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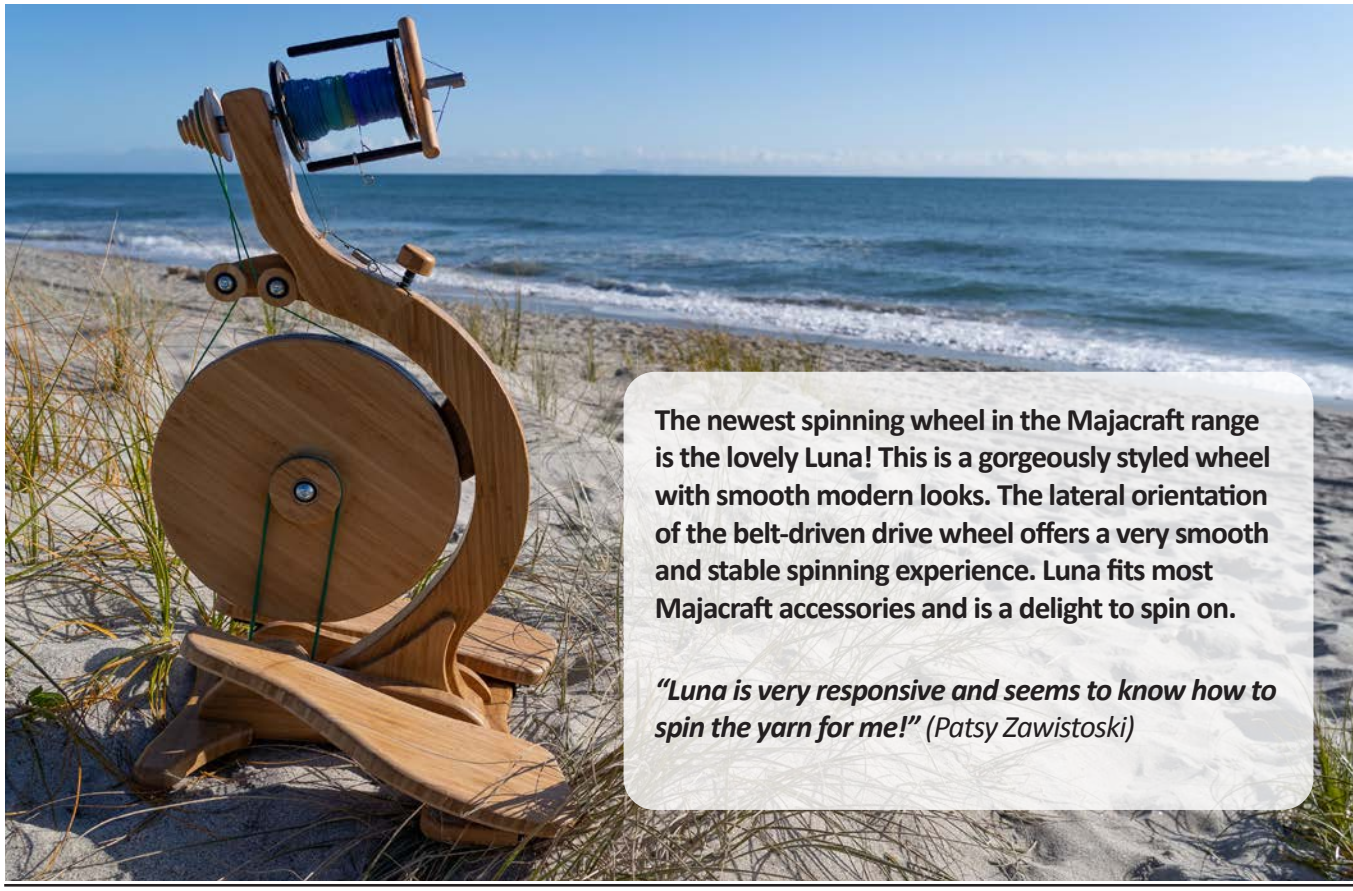

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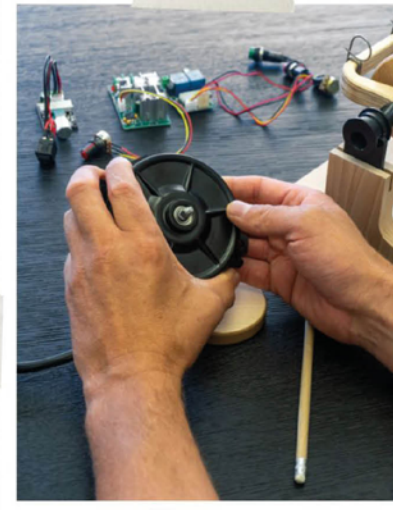

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On the cover: A natural palette of cochineal, madder, fustic, weld, and logwood dyed by Jane Woodhouse. See page 24.
Photo by Matt Graves

spinoffmagazine.com

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"Depth of shade" is a color theory term that I've always found to be as poetic as it is technical. It's often discussed as DOS and applied to specific measurements of dye, or it might be used more casually as we try to express an intuitive perception of color. Depth of shade involves hue families, saturation, and value—all evocative ideas for scientist and poet alike.

I know analytical spinners who don't consider themselves to be creative, and I know artistic spinners who don't feel they can incorporate math and measurements into their fiber work. But handspinning is always a mix of these elements, and in learning from one another, we can explore fibers close to home and far afield, into the future and deep into the past. We can create beautiful things individually and as a community.

In this Spring color issue, natural dyer **Jane Woodhouse** looks back to the work of Fred Gerber and uses his approach to create a huge palette of natural color. Even using her typical dyestuffs, she found some surprises! **Mary Berry** uses acid dyes to explore saturation, value, and the difference between the two—a must read if you want to develop more control over color.

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While living in Morocco, author **Irene Waggener** learned a traditional sock construction that is knit-to-fit. That's right—no gauge measurements! She added a simple colorwork motif to create the perfect slipper sock for handspun leftovers. **Louie García** shares some of the cotton and color histories that connect his current textile work with his Pueblo community and traditions. Hear from **Karida Collins** of Neighborhood Fiber Co. about finding color inspo in her cityscape, see **Riley Kleve**'s blending ratio results, and so much more!

Wishing you peace and perfectly filled bobbins,

Spin Off®

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Photo by Allan Brown

The Nettle Dress:
A Magical Tale of Love and Healing

LINDA LIGON

Once upon a time (as all good stories begin), I was walking along the headlands at Land's End in southern England. The hedgerows were rich with hawthorn, blackthorn, hazel, holly, and a lanky, leafy, weedy-looking plant that looked, I thought, just like stinging nettle. Just like in my backyard at home! I heedlessly grabbed a handful, and sure enough—stinging nettle. The more I walked along, nursing my poor hand, the more nettle I saw in the understory. It had sprung up everywhere in the fertile, moist soil.

It's a wonderful weed, really: rich in nutrients, effective for a wide range of maladies, delicious in soups, stews, salads, wherever you might use spinach, once you soak off or strip off the vicious little spines that inject you with histamines, formic acid, and other irritants.

But best of all, most magical of all, is the silky, spinnable fiber hidden in its long, rank stems. Humans have been retting out these fibers and fashioning them into cloth for at least three thousand years. It's the stuff of fairy tales (remember the story of the 11 brothers in Hans Christian Andersen's "The Wild Swans"?) but also the stuff of peasants' work clothes. For millennia in some communities, humans gathered, soaked, retted, hackled, combed, spun, and wove this ubiquitous weed into the fabric of their everyday lives—at least, until cotton came along. The spinning was especially time intensive. Imagine producing four or five thousand yards of nettle yarn on a drop spindle for a single shirt.

There's more magic than just the fiber, though. Nowadays, making our own nettle cloth isn't a life necessity. In practice, it can be a meditation on nature's bounty, on human ingenuity, on spiritual values. It

Image courtesy of Dylan Howitt

Film poster

can be a reflection on the hidden beauty to be found beneath thorns.

No one knows this better than Allan Brown of Brighton, England, who spent seven years immersed in the creation of a nettle dress. He says, "Making clothing this way is slow and gentle. It means returning to the same places and doing the same things over and over. The repetitiveness of so many of the tasks that go into creating cloth feels like a deepening rather than drudgery. It's as if the cloth is ensouled by intention. Clothing that is being made this way, specifically for you, by people that know and love you, from fibers that are to be found in your own landscape, is the way clothing has been made for most of our history. We were collectively wearing the dreams, stories, joys, and suffering of the people that made up our community."

Allan's journey into "hedgerow couture" has been documented in an enchanting film by his colleague Dylan Howitt. Allan spun and wove his way through years of "tragedy, magic, and love" as his wife died, his daughters grew up, and he evolved a simpler, more sustainable life. The film, simply titled *The Nettle Dress*, hasn't been released in the United States yet, but a short trailer is available at nettledress.org. It will feed your soul.

Visit nettledress.org or Instagram @nettledressfilm for up-to-date information on screenings in the United States and abroad.

Allan Brown collecting nettles in England

Allan's daughter Oonagh wearing the finished nettle dress

Photos by Dylan Howitt

Further Reading

The Nettle Dress. nettledress.org.
Nettles for Textiles. nettlesfortextiles.org.uk.
The Long Thread Podcast. "Allan Brown, *The Nettle Dress*."

Linda Ligon is a cofounder of Long Thread Media.

Photos courtesy of Emilia Vasnin and Spencer Tennant

Starfall Shawl

EMILIA VASNIN

Pattern and designer Radiata by Nim Teasdale (@nimble_knits).
Fiber Merino with Angelina.
Wheel system/spindle Kromski Polonaise.
Drafting method Woolen long draw.
Singles direction Z-twist.
Ply wraps per inch 14–16.
Total yardage About 750 yards.
Yarn classification/weight Fingering.
Yardage used About 750 yards plus 1 yard.
Needles Size 5 (3.75 mm).
Finished size 42" diameter.

Anyone who knows me knows that stars and moons and gradients are my thing. For years, I'd been talking about knitting a night sky that I could wear, but it was a challenge I never seemed prepared to take on. I had a set of gradient fibers sitting in my secret stash—because of course I have to stash favorite fiber—that was too pretty to use. Then one day, I decided out of the blue that it was its *turn* on the wheel.

I spun the yarn in spring of 2022, but then it sat on my shelf until late fall because, like the fiber, it was too perfect to use. But I wanted to show the world this incredible yarn, and carrying it around in a bag and shaking it at strangers seemed a little too weird, even for me. Shawls are some of my favorite things to make, so I searched for a pattern that was complex enough to be interesting

On the blocking mat

but not so much that it would clash with the complexity of the yarn. Radiata was perfect: it fit a range of sizes, the geometry felt mystical, and it was pointy like the little star sequins that I had scattered throughout my yarn.

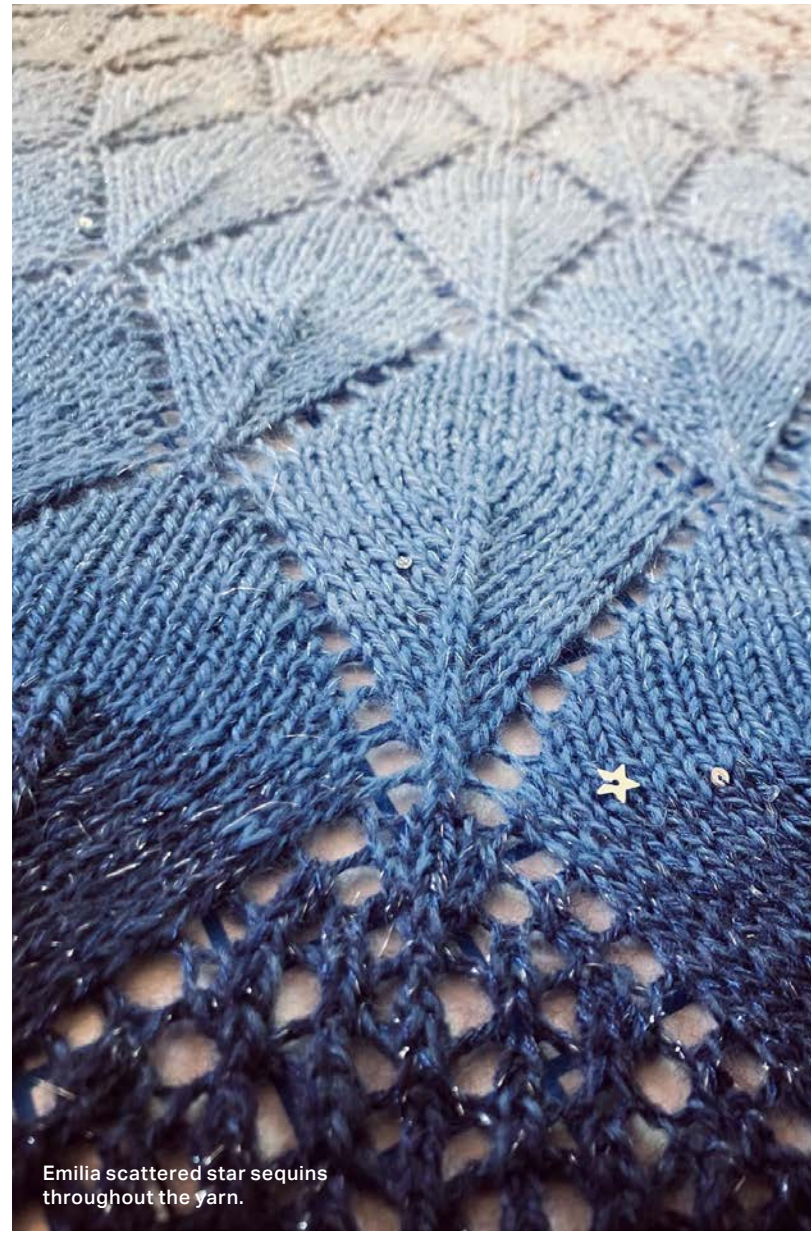
My favorite part of the project was creating the yarn itself, watching the colors blend into a gradient, and then I loved watching my knitting change colors as I worked. The challenge while spinning was mapping out the singles to overlap in a way that made the gradient as smooth as possible; while knitting, it was figuring out how to use up the whole skein to get the gradient effect to the max.

I made it halfway through the medium-sized pattern using a size 4 circular needle before I realized it felt too cramped and that I would have way too much yarn left over—unacceptable. So, one night in November, I frogged and cried and frogged some more.

The next morning, I reskeined, rewound, and restarted with a size large pattern and a size 5 needle. I worked diligently through December and, finally, just before Christmas, I lost at yarn chicken by 14 bind-off stitches. I grabbed the closest matching navy roving I had and a drop spindle, and I frantically churned out one more yard of yarn. Fourteen stitches, a blocking board, and two days later, my favorite project—inspired by the night sky during the coldest days of winter when the moon and stars shine the brightest—was complete and better than I'd ever dreamed. I have since entered this shawl in the Texas State Fair, and I'm pleased to say it won a blue ribbon!

Emilia Vasnin is a knitter, spinner, and carder living in Dallas, Texas. She fell in love with wool over 10 years ago at a local Renaissance fair. When she's not working on her handspun, she's caring for her two horses (very hairy) and her cat (hairless).

Have a finished object to share? Tell us about it! Contact **spinoff@longthreadmedia.com** to submit your project.



Emilia scattered star sequins throughout the yarn.

Photos courtesy of Irene Waggener

The Spinners of Timloukine

Handspun Rugs and Socks in the High Atlas Mountains

Based on an excerpt from *Keepers of the Sheep: Knitting in Morocco's High Atlas and Beyond*

IRENE WAGGENER

"Welcome to Timloukine!" Nora said brightly as we reached the top of a steep river bank. We were standing on the edge of a small terraced field full of bright green alfalfa below a village of rammed-earth homes made from the valley's rust red soil. Surrounding us were the tall, snow-capped peaks of Morocco's High Atlas Mountains. The bucolic view was punctuated by the sound of bah-ing from small flocks of sheep grazing on the slopes both near and far. We followed a dirt mule track into the village.

The *raoud* was a one-room school building in the middle of Timloukine. It had a door, badly damaged chalkboard, and teacher's desk on one end. Faded straw mats covered the hard, cement floor and wooden benches lined the robin's-egg-blue walls. A faded portrait of Mohammed VI, Morocco's current king, was tacked high on the back wall. Blue plastic stools, many with broken seats, were stacked in the corners. The *raoud* had not seen a class in several months. Although the community welcomed the teachers sent to them, the assignees only lasted a few days or weeks in the small village far removed from the hubbub of towns and cities. Nora, however, had accepted an offer to be the new pre-school teacher at the start of the upcoming school year, something the community waited for with anticipation. For now, Timloukine's women's cooperative - of which Nora was the current leader - used it as their meeting room.

Dusty shoes lay scattered by the door, and more than two dozen women sat crowded on the floor in groups with their legs stretched out in front of them. They had come with cardboard boxes full of wool, carders, and the long, thin spindles used by spinners in this area. Some of them had black and white striped blankets across their laps, which kept their clothes clean as they carded freshly washed white wool. The room was buzzing with their voices as they talked about family, news, and their aspirations for the cooperative.

I went from group to group and talked with the women about the different types of wool yarn they were spinning. Some were making the loosely spun *tilmi* I had seen on my first visit to Timloukine. Others were spinning up a more tightly spun, two-ply *ibilou* yarn, which is cut into finger-length pieces and tied around the warp threads on a loom to create the thick pile characteristic of Amazigh carpets in Morocco.

A couple of the older women were drawing out a much thinner, more tightly spun yarn called *ifilan n'tqasher*. In their dialect of Tashelhit, *ifilan* simply means yarn, and *tqasher* means socks. The *ifilan n'tqasher* seemed to be a worsted or bulky weight yarn.

I noticed that none of the younger women were spinning *ifilan n'tqasher*. I asked a young woman near my elbow if she could spin it. She smiled and shook her head explaining that only a few of the older men still knit socks, so there was no need for younger women to learn how to spin the finer yarn. Young women only needed to make the thicker yarn used for rug weaving - their main means of earning an income in a region with few economic opportunities for women.

