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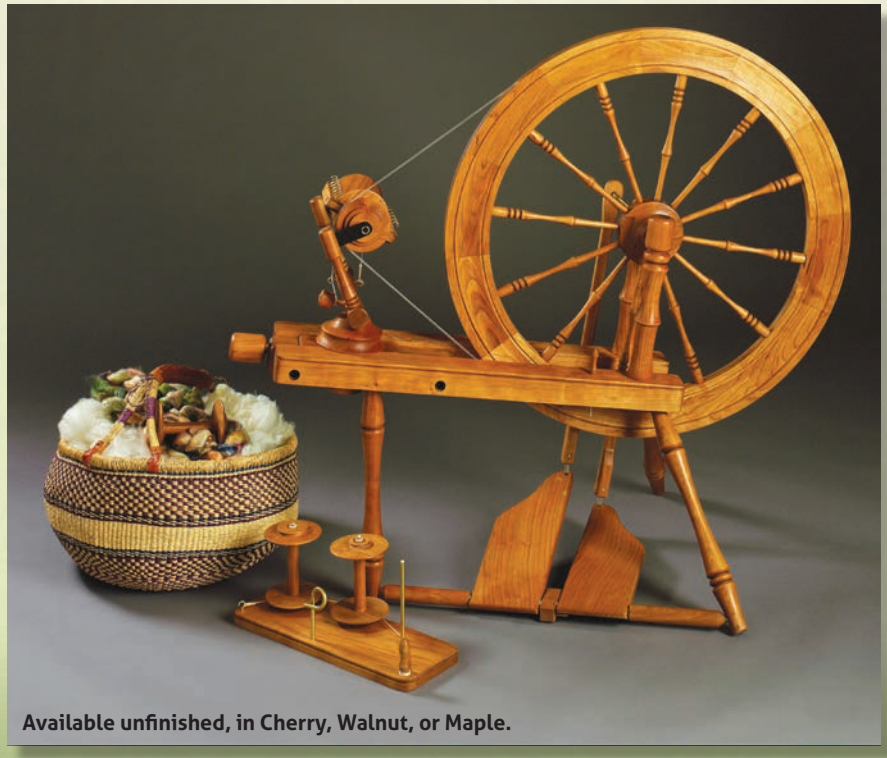

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THE WHEEL REINVENTED

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PROJECTS

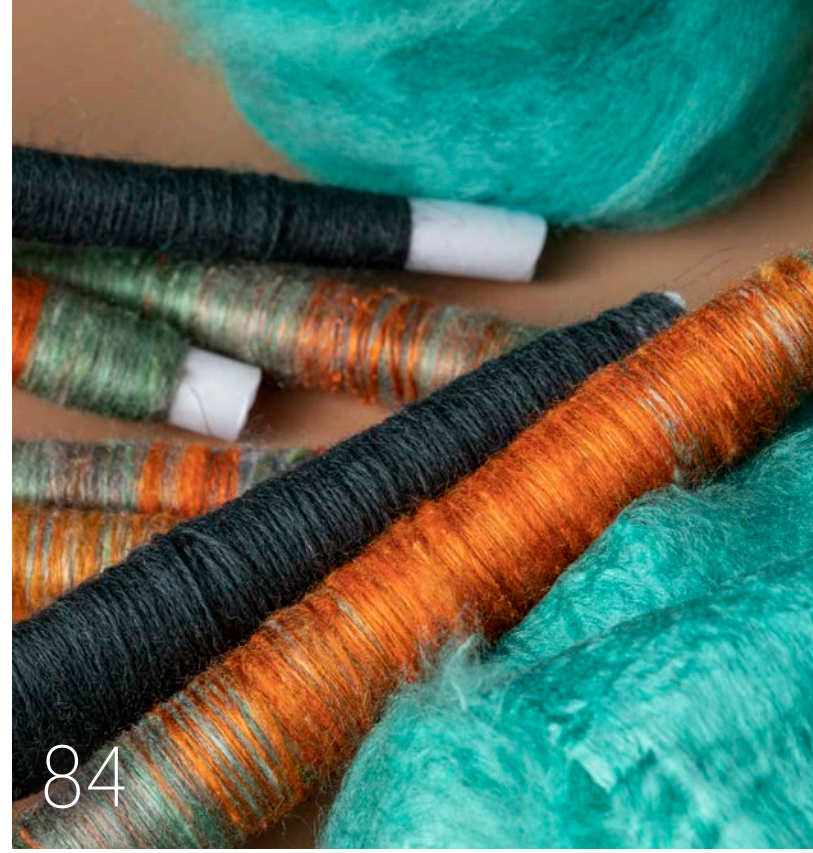

Photo by Belinda Ernest

DEPARTMENTS

On the cover: A Lendrum Folding Wheel sits in the back, and bobbins from Schacht, Lendrum, and Louet sit on a Louet lazy kate ready to ply. Orifice hook by Crafty Cat Knitty Bits (see page 24) and fiber from Eugene Textile Center

Photo by Matt Graves

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- Calls for Entries
- Corrections
- Index of Past Issues

The phrase "reinventing the wheel," typically a rebuff, often comes to my mind. The idea is, why bother figuring out something that is settled, something now optimized and made modern? So, why do we learn to spin yarn, knit sweaters, or bake bread when efficient machines now replace these hard-won hand-skills?

Why? Because I—and likely you, dear reader—find doing and making and learning to be a vital part of being alive in this world. And I think that's why our tools can become so endearing to us. Tools are our companions as we explore. Together, we face challenges, find our flow, and wander off the beaten track. Spinning wheels, in particular, find a way into our hearts.

"Reinventing the wheel" is a common adage, but I chose to think of this issue of *Spin Off* as "the wheel reinvented." We are indebted to the wheel makers, authors, and instructors who explore the old technology of handspinning with fresh eyes. New generations of thinkers and makers continue this work—are we not so very lucky?

When breakthroughs occur—from sealed bearings to modern minicombs to e-spinners that fit in your purse—change ripples out into our community as it always has. In this issue, researcher **Liz Hammond-Kaarremaa** follows the traditional bulky yarn of the Coast Salish peoples from spindle to the Salish spinner to modern wheels for XL yarns. **Meagan Condon** explores the possibility of using 3D printing to rehabilitate antique wheels with missing or broken parts, and **Kerry Bullock-Ozkan** shares her wheel adjustments for accommodating a blend of cotton and cottonized hemp.

Reinvention can also come in the form of renewal. **Deborah Held** entices us to try some tweed yarns by giving colorful leftover fibers a second life, and **Madeline Keller-King** shares simple tips for extracting a palette of colors from the humble onion skin.

We are a community of makers, and I'm so glad you are a part of it.

Looking for a quick, colorful cowl pattern? Details on page 77.

Photo by Matt Graves

Spin Off®

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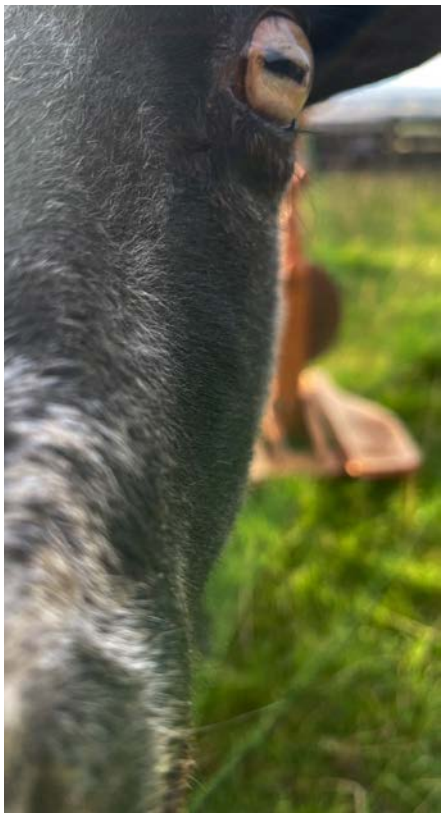
majacraft

Little Gem, the perfect travel wheel



Even the sheep love our Little Gem! Here we were, mid-photoshoot in the field when Grunhilda the Gotland photo-bombed us! First, she had a good look at the wheel (and a good sniff too) and then she ran over to exclaim her delight at this wonderous object we had brought for her... just as we snapped the pic!

Grunhilda would like to share her favourite things about the Little Gem. She loves the scent of the beautiful Rimu wood. Some of these special native New Zealand trees grow right next to her paddock. She also loves the extra nice lavender scent imbued into the wheel by the Majacraft conditioning wax. She was also fascinated at how easily we unpacked it from its travel case and set it up ready to spin in seconds.

She is very interested in the (luckily) very tough drive bands, which last for years if you don't chew them, and they are the colour of grass. Grunhilda was less interested when we told her that the Little Gem also fits nearly all the Majacraft accessories and bobbins - we think this is amazing, so next time we will bring them all with us to the paddock to show Grunhilda, she might change her mind!

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Visible Creative Mending for Knitwear

Flora Collingwood-Norris

I KNEW I NEEDED TO FIX the monster. Gray and white and knitted with recycled yarn (from @recycledyarn on Instagram), the adorable creature represented one of the very first handmade items I had gifted to my now-toddler son. Unfortunately, he could no longer play with it, as two quarter-sized holes had opened up on the main body, exposing the fluffy fill underneath. I knew I needed to fix the holes before they became bigger and bigger—but how? Although a prolific knitter, I never learned to darn, and the oddly shaped stuffed animal with no access to the "wrong side" of the work presented additional challenges.

Enter *Visible Creative Mending for Knitwear* by Flora Collingwood-Norris. Providing thorough instruction paired with bright, beautiful photography, Collingwood-Norris takes readers step-by-step through a variety of darning techniques and example projects before ending with a section on embroidery to embellish a newly fixed piece. I immediately fell in love with the textures and hues that a darned area could add to a sweater or sock. After mending, these pieces—to my eyes—looked *better* than before with an additional, artistic layer added to their original form.

Inspired, I chose two techniques to mend my pair of monster holes: a stylized square darn and a round darn. Both could be worked from the front, and both presented opportunities for colorful microweaves. The step-by-step instructions were relatively easy to follow, and I realized right away that I would need to continue to practice darning for results that looked as even and meticulous as those in the book. Still, when I held the first patch out to inspect my work, I grinned. The purple and blue of the stylized square looked so *cute*, the fun colors on an already-whimsical knitted piece easily disguising any mistakes I had made.

