyeing is possible in mineral-rich hot-spring waters with no additional mordant, only dyestuff and yarn. Colorfastness is apparently an issue with dodder, at least in combination with an amole rinse, and I need to explore this issue further.

The dissolved mineral content of the waters at Ojo Caliente Spa is not well known. Information from chemical analyses shared with me by Frank Mauro, whose family owned the spa years ago, indicates that iron is present in both the arsenic and iron waters and absent from the well water, but details on the soda and lithia waters were unavailable. Interestingly, Mr. Mauro's analyses show that there is more iron in the arsenic water than in the iron water, although both contain minute amounts of chromium and even teenier amounts of copper. These minerals likely explain the greenish cast to what should have been yellow dyes in this experiment.

Finally, the experiment has complex implications for my original question about red-dyed cotton. It looks like I'll just have to return to the spa and experiment some more. ⌘

Thanks to Marilyn McCray, Geraldine Campos, Susanne Robuck, and Josephine Garcia of the Ojo Caliente Spa for allowing me to collect water samples and spend a steamy afternoon with my jars of dye. Thanks also to Frank Mauro for sharing his knowledge and memories of the spa and its healing waters. Finally, thanks to Loni Viklund and Carol Ellick for inviting me along on their trip to "take the waters."

The yarns after they had been rinsed with soaptree yucca. **1)** undyed, **2)** arsenic, **3)** soda, **4)** iron, **5)** well water, and **6)** lithia.

Glenna Dean is the New Mexico state archaeologist. An inveterate experimenter, she enjoys finding out if and how fibers, textiles, and especially colors could have been made in the past and what the archaeological evidence for such colors might be. She recently moved an hour north of Santa Fe to the tiny village of Abiquiu with her husband and black lab Sabu, acquiring a yellow lab, a cat, and a pasture full of visiting horses along the way. She hasn't seen her books or files for a year.

Resources

Buchanan, Rita. *A Dyer's Garden*. Loveland, Colorado: Interweave Press, 1995.

———. *A Weaver's Garden*. Loveland, Colorado: Interweave Press, 1999.

Casselman, Karen. *Craft of the Dyer*. New York: Dover, 1993.

Grae, Ida. *Nature's Colors*. New York: MacMillan, 1974.

Liles, Jim. *The Art and Craft of Natural Dyeing: Traditional Recipes for Modern Use*. Knoxville, Tennessee: The University of Tennessee Press, 1990.

Van Stralen, Trudy. *Indigo, Madder, and Marigold*. Loveland, Colorado: Interweave Press, 1994.

Sun-Kissed Dyeing

Achieving beautiful colors with solar power

By Jeannine Bakriges

The Summer 1993 issue of *Spin·Off* featured four articles on solar dyeing that piqued my interest and set the stage for years of personal experimentation using the sun as a heat source for dyeing. Here was a process that allowed one to dye without having to tend a fire, an electric hot plate, or a gas burner.

I worked as a historical interpreter at Black Creek Pioneer Village in Toronto, Ontario, Canada, from 1995 to 1998. Half my shift during the week was spent spinning and natural dyeing inside and outside the oldest village building. During work I quickly developed a love for identifying, picking, and cooking up local plants and imported natural dyestuffs.

After rereading "Solar Box Dyeing—Making a Rainbow With Recycled Cardboard and Free Energy," by Colleen Kozlowski and Donann Remund in the Summer 1993 issue of *Spin·Off*, I wrote to the Solar Box International address listed at the end of their article. I sent for their solar cooker instructions. It took me less than an hour to put it together and paint the glass jars.

Brighid's Dyers

Brighid's Dyers was formed in 2003 when I envisioned other fiber-loving folks coming up with innovative ways to solar dye. We named our group after the Celtic goddess Brighid who was born with the sun shooting out of her head. By our November 2004 finishing date, ten of the sixteen people who started experimenting with solar dyeing had either dyed fiber, handspun skeins, or completed solar-dyed finished project(s). Some had taken my Brewing Natural Dyes with a Solar Twist class (offered at the 2002 Northeast Handspinners Association Gathering in 2002 and the Vermont Fiber Retreat in 2004) while others had an extensive dyeing background. Most simply set out with an open mind and a willingness to experiment; they could choose to use natural or chemical dyestuffs. The project participants are Leona Stonebridge Arthen, Jeannine Bakriges, Liz Celli, Tamara Christensen, Maureen Clark, Leslie Markey, Terry Miller, Leslie Powers, Anne Riker, and Elizabeth Szczesniak-Johnson.