Across from us was a young woman who had heard I was interested in knitting and had brought double-pointed knitting needles with her. She waved me over and placed in my hands thin, wire needles that were blunt and pinched at the tips where they had been cut. I presumed they had been made by cutting a longer piece of wire into the five needles I held. "These are wonderful!" I said. "Do you know how to knit socks?" She nodded and gestured to a neighbor who threw her a ball of freshly spun *ifilan n'tqasher*.

The young woman's hands shook as she cast on 10 stitches. More than half of the room had stopped to watch her. She was clearly nervous. "How did you learn to knit?" I asked in an effort to break the silence

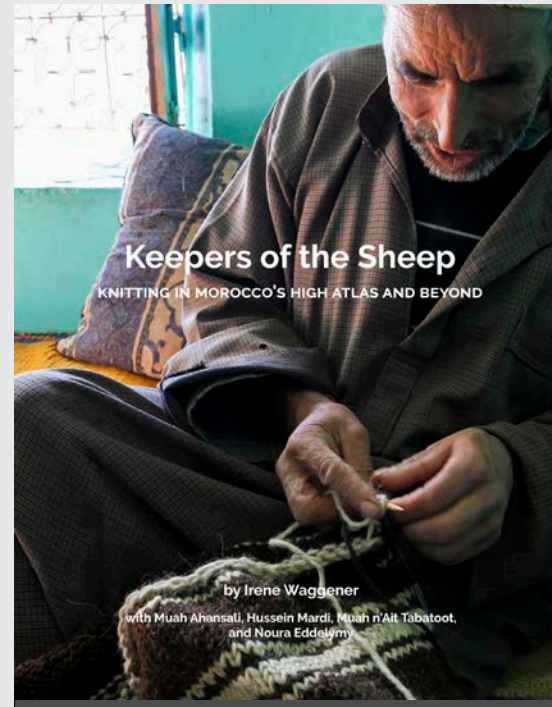
and deflect the attention. "Well, I'm still learning. I've been watching my grandfather," she replied, seeming relieved at the chance to talk instead of knit with so many eyes on her. "Oh! He makes socks?" I asked. "Well, not so much anymore," she responded. "Do you have any socks that he made?" I enquired. She nodded. One by one, other women chimed in that they had socks knitted by their fathers, grandfathers, uncles, and cousins. A few of them jumped up and left the *raoud*. When they returned, they were carrying pairs of worn socks in the colors of Timloukine's sheep.

I laid out the socks in a variety of sizes and shades of cream, brown, and gray. Some were clearly for children while others must have been worn by adults. All had the distinctive tail from the cuff that enabled the wearer to hang the socks up to dry. One woman showed me that the tail was tied around the leg to keep the socks from slipping down and the cuff snug around the wearer's pants leg, which they liked to tuck into their socks. The heels appeared to be a type of flap or band heel, and there were no gussets at the ankles.

"What wonderful socks!" I exclaimed. "These are the best when it's cold. They're better than the ones you get at the market," said a woman who had brought one of the pairs in front of me. "My husband can show you, but he's away with the sheep now."

I had arrived in Timloukine just as the men were beginning to take the sheep up to Jebel Rat, the highest peak near the village, where the air was cooler and grazing better. There, the shepherds would stay in stone huts, only coming down for the weekly Saturday market where they would sell one or two sheep to pay for provisions like grain, soap, and oil. I had come to work with the women, so I didn't have time to hike up Jebel Rat to visit the men - nor would it have been acceptable according to local custom for me, an unrelated woman, to go up there on my own. If I wanted to learn about sock knitting, I would have to return when the shepherds and their sheep were once again in Timloukine.

Irene Waggener researches knitting traditions around the world. She is the author of *Keepers of the Sheep: Knitting in Morocco's High Atlas and Beyond*, which she wrote in collaboration with shepherds from Morocco's Aït Boulli valley. She is currently living in Yerevan, where she is working on a new book about knitting in Armenia. You can find her work at 106metersfromtheroad.com or on Instagram @waggens_ho.



Irene Waggener with Muah Ahansali, Hussein Mardi, Muah n'Ait Tabatoot, and Noura Eddelymy

Find it at 106metersfromtheroad.com.

Savannah's Socks—perfect for early spring weather. Shown with a Sheep Gear Spindle from Snyder Spindle

Photos by Matt Graves

Ntaidrin (Wheat) Socks

Pattern for Handspun Yarn

Excerpted from *Keepers of the Sheep: Knitting in Morocco's High Atlas and Beyond*

IRENE WAGGENER

Author's Note: From 2017 to 2020, I worked with Amazigh shepherds in the High Atlas Mountains to document the oral knitting patterns they had learned from their forefathers. These patterns are like basic recipes and are used specifically with handspun yarn. Rather than relying on gauge swatches, they require the knitter to try on the garment as it is made, resulting in something that will fit any size.

The following sock pattern is based on the "Tqasher Qadeem" or "Old Sock" pattern that was taught to me by Hussein Mardi. Hussein knit only plain colored socks with tall cuffs. For the Ntaidrin pattern, I eliminated the cuff and added motifs that are used in knitting from the region. The simple pattern is ideal for any stitch count divisible by two.

For more about the people, patterns, and history of knitting in Morocco, check out the book *Keepers of the Sheep: Knitting in Morocco's High Atlas and Beyond* (learn more on page 17).

***I used Hussein's* tqasher qadeem** as the base for these slipper socks. The motif was inspired by High Atlas leg warmers in the book *Onze Lunes au Maroc* and can fit any size sock as long as you work with a multiple of 2 stitches.

In Tashelhit, *taidart* (singular)/*ntaidrin* (plural) means wheat, which is what this motif depicts in a beautifully abstract way. In the warmer months, the irrigated plots below Timloukine are full of soft, gently swaying wheat.

After harvesting, Noura's family keeps large sacks of the grain in a windowless interior room where it is always a constant temperature thanks to the thick rammed-earth walls. They take the wheat to a water-powered stone mill to grind it into flour.

Every morning, one woman in the family makes the day's bread by kneading together flour, salt, yeast, and water in a shallow, wooden bowl. She pats the dough into rounds, which she wraps carefully in several layers of cloth. The rounds are left to rise before they are unwrapped, flattened, and then wrapped again to rise a little longer before baking in a propane oven or in a hot pan.

Before the arrival of propane, women buried the dough under the embers of the cooking fire where it would develop a wonderful crust and soft, spongey interior. When the bread was finished, they dug it out and wiped it clean. In years where there is not enough snowfall or rain to sustain a good wheat harvest, people must buy flour from the weekly market.

Notes

- Any size needle and yarn are appropriate, but the slippers shown were knitted using a worsted weight yarn with US size 0 needles.
- This pattern is perfect for using up leftover yarn.
- If knitting with a tight gauge or thin yarn, follow instructions to CO 10 sts. If knitting with a looser gauge or thicker yarn, CO 5. Also, if making the slippers for a child, CO 5.
- A gauge swatch is not necessary. Just try the toe cap on as you knit and stop increasing when you reach both your desired size and an even number of stitches.

Savannah's Socks

The handspun socks shown here used about 110 yd total. MC is a three-ply spun from Corriedale combed top, and CC is chain-plied Merino/Bombyx silk from Lisa Souza Knitwear and Dyeworks in the Berry Compote colorway.

Corriedale combed top and Merino/Bombyx silk. Shown with a Snyder Spindle

MATERIALS

7, US size 0 double-pointed knitting needles
DK or worsted weight yarn
Stitch holder or waste yarn
Stitch marker
Tapestry Needle

SOCKS

1 The Toe

To start, the toe is worked flat in st st.

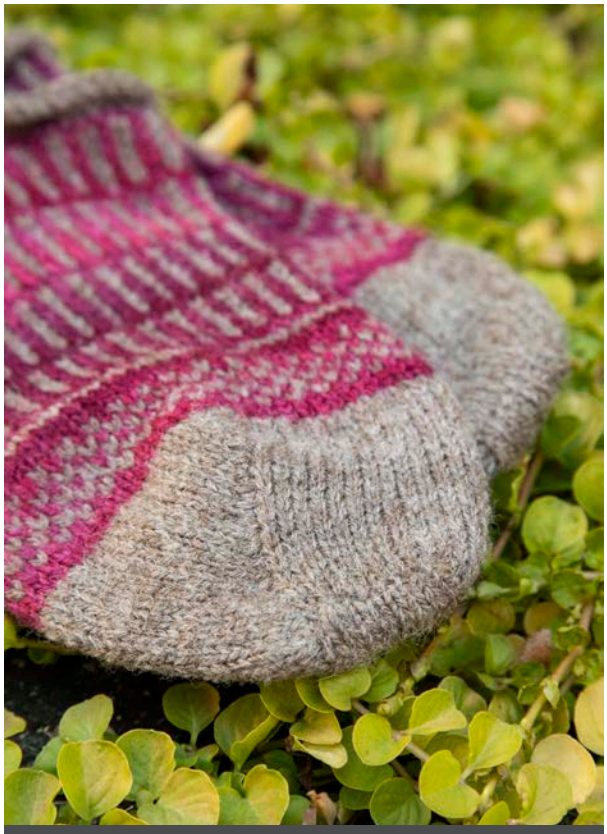
With MC, CO 10 (5) sts using SCO (simple cast on or e-wrap cast on) method.

Row 1: Slip 1st st purl-wise. P 9 (4). Turn work.

Row 2: Slip 1st st purl-wise. K 9 (4). Turn work.

Work rows 1 and 2 until piece measures 1 in (2.5 cm). Finish with a K row.

To prepare for working in the round, sts are picked up around the piece of flat knitting.



These toe-up socks are "knit to fit." No gauge swatch is necessary.

With working needle, PU&K 1 st for each st along side edge of rectangle. Continue to PU&K 10 (5) sts along bottom edge. This is now N1. To help you remember that this is N1, place a marker between the last and 2nd to last sts on needle (this is actually the beginning of the round since this is where you started). *Editor's note:* to put this another way, the marker is placed between the first and second stitches you worked onto N1.

With a new working needle, PU&K sts along final edge of rectangle ensuring you pick up the same number of sts as for opposite edge. Continue to K across 10 (5) sts on original needle. This is now N2. Both needles 1 and 2 have the same number of sts on each.

Work toe increases in the space between the 2 needles as follows:

With working needle, PU&K 1 st at the space between needles. Continue to K to end of N1, slipping marker when you come to it (note, the marker will shift position as you increase sts). With working needle, PU&K 1st at the space between needles. Continue to K to end of N2.

Repeat from * to * until the toe cap fits from big toe to little toe. Remember to try on the sock occasionally as you knit to ensure a good fit. When you finish increasing, N1 and N2 should have the same number of sts.

Distribute sts evenly on 4 needles to accommodate working in the round.

First, move stitch marker so it sits between the 1st and 2nd sts on N1 (it will have moved as you increased sts for toe shaping).

Count sts on N1 and divide in half. Slip last half of sts on N1 onto a new needle. This new needle is now N2.

Slip first half of sts on former N2 onto a new needle. This new needle is now N3.

What used to be N2, with the remaining half of the sts, is now N4.

There should be the same number of sts on each needle.

N1 and N2 are the top of the foot. N3 and N4 are the bottom of the foot.

The beginning of the round is between N1 and N4.

K in the round until toe cap reaches base of toes.

Remember to try your knitting on occasionally as you work to ensure the best fit.

2 The Foot

Follow the Colorwork chart using MC and CC until there is 1 finger width of space between the sock foot and the front of the ankle when foot is flexed.

Remember to try your knitting on occasionally as you work to ensure the best fit.

If necessary, repeat pattern from row 12 or 18 until foot is required length. Cut MC and CC leaving tails to sew in later.

3 The Heel

The sole is worked flat across 10 sts on 1 needle.

Isolate the 10 sole sts as follows:

Slip last 5 sts of N3 and 1st 5 sts of N4 onto a stitch holder.

Count remaining sts on needles and divide this number by 3. This will give you the number of sts that should be on each of 3 needles.

Note that if you cannot have the same number of sts on all 3 needles, you should divide sts so you have the same number of sts on the 2 side needles. The top needle can have a different number of sts.

Distribute sts accordingly by slipping sts from N2 to N3 and N1 to N2.

K remaining sts on N1 keeping stitch marker in place. You should have the appropriate number of sts on N1, now. N1 is sock's left side.

K across N2 (top) and N3 (right side).

Transfer sole sts from stitch holder to new needle. Transfer sts on N2 to stitch holder.

N1, N2 (stitch holder), and N3 remain dormant while working 10 sts for sole of sock.

Knit sole sts as follows:

Row 1: K 10. Turn work.

Row 2: Slip 1st st purl-wise. P 9. Turn work.

Row 3: Slip 1st st purl-wise. K 9. Turn work.

Repeat rows 2 and 3 until sole reaches back edge of heel. End with a K row. Try sock on occasionally as you knit to ensure proper fit.

The heel is turned by picking up sts along both sole selvedges and working back and forth across the sole sts; picked up sole selvedge sts; and the side sts.

Prepare for turning the heel as follows:

Move stitch marker from N1 to needle with sole sts. Sole is now N1.

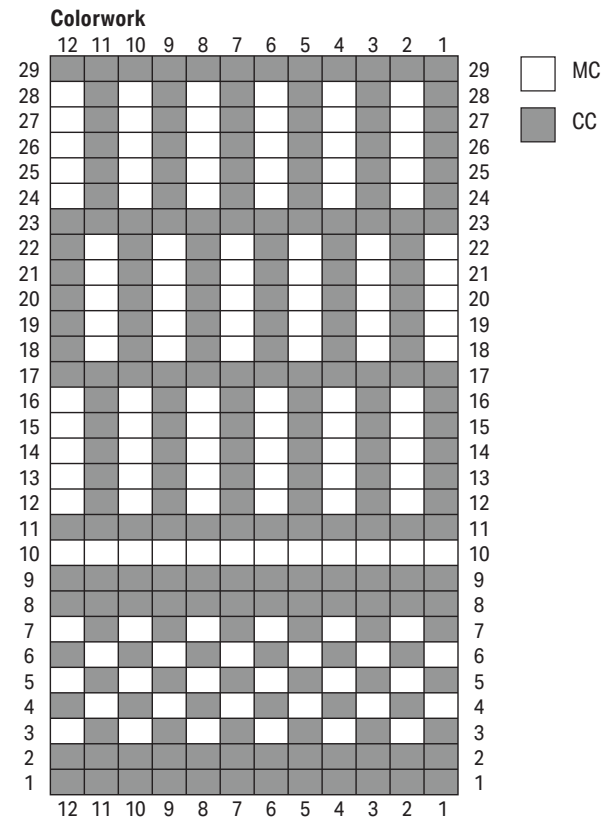
Move top sts from stitch holder to fresh needle.

With an empty needle, pick up 1 st for each selvedge st on left side of sole. This is now N2.

With a new working needle, K across next needle (left side of sock). This is now N3.

With a new working needle, K across next needle (top of sock). This is now N4. It will remain dormant as you turn heel. You may replace the needle with a stitch holder if you prefer.

The heel is worked with easy pick-ups and decreases.



This simple but elegant colorwork pattern symbolizes stalks of wheat.

With a new working needle, K across next needle (right side of sock). This is now N5.

With a new working needle, pick up 1 st for each selvedge st on right side of sole. Pick up the same number of sts as you did for left side on N2. This is now N6.

You need the same number of sts on N2, N3, N5, and N6. Adjust, if necessary, by slipping sts from N3 and N5 to dormant N4 or from dormant N4 to N3 and N5.

The needles are numbered as follows:

N1: sole of sock (10 sts)

N2: selvedge edge (total based on number of sts picked up)

N3: side (same number of sts as N2)

N4 (or stitch holder): top

N5: side (same number of sts as N2)

N6: selvedge edge (same number of sts as N2)

Turn the heel by working flat across N1, N2, N3, N5, and N6 as follows:

Row 1: With a 7th working needle, K to last st of N2. Slip last st on N2 to N3 and SSK with N2. Turn work.

Row 2: Slip 1st st purl-wise. P to last stitch of N6. Move last stitch on N6 to N5. P2tgthr with N6. Turn work.

Row 3: Slip 1st st purl-wise. K to last st of N2. Slip last st on N2 to N3 and SSK with N2. Turn work.

Repeat rows 2 and 3 until there are no more sts on N3 and N5. End with a purl row.

If top sts are on stitch holder, transfer to a fresh needle.

All sts are now distributed on 4 needles and are ready for working in the round. Needle numbering is as follows:

N4: right side of sock

N1: back of ankle

N2: left side of sock

N3: front of ankle (sts that were dormant as you turned heel)

4 The Cuff

The cuff is knit in the round.

Since the yarn is at the beginning of N4, set up for working in the round as follows:

Slip 1st st purl-wise. K to end of N4.

K in the round from N1 for 4 rounds.

BO loosely knit-wise all the way around. Sew in loose ends.

Resources

Irene Waggener, 106metersfromtheroad.com.
Lisa Souza Dyeworks, lisaknit.com.
Snyder Spindles, snyderspindles.com.

Irene Waggener researches knitting traditions around the world. She is the author of *Keepers of the Sheep: Knitting in Morocco's High Atlas and Beyond,* which she wrote in collaboration with shepherds from Morocco's Aït Boulli valley. She is currently living in Yerevan, where she is working on a new book about knitting in Armenia. You can find her work at 106metersfromtheroad.com or on Instagram @waggens_ho.