The second patch was even better, though it evolved from my original circle into more of an organic, oblong shape. I was impressed with how sturdy both mends felt, and my toddler approved! My only suggestion for this book would be to provide a little more information on completing embroidery stitches as well as the blanket stitches in the Scotch darning section. I have trouble visualizing the steps when learning stitches and generally benefit from a sketch with directional, numbered arrows.

Now that I'm no longer afraid of darning, I'm ready to apply the methods in *Visible Creative Mending* to socks, mittens, sweaters, and more!

—Erika Zambello

Galashiels, Scotland: Collingwood-Norris, 2021. Hardcover, 144 pages, $34.55. ISBN 9781739901608.

Courtesy of Erika Zambello

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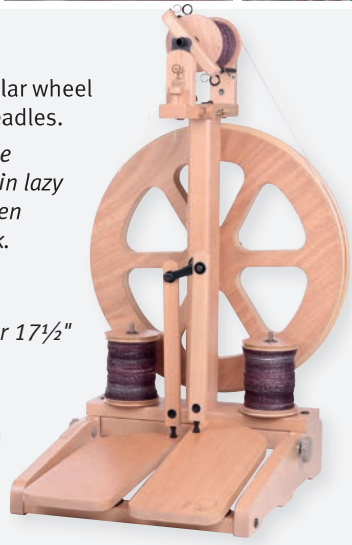


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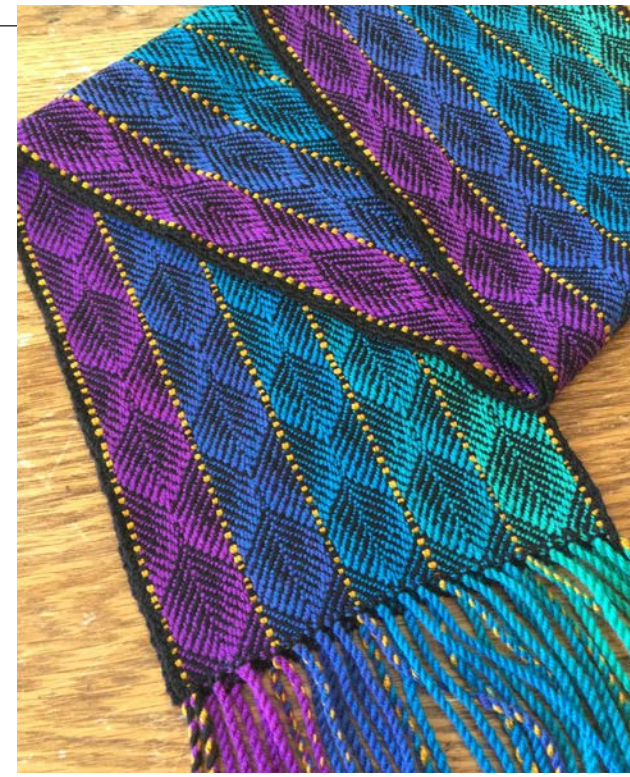
Peacock Scarf

BELINDA ERNEST

Pattern Peacock Scarf.
Fiber/preparation Mulberry silk and 19-micron Merino; drumcarded batts.
Wheel Electric Eel Nano.
Drafting method Short-forward draw.
Ply wraps per inch 22.
Total yardage 5- to 15-gram batts equaling 556 yards spun.
Yards per pound About 5,600 (roughly equivalent to 20/2 wool).
Yarn classification/weight Fingering.
Loom 16-shaft Ashford table loom.
Setts 24 epi; 22–24 ppi.
Finished size 67" × 6¾".



Photos by Belinda Ernest

I've been a weaver for five years and was looking to ply some extremely thin millspun yarns. I saw the Kickstarter project for the Electric Eel Nano. A friend and I went in on one together, and she taught me the fundamentals of spinning. Now, I've been spinning for about two years and still haven't plied the thin yarns that started my spinning journey.

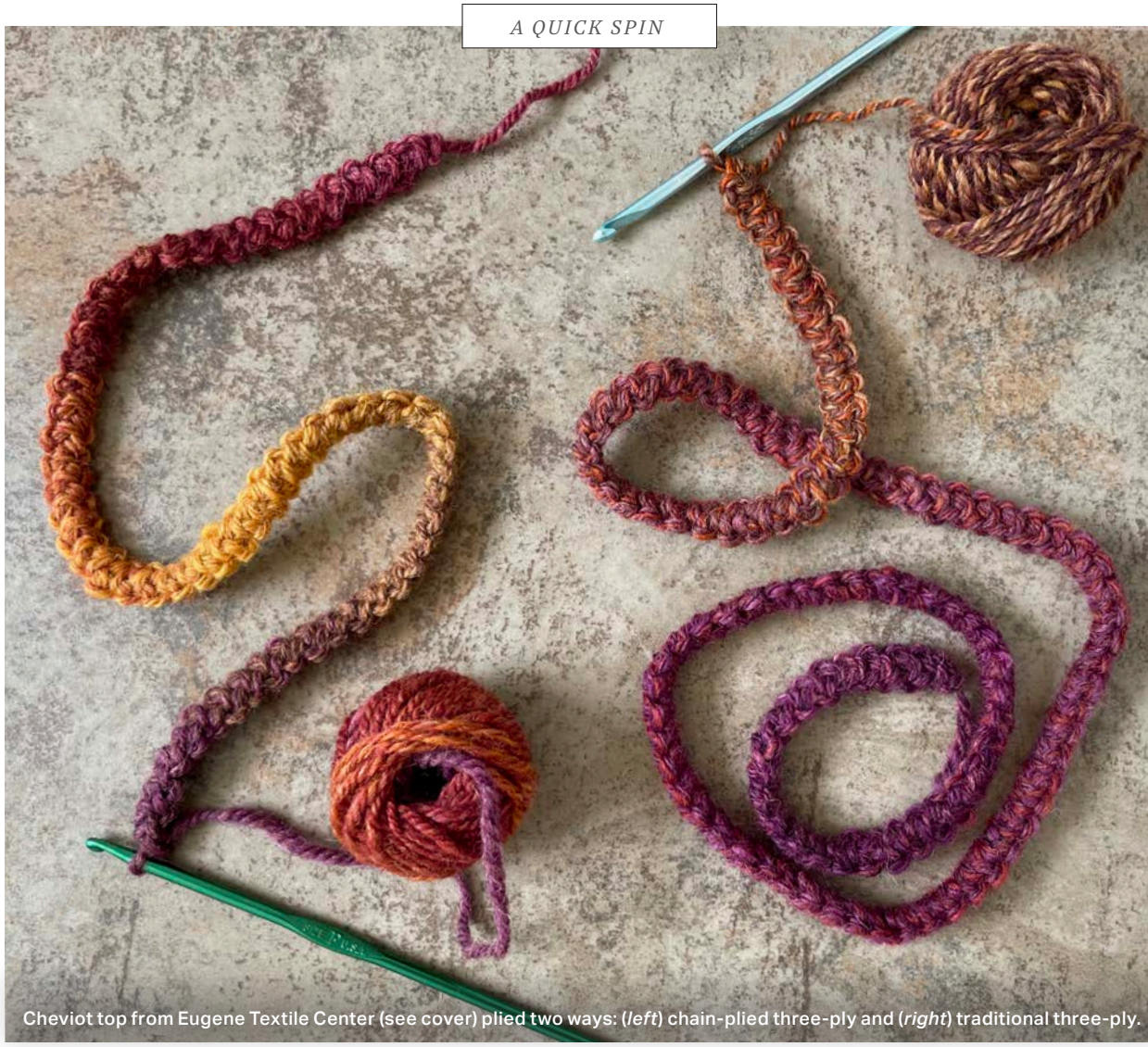
The inspiration for the scarf was a picture of a lovely peacock on Pinterest; I chose my colors from it because I love bright, jewel-tone colors combined with black. Blending for color was my favorite part and the most challenging part because I'd never done it before. I consulted the book *Color in Spinning* by Deb Menz as a guide and used a recipe approach to color blending. I started with three colors of Merino/silk to create five colors on a Strauch Finest drumcarder. For the blends, I combined 50% blue with 50% green and then 50% blue with 50% violet. I'm pleased with my first try. Each batt is roughly 15 grams (0.5 ounce).

I also spun the black and some gold that was left over from a previous spinning and weaving scarf project. Both were composed of mulberry silk and 19-micron Merino. This is my favorite spin so far.

I wove my scarves on my 16-shaft Ashford table loom. The draft is Feathers from the Thrilling Twills library by Ingrid Boesel, Draft #78099, 16sF055. You can find all of Ingrid's drafts at fiberworks-pcw.com/twills.html or handweaving.net/collection-drafts/collection/81/thrilling-twills-ingrid-boesel.

Belinda Ernest is a weaver who found that handspinning was the perfect way to expand her love of color and design. Planning and executing weaving with her handspun yarns is one of her greatest passions. Belinda is a member of Ravelry's forum of Warped Weavers under the username elfstone.

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



Cheviot top from Eugene Textile Center (see cover) plied two ways: (*left*) chain-plied three-ply and (*right*) traditional three-ply.

Photos by Kate Larson unless otherwise noted

What is Romanian Cord?

KATE LARSON

Romanian cord, also called Romanian braid, can be used for straps, edgings, or ties. A regular crochet chain or knitted I-cord will stretch and grow thinner over time, but the Romanian cord technique creates a stronger, more stable textile that looks great when worked in handspun yarn of any gauge.

Romanian cord or braid is also used to form the base of Romanian point lace. In *PieceWork* January/February 2001, author Bart Elwell shares more. "In Romanian point lace, a three-dimensional braid outlines the pattern and forms a framework upon which needle-lace fillings and wrapped, twisted, or needle-woven bars are worked. This sturdy lace is traditionally worked in white or ecru. The braid itself has such a complex structure and consistent quality that it appears to be machine made; it is actually crocheted. The origins of Romanian point lace are unknown, but it is thought to have been developed in central Europe in the eighteenth century, and eventually spread to Romania."

This firm, somewhat flat construction can feel awkward to create at first, but it is a fast and useful technique when you get the hang of it. Try it with fine two-ply handspun cotton or silk, or you might go big and bold with colorful bulky yarns.

SPINNING NOTES

Having become rather smitten with this technique, I started giving it a try with a wide variety of handspun yarns: singles, two-ply, chain ply (three-ply), traditional three-ply, and four-ply. Every structure and fiber

combo produced a different result and felt quite different in the making.

The easiest yarns I've worked with have been lofty, squishy three- or four-ply yarns spun from wool or wool blends. (The yarn shown below is four-ply spun from combed Corriedale.) The elasticity of these yarns allowed me to work quite loosely—making it easier to fit the hook into the two loops on the side of the cord—but the finished cord still looked well-tensioned and consistent.