The range of projects produced, the colors achieved, and the often unusual methods used by Brighid's Dyers were amazing. Here are some of the highlights.

Inspired by the colors of autumn leaves, **Leona Stonebridge Arthen** dyed Cormo roving with goldenrod tops for butter yellow and tansy tops for moss green; she got a glowing orange by overdyeing the disappointing results of a curly dock bath with madder root. She added her mordant (tin and cream of tartar for the goldenrod and madder dyebaths, and ferrous sulfate for the tansy bath) to her dyepots after removing the plant material and before adding the fiber. Leona made a solar oven by lining an old beverage cooler with aluminum

foil topped with a double pane window. She found the temperature in her clear jars reached about 120 degrees and feels that this low temperature contributed to the clear colors. Leona used the roving to knit a lively, cloche-style hat from the top down.

Liz Celli made a stunning envelope purse, which **Theresa O'Brien** wet-felted for her, from Merino, mohair, and Rambouillet fleece. Using *Umbilicaria* lichen- and tansy-dyed handspun yarns, Liz embellished the purse with a Deerfield crewel embroidery pattern from the 1700s. She solar-dyed the yarns and fibers that Theresa felted in black enamel pots put on a wooden carriage-wagon seat topped with a clear plastic lawn- furniture cover.

Tamara Christensen designed a vividly dyed, handknitted handbag. Using alum and cream of tartar for premordants, she dyed scoured Border Leicester fleece with goldenrod, jewelweed, and Brazilwood. She placed clear glass jars on an aluminum-covered cart that could be wheeled around to take best advantage of the sun. Each color fleece was handcarded separately and then spun in a random fashion to make a variegated yarn.

1) Elizabeth Szczesniak-Johnson, **2)** Leona Stonebridge Arthen, **3)** Tamara Christensen, **4)** Liz Celli and Theresa O'Brien.

1) Wool dyed with black walnut hull by Anne Riker, **2)** Merino and mohair dyed with goldenrod by Leslie Powers, **3)** Wool dyed with ferns by Maureen Clark, **4)** Cormo wool dyed with goldenrod and curly dock, overdyed with madder root by Leona Stonebridge Arthen, **5)** Wool dyed with coreopsis cuttings by Anne Riker, **6)** Merino and mohair dyed with Gaywool acid dyes (Citrus) and onion skins by Leslie Powers, **7)** Cormo wool dyed with tansy and curly dock and overdyed with madder root by Leona Stonebridge Arthen, **8)** Merino wool dyed with tomato vines and overdyed with goldenrod by Leslie Markey, **9)** Cormo wool dyed with tansy and goldenrod by Leona Stonebridge Arthen, **10)** Wool dyed with chokecherry leaves and twigs by Leona Stonebridge Arthen.

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1) and **2)** Anne Riker.

Maureen Clark dyed wool fleece with ferns gathered behind her home. She simply set the chopped ferns, mordant, and water in a black roaster pan outside on the ground. After a few days, she removed the ferns and placed dry wool in the dye liquor. A few more days of dyeing, followed by rinsing, yielded a pretty, soft yellow.

Leslie Markey, who had only been spinning for little more than a year, created her beautiful spindle-spun, four-ply, handknitted socks from Australian Merino top. She solar-dyed the yarn with tomato vines for a beige, then overdyed it with goldenrod for a brighter yellow. She used the "Terry's Tub" method developed by Terry Collard of New Hampshire. The fiber/yarn is placed directly in the bottom of a black tub (often used to mix cement and found in hardware stores). A glass or plexiglass cover secured by C-clamps is set over the tub to draw in and hold the heat. The method is wonderful for low-water, rainbow dyeing and can also be used for low-water immersion baths.

Using Earthues natural dye extracts, **Terry Miller** solar-dyed some commercially spun alpaca yarn in an old gardening cold frame. She made a reflective liner for one side of the frame and set black-painted glass jars inside.

Leslie Powers used a foil emergency blanket from a first-aid kit, propped up by wood supports on three sides, to reflect the sun onto black dyepots. She dyed Merino and mohair fleece with Gaywool Citrus acid dye and onion skins for one color and goldenrod for the other color. She sent the fiber to a mill for rinsing, blending, and processing into roving, then knitted her textured two-ply yarn into a cozy scarf.