Photos by Matt Graves

Natural dyestuffs (*top from left*): whole cochineal, ground madder roots, fustic extract, ground weld, logwood chips

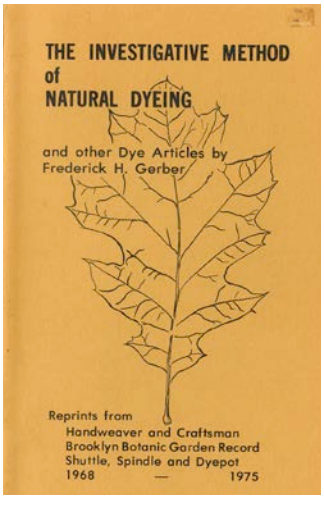
A Natural Dyer's Road Map

Revisiting Gerber's Investigative Method

JANE WOODHOUSE

Studying Fred Gerber's books and articles published in the late 1960s through 1970s has been a part of my recent journey revisiting the work and personalities of my fiber past. While Fred, a botanist by training, was involved in a wide range of textile and other art practices, it is his work in natural dyes that is most known.

Fred's articles were published in several magazines, and his three monographs *Indigo and the Antiquity of Dyeing, Cochineal and the Insect Dyes*, and *The Investigative Method of Natural Dyeing and other Dye Articles* were written in 1977 and 1978. These monographs were known for their inspiration to natural dyers, and the simple format made them inexpensive to purchase. *The Investigative Method of Natural Dyeing* is a collection of his published articles with one related to his investigation of a natural dyestuff's potential. His "method," used by many teachers, followed a prescription for testing dye potential by



sampling each one using a variety of premordant and postmordant processes. This article was reprinted in the Fall 1994 issue of *Spin Off* following his death that year and is worth a read.[1]

In the 1990s, our community became aware of the toxicity of several of the substances, in particular chrome, copper sulfate, tin, and a number of additional postmordanting chemicals. That awakening to material safety in handling and disposal prompted many of us to switch to chemical dyes. Later, a fresh look at chemical substances, dyes, and safety information led to a renaissance in natural dyes. I credit Michele Wipplinger with leading the shift back to natural dyes.[2] She researched her materials, professionally testing disposal of her mordant and dyebaths to inform her practices with health and the environment at the forefront of her decisions.

With our return to natural dyes, many of us were inspired by the work of Fred Gerber to approach our work methodically and in a way that offered a template for sampling dyes for their potential range of color hues and for reproducing them. However, his cheaply produced books are long out of print and scarce in the used-book market. Thus, they go for handsome sums.

> Are you interested in natural dyeing but need some beginner resources to help you follow along? We have you covered! Visit LT.Media/Beginner-Dyer.

A GERBER-INSPIRED INVESTIGATION

Gerber's sampling style allows us to study many aspects of natural dyeing, and my sample sets here explore several *mordants*, which are substances that facilitate bonding between dye and fiber. Mordants can be applied to the fiber before the fiber is added to the dyebath (premordant), within the dyebath itself, or after the dyebath (postmordant). With what I learn from the first samples, I can create a new set of samples to explore *assists*, substances that impact the dyeing results in various ways.

For me, the "investigation" is not only about color and shade shifting but also about comparing strength versus cost of similar mordants and ease versus difficulty of processes.

Premordant Samples

To begin mapping my own template for experiments, I needed to first set some parameters. I would limit my investigation to protein fibers and would compare several premordants and sample each one as a lone mordant substance in the mordant bath with no additional assists. I chose four mordants for sampling that technically should give the same color, but I suspected they would not produce the same color at the same strength. I used each one at the high end of its recommended amount to create darker colors. I wanted to be able to test the full potential of each dye in a given mordant.

Premordant 1 My usual mordant of choice is potassium aluminum sulfate, which we often call alum, but it is only one of four alums that work well on protein fibers. I did not include the usual addition of cream of tartar in this set of samples.

Premordant 2 Aluminum sulfate, which we often simply call alum sulfate, is a less expensive mordant that can be used with good results provided it is a low-iron alum sulfate.

Premordant 3 Symplocos, a plant-based mordant, would allow me to investigate opportunities in working with a 100% plant-based dye process. It is an aluminum accumulator with aluminum-rich leaves grown in Indonesia. The dry leaves are gathered to be ground and used in a mordant process. No trees are taken down to produce this mordant. It is a completely renewable resource for natural dyers.[3]

Premordant 4 Finally, I chose aluminum triformate to sample a cold-mordant process. It requires no heating and is a very passive way to prepare fibers for dyeing.[4]

To sample, I selected the dyes that I use in extract form in most of my work and workshops: cochineal, madder, fustic, weld, and logwood. These dyes can be purchased as extracts, or you can make your own.[5] (I did not include indigo in this sampling, as it is unlikely the mordants would have much effect on it.)

The initial group of base samples consisted of eight skeins of yarn: four natural white and four natural gray per dyestuff divided into four mordant baths. This is typically how I sample dyes and color

Dye and mordant combinations shown on white and natural gray wool

formulas in my workshops. Natural gray sheep's wool dyes beautifully and extends the range of color possibilities without much effort.

In replicating my samples, you may have completely different results. Depending on your source of water, color shifting will, to some extent, reflect the mineral content of your water. I use well water that is moderately hard to very hard. I think it is important to try dyeing with water you have readily available; purchasing water is unsustainable on many levels.

Premordant Results

The results were quite positive. One quick takeaway from this first group was that all samples came out very soft to the touch. With the omission of cream of tartar, I anticipated some harshness, but that was not the case. Colors dyed well. My initial expectation was that one mordant would win the prize as a reliable go-to for my dye work due to strength of shade. However, in evaluating the results, I found that some dyes, especially the reds, have an affinity for one mordant or another. In particular, cochineal and madder did well with different mordants: cochineal did well with the alum sulfate, while madder did better in the potassium alum sulfate. I suspect the alum sulfate has a lower pH because cochineal has an affinity for acids, while madder prefers a more alkaline environment to develop clear true reds. The two yellows, fustic and weld, showed little difference from one mordant to the next. Logwood was particularly interesting. It produced purples with alum sulfate and potassium alum sulfate, but with aluminum triforate and symplocos, it produced blue-leaning colors.

With these results, I decided to choose one mordant for each of the dyestuffs and began exploring assists.

ASSIST SAMPLES

I mordanted additional natural white and gray skeins to sample each dyestuff with seven separate assists in the dyebath. Seven made sense in that my canning kettles have a seven-jar capacity. For these samples, I would test cream of tartar, tartaric acid, citric acid, calcium carbonate, soda ash, and Glauber's salt, each added to a separate jar with a dye and two small skeins. The seventh sample included iron lactate (ferrous lactate) as a postmordant.

With the exception of Glauber's salt, all the assists shifted the baths toward an acid or alkaline pH to varying degrees. However, I wanted to test Glauber's salt, as it reportedly aids in leveling and exhausting of the bath. This was an opportunity to see if in fact it produced a slightly darker color on the yarn. If so, it could be used in combination with the acid/alkaline modifiers.

Finding the suggested amounts of each assist was not easy. Suppliers describe what the assist will do but fail in some cases to give suggested amounts. I was able to dig through very old dye notes to find some pointers. In other cases, such as for citric acid, I looked at the amount used to fix acid dyes thinking it would not harm the hand of the fiber. I found amounts for

Dye, mordant, and assist combinations shown on white and natural gray wool

Jar	A	B	C	D	E	F	G
MODIFYING ASSISTS	Cream of tartar	Tartaric acid	Citric acid	Calcium carbonate	Washing soda	Glauber's salt	Ferrous lactate
WOF	6%	5%	5%	10%	10%	20%	3%
COCHINEAL Alum Sulfate							
MADDER Potassium Alum Sulfate							
FUSTIC Potassium Alum Sulfate							
WELD Potassium Alum Sulfate							
LOGWOOD Potassium Alum Sulfate							

WOF: WEIGHT OF FIBER

calcium carbonate and soda ash as ratios of each to a given measurement of water. Both suggestions were 1 gram to 1 liter of water. Since a quart is slightly less than 1 liter and I was using quart canning jars, I went with 1 gram. In reality, I usually add calcium carbonate by pinches to shift color, especially with madder and weld.

I also used ferrous lactate as a postmordant added at the end of the dyebath process. According to GREEN'ING, a French supplier of natural dyes and additives, "it is produced from lactic acid obtained by fermentation of renewable materials from the sugar/starch industry."[6] It is an alternative for ferrous sulfate to darken colors and add to their colorfastness.[7] It was new to me and is suggested for organic textile production, so I gave it a try.

Assist Results

I was surprised and pleased with the results. The winner on diversity and range of color across the list of assists is madder, which ranged from gold to orange to reds and a good, clear red. It was exciting to see these colors coming out of the dyebaths. The assists shifted the other dyes to a lesser extent but still produced a range of colors. Glauber's salt seems to have aided in leveling the colors, and the samples are a bit darker. This would be consistent with its reputation for both leveling and encouraging the dye to strike more completely. Glauber's salt can also be used in combination with the acid and alkaline modifiers and may produce different results.

I still did not note harshness in the yarn from any of the processes. The assists that would concern me are the calcium carbonate, soda ash, and ferrous lactate, but the yarns all came through in good shape.

LOOKING FORWARD, LOOKING BACK

We can learn so much from seeing the results of someone else's dyepots, but again, I stress that color results are specific to one's source of water. I hope my investigation aids your own.

For me, revisiting older texts in this field of natural dyeing, such as Fred Gerber's, is inspiration. So many of the mordants and assists used in the past were toxic and even deadly. What we gain today is a sense of curiosity and appreciation in our search for color and process with respect to efficiency, cost, environmental impact, and discovery of new color options. The challenge is to find the combination of mordants, dyes, and assists that can both replicate a given color and expand your color range. ●

Notes

1. Fred Gerber, "Investigative Method: A Tool for Study." *Spin Off*, Fall 1994, 110–118.
2. Jane Woodhouse, "In Memory of a Master Natural Dyer: Thoughts on Michele Wipplinger." *Spin Off*, May 8, 2020, spinoffmagazine.com/in-memory-of-a-master-natural-dyer-thoughts-on-michele-wipplinger.
3. Maiwa provides information, instructions, and purchasing options for symplocos. See maiwa.com/collections/symplocos.
4. Botanical Colors provides information, instructions, and purchasing options for aluminum triformate. See botanicalcolors.com.
5. Woodhouse, "Making Dyestock Solutions from Natural Dyes." *Spin Off*, Spring 2014, 82–85.
6. GREEN'ING provides instructions and purchasing options for ferrous lactate. See green-ingredients.com/en.
7. Yarn Tree has purchasing options for ferrous lactate. See theyarntree.com.

Resources

Boutrup, Joy, and Catharine Ellis. *The Art and Science of Natural Dyes*. Atglen, PA: Schiffer, 2018.

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Gerber, Frederick H. *Cochineal and the Insect Dyes*. Ormond Beach, FL: self-published, 1978.

———. *The Investigative Method of Natural Dyeing*. Ormond Beach, FL: self-published, 1978.

Jane Woodhouse has spent many years working as a production weaver. In 1991, she earned an MFA from San Francisco State University with a concentration in textiles, and she now lives in Peacham, Vermont, on Brigid's Farm. Jane's interests also include spinning, knitting, ethnic textiles, and surface design on handwoven fabrics.

Sash with long, twisted fringes and a few of Louie's homegrown cotton bolls

Photos by Matt Graves

Pueblo Cotton

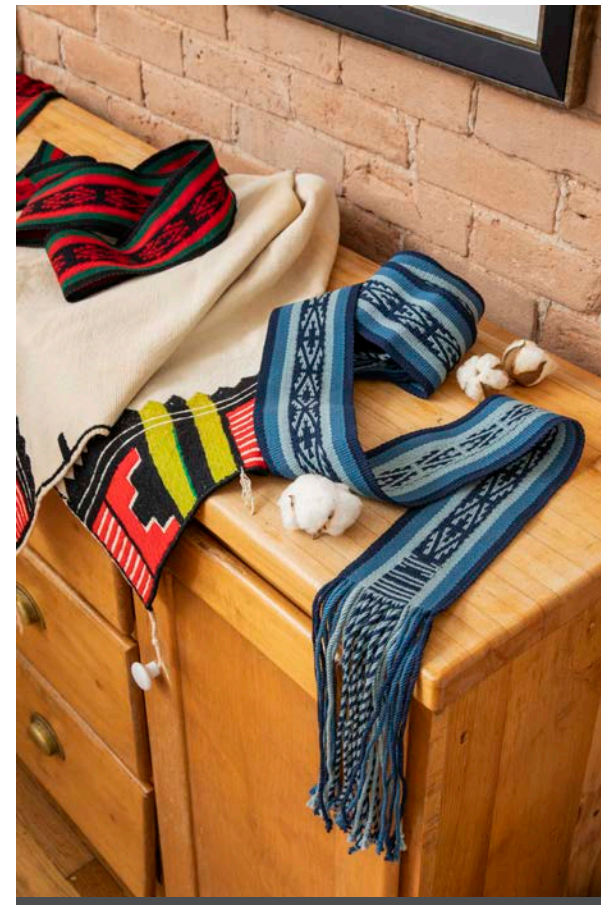
Tradition and Revival

LOUIE GARCÍA

Few individuals can trace their ancestral connection to cotton back two thousand years, as is the case for today's descendants of the Ancestral Pueblo people, formerly known by non-Pueblos as the Anasazi. The Pueblo people of the American Southwest are as contemporary as any other human beings living on Earth today, except for the fact that many of us continue to live in our ancestral homelands and can trace our ancestry back to the time of emergence, a time and place where we believe that our ancestors emerged from a previous world and were instructed to live a simple life on our Mother Earth. We were given three items with which to live: a gourd of water, a planting stick, and a bag of seeds. This bag contained all the seeds our people would need to survive on this Earth.

Farming in our desert homeland of the Pueblo Southwest definitely has its challenges, but we are taught from a young age to keep the faith and maintain our spiritual practices and ceremonies as a way to pray for the moisture we need to grow our crops of corn, beans, squash, and, of course, cotton. As long as our prayers are sincere and we continue to practice our traditional way of life, clouds will continue to bring the rains.

The ceremonies and traditional practices of the Pueblo people are set by an annual calendar. There is a time for praying, dancing, gathering, hunting, reflecting, planting, and harvesting. We are taught to share the blessings of the harvest with our friends and family so that no one goes without. We are a very spiritual people, but we balance that aspect of our culture with humor. We laugh and sing and often share words of encouragement to our young plants, just as we would our own children, encouraging them to be strong despite the hardships. This way of being is part of the reason many of us work so hard to maintain our traditional lifeways that are taught to us by our immediate family members and extended clan relatives. By participating in community ceremonies, we maintain our cultural ties and fulfill our religious obligations within the community so that our Pueblo way of life will continue in perpetuity.



Pueblo textiles (*from top*): red and green warp-faced belt, woven kilt with colorful embroidered patterns, and indigo-dyed warp-faced belt

PUEBLO CULTURE AND FIBER ARTS

As in any culture, men and women have traditional gender roles. In traditional Pueblo culture, the spinning and weaving of cotton falls under the responsibility of Pueblo men. Although this practice has gone to sleep in many Pueblo communities today, there have

Ancient Cloth Made New

Spin Off Summer 2020 included an article by Louie García about growing Hopi cotton and spindle-spinning yardage to weave a replica of an ancient textile. The extant cloth was found in Ventana Cave, a Hohokam site west of Tucson, Arizona, and was woven using gauze weave and weft-wrap openwork—two techniques that had become extinct in the Southwest. Louie's replica was so breathtaking that we featured it on the cover of the issue. —*Editor*

Louie García. "Pueblo Cotton in the American Southwest: Ancient Gauze Weave and Weft-Wrap Openwork." *Spin Off*, Summer 2020, 58–64.

Homegrown cotton, malacate spindle, and Louie's replica textile

been recent efforts to revive it in several communities. Some of my work has helped revitalize this interest, as a few male artists continue to produce brightly embroidered textiles for ceremonial and social use, albeit with commercial acrylic yarns and cotton cloth. Although some of the materials have changed over time, many of the techniques, colors, and designs have remained the same for almost a thousand years.

In the Rio Grande region of New Mexico, we also see more women involved in weaving and embroidery as a result of the Indian boarding-school era, when Pueblo children were taught many crafts and trades associated with Western gender roles, including embroidery, knitting, and crochet for Pueblo girls and carpentry and auto mechanics for Pueblo boys. This was part of the effort to "kill the Indian, save the man," designed to assimilate young Native children into mainstream American society by removing them from their traditional home communities, languages, and lifeways.

Despite the efforts of the United States government to address the "Indian problem," Pueblo communities have managed to maintain our traditional languages and lifeways, including but not limited to the traditional Pueblo fiber arts. Although Pueblo fiber artists are relatively few and far between, there are still a handful of us who take our work seriously, most carrying a full-time job while also fulfilling the textile orders we receive throughout the year to help our Pueblo people meet the needs of ceremonial obligations in any one of several Pueblo villages in New Mexico and Arizona. Although a greater value is placed on handwoven cloth, not everyone can afford the higher cost of traditional Pueblo loom-woven kilts, sashes, and manta dresses. As a result, there is now a strong market for Pueblo textiles made from commercial cotton cloth that has been cut to size, hemmed, and embroidered to create the traditional men's kilts and ladies' mantas used in various communities for social and ceremonial obligations throughout the year.