For several years, this has been my go-to method for creating handspun cotton cords to insert in handsewn project bags, but there is so much more to explore. I've started using scrap yarns to create lengths of cord that I'll use to wrap gifts for treasured friends, and I've just started a series of swatches using Romanian cord as a cast-on edge. Simply pick up and knit in the looped edges for a firm, no-roll, yet still-stretchy hem or button band. Grab a little handspun and see where it takes you!

A FEW TIPS FOR GETTING STARTED

- Turn the cord each time in the same direction as if flipping pages in a book.
- Tension is important. If your stitches are too tight, creating this cord will be tedious. Try loosening it up and see if you are more comfortable. If your tension is too loose, you'll have untidy loops that form on the sides of the braid.
- The braid feels much easier to create once you have an inch or two of the pattern established. Not sure you have it right? Keep going and see if you hit your groove. Then, try restarting and see if the beginning looks better.

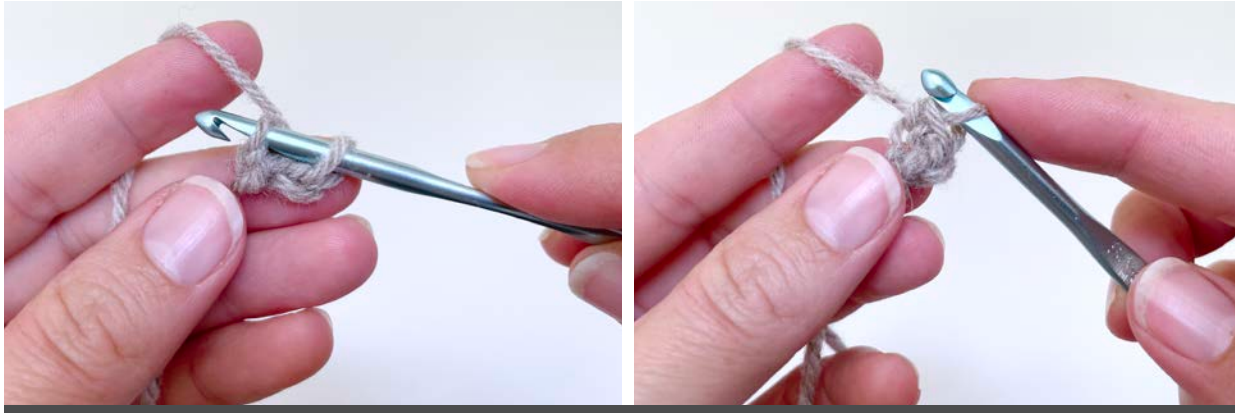
Photo by Joe Coca

PieceWork January/February 2001 featured an article about Romanian point lace and included a butterfly-motif project worked in fine cotton thread. Romanian cord is used to create the structure of the motif by basting it to a pattern before additional lace elements are added.

INSTRUCTIONS

Row 1 Ch 2, sc in 2nd ch from hook, turn.

Row 2 Sc in horizontal bar at end of row (cord edge), turn.



Chain 2 and create a single crochet in the second chain from the hook (Row 1).

After you turn the work, do you see the horizontal bar at the end of the row? Pick it up and work a single crochet (Row 2). This will feel a little odd because it pulls up the work.

After you turn, you'll see two bars at the end of the row. Insert the hook under both and work a single crochet (Row 3).

After you have worked Row 2, it is easy to fall into a rhythm. Watch the cord grow and your handspun become a sturdy strap, edging for a skirt, or trim for your favorite mittens.

Row 3 Sc in 2 horizontal bars at end of row (cord edge), turn.

Rep Row 3 for patt until cord measures desired length, fasten off. ●

Resources

Elwell, Bart. "Ioana Bodrojan's Romanian Point Lace." *PieceWork,* January/February 2001, 43–44.

Bodrojan, Ioana, and Narcisa Webb. "A Romanian Point-Lace Butterfly to Make." *PieceWork,* January/February 2001, 45–46.

Kate Larson is the editor of *Spin Off* and author of *The Practical Spinner's Guide: Wool* (Interweave, 2015). She teaches handspinning workshops around the country and spends as many hours as life allows in the barn with her beloved flock of Border Leicesters.

Spinning Comfortably

Choosing and Using the Best Wheel for Your Body

CARSON DEMERS

What treadle shape works for your body? *From left:* Schacht Matchless, Louet Victoria, and Lendrum Folding Wheel.

Photos by Matt Graves

Shopping for a new wheel can be fun, exciting, and, let's face it, a little overwhelming—especially if you're a first-time buyer. There are so many things to consider! Everything from price and what it includes, to the materials it's made of, and the wheel's aesthetics seem to muddy the waters of clear, objective decision-making. Let's take a step back and consider the selection process with *you*—not the wheel—at the center of the decision. Because you are the probable energy source that will operate this device, your needs, not those of the yarn you will produce, come first.

When you boil it down, all wheels have one thing in common. They are powered (somehow) to revolve around an axis, creating rotational energy (twist) that is then delivered into the attenuated fibers exposed to it by the spinner. Within this basic and very simplified definition of what a wheel does are myriad variables that impact how easily this energy transfer happens. And it's these variables that make the decision of which wheel is right for you seem challenging. But if you remember that you're trying to find the twist machine that requires the least amount of *your* energy to do the job of rotating the wheel and passing along energy to make it spin, then it becomes much easier to choose which wheel is best for you.

A good place to start the decision-making process is with an inventory of your body. What physical needs or history of injury do you have that the wheel must accommodate in order for you to work comfortably? Physical characteristics include things such as your height, size, and handedness. Pertinent history of injury might include Achilles tendinitis, plantar fasciitis, de Quervain's tenosynovitis, or carpal tunnel syndrome to name a few. Chronic issues to inventory might include low-back pain with bending; (in)tolerance to sitting; mobility issues, including at the ankles; and overall strength. Some of these become especially important if you are purchasing a wheel you plan to transport outside your home or studio regularly.

Let's walk through key anthropometric measurements that you'll want to know to determine if the wheel is a good fit for you. We'll come back to these other physical needs and any history of injury to help with other decisions you need to make.

START WITH YOUR SEAT

You can't judge how the wheel fits until you know that the chair you'll use while spinning is a good fit. Proper chair fit aligns your hips and knees to 90-degree angles when your feet are on the floor and your legs are perpendicular to the floor. To measure this, place a yardstick at the side of your leg and measure from the center of your knee joint to the floor. Don't wear shoes unless you wear them while you spin. This is how high

First, find the right spinning chair. Knees should be level with hips when your feet are placed on the treadles. The lower leg is at a right angle to the thigh. What is your ideal seat height? The ideal measurement is the length of your center knee (A) to the bottom of the foot (B) plus the height of the treadle at the axis point (B to C).

As a physical therapist, I get questions from spinners about what wheel they should purchase. There isn't a one-size-fits-all answer because it depends on you and your body.

the seat of the chair needs to be for you to sit with your feet on the floor. But there's more to the equation. The proper sitting height needs to be the length of your leg measurement *plus* the height of the wheel's treadle(s). Measure treadle height from the end closest to you to the floor. Treadle height plus leg length equals how tall the chair seat should be and assures a 90-degree angle at the knee and hip when you're sitting at the wheel.

Measure the distance from the outside edge of one foot to the other when seated (A to B). Then measure the width of the treadles (C to D) to see if the wheel is a good fit for your body. Treadle base too narrow? Try treadling with just one foot.

These joint angles reduce lower-back strain and pressure behind the kneecap. Poorly fitted chairs will make any wheel harder to use.

Seats that are too low (a common occurrence) will add this strain to ankles, knees, and back, limiting your comfort at the wheel. Chairs that are higher than the sum of these numbers make it difficult to access the treadles without either sitting on the edge of the seat or straining the ankle to generate sufficient force to move the treadle.

TREADLE SIZE AND PLACEMENT

The distance your feet are comfortably apart when sitting is an often-missed measurement that is crucial if you're considering a double-treadle wheel. To get this measurement, place a yardstick or measuring tape on the floor in front of your spinning chair. Sit in the chair and measure the distance between your feet when they are placed at a natural, comfortable distance apart. This distance represents where your hips are comfortable in a relaxed seated position. Now measure the width of the treadles on the double-treadle wheel you're considering. Subtract seated measurement from treadle width. The result gives you an idea of how active your hip adductors—the muscles that pull your thighs together—need to work while using both treadles.

Prolonged and static muscle contraction can fatigue muscles and cause soreness the next day, so you want the difference in these widths to be small, ideally a couple of inches. In reality, it's unlikely that you'll find a double-treadle base equal to or wider than your seated measurement. Although there are exceptions, most of the ready-made wheels will have a treadle width between 9 and 12 inches.

This is not to say that a large difference between treadle width and distance between your feet when sitting is necessarily a deal breaker for a particular wheel. Another way to solve the problem is to choose a double-treadle wheel that can be treadled with just one foot for some of your spinning time. For me, this is a requirement in any double-treadle wheel I consider buying because I have a wide distance between my feet when I sit. If it can't be treadled with just a single treadle, it contains more ergonomic risk than I want to be exposed to.

Wheels with treadles that are too small to fully support your foot from heel to toe are not likely to make the cut either. Their lack of foot support limits positions from which you can power the wheel and adds to the work the calf muscles are required to do to push the forefoot down.

The ability to use a single treadle of your double-treadle wheel allows you to sit at an angle to the wheel for a longer draft without twisting your spine. If you like using long-draw or backward-draft techniques, I think the ability to use one treadle is a requirement of a double-treadle wheel.

WHEEL MECHANICS AT WORK

There are quite a few other wheel characteristics that, depending on your needs, can make work easier.