Anne Riker solar-dyed her handspun, naturally dark, Bluefaced Leicester wool yarn with Jacquard acid dyes for a lovely handknitted green Faroese shawl. The interesting dye technique she used involved layering some Romney X Cotswold roving on an opened, black garbage bag. She made stock solutions of green, blue, and two shades of yellow with the acid dyes, then poured the solutions over the roving, rolled it all up, secured the package with rubber bands, and placed it in a solar cooker for a day. She spun the dyed roving using her "habitual" long- draw method and created a knitted and fulled tote bag that's accented with a commercial, novelty yarn. She also contributed two separate handspun skeins; one dyed with black walnut hulls and the other with coreopsis cuttings.

Elizabeth Szczesniak-Johnson, working with the fibers from her dearly loved llamas, wet- and needle-felted a decorative piece entitled *The Sun Giveth and the Sun Taketh*. She

Terry Miller

1) Leslie Markey, **2)** Elizabeth Szczesniak-Johnson.

solar dyed with Kool-aid, McCormick's food color, jewelweed, mint, fern, dahlia, goldenrod, and onion. Elizabeth achieved some of her dyeing by placing clear glass lidded jars on their sides in "Terry's Tub."

Solar dyeing is an exciting, low-cost, and environmentally friendly way to get involved with dyeing. It makes use of a gloriously free, natural energy source—the sun! Try it out some blissfully warm summer day and revel in your creation. ⌘

Jeannine Bakriges doesn't see her interest in solar and natural dyeing waning anytime soon. She's spent the snowy winter months in Vermont pouring over seed catalogs and dreaming of dye garden possibilities. Who knows, she may even venture beyond a dye garden and plant potatoes and pumpkins as well.

Resources

Selected Companies Selling Solar Products and/or Natural Dyes

Earthues
A Natural Color Company
5129 Ballard Ave. NW
Seattle, WA 98107
(206) 789-1065
www.earthues.com
Excellent tips and techniques about mordanting and natural dyeing, class offerings, retail suppliers for Earthues Natural Dye Extracts.

Prairie Fibers Company
627 7th St.
Ames, IA 50010
www.prairiefibers.com
A wide variety of natural dyestuffs and dye books.

Solar Cookers International
1919 21st St., Ste. 101
Sacramento, CA 95814
(916) 455-4499
info@solarcookers.org
www.solarcookers.org
Instructions for making solar cookers and boxes; premade cookers and boxes available for purchase.

Selected Solar Dyeing Articles

Bunkers-Branden, Traci. "Rainbow Dyeing, Sun-Tea Style," *Spin·Off 17, 2* (Summer 1993), 69–70.

Crump, Kathy. "Gifts From the Garden: Solar Dyeing With Natural Materials," *Spin·Off 17, 2* (Summer 1993), 74–76.

Kozlowski, Colleen, and Donann Remund. "Solar Box Dyeing—Making A Rainbow with Recycled Cardboard and Free Energy," *Spin·Off* 17, 2 (Summer 1993), 64–68.

Lampe, Jean. "Solar-Dyed Lace Poncho," *Spin·Off* 17, 2 (Summer 1993), 78–82).

Rubio, Nest. "Cool Dyeing," *Spin·Off* 17, 1 (Spring 1993), 14–16.

Selected Books for Natural and/or Solar Dyeing

Baxter-Packwood, Kimberly. *Compost Dyeing and Other Fermentation Dye Techniques*. Ames, Iowa: Prairie Fibers Company, 2003.

Casselman, Karen Diadeck. *Ethical and Ecological Dyes: A Work Book for the Natural Dyer*. Cheverie, Nova Scotia, Canada: A Studio Vista Textile Monograph: Number 3, 2000.

Dean, Jenny. *Wild Color*. New York: Watson-Guptill Publications, 1999.

Liles, J. N. *The Art and Craft of Natural Dyeing*. Knoxville, Tennessee: The University of Tennessee Press, 1990.

Van Stralen, Trudy. *Indigo, Madder & Marigold*. Loveland, Colorado: Interweave Press, 1993.

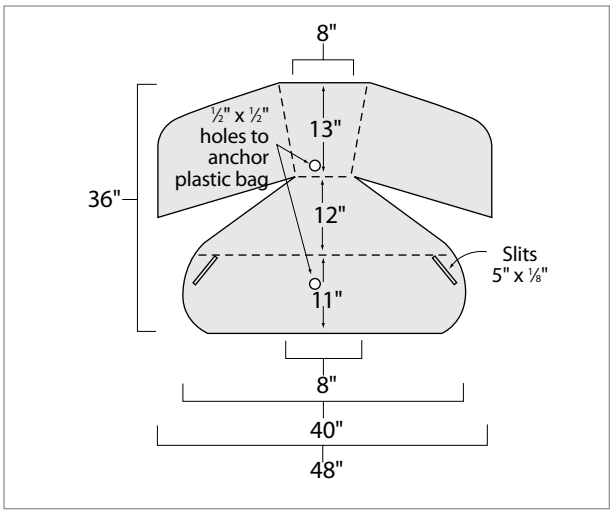
Wipplinger, Michele. *Natural Dye Instruction Booklet*. Seattle, Washington: Earthues/Color Trends, 1998.