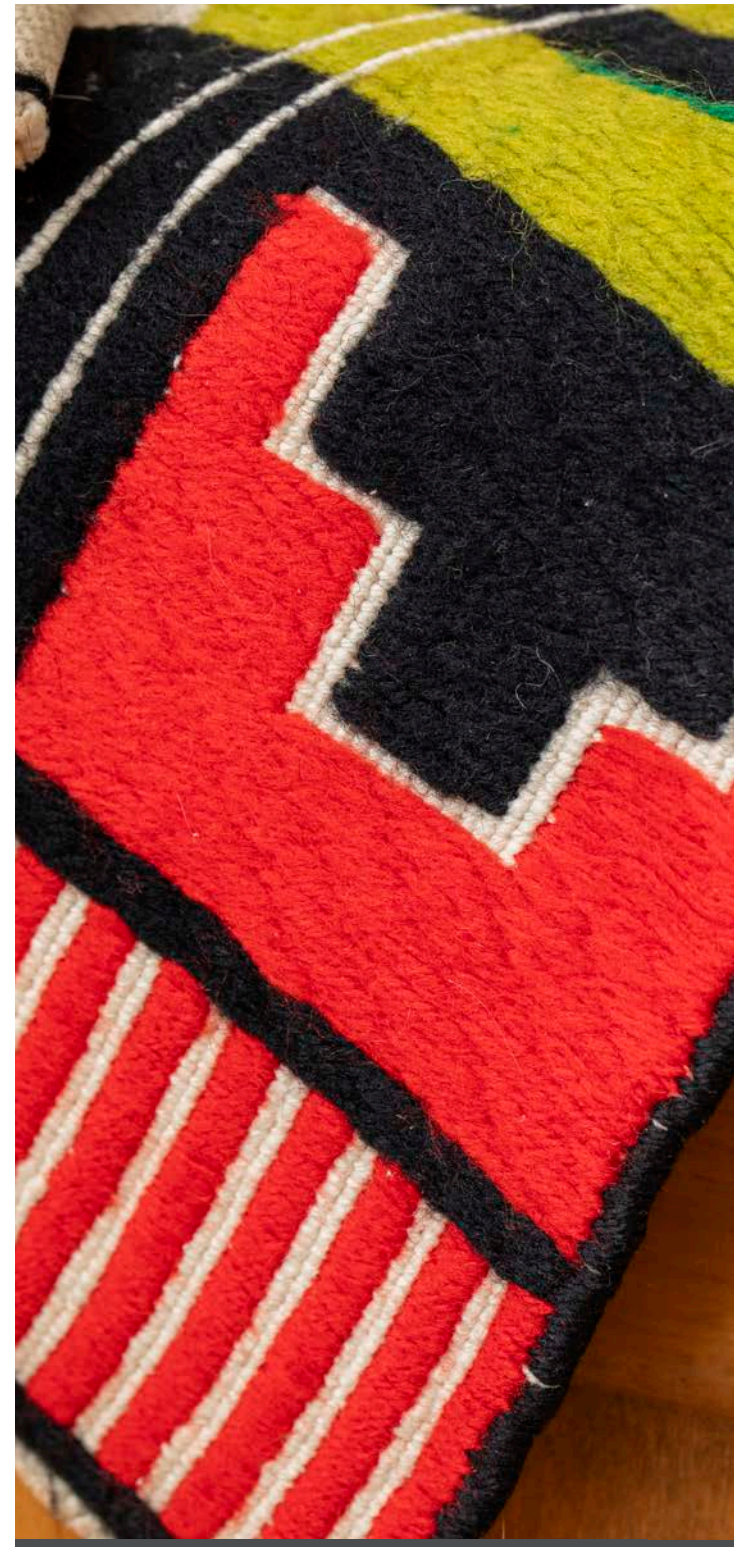
As one might imagine, the spinning and weaving of a textile from raw fiber is very time-consuming and results in a costly product. For this reason, most Pueblo fiber artists use commercially spun cotton

twine and acrylic yarn for the weaving of belts, sashes, and mantas. Despite this, there has been renewed interest in the use of commercially spun and dyed sheep's wool for the weaving of belts and embroidery on mantas and kilts.

A Pueblo kilt is a man's ceremonial garment used in most ceremonies. It consists of a rectangular woven cloth that has been embroidered on both ends with cloud and water designs. The kilt is secured around the waist with one of several types of woven or braided sashes. The ladies' manta is woven in two styles, one in cotton, the other wool. It consists of a rectangular, wider-than-long fabric that is worn by folding it in half, stitching it up the side, and securing it over the individual's right shoulder. Ancient depictions of these kilts and mantas in rock art and kiva murals dating back more than six hundred years show how these garments were used and worn in precontact times, and they continue to be used in the same way today.

As a traditional Pueblo fiber artist, I am inspired by these ancient textiles in both form and structure. Each style has a particular purpose and a meaning, and they are often gifted to honor a certain milestone in an individual's life, from birth to death and everything in between.

Pueblo people keep aspects of their culture to themselves for religious and cultural reasons. Out of respect for our ancestors and knowledge keepers within our communities, we do not share certain things with the outside world. What I can say about the significance of our textiles is that they are often associated with clouds and moisture, which is unsurprising given that we are an agricultural people living in an arid environment. In Pueblo culture, secrecy is respected, and we do not ask questions about things that do not pertain to us. This is something that we are taught at a young age. We believe that knowledge has an important purpose and that certain knowledge in the hands of the uninitiated can have disastrous consequences to both the individual and/or the community as a whole. For this reason, we ask that non-Pueblo people respect Pueblo tradition and culture and accept that there are aspects that we prefer to keep within our communities.



Detail of embroidered motifs on a woven kilt. Traditionally, the kilts were woven with cotton and then embroidered using dyed wool yarns.

Along these same lines, we see it as disrespectful for a non-Pueblo individual to create or re-create a Pueblo textile. There is rich meaning behind the designs and colors used in each garment, and Pueblo individuals grow up seeing and wearing these textiles their whole lives. In this way, we learn the context and significance of each textile and how to respect, use, and care for these family heirlooms in a culturally appropriate way.

INDIGO EXPLORATIONS

One area I have been exploring in recent years is the traditional use of indigo. In historic times, indigo was traded in from Mexico and used sparingly in some Pueblo textiles to highlight a subtle detail in a textile such as the diamond-twill border of a woolen manta. Indigo has a very long history in the Pueblo Southwest going back over one thousand years. With the arrival of the Spanish in the sixteenth century, indigo became a very valuable commodity.

My experimentation has led me to use indigo to dye woolen yarn for weaving traditional floated-warp Pueblo belts with traditional designs in shades of blue. I dye with the traditional sig fermentation vat used historically in the Pueblos, which is made with fermented urine. Not a common vat choice today for obvious reasons, the sig vat is considered to be quite versatile. I have also found that, and dye from this type of vat is much less likely to crock or rub off the yarn compared to some of the other methods I have used, such as the Spectralite (thiourea dioxide) vat. My experimentation is by no means a new innovation, but it is a new twist on old materials and an ancient technique. There are traditional uses for urine in Pueblo culture, and indigo has a special place in all of the cultures that it has come into contact with as it is the only natural blue dye. The color reflects the sky and water, two things that we, as Pueblo people, respect and pray for as a means of bringing life to a dry land.

All in all, Pueblo textiles are a reflection of life. Their continuous warp and weft generate a highly ordered web for a long and happy life. As the weaver weaves, he deposits the life breath into the matrix with his batten, just as a farmer plants the seeds in fertile ground where they will grow and develop and eventually produce the fruit of the next generation. Like any life, there is a beginning and an end. After we serve our purpose, we return to the underworld to be manifested into existence again through song and dance, and the cycle is repeated.

Indigo shades dyed using a traditional sig (urine) indigo vat

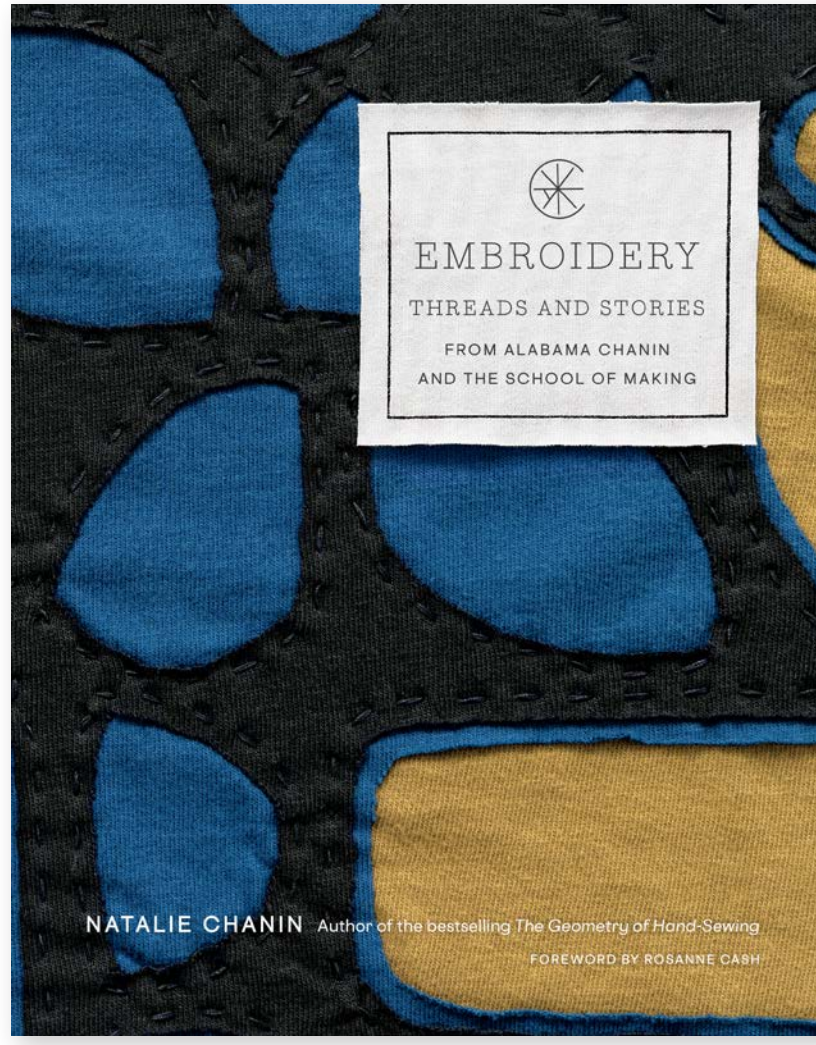
Louie García is a Piro Pueblo/Chicano textile artist with over 30 years of experience. He is the president and founder of the New Mexico Pueblo Fiber Arts Guild and regularly teaches Pueblo weaving to Pueblo tribal members as a means of revitalizing the Pueblo textile tradition. Louie also cultivates native cotton varieties from heritage seeds and processes the fiber from the cotton he grows by hand with the help of his wife and two daughters, who are now 12 and 17 years old. Louie's work is featured in several private and public collections and museums, including the Indian Arts Research Center at the School for Advanced Research in Santa Fe, New Mexico, the Albuquerque Museum, and others.

REVIEW BY MIRIAM L. FELTON

Embroidery:

Threads and Stories from Alabama Chanin and the School of Making

by Natalie Chanin



New York: Abrams Books, 2022. Hardcover, 272 pages. ISBN 9781419752773.

THE LATEST INSTALLMENT FROM NATALIE CHANIN and her Alabama Chanin Studio is a retrospective tome filled with essays and photos of landscapes both topographical and textile. The book tracks the evolution of Alabama Chanin over the past quarter century from a New York City art exhibit featuring reclaimed T-shirts to the sustainable fashion house and maker revolution it has become today.

Natalie's gift as a storyteller shines through each essay, with little gems of story scattered between photos of shaggy stitches and reverse appliqué. My favorite essay, called "Cotton, Tools, and Physics," compares old wives' tales about sewing to what material physics tells us about the things we work with: that there are good reasons for old adages such as "The end you cut is the end you knot" and "Needle your thread, don't thread your needle."

If you're looking for a book that will get you started on an Alabama Chanin making journey, this is not the book for you; for that, I recommend *Alabama Studio Sewing*. But if you're interested in the history and artistry of a thoughtful business that respects the heritage of the place Natalie grew up in as well as the vast history of sewists everywhere, this is a great book for you.

No Alabama Chanin book would be complete without a few projects, and this book contains the kinds of tools you use every day, such as a simple needle roll and a travel kit bag. I chose to make the bag because I can always use another little bag.

I pulled out some jersey I had resist-dyed this summer with my friend Roxanne (@sagoadornment) in her indigo vat and a remnant of sand-colored jersey from an Alabama Chanin jersey scrap pack. I decided to spin either silk or cotton to make a smooth thread to sew together up to six layers of tightly knitted jersey fabric, and the white silk looked so nice next to the indigo jersey.

Now, I'm not a technical spinner. I would say I spin by the seat of my pants, but I decided I wanted to learn to use my supported spindle for this project. I got out a little dish and began to spin with many a false start and a lot of trial and error. Eventually, I landed on using a very long draw from the fold of a silk hankie and found I could pretty well control the number of fibers heading into the twist. I wound the yarn onto a nøstepinne and then plied it back against itself using both ends of the ball.

I found it interesting, spinning for sewing. Since the project was small, I didn't need to spin long before I had a reasonable length, and I decided to use a single strand of my two-ply silk to stitch the bag and Cretan-stitch decoration across the flap. Because the projects in the book are written for a smooth, sturdy button thread, whatever you choose to spin, focus on getting a smooth and sturdy handspun. Perhaps a long-staple wool or a tightly twisted cotton would be a good alternative to my silk two-ply.

Photos by Miriam L. Felton

Skeins of hand-reeled silk dyed with lac

Photos by Joe Coca unless otherwise noted

Making Red

Dyeing with Lac in Laos

JOSHUA HIRSCHSTEIN AND MAREN BECK

Xam Tai village, a tiny dot on the map of Houaphan Province in northeast Laos, is a study in earth tones. With rutted roads of dusty browns and tan, stilted houses of aged wooden posts and unfinished board siding, and thick, dry, gray-brown roof thatch, this seems like an unlikely home for some of the most vibrant, spectrum-spanning natural dye colors in the world. Let's take a look at one.

MAKING RED

The rich red so central to Xam Tai's ceremonial textiles is courtesy of a small insect, *Coccus lacca* (or *Kerria lacca*), one of the species of lac insects. The insect is a parasite that feeds on the sap of trees that grow in the jungle. The dye has a long history and was first collected and farmed in India more than 3000 years ago. Its brightness, ability to hold fast to fibers (especially silk and other protein fibers), and ease of preparation and transport took it to China and later, the Roman Empire, where, as an import, it became a staple dye for cloth, leather, and rouge for ladies' cheeks.

Its creation in nature is miraculous and peculiar. The female *C. lacca* insect, in its larval stage, is about the size of a child's fingernail. Once latched onto the tree, it bores into the bark on a sapling branch with its proboscis and then "settles in," never moving again. At this time the eyes, legs, and wings atrophy and drop off as needless baggage. Certain abdominal glands now begin to secrete a red, resinous substance that at first is moist and shiny, but quickly hardens and dulls with exposure to the air. As the female drinks from the branch, the secretions continue and build a hard shell that ultimately encases the entire insect. Rows of insects on a branch eventually create a continuous

encrustation: a long tube of reddish resin with the sapling Khakampanh buried at its core (generating the common name, "stick lac").

The male insect fertilizes the encased female through the female's anal tubular opening, and the female, now developing more quickly, takes more sap from the tree and continues to exude more lac. The eggs, up to 1000 per insect, then move in a process called ovipositing from the ovaries of the insect to incubating chambers that are formed in a region of the shell left void when the female's body contracts. Soon, the tiny ½m m-long larvae, complete with eyes and legs, hatch and swarm the tree in search of new sapling branches.

The crusty stick lac (in Lao, *khang*) covering the branches look like tubes of dry tree sap a half inch (1.5 cm) or more in diameter, and are harvested just before the new larvae swarm. The resin is easily harvested by trimming the red crust off the infected branches. If one looks carefully, tiny larvae can be seen in the dark red resin. The resin stores easily, although the color becomes browner with time.

Making the dye requires delicately balancing the dye liquor's additives. If the concoction gets too much tannin, the red pigment bleaches out, leaving a clear liquid (which, before petrochemicals, was the natural source of lacquer and shellac). Patricia Cheesman notes that the sudden disappearance of color has invited many taboos to form around the creation of this color:

> "To prevent evil spirits entering the dye-pot and stealing the colour, spiked vines may be wrapped around the dye-pot, and a piece of spiky bamboo or a knife is placed on the lid. Women cannot dye [lac] while they are menstruating, and strangers might bring bad luck. For this reason, women often dyed lac secretly in the forest at night."

We have not witnessed these traditions with regards to dyeing, but such beliefs and understandings may still be alive in more remote villages. Or perhaps our hosts do adhere to such traditions, but do not want to share such personal feelings or project themselves as "of the old ways."

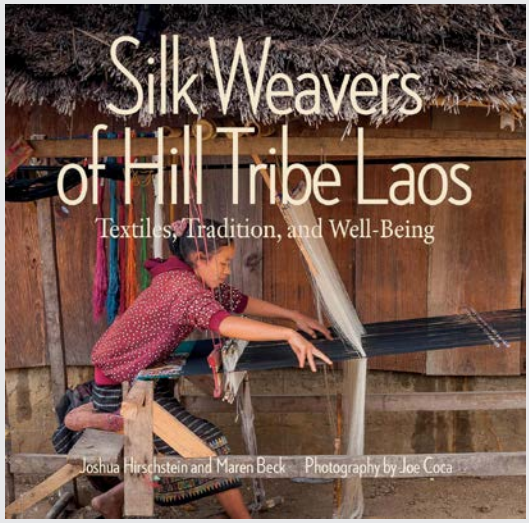
Lac can generate an array of red tones. Most are centered around deep crimson, but lac can be manipulated to generate pink, coral, and even brown. Adding a touch of iron, for example, generates an attractive purplish red.

In addition to the bright to deep reds that can be achieved, a bright, rich purple can also be obtained with lac. However, the lac that makes purple dye grows on a different tree from the usual—one the Lao call the "bean tree." The sap from this tree that is consumed by the lac scale bug is sufficiently different from the sap from the red lac tree that the eventual dye color is different. A strong dye bath of the "bean tree" lac, using exactly the same process as used to get red from the other lac, results in a rich purple. A lesser quantity of purple bean tree lac yields a bright, almost neon magenta.

Souksakone Khakampanh filters the dye liquid from soaked lac through cheesecloth.

Three of the vast range of reds and purples that can be obtained from stick lac. The purple skein at top came from insects that fed on a different tree than the usual, called "bean tree" by local Lao.