Left- and Right-Hand Flyers

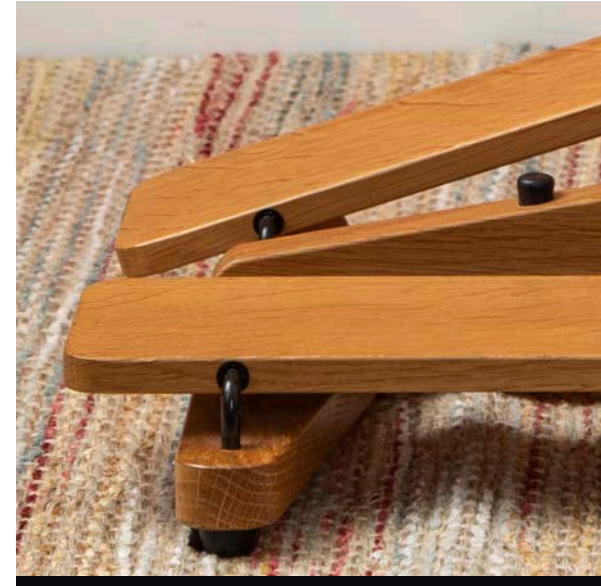
Orifice position on a Saxony wheel needs to be on the side of your drafting hand. Since some lefties spin with the right hand forward (drafting hand), it is important to select the flyer position based on how you actually spin. This helps you avoid twisting through your spine—an important consideration for all of us, and especially those with stenosis or disc issues that create a lower tolerance for sustained trunk rotation.

Treadle Axis

Regardless of wheel style, pay attention to where the axis of the treadle is located. Treadles are typically designed for downward movement of the front of your foot (plantar flexion) to create wheel rotation. This makes the muscles in your calf get all the workout (minus the momentum you can build once the wheel is set in motion). This can be a problem for those who are prone to, or are suffering from, Achilles tendinitis or plantar fasciitis. To make work easier if you have one of these sensitivies, you want both the front of your foot *and* the heel (dorsiflexion) to be able to contribute. This requires that part of the treadle is on the side of the axis closest to you, so the lever is long enough for you to exert force.

Having the ability to rotate the wheel with both plantar flexion and dorsiflexion also lets you start a stopped wheel without flexing forward—a real back saver for those with low-back issues. To find out how much treadle is available for dorsiflexion driving, look at where the axle of the treadle is and note how much space is on the side closest to you. There should always be more treadle in front of the fulcrum, but some wheels also have sufficient space for your heel to press down on one side of the fulcrum (treadle bar) as your toes come up on the other.

This is not to say that a large difference between treadle width and distance between your feet when sitting is necessarily a deal breaker for a particular wheel. Another way to solve the problem is to choose a double-treadle wheel that can be treadled with just one foot for some of your spinning time.



This treadle axis location allows for dorsiflexion, which means that the heel can push down and contribute to the treadling action. This can be helpful for spinners with certain sensitivities in the feet and legs.

If, while reading these guidelines, you discover that your current wheel doesn't fit optimally, relax! There's always a Plan B.

Drive Bands

Drive bands are another consideration. Putting on a drive band can be tricky for those whose backs don't tolerate bending forward to loop the band around the bottom of the wheel. Pay attention to how easy this is, especially on double-drive wheels. Wheels with scotch tension will have shorter drive bands than double-drive wheels, and the drive bands are often easier to place.

GO TREADLE-LESS

Not all wheels require you to be seated or to treadle to use them. This is good news for those with low tolerance to sitting (as is common among people with lumbar disc problems or sciatica) or limited tolerance to treadling (chronic Achilles tendinitis or limited ankle mobility). Electric spinners, charkhas, or great wheels can all be operated from a standing position. Electric wheels have the added advantage of portability.

FINDING BALANCE

For every ergonomic "plus," there is also a "minus" to consider. Treadling is actually a good activity (if you can tolerate it) for keeping blood moving out of your legs and back to your heart while sitting. It helps prevent deep vein thrombosis. That advantage is lost if you sit for long durations using an electric spinner. Plan to take standing breaks every 20 or 30 minutes when using these devices as you would (should!) do while weaving, knitting, or crocheting. Great wheels and walking wheels keep the blood moving because you're standing to use them, but they aren't very portable. If portability is important, then lightweight upright wheels and electric spinners are great options provided they are not too heavy for you to carry. A wheeled cart or bag makes moving your wheel easier for you.

If, while reading these guidelines, you discover that your current wheel doesn't fit optimally, relax! There's always a Plan B. We've looked at forces that are caused by wheel design and fit, and the guidelines have suggested what is optimal. But there are plenty of variables you can manipulate to lower the risk that an imperfect fit creates.

The impact of force exposure is based on the *frequency* and *duration* of the force, the *magnitude* (intensity) of the force, and your individual tolerance to external forces. In other words, you can change your exposure (frequency and duration) to high-magnitude forces from wheels that present a fitting challenge for your body. Taking more frequent breaks is an easy way to do this. Instead of waiting 30 minutes to stand, get up after 10 or 15 minutes.

Stretching is another way to lower your ergonomic risk. Treadle width too narrow? Then stretch your inner thigh frequently. Stand with feet wide apart (straddle stance) and shift your weight to one side as you bend that knee; repeat on the other side. If your Saxony wheel orifice is located on the wrong side for your drafting style, stand frequently and twist yourself in the opposite direction.

You can also change your tolerance to these forces by working on your strength and range of motion through exercises specific to the areas that need it. Stretch your calves during your standing break, especially if your wheel doesn't allow for much dorsiflexion. We all need strong core muscles (abdominal, gluteal, thigh, back, and shoulder muscles), especially when we spend much time sitting. Sure, you can take a Pilates class or two, but even a brisk walk with intentionally erect posture to use your abdominal muscles can help keep these muscles strong and flexible.

Knowing your body's needs based on its size, level of fitness, and history of injury gives you some objective information to either start your decision-making process when wheel shopping or identify ways that the wheel you own might present challenges to consider. Remember to take care of your body. There are behavioral changes that can help all of us spin more comfortably no matter how well our wheels fit us.

Carson Demers is a physical therapist, ergonomist, and the author and publisher of *Knitting Comfortably: The Ergonomics of Handknitting*. He teaches throughout the United States and internationally and is a frequent contributor to fiber- and craft-related publications. His aim is to keep us all creating healthfully and comfortably ever after. Visit him online at ergoiknit.com.

ORIFICE TOOLS

❶ **Clemes & Clemes** creates one-of-a-kind orifice hooks in a variety of woods. Shown here in cocobolo wood with a durable lacquer finish. **clemes.com**

❷ Ideal for many e-spinners and miniSpinners, **Hansen Crafts**' orifice threaders have a strong nylon loop and come in a variety of colors. **hansencrafts.com**

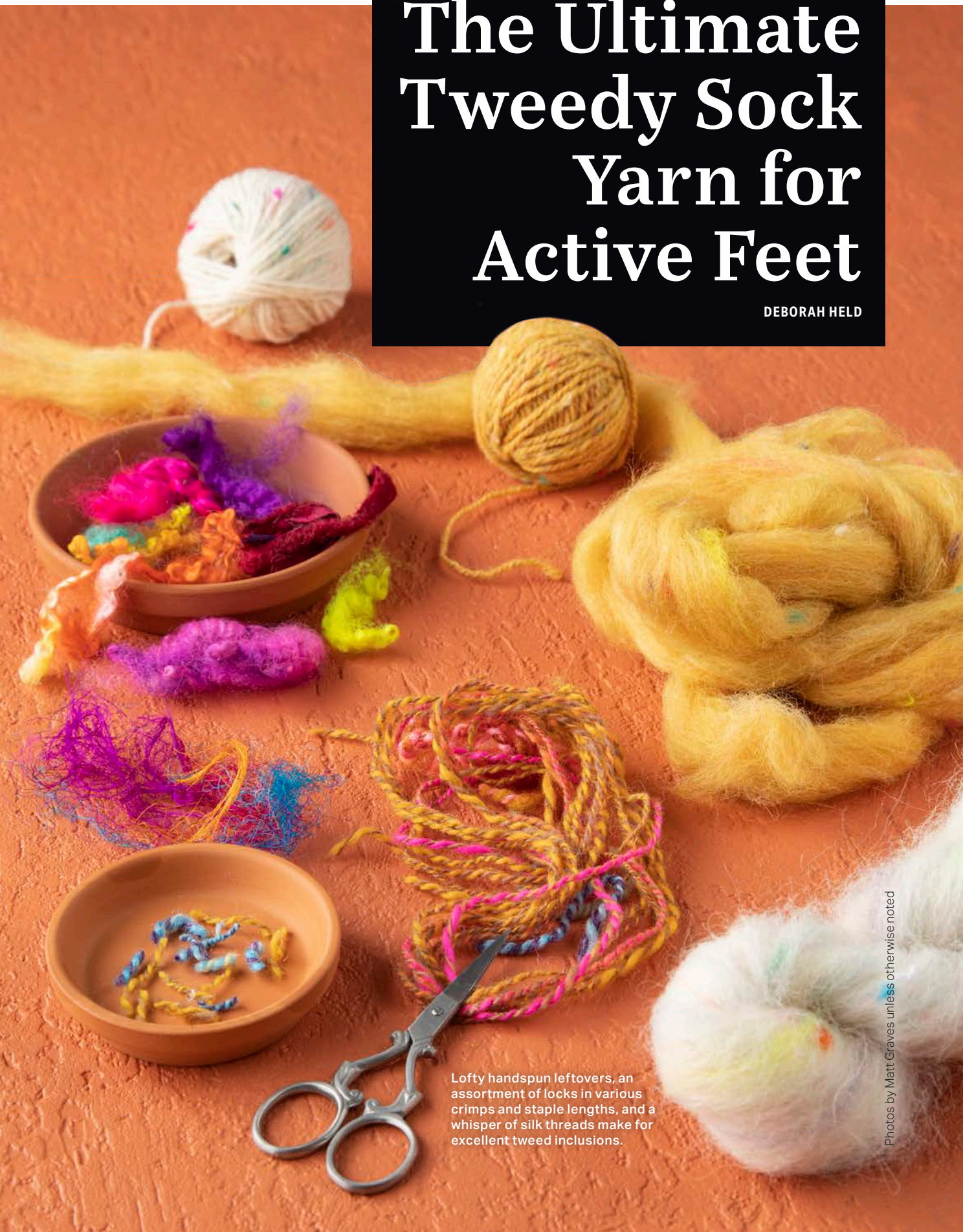
❸ Celebrate our woolly friends with this adorable lampwork sheep hook from **Catalina Glass**. **catalinaglass.etsy.com**

❹ Crafted in the United Kingdom using copper wire, this handmade hook by **Crafty Cat Knitty Bits** is lightweight yet strong. **craftycatknittybits.etsy.com**

If you have a new product you would like featured in Get This, please contact us at **spinoff@longthreadmedia.com**.

The Ultimate Tweedy Sock Yarn for Active Feet

DEBORAH HELD



Lofty handspun leftovers, an assortment of locks in various crimps and staple lengths, and a whisper of silk threads make for excellent tweed inclusions.