1) Anne Riker, **2)** Leslie Powers, **3)** Leslie Markey.

Making a Solar Cooker

You can easily make a solar cooker by covering a piece of cardboard with aluminum foil to accelerate the heating process in your solar dyeing experiments.

Cut cardboard, making holes and slots where indicated; fold as shown. Glue aluminum foil to the side that will be concave when the cooker is in use. To set up, fit corners into cut slots as shown.



Solar Cooker #2 diagram provided with permission from Solar Cookers International, Sacramento, California.

Paint the outside of the glass jars with black enamel. Cut three squares from the black garbage bag to serve as covers for the jars. Use a rubber band to hold each square in place.

Using the solar cooker

Tuck the bottom of a clear plastic garbage bag into the back hole of the cooker to anchor. You may need to cut down the clear bag if it's too big. Place the jars inside the clear bag, lid side down so that they heat more evenly. If you're using a pot, do the same inside the pot. Place lid on the pot. Cover loose jars with cut squares of black garbage bag and secure with rubber bands. Gather the open area of the clear bag and poke it through the front hole on the cooker to anchor. Plastic clips are great for securing the clear bag and holding the corners in the slots.

Equipment Needed

Large cardboard sheet measuring 3′×4′.

Heavy-duty scissors or box-cutting knife.

1 box (25 yards) of heavy-duty aluminum foil.

Glue and foam brush.

Photo by Jeannine Bakriges

Two cooker panels being used to heat up dye baths on Jeannine's back porch.

Auxiliary Equipment

Three 1-gallon glass jars*, 1 black enamel canning pot, or 2 smaller black enamel blanching pots.

Black enamel paint and brush.*

Large, clear garbage bag.

Black garbage bag.*

Scissors.

Rubber bands.*

Three jar lids for glass jars* or 1 large jar lid (from gallon jar) for each black pot.

Four plastic clips.

Note: If you have a black pot, you won't need the items marked with an *.

Dyeing Safely

Follow the safety precautions on the labels for handling dye powder and dye solutions. Always wear a dust mask and gloves when handling dye powder and work in a well-ventilated area. Protect your skin and eyes from dye solutions. Never use your dye equipment for food preparation.

Tips for Solar Dyeing

- My mordant of choice is alum. I stay away from the more toxic mordants and suggest that you research mordants to help you make safe and environmentally friendly decisions. I sometimes use copper pennies, old brass doorknobs, or rusty nails as alternative mordant choices.
- Natural dyeing is about options and variables. Every step affects the color you get. Explaining all the options and variables are beyond the scope of this article, so please refer to the excellent books listed at the end.
- Sun is an absolute necessity for solar dyeing. Arrange your cooker to take advantage of the light. However, don't despair if it's cloudy. Soaking and fermenting at cool temperatures can be one of the variables you experiment with. Dyeing can take place over hours, days, or weeks. Take control and pull out the dyestuff or what you're dyeing as you wish. Remember that you can almost always overdye anything you're not satisfied with.

Photo by Elizabeth Szczesniak-Johnson

Leslie Markey's "Terry's Tub" with glass jars filled with vegetable matter dyes (see page 14 for details of her project).

- Remember that many dyestuffs, including plant material and woods, swell when wet. Do leave some wiggle room in the pot.
- The more water you use, the longer it takes to heat up. Consider using the least amount of liquid necessary to achieve good results.
- Temperatures within the cooker and jars and pots can get very hot. My dyes have reached 200 degrees with a cooker, even higher with a solar box. Be very careful when you're handling jars/pots that have been cooking. Note that when you're using some dyestuffs, clear and bright colors get muddied at high temperatures. On the other hand, some dyestuffs do not release their full color potential unless they're heated to a simmer or above and held there for an hour or more. Experimentation, coupled with researching what's been done before, is key to helping you decide how to proceed.

Photo by Tamara Christensen

Tamara Christensen's Cooker moveable, foil-lined cart for solar dyeing that can easily follow the sun (see page 13 for details of her project).