Photo by Maren Beck



This article is excerpted and adapted from *Silk Weavers of Hill Tribe Laos: Textiles, Tradition, and Well-Being* by Joshua Hirschstein and Maren Beck.

Schiffer Books/Thrums Books, 2017

schifferbooks.com

DYEING WITH LAC

Souksakone Khakampanh is a master dyer in Xam Tai, known for her deep knowledge of a wide range of dyestuffs and her ability to coax virtually any color from local materials. Here she shares her process for dyeing with lac.

- Rinse 1 kilogram (2.2 lb) of stick lac and let sit for a few minutes.
- Pulverize the stick lac with a mortar and pestle.
- Remove any sticks as you pulverize.
- Soak lac overnight in a large kettle of water, then strain through cheesecloth.
- Soak pulverized lac for 30 minutes in a pot of hot water, strain the lac through cheesecloth. Repeat three times, straining all the dye liquid into a single kettle.

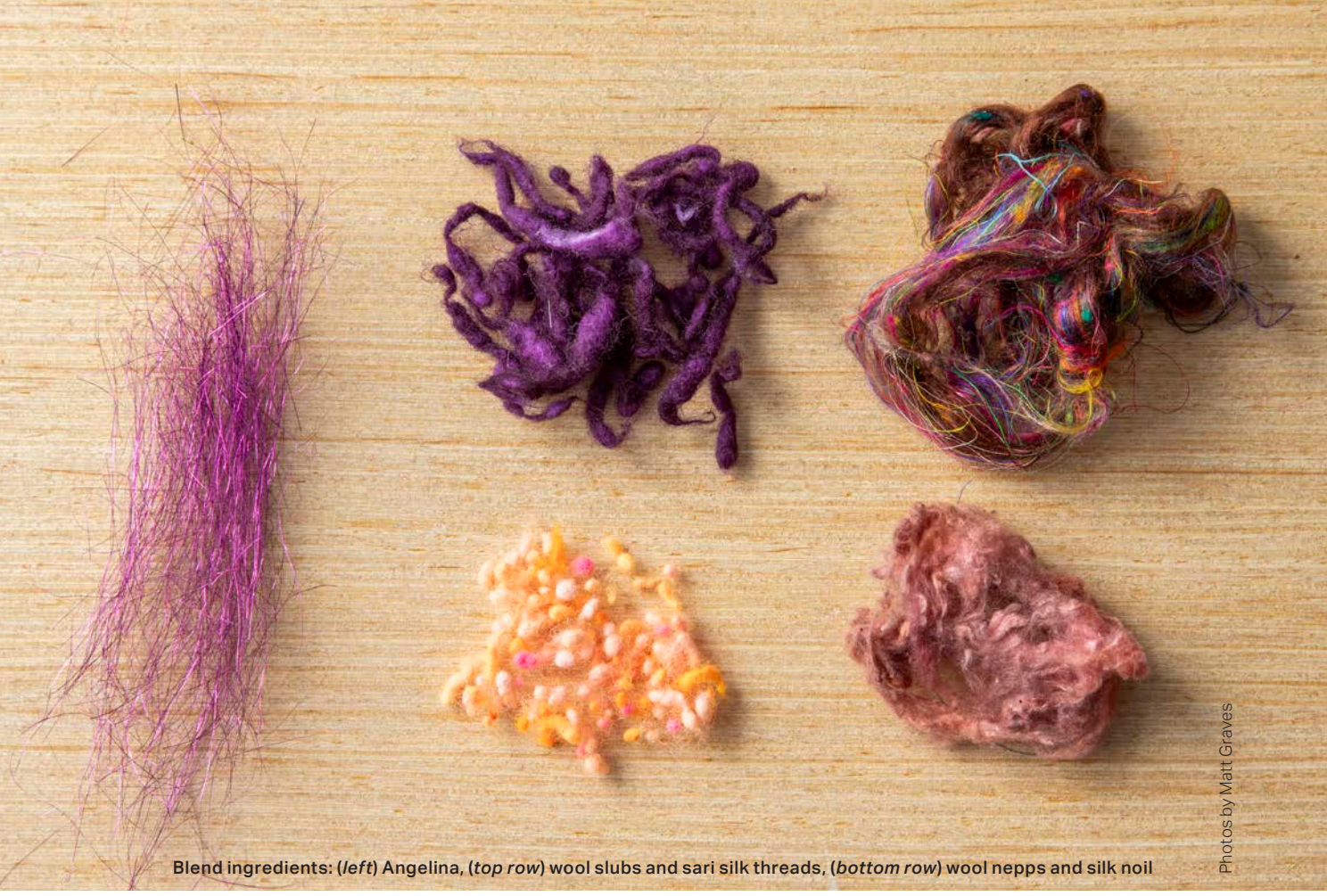
- Discard the faded lac solids, which can be used in other applications for their resinous qualities.
- Boil the dye bath.
- Immerse a dozen skeins of alum-mordanted silk (each weighing about 50 gm) in the dye bath and soak until the desired color is obtained (30 to 60 minutes).

The recipe seems simple, but slight variations generate different outcomes. The dye artist who is seeking certain depths, tones, and shades must consider several factors: the qualities, age, and amount of the stick lac, the type of mordant, the qualities and amount of raw silk, the temperature of the water and the silk's soaking time, the nature of the rinsing, the day's humidity and temperature, and more. These all influence the nature of a dye-lot's "rich red." ●

Resources

Powdered lac is available from a number of online sources, including Botanical Colors of Seattle, Washington. Botanicalcolors.com.

Skeins of silk have taken on deep, color-fast shades of red after less than an hour in the dye bath.



Blend ingredients: (*left*) Angelina, (*top row*) wool slubs and sari silk threads, (*bottom row*) wool nepps and silk noil

Photos by Matt Graves

Blending Ratios

Experimenting with Nepps, Noils, and More

RILEY KLEVE

My usual approach to carding—wherein I throw whatever catches my fancy through my drumcarder—has led me to create some really beautiful yarn and quite a few lumpy or dense skeins that will never see the light of day. After one particularly difficult batt, I decided to dedicate myself to sampling first and developing a plan for my blends.

Common fiber add-ins that we blend with base fibers to create color and texture—such as silk noil, sari silk, Angelina, and wool nepps—all behave differently on the drumcarder and in our handspun. I can't count the number of times I've incorporated these into my spinning, and yet I had no idea how much I typically used. Would different ratios have varying effects on drape and color effect, or would the impact diminish past a certain point?

THE ADD-INS

Silk noil and Angelina fiber are add-ins that I am comfortable using, having carded them into many projects to add softness or sparkle. With both, I knew that typically a little went a long way, having mistakenly added way too much in the past. I hoped that I could finally learn how much noil I needed to add for my desired effect. I had the same question for Angelina fiber: how much was necessary to add the perfect amount of sparkle to my yarn?

I purchased and dyed some wool nepps on a whim years ago, perhaps inspired by Holly Callahan-Kasmala's rare-breed tweed, but never got the hang of working with them in my handspinning. The pesky nepps never seemed to want to stay put, jumping out

of my singles and plied yarn. Eager to try to learn to love them, I added them to my list of add-ins to study, along with wool slubs, which have a longer staple than nepps.

SAMPLE SET 1

Before I began carding, I neatly divided my multicolor Polwarth top into five 10-gram sections (one for each add-in). I ran each of these sections through my drumcarder once before dividing it again into thirds for the first batch of 3.33-gram samples. Carding the wool once first helped ensure that all of my samples had a consistent start. When considering what ratios of add-ins to Polwarth wool I wanted to sample, I decided on 5%, 10%, and 20% ratios, which came out to 0.17 g, 0.33 g, and 0.66 g of add-ins. These small amounts work if you have a very precise scale. If you have a scale that weighs grams in whole numbers, just work with larger samples.

I blended one sample at a time, first adding a layer of wool through the feed tray, then painting the add-in directly on the large drum while slowly turning the crank as demonstrated by Emily Wohlscheid in her video *Drumcarding Basics & Beyond* (Long Thread Media). After applying the add-in, I added the rest of the wool, sandwiching it on top.

I pulled the batt off, divided it into sections, carded the sections together again, removed the batt, and carded it in sections once more to ensure an even blend. I repeated this for each of the ratios for sari silk, silk noil, and Angelina.

Carding batts with slubs required some trial and error as they were far denser than I expected and often fractal shaped. After some experimentation, I determined that the best course of action would be manually separating the conjoined slubs so that they were all roughly linear, then painting them onto the drum like the other add-ins. I tried to keep them roughly parallel to the wool fibers, but as I passed the batt through my carder a second time, they came out of alignment and started to double over on themselves. Before spinning, I took some time to straighten them out.

Finally, it was time for me to face my fears and blend my wool with nepps. I laid a foundation layer of wool, then added the nepps to the drum as I fed another thin layer of wool through the feed tray. This sandwiched the nepps before they came in contact with the licker-on roller and helped me stay sane through the process. A few escaped onto the roller anyway, and I simply added them back to the batt during the second pass through the drumcarder. I carded these batts four times, trying to ensure that the nepps were well incorporated.

SPINNING

I began spinning the samples with the slubs added in since starting with the most unfamiliar blend would allow me to spin the rest of my samples to a similar grist. I'm very glad that I made this choice, as the slub batts spun best with a thicker grist than I typically spin. I also found that I needed to fuss with the slubs a bit to get the ends anchored securely into the singles. The skein with 5% wool slubs had very occasional slubs and places where the slubs were very loosely plied, which could cause trouble over time in a high-abrasion garment. The 10% and 20% skeins looked fairly similar to one another and had the same plying issues.

Nepps were next. Although they had been evenly carded into a batt and were sandwiched in layers of wool, many nepps still found their way onto my lap

Polwarth/wool slubs, 80/20

SAMPLE SET 1


silk noil
5%, 10%, 20%
sari silk
5%, 10%, 20%
wool slubs
5%, 10%, 20%
Angelina
5%, 10%, 20%
wool nepps
5%, 10%, 20%

SAMPLE SET 2


silk noil
2.5%, 10%, 20%
sari silk
10%, 20%, 30%
wool slubs
5%, 10%, 20%
Angelina
2.5%, 5%, 10%
wool nepps
5%, 10%, 20%

cloth during spinning and plying. The ratios of nepps to yarn, then, seemed to be of only temporary importance because, over time, I imagine most nepps would migrate out of the yarn.

I spun the three samples with sari silk threads next but was unimpressed with the impact that the threads had on the yarn. The 20% silk skein was the only one with considerably more drape than a 100% wool skein, and the 5% silk skein had only a little bit of the multicolored visual impact I associate with silk threads.

If my ratios for silk threads were a bit low, the opposite was the case with silk noil. My 20% noil blend looked practically like novelty yarn due to all of the fuzzy noil on the surface of the yarn. It also shed a bit of noil as I was spinning it and feels almost like a slubby millspun cotton yarn in some places due to the soft coolness of the silk.

Similarly, I think I hit the upper limit on the ratio of Angelina fiber to wool somewhere between 10% and 20%. I found the 5% blend fairly sparkly, the 10% blend extremely sparkly, and 20% just as sparkly as 10% but with a lot more flyaway bits and ends from the Angelina fiber sticking out. The Angelina fibers are visible even when they are not reflecting any shimmer, which I think detracts from the visual effect.

SAMPLE SET 2

Based on the results of the first sample set, I decided to adjust the ratios for each add-in individually rather than pursue a one-size-fits-all approach.

I adjusted the ratios of Angelina fiber to 2.5%, 5%, and 10% and carded each batt as before, then used my handcards to create rolags from the batts. I hoped that the rolled arrangement of fibers would help to trap the ends of the Angelina in the yarn. I also halved the ratios for the silk noil blends and increased the ratios for sari silk threads to 10%, 20%, and 30%.

The samples spun with Angelina fiber still have some flyaway sparkle, some of which could probably be attributed to a smaller grist in the handspun samples. Still, I would say that spinning from a rolag did a bit to mitigate that effect. The 2.5% Angelina sample had a subtle but noticeable amount of glimmer, and the 5% had a more prominent shine to it. The 10% blend was only slightly more shimmery than the latter, despite having twice as much material and more flyaway strands of Angelina.

The silk noil also underwent a similar transformation, where 2.5% noil created a subtle tweedy texture, 5% was more prominent, and 10% was very tweedy. In the future, I might try adding more than one color of noil to the 5% and 10% blends to see if that changes the dimensions of the yarn.

I shifted the ratios for sari silk threads in the opposite direction. The 10% and 20% blends produced lovely tweedy patterns, and the new 30% blend was fully multicolor, with the purple wool taking a back seat to the silk threads. The 30% silk sample seems like the most sari silk I could blend into this wool before starting to have issues with the structural integrity and loose ends similar to the Angelina samples.

SPINNING

Deciding what to do with nepps and slubs was tricky. I asked around at my guild, and my colleague Ashley Haapapuro of Sartorial Jutsu Studios said that she has no problem working with nepps for her art yarn; she just spins them into thick singles. It was a lightbulb moment—it made total sense to try spinning the batts into thicker yarn so that I wasn't at war with their contents. I spun thick chain-plied samples from the batts with slubs and nepps and, while I still lost some nepps, I was finally able to study the ratios without so much loss. The samples with 10% and 20% nepps seem like the clear winners over the 5% sample, which doesn't have enough texture to look quite as intentional. With abrasion, the 20% and 10% samples will likely shed a little bit, but the bulky weight seems to anchor more of the add-ins than the medium-weight samples. The bulky samples with slubs tell a similar story: the 5% blend doesn't have much texture, but the 10% and 20% samples have stronger texture and are interesting samples for further study.

Riley Kleve is a nonbinary artist and educator in Minneapolis. Their handspun and woven work mines archives to create a queerer future for textiles. Riley teaches with the Weavers Guild of Minnesota and can be found online at @lezphair and @betterdaysyarn.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Photos courtesy of Amanda Buckley unless otherwise noted

Blending Colors Using a Co-Primary Palette

AMANDA BUCKLEY

As it so often does, it started with a pretty picture. A textbook diagram showing the solar absorption spectrum was illustrated as a glorious rainbow of vivid color interrupted by black lines revealing the chemical composition of the sun. I even made an embroidery of that solar absorption spectrum from lots of different colors of thread. In the years since, I've learned to spin and often wonder if I could achieve such vibrant hues—the colors of the rainbow—through blending from a limited palette. But, unless the fiber was already dyed that bright, I'd never had much success blending saturated color until I took a deeper dive into color theory and inspiration from painters.

WHAT IS A CO-PRIMARY COLOR PALETTE?

In theory, primary colors are those unattainable by mixing, and you could achieve any other color by intermixing two or more primary colors. It turns out that the traditional red, yellow, and blue (RYB) color wheel is great for making color mixing easy to understand in mediums such as fiber arts or painting, but it has limitations in the real world.

If we mix the secondary colors (green, violet, orange) from a three-color palette of red, yellow, and blue, we don't get the saturated colors of the rainbow and instead get duller, muted versions. Whether we mix paints or blend fibers, there aren't really any true primary colors in nature for us to work from. In other words, there is no single hue of red, yellow, or blue that can mix all the other colors in the spectrum. Instead, let's expand our primary color set to six colors, the co-primary colors. This is also sometimes called a split primary palette.

Each primary is now represented twice, a version leaning toward one secondary hue and a version leaning toward its other secondary hue. For example, the color crimson is a red that leans toward violet, and scarlet is a red that leans toward orange. Borrowing language from music, crimson has a red *masstone* with a violet *overtone* and scarlet has a red *masstone* with an orange *overtone*. The different overtones of each primary color result in different properties and behaviors when mixed with other colors.

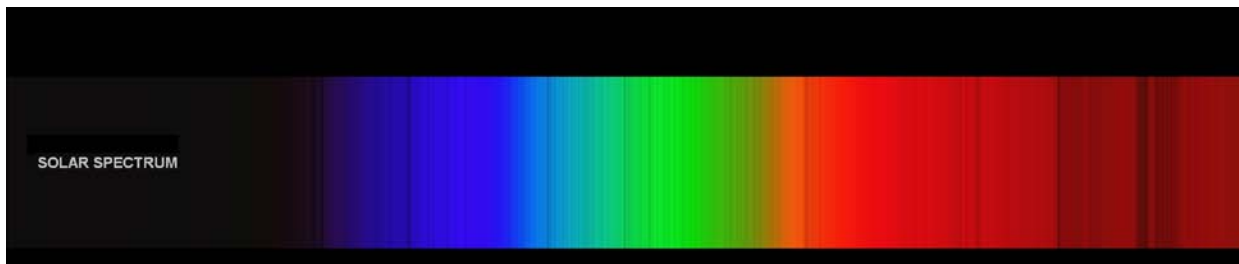
For example, if you mix red with orange overtone with blue with green overtone, you will get dull purple. But if you mix red with violet overtone with blue with violet overtone, you will get bright purple. Similarly, if you mix yellow with orange overtone with blue with violet overtone, you will get greenish gray. But if you mix yellow with green overtone with blue with green overtone, you will get vivid green.

If we had kept our palette to the traditional red, yellow, and blue, each of our primaries would still have had overtones, even if they were only subtle. Those overtones are the reason why I had trouble blending a full range of saturated secondary colors. If I only had one of each primary—say red with a violet overtone, yellow with an orange overtone, and blue with a violet overtone—I could make one bright secondary (violet) and one of my secondaries would be a bit muted (orange), but my third secondary color (green) would be very dull. With this combination, I just can't mix a good green.

By using two hues of each primary color, we expand our color-mixing possibilities and can create more nuanced and expressive colors. Isn't that awesome?

Yellow with green overtone and blue with green overtone in a seven-step carded gradient yields bright greens.

Red with orange overtone and yellow with orange overtone in a seven-step carded gradient yields bright oranges.



A solar absorption spectrum helped inspire Amanda's color quest.