Photos by Matt Graves unless otherwise noted

One of the benefits of being a spinner is having the ability to create an intentional yarn for a given project—but just because a yarn is functional doesn't mean it can't also be captivating from both a spinning and knitting perspective. So, when I opted to spin for my ultimate comfort sock yarn, I decided that I may as well incorporate a little added elegance in the form of a visually complex tweed.

These socks would be worn year-round and actively, either in my sneakers on my daily walks or while kicking around the house in my Birkenstocks. To be in rotation with my current favorite pair of socks—shorties, densely knitted from an elastic sportweight handspun—my new pair would need to be equally plush and durable.

WHAT'S IN A TWEED?

At its most basic, our modern use of the term "tweed" tends to simply refer to the look of flecks in a fabric. This can be accomplished in any number of ways, including by carding texture, color, or both into a base fiber prior to spinning. A woolen draw is not only traditional, but it can be helpful when managing a carded blend with inclusions. Tweed can be bold or understated, and I was looking for both in these socks: bright, bold pops of color combined with more subtle background flecks.

But here's the rub (or rather, the lack of one): feet can be sensitive, so these nubby bits of color or texture couldn't be too large or too solid, as this could lead to discomfort, especially when the finished socks are worn in shoes. Sampling would be a must.

I decided that the dense grabbiness of Cheviot wool—ideal for socks all on its own—would be the perfect base for this yarn. Cheviot is bouncy, toothy, and strong, no matter the draw used to spin it. It has incredible memory, so the spun yarn would hug and support the foot. Better still, Cheviot has a sort of natural resilience to it, so tweedy bits would felt into the surface of the fabric the more the sock was worn, increasing the sock's durability. As it turned out, the Cheviot worked as an asset to the tweed-making process, thanks to these very traits.

PREPARATION

I am hard on my footwear, so I believe in spinning socks with (at least) a three-ply yarn construction. From past experience, I also know that the roundness of a three-ply structure tends to push added inclusions

Deborah fed light layers of the combed top into the carder, tamped in inclusions arbitrarily, and then burnished the growing batt as more layers were added.

Photos by Deborah Held

Cutting the add-ins into randomly sized tiny pieces keeps them lightweight and helps ensure they'll open sufficiently during carding. Longer strands of locks and silk threads will grab onto the wool fiber, adding dimension to background flecks.

Photo by Deborah Held

outward, toward the exterior of the yarn—definitely not what I was looking for. To combat this issue, I would include tweed in only two of my three plies, leaving one ply plain.

I chose to use commercial combed top in both an undyed white and a sweet hand-dyed yellow tonal, to be used as complementary stripes in my socks. The white would be my main color and the yellow would be the contrast. Two 4-ounce braids of fiber would allow for adequate sampling, even with my extra-large feet. (For more on sizing your socks to fit, please see the accompanying project on page 30.)

The roundness of a three-ply structure tends to push added inclusions outward, toward the exterior of the yarn. To combat this issue, I would include tweed in only two of my three plies, leaving one ply plain.

I didn't want to use any fiber or add-ins that could detract from the Cheviot's qualities, so blending in "shinies"—silks, bamboo, nylon, etc.—was out. Instead, I looked to loftier (and lighter-weight) heights. From my stash, I pulled an assortment of hand-dyed locks in various staple lengths and crimp patterns, leftover bits and bobs of airy woolen-spun handspun scraps, and a few sari silk waste threads, though almost any thread scraps would have worked. It's surprising just how far a couple of locks and a few strands of threads will go. As for a color palette, I was drawn to bright primaries: cyan, magenta, and yellow. I also pulled just the slightest pinch of undyed silk noil to card into the yellow fiber to complement what would be its neighboring, white-based stripes.

I then cut these materials into random tiny bits, ⅛ to ½ inch in length, using sharp scissors. The small but arbitrary sizes would ensure that these inclusions would act as flecks or blips, not stripes, in the finished fabric. I teased open the locks prior to trimming, keeping some of the more lustrous lock strands and the silk threads on the longer side so that they could wrap themselves around the wool fibers during spinning.

I used my drumcarder to blend 1-ounce batts, but a blending board or handcards would work well for this type of blending, too. I placed the add-ins randomly, by eye, and tamped them onto my layers of burnished wool. It took two passes to incorporate the inclusions the way I'd hoped, yielding an immensely soft and lofty batt. I Z-stripped the batts, pulling them into a mostly aligned roving prior to spinning.

It's important that you sample your prepared fiber all the way through to yarn and knitted swatch. This allows you to make any adjustments needed. I went through at least three batts (and two draws!) before I found the combination of results that made me happy.

SPINNING AND PLYING

The down-breed-like Cheviot made trapping the inclusions a breeze. I spun my singles using a

short-backward draw, allowing twist into the drafted fiber. If you prefer a more worsted draw, you can use your thumb and index finger to massage the materials into the yarn as needed. Play around to see what works for you.

Just as I'd hoped, each ingredient took to the wool slightly differently, the bits of handspun and crimpier locks yielding those bright pops of color, and the wispy strands of fiber and thread creating the multidimensional background speckles I'd envisioned.

To ply, I set up my lazy kate so that the bobbin of plain singles was between the two that were tweeded. I found that I was further able to manipulate any wayward inclusions, locking them between the plies during the plying process. I finished the yarn with a warm soak and a thorough snapping before leaving the skeins to dry.

While my sample yarns—white tweed and yellow tweed—were both easily sportweight, my finished yarns definitely lean toward DK. The most notable factor was that I accidentally switched from a worsted short-forward draw to my default backward draw. By the time I realized that, I had used up all my fiber, so I just went with it. Since the yarns had so much loft, it didn't really matter in the end, as I'd planned for knitting a dense fabric. The grists were 920 ypp (yards per pound) and 843 ypp, so, again, the yarns were on the borderline between yarn classifications. Both had similar wpi (wraps per inch) measurements, between 14 and 16. They worked beautifully together in the knitted sock, especially after blocking.

The finished tweed fabric was even better than I'd hoped for, and each step of the process along the way was immeasurably satisfying on its own.

I can't wait to get started on my next pair, so that I'll have even more socks for pounding the pavement!

Deborah Held has been a committed spinster since 2012. She's a freelance writer, author, and international and online fiber arts educator. She and her Persian cat, Stanley, live on an urban farm in Atlanta, Georgia, where a spinner's flock of Shetland sheep roam beneath their windows. Find them at debbieheld.com.

Both blends started as combed top and were drumcarded with colorful add-ins.

Try spinning this resilient tweed to knit your own cushy everyday socks.

Photos by Matt Graves

Toe-Up Tweed and the Sporty-Shortie Socks

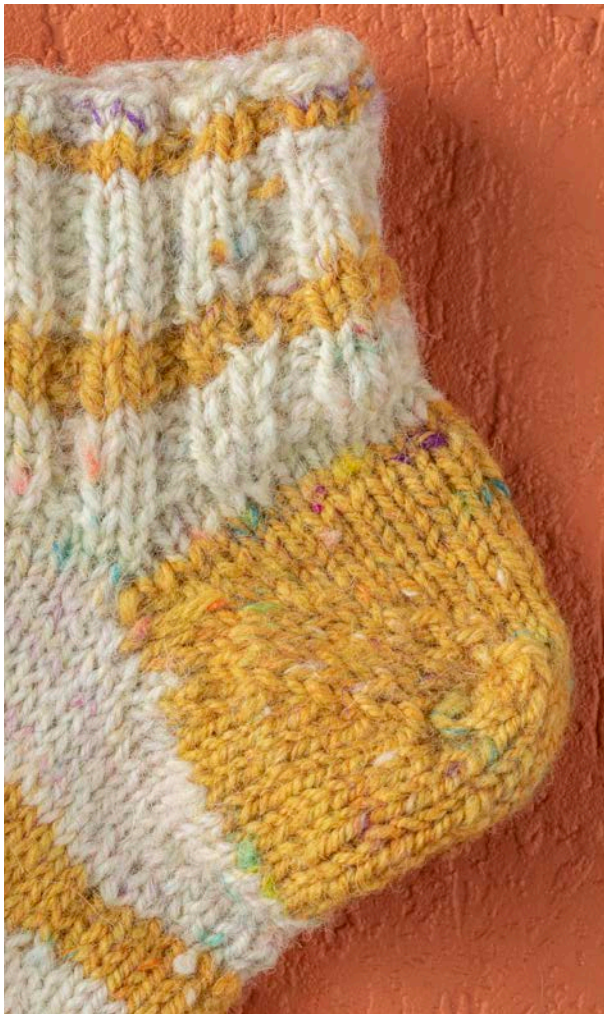
DEBORAH HELD

Some knitters love knitting socks, while others definitely do not. If you didn't love your previous sock-knitting experiences, I urge you to give it another try. Socks don't have to be tedious to knit, and excellent sock yarn doesn't always need to be a fine fingering weight. With this in mind, I decided to spin for the ultimate sporty but hardy pair of shortie socks to wear in my sneakers and clogs. I set out to create yarn that was durable and plush but also easy on the eye.

After quite a lot of sampling, I finally created my ideal sock tweed (see page 26) by using a base of springy Cheviot wool carded with my own airy mix of ingredients. I spun and plied the singles into a traditional three-ply yarn—leaving one ply plain and untweeded—using my Daedalus Starling V3 e-spinner and making the most of the Cheviot's natural traits to trap the mix of inclusions.

I chose two colors of Cheviot (one hand-dyed, one a natural white) to be striped in the socks. To avoid a line of jogs up the foot and leg, a simple fix is written into the pattern instructions. Speaking of striping, yes, there were a number of ends to weave in, but the Cheviot offers so much in the way of bounce and grab that the end-weaving was almost enjoyable. Using a small crochet hook instead of a tapestry needle certainly helps to quicken the chore.

The tweed elements were blended with two Cheviot base fibers: dyed and natural white.



The socks are constructed with a Turkish cast on for the toe and an afterthought heel.

Although the yarns were hovering between sport- and DK weight, there was more than enough to knit my socks—and I do have rather large feet (US women's size 10.5–11). Still, I knitted them toe-up "just in case" but also because toe-up socks are so easy to try on for fit as you knit them. The knitted fabric is intentionally dense, so the socks feel supportive and help to cushion my feet no matter how long I'm on them.

A word on gauge and sampling: I like to knit a toe and beginning of the body as a swatch when working on socks. I think of it as an efficient way to get the project rolling. Always be sure to block your swatch before noting a final stitch and row tally.

Resources

Banshee Fiber Art, bansheefiberart.etsy.com.
The Woolery (undyed white Cheviot), woolery.com.

MATERIALS

Fiber MC: 100% Cheviot, natural, 3 oz (85 g); CC: Banshee Fiber Art, 100% Cheviot, #265 golden yellow, 3 oz (85 g).
Yarn 3-ply; 85 (100, 115) yd MC, 80 (90, 105) yd CC; 900 ypp; 15 wpi; DK weight.
Needles Size 2 (2.75 mm) (see Notes). Adjust needle size if necessary to obtain the correct gauge.
Notions Markers (m); tapestry needle and/or crochet hook for weaving in ends; waste yarn for heel.
Gauge 22 sts and 34 rnds = 4" in St st.
Finished Size 7¼ (8, 8¾)" foot circumference and 9 (9½, 10)" long from back of heel to tip of toe; foot length is adjustable. Socks shown measure 8" in circumference.

Visit **spinoffmagazine.com/spin-off-abbreviations** for terms you don't know.

Notes

- These socks are worked in the round from the toe up with a peasant heel.
- Use the needles that you prefer for working a small circumference in the round: double-pointed, two circulars, or one long circular for Magic Loop. However, you might find double-pointed the easiest for working a Turkish cast on.
- To avoid a jog when changing colors, work the first round with the new color as usual. At the beginning of the second round, slip the first stitch purlwise, then work the rest of the round. Pull on yarn ends as needed to avoid gaps.

Turkish/Eastern Cast On

- Hold two double-pointed needles parallel to each other. Leaving a 4" (10 cm) tail hanging to the front between the two needles, wrap the yarn around both needles from back to front half the number of times as desired stitches (four wraps shown here for eight stitches total), then bring the yarn forward between the needles (Figure 1).
- Use a third needle to knit across the loops on the top needle, keeping the third needle on top of both the other needles when knitting the first stitch (Figure 2).
- With the right side facing, rotate the two cast-on needles like the hand of a clock so that the bottom needle is on the top (Figure 3).
- Knit across the loops on the new top needle (Figure 4).
- Rotate the needles again and use a third needle to knit half of the stitches on the new top needle. There will now be an equal number of stitches on two needles and twice as many stitches on the third needle. The two needles with the smaller number of stitches will form the bottom of the foot; the needle with twice as many stitches will form the top of the foot. Using a fourth needle, begin working in rounds.

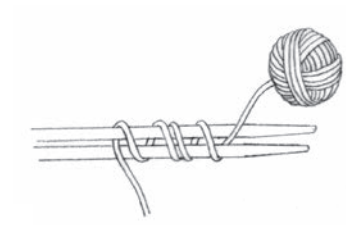


Figure 1

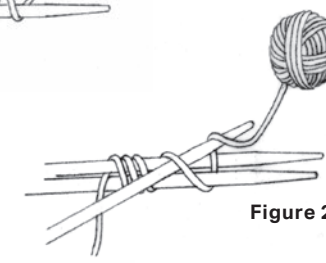


Figure 2

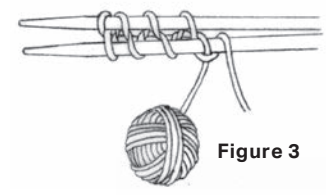


Figure 3

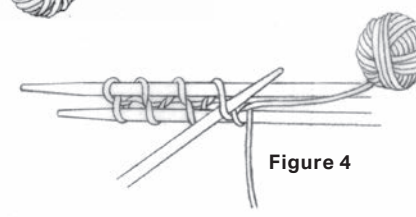


Figure 4

SOCKS

Toe

With CC and using the Turkish method, CO 20 sts—10 sts on each needle. Place marker (pm) and join in the rnd.

Next rnd K10, pm, k10.

Knit 1 rnd.

Inc rnd *K1, k1f&b, knit to 2 sts before m, k1f&b, k1; rep from * once more—4 sts inc'd.

Rep inc rnd every other rnd 4 (5, 6) more times—40 (44, 48) sts.

Foot

Knit 1 rnd.

Join MC. Knit 1 rnd.

Next rnd With MC, sl 1 pwise wyb (see Notes), knit to end of rnd.

Next rnd Knit with CC.

Next rnd With CC, sl 1 pwise wyb, knit to end of rnd. Break CC.

Knit 14 rnds with MC.

Slipping the first st of 2nd rnd when changing colors, *work 5 rnds with CC, then 5 rnds with MC; rep from * 2 more times.

Knit with MC until piece measures 7¼ (7½, 7¾)" from tip of toe, or 1¾ (2, 2¼)" less than desired finished foot length (including heel).

Heel Placement

Next rnd With waste yarn and keeping tails on RS of piece, k20 (22, 24), transfer waste yarn sts to left needle, knit to end with MC.

Leg/Cuff

Knit 2 rnds.

Work 5 rnds in k2, p2 rib.

Change to CC.

Knit 1 rnd.

Next rnd Sl 1 pwise wyb, k1, p2, *k2, p2; rep from * to end of rnd.

Work 1 rnd in k2, p2 rib. Break CC.

Change to MC.

Knit 1 rnd.

Next rnd Sl 1 pwise wyb, k1, p2, *k2, p2; rep from * to end of rnd.

Work 6 rnds in k2, p2 rib.

Change to CC.

Knit 1 rnd.

Next rnd Sl 1 pwise wyb, k1, p2, *k2, p2; rep from * to end.

Work 1 rnd in k2, p2 rib. Break CC.

Change to MC.

Knit 1 rnd.

Next rnd Sl 1 pwise wyb, k1, p2, *k2, p2; rep from * to end of rnd.

BO all sts as foll: K2, insert left needle into front of these 2 sts and knit them tog, [p1, insert left needle into front of 2 sts on right needle and knit them tog] 2 times, *[k1, insert left needle into front of 2 sts on right needle and knit them tog] 2 times, [p1, insert left needle into front of 2 sts on right needle and knit them tog] 2 times; rep from * to end of rnd.

Heel

Remove waste yarn and place 40 (44, 48) heel sts onto needles. Join CC.

Next rnd *K20 (22, 24), pm; rep from * once more.

Dec rnd *K1, ssk, knit to 3 sts before m, k2tog, k1, sl m; rep from * once more—4 sts dec'd.

Rep dec rnd every other rnd 4 (5, 6) more times—20 sts rem.

Knit 1 rnd.

Break yarn, leaving a 15" tail. With tail threaded on a tapestry needle, graft sts using Kitchener st.

FINISHING

Weave in ends. Soak in warm water and a bit of wool wash. To remove excess water and hasten drying time, roll socks in an absorbent towel for 30 minutes, remove socks, and block them. Trim ends after socks have dried.

Deborah Held has been committed to spinsterhood since 2012. She's a freelance writer, author, and international and online fiber arts educator. She and her Persian cat, Stanley, live on an urban farm in Atlanta, Georgia, where a spinner's flock of Shetland sheep roam beneath their windows. Find them at debbieheld.com.

Using the same add-ins for both gold and white tweed yarns creates a unifying palette.

Courtesy of Stark Museum of Art, Orange, Texas, 31.78.96, collections.starkculturalvenues.org/objects/42194/woman-spinning-yarn

Detail of *Woman Spinning Yarn* (1847) by Paul Kane (1810–1871). Watercolor and pencil on paper, 5 × 7 inches. Bequest of H. J. Lutcher Stark, 1965

The Salish Spinner

Innovation, Evolution, and Adaptation

LIZ HAMMOND-KAARREMAA

One of my favorite spinning wheels is a bit of an ugly duckling—it looks a little strange, as if it is missing parts. It's a bobbin and flyer without the wheel, a head without a body—yet when properly assembled on top of an old treadle sewing machine, it transforms into a swan complete with a heartbeat, and the treadle beats in time with mine. It relaxes and calms me in a meditative way.

It is known by different names: originally, the "Indian Head" or the "Cowichan" and now, the "Salish spinner" or "head spinner." It even has brothers and sisters that are complete units with the treadle and the head combined, like the Ashford (a New Zealand company thousands of miles away) Country Spinner. How did this all come to be? The use of the original Salish spinner was unique to the Pacific Northwest, the traditional Coast Salish territory (see map on page 39).

Why is the Salish spinner so useful? To understand that, you need to know a little about the Coast Salish and their traditional textiles and yarns. The Coast Salish people are many nations with a common ancestral language who use similar fibers, tools, and techniques to make their incredibly beautiful blankets, robes, regalia, and sweaters. They invented the Salish spinner to make a specific yarn—a warm, lightweight, lofty singles wool yarn that is used in the famous Cowichan or Salish sweaters. Although the Salish spinner was invented in the early 1900s, its ancestry

The Coast Salish people are many nations with a common ancestral language who use similar fibers, tools, and techniques to make their incredibly beautiful blankets, robes, regalia, and sweaters. They invented the Salish spinner to make a specific yarn—a warm, lightweight, lofty singles wool yarn that is used in the famous Cowichan or Salish sweaters.

can be traced from the thigh-spinning technique used in ancient times and then to a unique spindle before it eventually emerged as the Salish head spinner.

The most common Coast Salish–style blankets and regalia, still made and in use today, are twill weaves made from a bulky two-ply yarn. Traditionally, the yarn was made from the hair of a mountain goat or a special breed of dog known as the Coast Salish woolly dog, and sometimes from a mixture of the two.

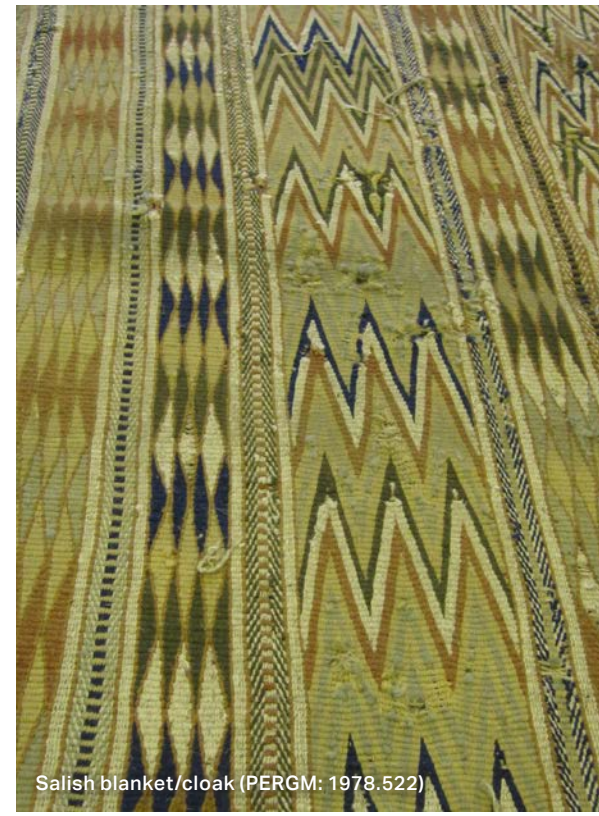
The mountain goat was revered and seen as a protector. Elder Ellen White, who has passed away, once explained, "The mountain goat is most pure of all the animals because it lives in remote areas nearest the sky. Nothing can reach it there." It looks down over the lands like a guardian. As a protector, its wool also provides protection. The mountain goat's spirituality was embedded into the spinning of the yarn and into the blanket. People are wrapped in blankets or stand on a blanket during ceremonies, such as a couple getting married, a newborn baby, a naming. The blanket provides warmth and spiritual protection and is still used today. It is this spiritual protection that has guided the evolution of traditional spinning methods into their current methods.