Courtesy of Rudy E. Kokich

A Set of Six Co-Primaries

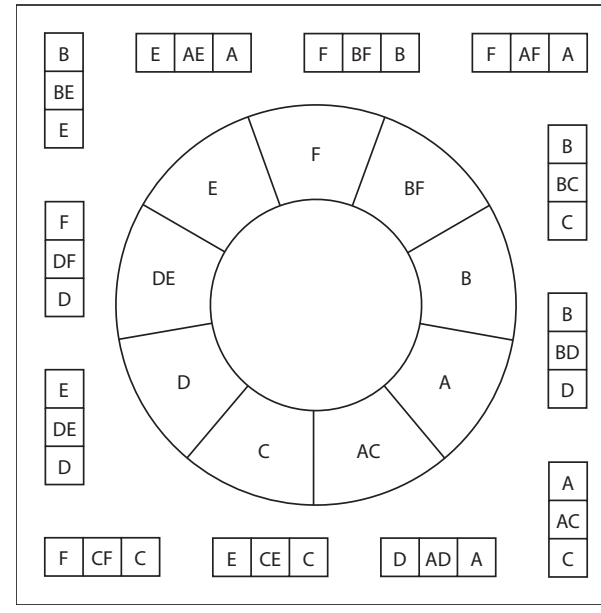
- Red with violet overtone
- Red with orange overtone
- Yellow with orange overtone
- Yellow with green overtone
- Blue with green overtone
- Blue with violet overtone

USING A CO-PRIMARY PALETTE

To use a co-primary color palette, we need to choose two hues of each primary color: one leaning toward one of its secondaries, and one leaning toward the other of its secondaries.

To blend color with a co-primary color palette, here are some basic rules:

- To mix vivid secondary colors, use primary colors with overtones that are the same as the secondary color. For example, to mix bright orange, use red with orange overtone and yellow with orange overtone. To mix bright green, use yellow with green overtone and blue with green overtone. To mix bright purple (violet), use red with violet overtone and blue with violet overtone.
- To mix vivid tertiary colors (red-orange, yellow-orange, yellow-green, blue-green, blue-purple, and red-purple), use the bright version of the secondary color and the primary color with matching overtones. For example, to mix red-orange, use bright orange (mixed from red with orange overtone and yellow with orange overtone) with more of the same red with orange overtone.
- To blend muted colors, mix from primaries with overtones that don't match. The farther away two primaries are from each other on the color wheel, the more muted the new blended color will be. In some cases, you might even be mixing almost-complements into colors so muted they are more gray or brown—the chromatic grays.
- To create supersmooth color transitions, mix the two versions of the same primary color to make a *process primary*. It isn't quite as vivid as the real deal, but it is a pretty good substitute.



Secondary colors—orange, violet, and green—sit between three sets of co-primary colors.

EXPERIMENTING WITH MERINO

There is an allure to working from a limited palette of colors and mixing the exact color you want. I've

Yellow blended with black, brown, and white to create a full set of shades, tones, and tints

been working with a palette of colors in fine Merino from DHG (see page 52), but there are other sources that offer full palettes on different combed-top bases. In practice, I supplement my co-primary palette with white, black, and dark brown so I can adjust the value and saturation of my color blends.

My experiments thus far have all been based on blending two colors of fiber together. For my sampling, I find 2 grams of fiber a good amount to work with for each little skein. I get a good-sized sample of yarn from 2 grams without spending too much time prepping and spinning. Even with a limited palette of colors, there are so many possibilities! Using a precise scale to measure small amounts of fiber, I can work my way from 100% color A to 100% color B in 10% increments, resulting in a set of 11 miniskeins.

Blending 2 grams of fiber is a bit tough on even the smallest hand combs, and I recommend handcards for this task. So that I can compare the colors, I've spun all my samples short-forward draw with a 25- to 30-degree twist angle and bracelet-plied them for a balanced two-ply yarn. My final yarns have the look and feel of an Australian-style wool embroidery yarn, which tends to be plump and spun from finer wools than traditional English crewel yarns.

Exploring color with a co-primary palette is teaching me so much about how the nuances of a color affect how it blends with other colors. Whether I am producing bright and saturated colors like those in the solar absorption spectrum or blending for muted colors by purposeful mixing using overtones, tints, and shades, I am certainly feeling more confident for future color experiments. Whether you start from colored fiber or dye your own, I encourage you to explore a co-primary palette to express all the nuances of color you can.

Turn your color study into a sweet and useful pincushion. Find Amanda's instructions for a Color Swatch Biscornu on page 52.

Resources

Hornung, David. *Color: A Workshop for Artists & Designers*. 3rd ed. London: Laurence King Publishing, 2020.

Amanda Buckley is an enthusiastic lifelong learner who enjoys the challenge of communicating scientific and philosophical concepts in unexpected spaces. Formerly a records specialist with degrees in mathematics, physics, education, and information systems, she now spends her time exploring knowledge and understanding through her interdisciplinary arts practice, most recently from studios in Sweden and Australia.

Photos by Amanda Buckley

Color Swatch Biscornu

AMANDA BUCKLEY

A pincushion is a useful tool in a fiber-arts studio, and this biscornu puts colorplay front and center. Whether you use it as a design tool or as a handy place to store a pin, embroider your own color wheel and record your color blends in this marriage of form and function.

Spinning Notes

Wool embroidery yarns are funny creatures—they need to be plump enough to cover the ground fabric, but they also need to be strong enough to withstand the abrasion from passing through the ground fabric each time we make a stitch. I spun a two-ply, worsted-spun yarn from extrafine Merino so that it bloomed to create a plump yarn.

You only need a tiny amount of each yarn to embroider the swatch on the pincushion, but it can be difficult to measure and then create a thoroughly blended prep if you go too small. Through trial and error, I've found that batches of 2 grams, blended using handcards, are a nice amount to card and spin. If you are using other tools, such as hand combs, to blend your colors, you may need more fiber.

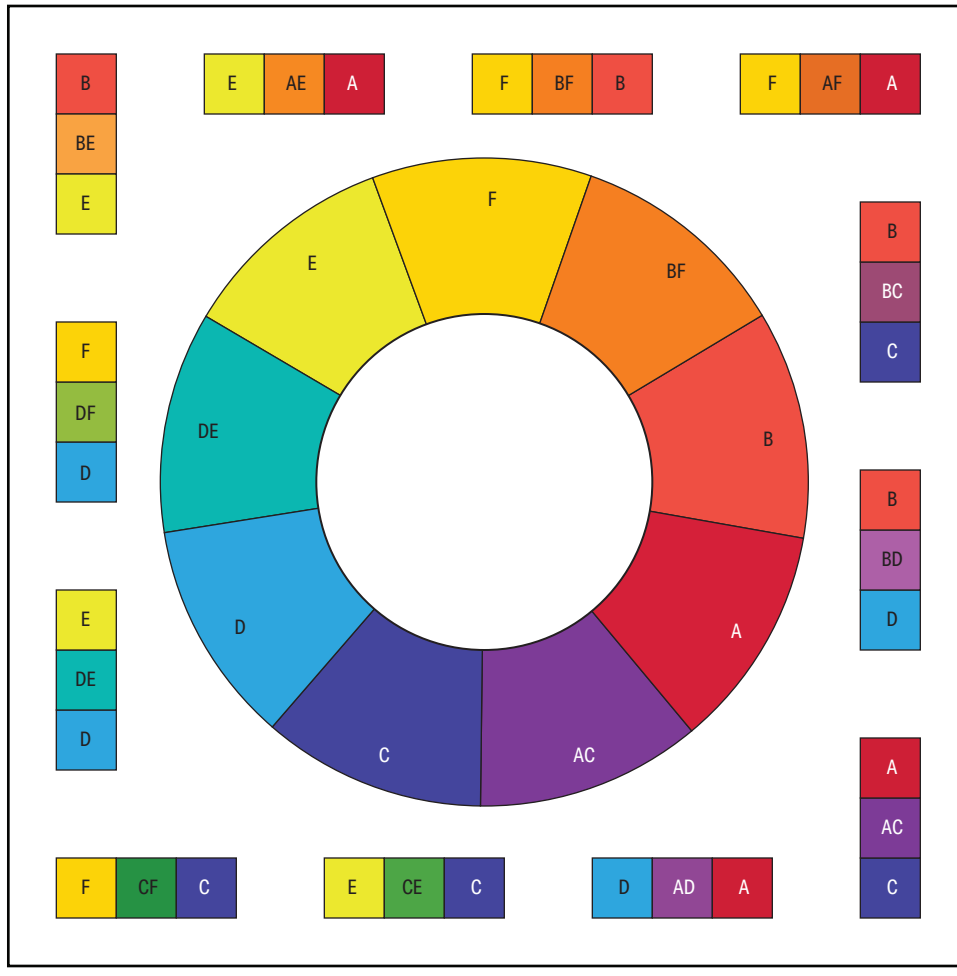
I blended each color using handcards and dizzed directly from the cards to produce a top-style preparation. I then spun the singles as a batch using a short-forward draw. Each time I finished spinning one color, I spun some white fiber as a divider before starting to spin the next color.

Once all the singles were completed, I bracelet-plied each yarn to get a two-ply embroidery thread. To do that, I started by transferring the singles to my hand until I reached a white divider, then broke the singles and bracelet-plied that color on my wheel. I then transferred the next color to my hand, knotted the new color to the old color, and continued to ply. I repeated the process until all the colors were plied.

To separate the yarn into individual color skeins, I used a niddy-noddy to transfer one color at a time from the bobbin. Some colors were hard to tell apart so I used the knots that joined the colors to determine when to break off the skein.

My ground fabric was a relatively fine fabric, so I spun a fine yarn to match. If you embroider on a thicker ground fabric, such as felt, then you can spin a heavier-weight yarn to embroider with. This also gives you plenty of opportunities to play with color using fiber blends or wool from other breeds. If you work with heavier thread, don't forget to change your needle

Two blended oranges (from left): BF and AF



Actual size 5" × 5" (12.7 cm × 12.7 cm)

Solid colors

- A Red (purple-leaning) [color a]
- B Red (orange-leaning) [color b]
- C Blue (purple-leaning) [color c]
- D Blue (green-leaning) [color d]
- E Yellow (green-leaning) [color e]
- F Yellow (orange-leaning) [color f]

50/50 color blends

- AC Purple, color a and color c
- AD Purple, color a and color d
- BC Purple, color b and color c
- BD Purple, color b and color d
- AE Orange, color a and color e
- AF Orange, color a and color f
- BE Orange, color b and color e
- BF Orange, color b and color f
- CE Green, color c and color e
- CF Green, color c and color f
- DE Green, color d and color e
- DF Green, color d and color f

size! Choose the smallest size that you can thread. If you are having trouble, a chenille needle will be easier to thread but may be harder to embroider with.

As for wadding, we spinners seem to have no shortage of waste fiber lying around! I used some clean combing waste from a very dark brown Swedish Finewool fleece I recently prepped. The advantage of using dense black wool for ground fabric is that you can get away with wadding of any color.

MATERIALS

Fiber Extrafine Merino top (DHG [Dyeing House Gallery]), Passion (A), Chinese Lacquer (B), Chagall (C), Cobalt (D), Sun (E), and Yolk (F), 6 g (¼ oz) each. Contrast fiber (white), 6 g (¼ oz).
Yarn 2-ply (about 2,800 ypp; about 40 wpi; laceweight), 1 or 2 yd of each color.
Fabric Wool broadcloth, black, two squares, 10" × 10" (25 cm × 25 cm) each. ***Note:*** Vadmal, felt, or doctor's flannel would also work.
Needles No. 5 crewel for embroidery; sewing needle for construction.
Notions 9" (23 cm) embroidery hoop, inner ring bound; white transfer paper; sharp H pencil; white gel pen; sewing machine thread, black; tacking thread, contrasting color; sewing pins; wadding, for stuffing the pincushion; two ⅝" (1.6 cm) buttons to match fabric.
Finished Size 4½" × 4½" × 1½" (11.4 cm × 11.4 cm × 3.8 cm).

Embroidery yarns

Spin 18 yarns as listed in the color key: Spin 6 solid colors, using 2 g of fiber for each. Spin 12 color blends 50/50, using 1 g of each of two colors in the blend.

PREPARATIONS FOR EMBROIDERY

Transfer the Design

Position transfer paper on fabric with chalk side down. Position the embroidery design on top of transfer paper and, using the pencil, transfer the embroidery design to the fabric, including the square outline. Remove paper. At this stage, the design on the fabric will be faint. Use the white gel pen to trace over the design on the fabric to make it easier to work.

EMBROIDERY

Refer to the embroidery key for color placement.

All embroidery is worked in the hoop with one strand of handspun yarn.

ORDER OF WORK

Color Wheel

For each segment, outline the shape in split stitch using the indicated yarn color. Beginning at the outer edge, fill the segment with long and short stitch, covering the outline at the edges.

Border Swatches

For each square, outline the shape in split stitch using the indicated yarn color. Fill each square with satin stitch, covering the outline at the edges.

CONSTRUCTION

Preparing the Biscornu

Remove embroidery from hoop and steam-press, face down, on a well-padded surface.

Trim the embroidered piece, leaving a ⅝" (1.6 cm) seam allowance.

Using the embroidered piece as a guide, trim the second fabric square (back piece) to the same size.

For the embroidered piece, fold the seam allowance on two opposite sides to the wrong side. Tack the

seam allowances through both layers. Fold and tack the remaining edges. Repeat for the back piece.

Mark the center (midpoint) of each side of the squares using the tacking thread.

Constructing the Biscornu

The biscornu is made from two offset squares seamed together so that the join forms a zigzag shape made up of eight short seams. Each corner of one square matches up with the midpoint of an edge of the other square.

With wrong sides together and the embroidered piece facing you, line up a corner of the embroidered piece with a midpoint thread mark on the back piece and secure them together at this point with a pin. Working counterclockwise, line up the next midpoint thread mark on the embroidered piece with the next corner of the back piece and secure the pieces together at this point with a pin. Using matching sewing thread, handstitch the folded edges of the squares together between the pinned points. Remove the first pin. One short seam is complete.

Repeat, matching each corner on one square to the midpoint thread mark of the other square and stitching them until only one short seam remains. Use wadding to stuff the biscornu to shape, then stitch the last seam to close the biscornu.

FINISHING THE BISCORNU

Using matching sewing thread and starting from the back, take a tiny stitch in the center of the biscornu to secure the thread, then stitch through the thickness of the biscornu, exiting the needle at the center of the embroidered side, and pull the thread tight. Thread a button onto the needle, take the needle back through the center of the biscornu, exiting the needle at the center of the back side, and pull the thread tight. Thread the second button onto the needle, take the needle back through the center of the biscornu, exiting the needle through the button on the embroidered side, and pull the thread tight. Continue in this manner until both buttons are attached and secure, ending on the back side of the biscornu. Take a few stitches under the back button to secure the thread. Cut the thread, taking care not to cut the biscornu. Remove any visible tacking thread.

Amanda Buckley is an enthusiastic lifelong learner who enjoys the challenge of communicating scientific and philosophical concepts in unexpected spaces. Formerly a records specialist with degrees in mathematics, physics, education, and information systems, she now spends her time exploring knowledge and understanding through her interdisciplinary arts practice, most recently from studios in Sweden and Australia.

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Photos by Matt Graves

Pastel to Pure Hue

Dyeing with Value and Saturation in Mind

MARY BERRY

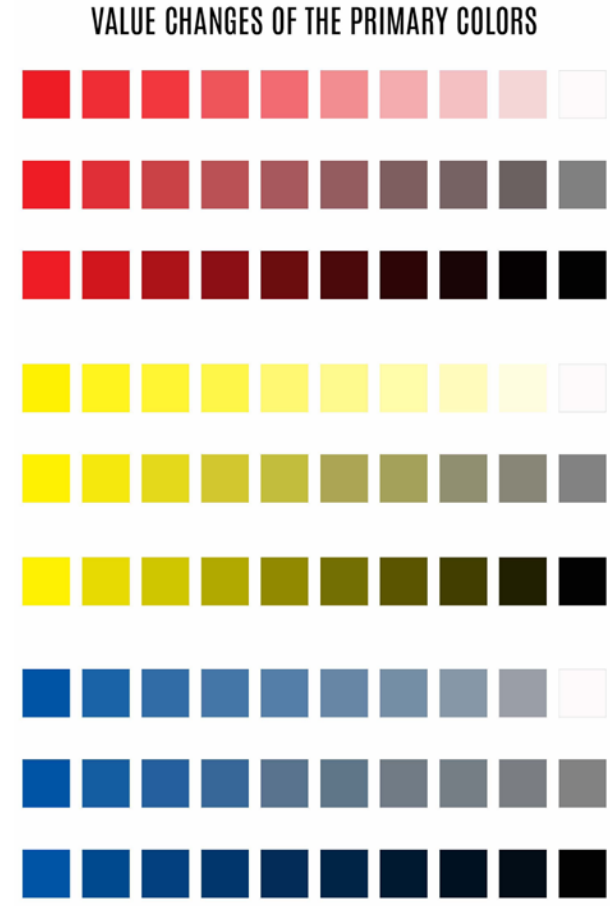
The color-theory concepts of value and saturation are related and yet different, and both are important when dyeing yarn and fiber. You don't have to be versed in color theory to hand-dye beautiful colors, but key concepts can help you explore further, understand your results, and expand your personal palette.

The color you choose to dye your yarn or fiber is called the *hue*. Hues and blends of hues form the bright ring of a color wheel; we might describe a wedge of a color wheel as a hue family (read more on page 48). *Saturation* has two meanings for dyers. It refers to how visually strong (high saturation) or weak (low saturation) a hue is. Consider a vibrant yellow, for example. We don't usually think of that yellow as "dark," but it is highly saturated. A barely yellow yarn, which we might describe as a pastel color, has low saturation.

Saturation also refers to the state of the fiber itself. Think of a cloth soaking up water and becoming fully saturated; yarn or fiber can be physically saturated with dye. With most types of dye, every fiber has a point at which it cannot accommodate any more dye through chemical bonding and/or by filling up any free accessible space inside the fiber. The yarn is physically fully saturated.