TRADITIONAL TEXTILES AND TECHNIQUES

There are two main types of Coast Salish weavings: twining, with tightly spun yarn woven into colorful, intricate geometric designs; and twill-woven, white, and loosely spun.

To achieve the bulky, lofty yarn for the twill weavings, fibers are rolled together on the thigh. More fibers are spliced in and spun lightly, with barely enough twist to hold the fibers together as roving.

The next step is to use a spindle, but a drop spindle that hangs in the air won't work. A suspended spindle would put too much weight on the roving, especially one made of dog wool, which does not have the grabby crimp of sheep wool; the fibers would easily pull apart before you could start your spin. If you are spinning a light, bulky yarn suitable for the twill blanket, your spindle needs a large whorl and a long spindle stick to hold it. This means the spindle will be heavy and needs to be supported somehow without too much stress on the fibers while the twist goes in. That is how another innovation came to be: the Salish spindle.



Salish blanket/cloak (PERGM: 1978.522)

Photo by Liz Hammond-Kaarremaa and courtesy of Perth Museum and Art Gallery, Culture Perth and Kinross, Perth, Scotland

Detail of a Coast Salish twill blanket woven with handspun mountain goat fibers

Photo by Liz Hammond-Kaarremaa

The Salish spindle is around 36 inches long with a whorl around 8 inches in diameter. One side of the whorl tends to be flat and the other side has a slight curve to it. Often the curved side that faces the spinner is carved. The whorl is placed about a third of the way down the tapered spindle (see page 36). The support comes from the spinner's hands holding the spindle shaft rather than from the blunt end resting on the floor as it does with a Navajo spindle.

To begin, the rough roving is attached to the Salish spindle and winds up to the tip. The spinner then turns the spindle either by rolling it in her palm, tossing it a bit, or rolling the spindle down her thigh. If you try this a few times, your yarn becomes kinked with too much twist collecting near the tip, and you will naturally lift the spindle away from the source of the roving to straighten the newly formed yarn and let the twist flow along the yarn. This movement is like fly fishing and pulling the tip of the rod back, which tugs the lure through the water. If you gently tug the spindle while pulling back, you will draft out some of the lumps in the singles.

For this tugging action to work, the spinner needs to pull against something, so Coast Salish spinners came up with another innovation: the tension ring. The tension ring is just a small 1- or 2-inch hole in a small piece of wood or stone, or a loop made from plant material. The roving to be spun is threaded through the hole or loop that is placed up high.

The spinner sits far enough away from the tension ring to allow enough distance between it and the tip of the spindle. For plying, the distance can be quite far. For spinning a singles, the yarn is likely to come apart and need fixing at some point, so the spinner sits closer and the tension device would be lower, say up and over an upright loom, a curtain rod, or a hook on a door.

In the painting by Paul Kane, based on his 1847 visit to Fort Victoria in British Columbia, you can see a woman weaving a traditional blanket with a colorful geometric twined border around the plain white twill. You can also see in the background a woman spinning using the Coast Salish spindle with her yarn going up and over a ceiling beam (see page 40).

CHANGING TRADITIONS

After 1847, sheep were imported into southern Puget Sound and Vancouver Island. Sheep wool became easier to acquire, but it never took on the spiritual function of mountain goat wool in the blankets. The breeds brought to this cool, high-rainfall region were oriented toward meat production and had crimpy, springy, elastic wool qualities that made their fleeces easy to draft on the traditional spindle.

In 1858, the Sisters of Saint Anne arrived in the Cowichan Valley and likely taught the Cowichan (Quw'utsun) people how to knit. The story remembered today is that Jerimina Colvin, a Scottish settler, taught them the Fair Isle techniques of knitting with color and knitting in the round. Soon, many Coast Salish women from other areas learned to knit Fair Isle and make Salish sweaters, also called Cowichan sweaters.

Two hundred years ago, before the arrival of the Sisters, the lofty, bulky, and warm two-ply yarns created in these communities using the large Coast Salish spindles were for weaving twill Salish blankets. All Coast Salish yarn was plied prior to the knitting of Cowichan sweaters in the late 1800s. Later, when spinning for knitting, only singles yarns were used. With more inserted twist due to the head spinner and the structure of the knitted stitches provided enough

protection against pilling and abrasion, negating the need for an overly bulky two-ply yarn.

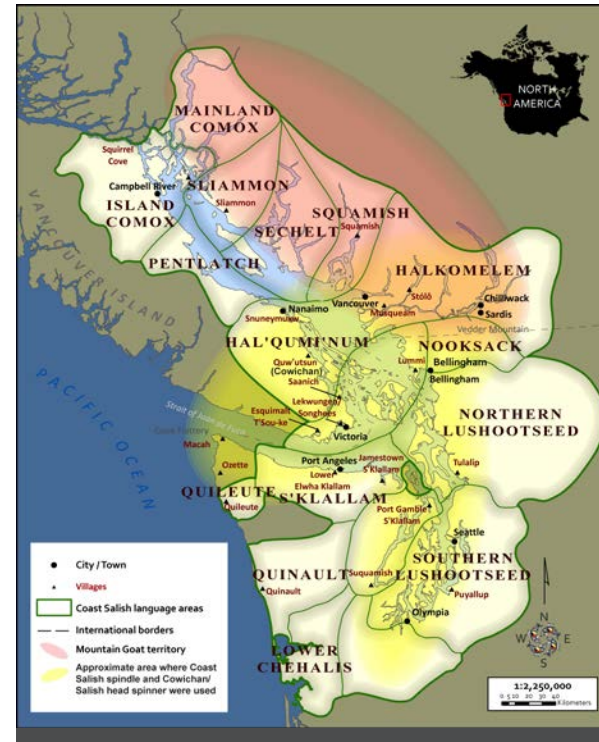
Spinning wheels never really caught on with the Indigenous women. A missionary in the late 1800s wrote of an "Indian Agent" supplying spinning wheels to the Skokomish (Southern Puget Sound), and although some of the women became proficient, they did not care for them, preferring their spindles. At the time, most spinning wheels were designed to spin thin yarn, not the medium or bulky yarns preferred for the Salish blankets. Cowichan women also commented that the spindle was far easier to transport as they moved throughout the year to gather resources or for seasonal work. The spindle remained in use even after sheep wool and spinning wheels became available.

Although spinning wheels never became common among the Coast Salish people, treadle sewing machines did. Thus, another innovation came to be: the Salish spinner or head spinner. Cowichan men took the sewing machine off the treadle, placed the large-whorl spindle horizontal in its place, and added another whorl with a groove for the drive band onto the other end of the spindle, creating a jumbo bobbin. The cast-iron treadle provided momentum and helped to keep a rhythm, a slow steady pace, like a calm heartbeat. This spinner became very popular among the Coast Salish, not just among the Cowichan, but up and down the coast because it met their need for a lofty yarn.

Spinning wheels never really caught on with the Indigenous women. . . . And although some of the women became proficient, they did not care for them, preferring their spindles. At the time, spinning wheels were designed to spin thin yarn, not the medium or bulky yarns preferred for the Salish blankets.

For every press of the foot treadle, the bobbin spins two to four times, giving the Salish head spinner a low twist ratio somewhere between 2:1 and 4:1. The drive band turns the bobbin, which gobbles the yarn in quickly, not giving it time to acquire a lot of twist. The spinning experience is quite different compared to most spinning wheels that provide the spinner with more time to draft out the fibers. The low ratio of the Salish spinner, with a brake that can reduce the amount of twist and a fast, strong intake, result in a light, airy, bulky low-twist yarn similar to the traditional bulky yarn originally made with mountain goat fiber. This yarn, along with the Fair Isle technique, became the standard for use in Cowichan sweaters knitted with traditional stylized motifs such as eagles and whales.

Other innovations came along, such as the small sewing-machine motor used instead of the treadle to turn the bobbin. However, by the 1960s, old treadle sewing-machine bases were becoming hard to find, and homemade wooden treadles started to fill the need.



Map showing the Coast Salish nations and language areas

Map by Carlos Garcia Gonzalez, courtesy of Liz Hammond-Kaarremaa

While many of these spinning wheels were probably originally inspired by the Salish head spinners, the Coast Salish people were inspired to make bulky yarn by their ancient traditions. Next time you look at a skein of handspun bulky yarn, remember a yarn inspired by time and the Coast Salish tradition.

In the mid-1970s, interest in bulky yarn was growing around the world. At first it was craftspeople and small production houses who started building "bulky" spinners. They are similar to the Salish head spinners with low wheel ratios, large bobbins with the brake on the bobbin, large orifices, and large hooks. However, these newer spinning machines are built complete with the head and wooden treadle.

Salt Spring Island lies a short way from Cowichan Bay and has been the home of many craftspeople, including Byron Marks and his wife, who, in the late 1970s, built finely crafted and finished spinning and weaving equipment. His Salish Spinner was likely inspired by the local Coast Salish women and, in turn, inspired many a spinner and knitter on Salt Spring and in nearby Victoria.

Other craftspeople, such as Lin Black and his wife, Sharon, from Mud River, British Columbia, made and sold thousands of so-called "Mud River wheels" to spinners around the world. Another craftsperson was Sid Sharples, who made the California Bulky spinning wheel.

In the late 1970s, Terry Nelson and his parents, Gilbert and Nancy, of Treenway Crafts (later Treenway Silks of Salt Spring Island and now of Colorado) supplied Coast Salish women with wool roving. They were

A Woman Weaving a Blanket by Paul Kane (1810–1871), Songhees/Saanich (Central Coast Salish)

Courtesy of the Royal Ontario Museum, 912.1.93

A spindle sits in front of a Salish head spinner mounted on a treadle originally used for a sewing machine.