Value refers to how light (high value) or dark (low value) a color is and can be measured by comparing the color to a gray-scale card. The scale shows graduated shades of gray, with white at one end (the lightest value) and black (the darkest value) at the other end. The card shown here has eight steps between white and black, but there can be many steps between black and white, with some so slight that the human eye cannot discern the difference. Hold the card on top of your fiber and move it until you find a spot where the color and the depth of shade (DOS) seem to match; the color does not stand out and look brighter or darker than the gray. Squinting your eyes can help you see value rather than hue. Technology can also help make this easier with black-and-white photography filters.

Of these three characteristics of color, value is arguably the most important. Contrast in values is what your eyes use to determine your perception of space and patterns. A composition where all the colors are the same value can appear flat and indistinct; the colors will all fade into one another, and the design will be lost. In fact, the values you choose for your project are even more important than the hues. I believe all hues can be used with all other hues. Put together the craziest combination of colors you can imagine, and if the values are a mix of dark, medium, and light, they will work together. Compositions, regardless of the medium (painting, beading, paper crafts, spinning, weaving, and more) typically rely on a mix of values. Notice I did not say an equal mix, but a mix, nevertheless.



Courtesy of Sensational Colors

Value changes of primary colors (*rows from top*): red tints, tones, and shades; yellow tints, tones, and shades; and blue tints, tones, and shades

CREATING A VALUE RANGE

Look at the chart showing value changes of primary colors above. The three colors represented—red, yellow, and blue—are commonly used primary colors. The lighter hues at the top of each color section come

from using progressively less dye on a white base (the equivalents of painters adding white to their paints, which are referred to as *tints*). The middle hues represent the gradual addition of medium gray (*tones*). The dark hues represent the gradual addition of black (*shades*). We have not changed the hues; they are still red, blue, and yellow. What we have changed is the value. Or have we? Take a minute to look specifically at the middle row of each section. Those samples have not changed value as much or at all with the addition of gray. This is because the two colors that were blended (red + gray, blue + gray, yellow + gray) are closer in value than the colors blended in the rows of tints and shades. When you mix two colors of the same value, your result will be the same value.

For a hand-dyer, the top row of each section showing tints is an important reference for depth of shade. When less dye is added to the dyebath with white fiber, the value shifts toward white. Dyeing your own yarn or fiber with value in mind requires a bit of experimentation, and determining what amount of dye is needed to create a fully saturated color for your fiber can help guide your future explorations. Once you've determined what "fully saturated" looks like for whatever hue you choose, then you can key into medium and light values.

A gray-scale card can help you describe the value of colors. Here, where 1 is black and 10 is white, the darker fiber on the left is a value 2 and the lighter fiber is a value 7.

Mary's Value Scale for Jacquard Turquoise

WOG (grams)	DYE (grams)	VALUE	DOS %
28	1.12	Very Deep	4.0%
28	0.84	Deep	3.0%
28	0.56	Dark	2.0%
28	0.42	Dark Medium	1.5%
28	0.28	Medium	1.0%
28	0.14	Light	0.50%
28	0.056	Pale	0.20%
28	0.028	Very Pale	0.10%
28	0.014	Palest	0.05%

Saturation Experiment

For this example, I chose Turquoise from Jacquard's acid-dye line. I mixed the maximum amount of dye that the manufacturer recommended: 2 ounces per 16 ounces of fiber, which is 3.5 grams of dye per 1 ounce (28.3 grams) of fiber.* We might also describe this as 12.5% DOS because the amount of dye is 12.5% of the weight of the dry fiber. Despite my feeling that this was too much dye, I went ahead and dyed the DOS, then scaled the amount of dye powder down by 10% for several steps. I was right; this was way too much dye for the fiber and dyeing method I was using! Even after processing, there was quite a bit of dye left in the water. My yarn reached its physical saturation point before it exhausted all the dye from the bath. There was so much dye available at each level that there was very little variation between the skeins. The benefit of this experiment was that I learned how dark this color could be at full saturation.

Saturation from 12.5% to 2.5% DOS (*from top to bottom*) in gray scale and color

Value from 4% DOS "very deep" to 0.5% DOS "light"(*from top to bottom*): 4%, 3%, 2%, 1.5%, 1%, and 0.5% in color and gray scale

When hue is removed, value is easier to see. Locks dyed by Betsy Neal

Value Experiment

I approached my second experiment differently. Based on what I learned from the first experiment, I switched to dyeing 1 ounce (which I'll round to 28 grams) of wool spinning fiber. This is my weight of goods (WOG). How much dye to use for each value is determined by multiplying your WOG in grams by the percentage suggested by the manufacturer for full saturation and stepping down the concentration from that point. For this experiment, I chose 4% as my full saturation level. Then it is just a matter of doing the math: 28 grams × 0.04 = 1.12 grams of dye powder, and so on for each step.

Below 0.5%, it becomes very difficult to measure out dry dye powder. Instead, mix a 2% liquid solution of dye by adding 98 milliliters of water to 2 grams of dye powder. Then, draw your dye solution out using a large syringe. This changes the math just a bit: WOG (grams) × desired depth of shade divided by dyestock solution strength equals number of milliliters of dye solution to be used.

Pale = (28 × 0.20)/2.0 = 2.8 ml dye solution

Very Pale = (28 × 0.10)/2.0 = 1.4 ml dye solution

Palest = (28 × 0.05)/2.0 = 0.7 ml of dye solution

Overall, I am happy with my roving experiments and think that the values I dyed are suitable to be spun together. Because most of the values are in the dark to medium value range, I will include less of the light value. Another use of information from my experiments would be to dye my handspun yarn in a mix of these values. Because I will use my yarn for weaving, I will likely wind my warp first and apply the dye in a way I find most interesting.

Dyeing yarn in a variety of values is fun and so important to your final project. Whether you are dyeing variations of the same hue or combining several hues, consult your gray scale and dye a mix of values for the most pleasing result.

New to acid dyes? Mary details her approach to dyeing a series of samples like these on our website at LT.Media/Beginner-Dyer.

*Jacquard's instruction sheet lists dye quantities for deepest shades of its acid dyes for dyeing fabric in washing machines and indicates that stovetop dyeing (as used in Mary's process here) will require less dye. Learn more at jacquardproducts.com/acid-dye.

Mary Berry creates fiber art by weaving, spinning, dyeing, and rug hooking. She also teaches at fiber festivals nationwide. Her special joy is seeing another student get hooked on playing with yarn and fiber.

Photo by Kate Larson

Karida and her team dye more than 70 colorways.

Karida Collins

Owner, Neighborhood Fiber Co.

Photo courtesy of Neighborhood Fiber Co.

Color inspiration is everywhere around us. I love grabbing a piece of the city others might not see beauty in and refining it into a bold and vibrant shade.

How did you get into your craft?

I began knitting in college at George Washington University after a dear friend suggested the hobby. It was when *Stitch 'n Bitch* [by Debbie Stoller, 2004] was out and all the third-wave feminists were knitting. My friend thought I would be into it and, clearly, she was right.

How did you shift from hobby to business?

My first job in the industry was at a local yarn store in Washington, DC. While working there, I noticed that very few yarn store owners, dyers, or publishers were BIPOC (Black, Indigenous, and People of Color). I also noticed that so much of the yarn colors on the market were inspired by nature or pastoral settings. As a city dweller who grew up in Memphis with ties to DC and Baltimore, I wanted to introduce a bold, urban color perspective and use it to reflect the beauty of cities and neighborhoods. Neighborhood Fiber Co. was born in 2006 in a basement apartment in Washington, DC. Since 2011, Neighborhood Fiber Co. has made a home in Baltimore and continues to offer vibrant, one-of-a-kind colors inspired by urban landscapes.

Photo by Matt Graves

The luscious Cobblestone Roving (75% BFL and 25% silk) shown in (*from top*): Observatory Circle, Mondawmin, Guilford, and Joyce Scott

What is your favorite part of the process?

My favorite part of the process is seeking out inspiration for new colors. Color inspiration is everywhere around us. I love grabbing a piece of the city others might not see beauty in and refining it into a bold and vibrant shade. We currently dye 11 different yarn bases and 2 fiber bases in more than 70 colors. Most of the yarns are made with GOTS-certified organic Merino. While still machine washable, this wool is free from the harmful chemicals associated with the traditional superwash process.

What would you like us to know about your work?

Neighborhood Fiber Co. takes its commitment to Baltimore and its communities seriously. During the Baltimore Uprising in 2015, I had the idea to fundraise by dyeing a special color, Sandtown-Winchester, named for Freddie Gray's neighborhood. This was our first "Color for a Cause," and profits from the sale of this color were donated to the Fund to Rebuild Baltimore. Over the years, we've dyed Colors for a Cause for many issues and began to garner a reputation for human rights advocacy. In May of 2020 after the murder of George Floyd, many customers and fellow industry professionals reached out to me for ways to contribute to anti-racist causes. I decided to start a GoFundMe to establish a donor-advised fund with a local nonprofit that would provide support to organizations, local and national, that I saw fighting for equity and justice; that way, people in my network could donate to a centralized place. This evolved into the NFC Momentum Fund, which has raised over $125,000 for organizations working for justice, empowerment, and equality.

What are your plans for the future?

The future has so many amazing options for us! Right now, we are beginning to plan a community maker space. We hope to provide dedicated studio workspaces to fellow fiber artists in Baltimore, with access to a dye studio—something our area completely lacks. We hope to foster creativity and growth while building a bigger and stronger diversified community.

Visit neighborhoodfiberco.com to learn more about Karida and her team, their fiber, and everything they do.

Is there a dyer, toolmaker, fiber producer, or mill we should feature? Tell us about your favorite makers—large or small—at **spinoff@longthreadmedia.com**.

Photos by Matt Graves unless otherwise noted

All the Colors of the Wind

ANDREA DECK

Have you ever looked at something beautiful and thought, "I could do that"? The hubris of the fiber artist strikes again as I scroll through the beautiful sunset pictures on social media, wondering how hard it would be to capture the incredible display of color. As a handspinner and beginner rigid-heddle weaver, I set out to see if I could apply the principles I've seen used in planned pooling for knit and crochet to build a clasped-weft weaving, mimicking all the colors of the wind.

In knitting and crochet, planned pooling is where a skein of yarn is space-dyed in a specific pattern so that when you work a particular number of stitches, the colors "pool" together and create a pattern—magical! Using this method, my plan was to start with a beautiful sunset photo, design a weaving draft, and spin a yarn for the weft that would magically change colors as I wove to pool into my desired sunset. As I set out to do some weaving math, I quickly dialed back my ambition and decided the mountain part of this sunset scene needed to be its own yarn; this meant I could spin the sunset of my dreams. Clasped weft offered the perfect weaving solution, allowing me to create an undulating transition between mountain and sky as I wove.

CREATING A DESIGN

I started where any overly ambitious fiber project starts: the internet. When determining what I was looking for, I decided I needed a mountain line that had some visual interest with higher peaks and low valleys and a set of no more than four sunset colors. Using images I found online was easy, but I hope you experiment with your own photos and imagination, too!

Using my chosen photo, I overlaid a grid image and changed the colors a bit to match what I had in my stash and the colors in my living room. I created a 30-block grid, where each block represented ½ inch in my final weaving. Because I planned to create the mountain line using clasped weft, I would need to weave the piece sideways, so the grid would be woven from left to right. The top of the pillow (sky) would be my left selvedge edge while it was on the loom.

Using the grid, I next needed to determine how long each sunset color needed to be per row if I were to weave from the left selvedge to the mountain line and back for each row. As someone who struggles with arithmetic while spinning, I then wrote out a list of lengths (yellow: 1", orange: 1", pink: 2", maroon: 4") to keep myself on track.

I planned to use millspun for warp and calculated 16" for loom waste and 2" for header on both sides, and I assumed I would be creating a slightly weft-faced fabric at about 10 picks per inch. To spin enough weft yarn for the front of the pillow, I needed about 150 yards total. I then assumed the ratio of sunset to mountain colors would be about 70/30 based on my graph, but with headers in the blue mountain color, I expected it to be closer to 50/50. When choosing a warp for this project, I wanted to make sure that my handspun shone, so I chose a smaller-gauge, sturdy wool thread in black that I expected to fade into the background.

Photo by Bailey Zindel on Unsplash

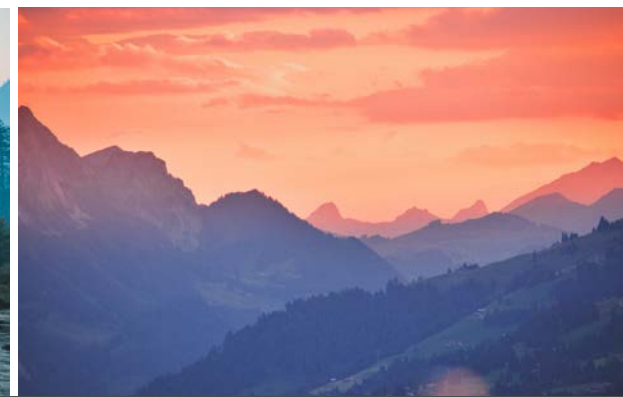


Photo by Sven Pieren on Unsplash

Andrea used elements of several scenes to create her design.

For a project like this, I sample, sample, sample! Even though it's not my favorite thing to do, I added warp so I could do several samples. I first used space-dyed yarn to figure out the general plan, and I then spun up extra yarn in two different colorways to sample as well.

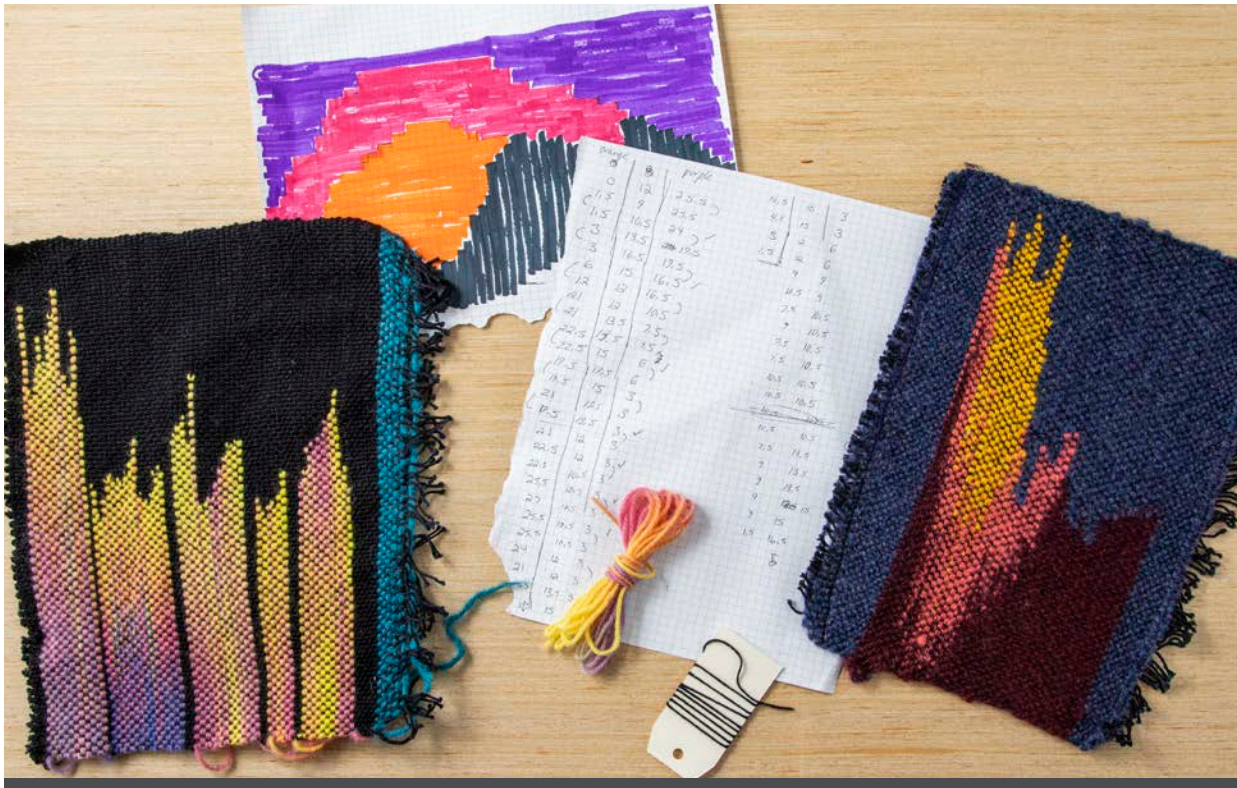
SPINNING

To keep the clear, crisp delineations between colors that I was looking for, I determined a chain-ply (three-ply) was necessary, as I didn't trust my ability to plan two identical color-changing singles and then ply them. So, I multiplied each measurement per color by three for the length of the singles. I strongly recommend predrafting your fiber at this point. I used a pin-drafted roving for the pillow and was pleased with how easy it was to spin while I was simultaneously measuring every section. Then, I prepared to spin, measure, splice, repeat!

I spun an active, slightly overspun singles starting with the color closest to the left selvedge (top of the sky), measured how long it needed to be in a singles, and then changed colors approaching the mountain line. Thinking through the weaving, I then needed to spin the colors back from the mountain to the edge of the weaving. On the bobbin, the color sequence was something like maroon-pink-orange-yellow, yellow-orange-pink-maroon.

Am I great at joins and splicing? No. But a cup of water near my wheel to help with "spit" splicing, using a well-prepared fiber, and working slowly with a lot of measuring helped me through this. I was also using a fine Merino, which was a very easy spin. This was helpful, as I believe the math works out that I spun 618 color-change splices in the 1½ ounces of singles for the project. I have a lot more experience with joining fiber now!

I then chain-plied the singles, looping at every color change to maintain the pooling effect. After finishing, it was a fairly balanced worsted-weight, three-ply yarn with clear color changes. I set it to soak and quickly



Andrea added extra warp onto her rigid-heddle loom so she could experiment and sample with millspun and then handspun yarns before beginning her project. A portion of her grid shown here was easily transferred to step-by-step notes.

spun up my mountain color—a breeze of a spin—and chain-plied to match the size of the color-changing yarn but with only one color throughout!

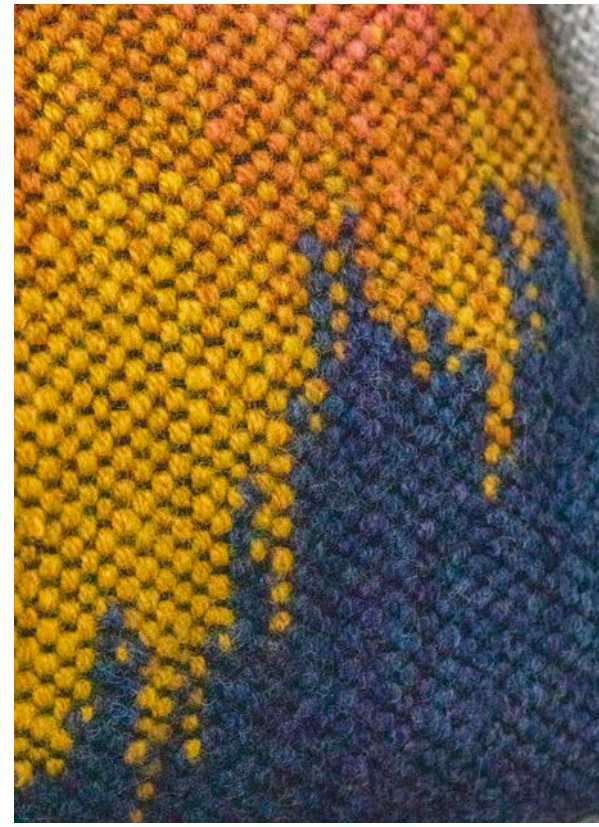
WEAVING

Weaving a weft like this was, unlike the spinning, very easy! Let your previously completed math do the work. How do you know how long the mountain should be as you work a pick? Once you hit the color change (the middle of the yellow section), that should be closest to the mountain, and it lines up going into and back out of the warp. In a weft like this, you can determine where the clasp sits on every single pick. It was a breeze to weave and looked like magic as the sunset suddenly appeared!

MATERIALS

Fiber Merino pin-drafted roving in four sunset colors, 2 oz (Angel Locks Fiberworks). Wool of the Andes Roving (100% Peruvian Highland wool), #28169 Delft Heather, 100 g (Knit Picks).
Yarn ***Warp:*** Curio #3 (100% cotton; 295 yd/100 g; Knit Picks), #28001, Black, 120 yd. ***Weft:*** Chain-plied worsted weight (about 800 ypp; 9 wpi) sunset and mountain colorways, about 75 yd each.
Equipment Rigid-heddle loom, 15" weaving width; 8-dent heddle; 1 shuttle.
Other supplies Tapestry needle; 12" × 16" pillow form or polyfill stuffing; coordinating fabric, 14" × 18"; quilting thread in coordinating color. ***Note:*** You can weave fabric for the pillow back, but this is not included in the yardage.
Structure Plain weave with clasped weft.
Warp length 120 ends 36" long (allows 1" for take-up, 16" for loom waste). ***Note:*** Optional, add 4–8" of warp for sampling. To weave fabric for the back of your pillow, add another 21" of warp.
Setts ***Warp:*** 8 epi. ***Weft:*** 6.5 ppi, doubled.
Dimensions ***Width in the heddle***: 15". ***Woven length:*** (measured under tension on the loom) 19". ***Finished size:*** (after washing and assembly) 12" × 16".

Dyed Merino tops spun into a planned-pooling gradient for a sunset and a solid blue to form mountains



Weaving Instructions

1 Set up your loom for direct warping a length of 36" or wind a warp of 120 ends 36" (1 yd) long. Centering for a weaving width of 15" (14¾" in a 7.5-dent heddle), warp your loom with 120 ends.

2 Wind a shuttle with your mountain color. Wind your sunset color into a ball for clasped weft. Spread the warp with scrap yarn.

3 Leaving a tail 1 yd long for hemstitching, weave 2" of plain weave with the mountain color. Use the tail to hemstitch in groups of 4 warp ends.

4 Place the ball of sunset color on the side of the loom opposite the shuttle. Begin the pattern in clasped weft according to your created draft following the "mountain" and "sunset" pooling. To weave clasped weft, open the shed and pass the shuttle through to the other side, around the second weft yarn, and back through the same open shed, pulling the second weft into the shed. Adjust the position of the clasp to align the color changes in the sunset yarn. Beat each doubled pick (to the clasp and back) before changing your shed. Be careful if the clasp winds up close to the selvedge, as it can slip out of the weaving. Continue until the clasped-weft pattern reaches 15".

5 End with 2" of plain weave in the mountain color and hemstitch as you did at the beginning.

6 Leaving at least 2" of warp, cut the fabric from the loom.

7 Wet-finish in warm water by gently agitating and then leaving the pillow front to soak for 20 minutes. Block flat and square. Air-dry.

8 Trim excess warp. Cut the backing fabric to match the width of the woven pillow front and 2" longer than the clasped-weft pattern. Place weaving and backing fabric with right sides together, centering the clasped-weft pattern. Leaving a 4" gap in one side, sew ½" hems around all four sides with ½" of plain weave included at each end of the pillow front. If you prefer to lockstitch over your weaving edges, do so before turning. Turn the pillow right-side out and stuff or insert the pillow form. Slip-stitch the opening closed. Spot clean only.

Clasped Weft

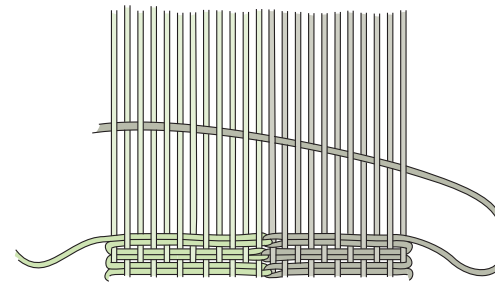


Figure 1

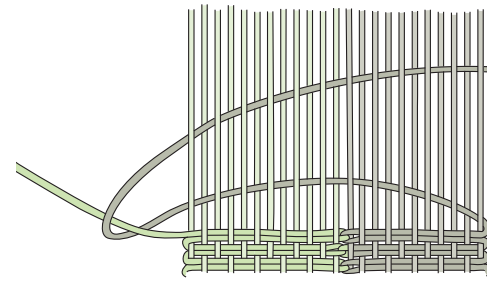


Figure 2

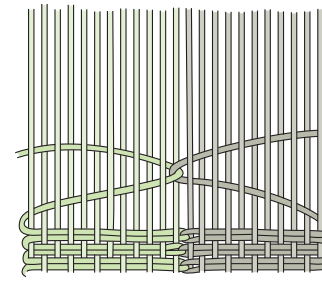


Figure 3

This clasped-weft technique uses two weft yarns that wrap around each other within the warp. The point where they meet can be easily adjusted to create shapes in the woven cloth.

Illustration by Ann Sabin Swanson

Andrea Deck is a fiber artist, community builder, and Washington, DC, native. She is lucky to be able to pursue all of her fiber whims, from dyeing to weaving to spinning to knitting to researching her traditional craft roots, and she looks forward to continuing to learn and grow with the fiber community.

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Woven swatch of Cindy's first homegrown-cotton project, a few of her beautiful bolls from 2023, and colorful bundles of handspun loom waste

Photos by Matt Graves

Mixing It Up with Natural-Color Cottons

CINDY CONNER

I grow cotton and flax to make clothes for myself, but when I first grew cotton to spin, I had no idea that I would end up with a homegrown wardrobe or write a book about the process. In the beginning, it was just for fun. I planted green and brown cotton varieties about 100 feet apart in my garden. I found out later that the recommended isolation distance is 660 feet for home use, longer for pure seed. Although not evident that year in the fiber, crosses between the varieties began to show up the next year. However, since the color at harvest is muted, I did not notice some brown in with the green, nor was I looking for it.

After saving my seed and growing cotton for several years, I decided to use the second- and third-year harvests from the green beds to spin for fabric for a vest.[1] I had intended to have a strictly green fabric, but what resulted was so much more interesting. There was brown and even a bit of white mixed with the green. Cross-pollination is not necessarily a bad thing for an adventurous homegrower. It opened my eyes to the possibilities waiting to be discovered. Since 2016, I have been working with these crosses in The Cotton Project.[2]

Working with homegrown fiber can be both limiting and freeing—limiting in the amount you have

to work with, depending on the harvest, and freeing in that you can combine what you do have in ways you may not have tried if you were able to order any amount of fiber you wanted. I am dependent on the amount that I have grown, and it has challenged me in a good way to be creative with my spinning.

I've created a series of samples to encourage you to mix natural-color cottons, but I know not every spinner lives in a cotton-friendly climate or has the desire to grow cotton. To share the color-mixing fun with more people, I decided to explore commercially available cotton sliver and see what I could do with it.

COTTON SLIVER COLOR MIXING

I used the Spin & Weave Towel Kit from Cotton Clouds, containing green, brown, and white slivers.[3] My goal was to weave a gamp, which is a sample woven in a grid pattern so that each block showcases how different colors used in the warp and weft interact. I wanted to give you inspiration and suggestions on combining these colors, rather than keeping them separate.

Colored cotton darkens once it is scoured. You clean away any oils and dirt and the color pops! For this project, I scoured some of the yarns and left some raw, which expanded the number of colors I had to work with. Scouring does cause the skeins to shrink a bit, which may be something to consider if you are combining scoured and raw fibers in the same fabric, but I have done so without problems. Experiment and see how things go for you.

You can see from the finished sample that without doing anything other than scouring either the warp or weft and leaving the other raw, you can have a fabric that is a bit more interesting than if it was a very solid color—at least for the green. To show how the color difference will persist in the fabric, I have washed this gamp five times with my regular laundry in warm water and cold rinse using Seventh Generation Free & Clear detergent.

The Warp

I started by spinning two-ply yarns for the warp and weft in all three colors. After splitting the brown and green skeins in half to create five total skeins, I scoured one of each color. My handspun yarn measured 29 to 35 wraps per inch (wpi). I warped my Louet Jane 50 loom at 20 ends per inch (epi) in 2-inch-wide sections (about 5 centimeters) of each color: green scoured, green raw, white scoured, brown raw, and brown scoured.

Cindy's Cotton-Scouring Method

In a stainless steel pot with 2 gallons of water (7.6 liters), add 2 tablespoons washing soda (31 grams) and a squirt of dish soap or a tablespoon of detergent (about 15 milliliters). Bring to a simmer and add wet skeins. Simmer for 40 minutes. Rinse thoroughly and hang to dry. Washing soda, also known as soda ash, can be found in the detergent section of your grocery store.

The Weft

My weft would include the five colors used in the warp plus a few extra, and each section would be about 2 inches. To start, I wove green scoured, then green raw. I decided to mix it up in the next two weft segments, and more surprises were in store.

First, I used a yarn made up of green and brown carded together to produce a blended yarn that was not distinctly either color. Both plies were the same blend. Then I used a two-ply yarn made by spinning green and brown separately and then plying them. When woven, the difference between the two yarns is barely noticeable. Anticipating that they might be similar, I put two rows of white between them. With my homegrown fibers, I have carded two colors together when I did not have enough of either one for my project. Now I know that I can get the same effect by plying two colors together, without needing to have both colors in the same singles. Green and brown have the same value, or shade of lightness, which might account for that. Sometimes, I have more of one color than another, so in that case, I would blend them before spinning. Also, if I were using the yarn as singles, rather than plying, I would need to blend the colors before spinning. The instructions for the dish towels that came with the kit indicate to use singles for the weft.

The yarn in the next weft section is white and green, each spun separately, then scoured and plied.

Find a high-resolution image of Cindy's gamp at LT.Media/Cotton-Gamp. Zoom in and explore natural color!

I usually scour my singles before plying to see their actual color. If I know I will be plying them, I may wait to do a scour after plying. Next is a weft stripe of two-ply white. After that is white and brown, each spun separately, then scoured and plied. That is followed by a yarn with white, green, and brown carded together, then scoured and plied.

After that is brown raw, then brown scoured. Initially, the scoured brown was darker, and these sections were different in the gamp. After laundering the gamp several times, the deeper color did not hold, and the scoured and unscoured browns look the same. When I am working with crosses, I am anxious to see what colors I have and like to spin and scour some skeins soon after harvest; however, color changes will occur naturally when you wash the piece multiple times. Sally Fox, of colored-cotton fame, has a FoxFibre Wash Analysis chart on her website showing the color development of several of her natural-color cottons.[4] I've noticed that the green in my homegrown clothes takes on a gray hue as time passes.

You could make a dish towel from this yarn or weave very interesting fabric using any of these combinations for something to wear.

KNITTING WITH HANDSPUN COTTON

I realize that not everyone is a weaver, so I got out my knitting needles to create another set of color-mixing samples using the slivers from Cotton Clouds. For these knitted swatches, I plied my thin singles into several different knitting yarns.

I love the heather effect you can achieve by knitting yarns plied from singles in distinct colors. As spinners, we can create yarns that aren't otherwise available. When you spin your own, you may have some spots thicker than others, and that adds to the uniqueness of the fabric.

There is a lot of fun to be had, no matter what fiber you are spinning. I hope I have sparked your imagination to have your own unique adventures with natural-color cotton. Happy spinning!

1. Unscoured green warp, green/white plied weft
2. Scoured green warp, green/white plied weft
3. Unscoured green warp, white weft
4. Scoured green warp, white weft

The brown tones are formed from water soluble and water insoluble tannins. Found on the surface and inside the lumen of the fibers themselves. In the simmering or first laundering the water soluble tannins are released along with the surface waxes that prevent the fiber from absorbing water.

The green color is composed of waxes classified as *suberins*. They are laid between each of the 20–35 layers of cellulose within the cotton fiber. They remain fascinating to me after all these decades of working with them. The changes in color are remarkable. And malleable, as they react to acidic liquids by turning yellow and basic liquids by turning grey/green. But the color changes are reversible and not permanent. This is why, however, one must be sure that any boiling of these cottons is in water that is basic, not acidic. Acids degrade all cellulosic fibers anyway. Bases strengthen them.[4] —Sally Fox

Brown and white singles in a two-ply

Green and two white singles in a three-ply

Green, brown, and white singles in a three-ply

Green/brown mixed and white singles in a two-ply

Homegrown Cotton and The Cotton Project

Once I discovered that growing my natural-color cotton plants close together resulted in cotton seeds with mixed color genetics, I started The Cotton Project to explore those crosses, enlisting family and friends to do some of the grow-outs. None of the other growers in my circle are spinners, but they all like to have gardening adventures with me.

In 2019, using yarns from The Cotton Project, I wove fabric for a dress using all the color variations I had so far in the warp. I also grow flax and used my linen handspun for the weft. My warp width on the loom was 17 inches (43 centimeters), which resulted in a finished fabric 15 inches (38 centimeters) wide. I knew how many warp ends of each color I could place within each inch, so I randomly picked them to add, working 1 inch at a time to avoid repeating a pattern. It meant cutting and adding at almost every wind on the warping board, but it was worth it. That dress won Best in Show at the 2019 Fall Fiber Festival at Montpelier Station, Virginia.

I continued exploring with my handspun yarns and developed a fabric for a shirt that combined some of my homegrown cotton and some grown by others. Much of that other cotton was grown as a seed crop for Southern Exposure Seed Exchange in Virginia. I carded green and brown cotton fiber together to spin one singles and then plied that with brown to create a two-ply warp yarn. The weft is singles produced by carding green, brown, and white together. I spun the singles on my charkha and put the charkha spindles into a Bosworth shuttle to weave directly from the spindle. That meant the weft was not scoured before weaving.

Homegrown dress fabric: 2-ply cotton warp and singles linen weft

Homegrown shirt fabric: 2-ply cotton warp and singles cotton weft

Notes

1. Homeplace Earth, homeplaceearth.wordpress.com/2015/06/02/homegrown-handspun-cotton-vest.
2. Cindy Conner, *Homegrown Flax and Cotton* (Guilford, CT: Stackpole Books, 2023), 65.
3. Cotton Clouds, cottonclouds.com.
4. Sally Fox, "This Color Is Alive," vreseis.com/ridiculus-lorem.

Cindy Conner lives with her husband near Ashland, Virginia, and grows cotton in her garden. Her book *Homegrown Flax and Cotton: DIY Guide to Growing, Processing, Spinning & Weaving Fiber to Cloth* was published by Stackpole Books in 2023 and includes a chapter on The Cotton Project. Seeds for Spinner's Ivory, a variety that came out of that project, are available for the first time this year through Southern Exposure Seed Exchange. Find Cindy at homeplaceearth.com.

Contact Michaela Kimbrough for magazine standing order opportunities.
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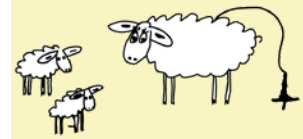

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Photo by Matt Graves

❶ **Living Dreams Yarn** offers fibers in a wide range of preparations and colors. This set of luscious hand-dyed combed tops, a blend of superfine Merino and Tencel, is available in six kettle-dyed colorways. Shown in Pinks. **livingdreamsyarn.etsy.com**

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❹ Julie Beeler created the Mushroom Color Atlas as a free online resource for those curious about dyeing with mushrooms. Her Mushroom Color Atlas poster shows colors derived from various wild, foraged mushrooms on bases of linen, silk, and wool, and the companion Dye Mark shown presents them in a portable bookmark-sized swatch collection. Poster and Dye Marks are available from **Botanical Colors**. **botanicalcolors.com**

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