Photo by Liz Hammond-Kaarremaa

also distributors for Ashford in western Canada, so when Richard Ashford came to visit Victoria in 1978, Terry took him to meet the Cowichan Coast Salish women who described what they wanted—the big bobbin, a low ratio and whorl for bulky spinning, and something lighter and more portable. On returning to New Zealand, the Ashford company launched its Indian Spinner in 1979 and sold 550 in the first year! Over the years, Ashford has designed a series of bulky spinners: the Bulky Spinner in 1984, the Country Spinner in 1988, and more recently, the Super Jumbo e-Spinner.

Ashford wasn't the only company to make bulky spinners. In 1975, the now-classic and lovable Louet S10 was developed, and it is still going strong. Lendrum came out with the head attachment for bulky plying for the Lendrum Folding Wheel. More recently, with the upswing of interest in art yarn, more bulky options have become available. SpinOlution has a bobbin that can hold 4 pounds of yarn!

While many of these spinning wheels were probably originally inspired by the Salish head spinners, the Coast Salish people were inspired to make bulky yarn by their ancient traditions. Next time you look at a skein of handspun bulky yarn, remember a yarn inspired by time and the Coast Salish tradition.

Author's Note: I want to raise my hands in thanks to Susan Pavel and Andrea Fritz, two Coast Salish women who are reviving spinning with the traditional spinner and who reviewed this article to ensure cultural appropriateness; and I thank Richard Ashford and Salt Spring Islanders Mary Paddon, Cheryl Huseby, and Karen Selk for providing historical background.

Further Resources

Gibson-Roberts, Priscilla A. *Salish Indian Sweaters: A Pacific Northwest Tradition*. Saint Paul, MN: Dos Tejedoras Fiber Arts Publications, 1989.

Olsen, Sylvia. *Working with Wool: A Coast Salish Legacy and the Cowichan Sweater*. Winlaw, BC: Sono Nis Press, 2010.

Liz Hammond-Kaarremaa holds a Master Spinner Certificate, earned by completing a research project focused on the Coast Salish spinning of traditional fibers into yarns. She is a research associate with the Smithsonian and with the Anthropology Department at Vancouver Island University. You can follow up this story with further resource links from her website, lizhk.ca.

Quebec Wheel Song

JOANNE SEIFF

Illustration by Katie Eberts

In early 2003, I lived outside of Buffalo, New York, near an auction house. On a cold, dark winter day, I went to an auction alone after reading that there were spinning wheels involved. As I cut across the empty parking lot, I slipped on black ice. One whole side of my leg, jeans, and coat were soaked, and later on, there were significant bruises from the fall. This didn't stop me! I got up and kept going, icy leg and all.

The auction had some amazing collectors' items, but I only had eyes for the Quebec Production Wheel. Some people call these Canadian Production Wheels, but they were made in Quebec. (I don't give my wheels human names, but Canada's a big place, so "Quebec wheel" it is.) I tried not to look excited as I checked out the wheel—minimal wobble, all parts intact—and skipped the great wheel nearby. While I lingered at the auction trying not to look overly interested, I heard that these had been sitting for many years in the collector's house unused.

I bought that wheel for $140, including the auctioneer's fee, and spent the rest of the weekend working on it. It took a lot of oil to get the whorl off the back of the flyer, that's for sure! It took time and patience to adjust things, but this spinning wheel absolutely hums now. It came with only one bobbin. I had others made, but none were as silent and true as the one that came with the wheel.

The flyer has grooves worn into it by the yarn of spinners who came before me. This wheel spins only fine yarns; I don't even ply on it. However, it's an amazing tool, perfect at what it does, and incredibly calming to use. The wheel moved with me from upstate New York to Kentucky, and then across the continent to Winnipeg, Manitoba. Despite its return to Canada, it was far from Quebec's climate. If stored carefully, in a temperature-controlled place, this wheel shares a special gift that comes only with tools of a certain age.

A good tool celebrates best in use; with my body in time with this Quebec wheel, we fly.

When my twins were born, the wheel was parked away from toddlers. It spent long years there and was visited infrequently. Recently, I had some fine wool ready to spin. I'd washed and carded it while supervising those twin 10-year-olds outside. I knew just what to do. I oiled up the Quebec wheel and adjusted the drive band, and the years in storage vanished. She sang again, humming as I flew through the handcarded rolags. A good tool celebrates best in use; with my body in time with this Quebec wheel, we fly.

Joanne Seiff is a writer, knitwear designer, editor, and teacher. She's the author of *Three Ply, Knit Green*, and *Fiber Gathering*. She lives in Winnipeg with her professor husband, twins, and a bird dog. She loves to make things from scratch, especially things to keep people warm during long winters on the Canadian prairie. Her knitwear designs on Ravelry, Lovecrafts, and Payhip just might sing in your handspun. See more about Joanne on her blog, joanneseiff.blogspot.com or on Instagram @yrnspinner.

Mechanics Made Easy

Making Friends with Your Wheel

ELANA GOODFELLOW

A Schacht Matchless wheel set up for single drive, flyer led

Photo by Matt Graves

Understanding how your wheel operates and what it excels at directly affects the success and the pleasure of the spinning experience. Many spinners abandon spinning particular yarns on their wheels or e-spinners due to frustration. Although you can spin almost any yarn on any wheel, it is easier and feels more comfortable to spin the range of yarns that are best suited to your wheel.

Spinners are often unsure how the wheel they become familiar with compares to others. I want to describe different types of wheels by both drive systems and tensioning systems so that you have a better idea of how your wheel (or wheels) fits into the larger picture. Understanding why your wheel excels at some yarns and is challenged by others can help you be your most confident!

We've included examples of some common spinning wheels in this article, but there are many more! To explore more spinning-wheel brands, details, and specifications, check out the Great Spinning Wheel Roundup at **LT.Media/Wheel-Roundup**.

DRIVE SYSTEMS

Spinning wheels come in many shapes and sizes, and most of them fit into one of three drive system categories.

Direct Drive

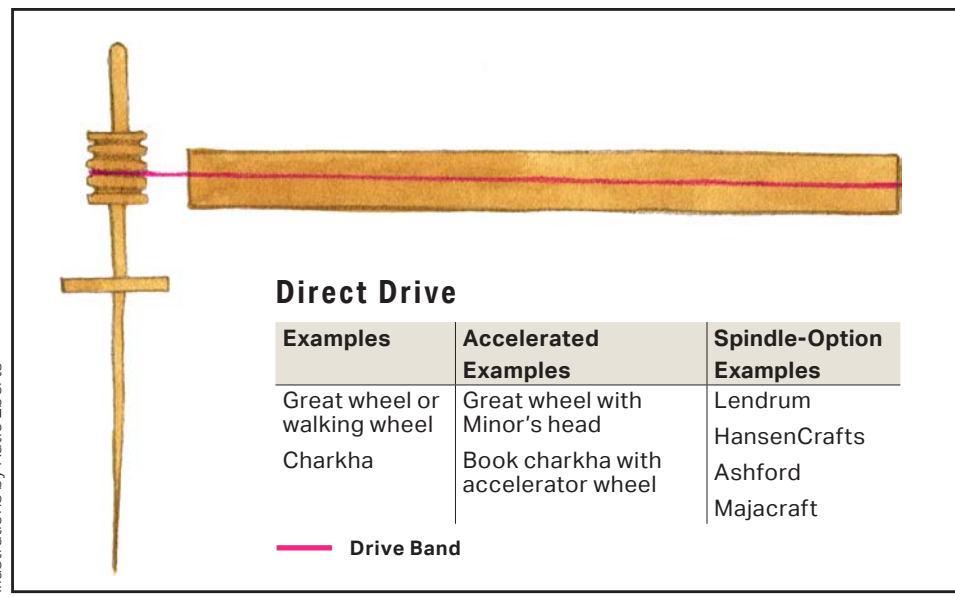
Characteristics: This system is most commonly found on antique wheels. In its most basic form, a single drive band connects the drive wheel and a spindle. These spinners excel at creating high-twist yarns because the ratio in the speed at which the spindle whorl turns versus the speed that the drive wheel turns is typically very high. This is due to the difference in size between a small spindle whorl and a large drive wheel.

Variation: Accelerated wheels have two separate bands, one connecting the drive wheel to an accelerator and a second that connects the accelerator to the spindle whorl. Accelerators create even faster spindle speeds and make high-twist yarns easier to spin.

Modern Option: Some brands offer a spindle attachment designed to fit one or all of their spinners.

Book charkha: accelerated direct drive

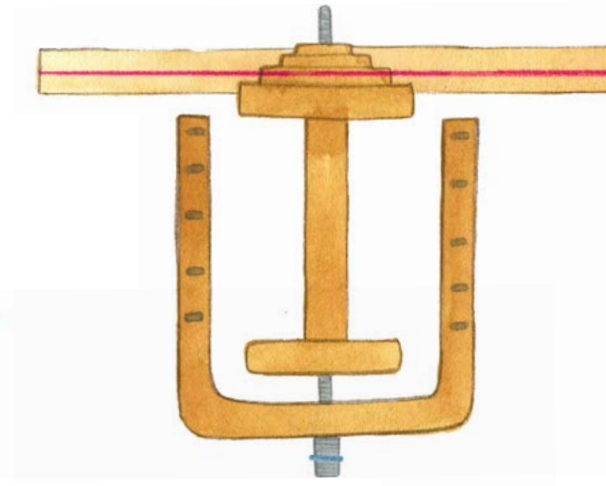
Special Considerations: If you are using a manually powered wheel without treadles, one-handed long-draw drafting or park-and-draft techniques are strongly encouraged.



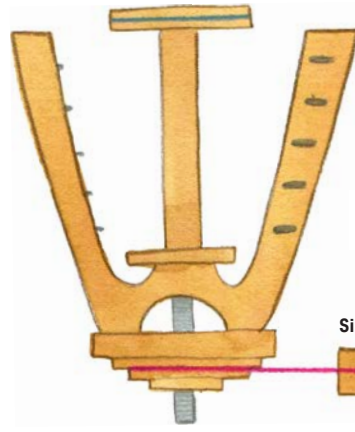
Illustrations by Katie Eberts

Single Drive

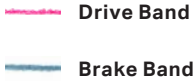
Bobbin-Led Examples	Flyer-Led Examples
Louet S10	Lendrum Folding Wheel
Ashford Country Spinner	Ashford Traveller
Ashford e-Spinner Super Jumbo	Majacraft Rose
Most Babe's Fiber Garden spinning wheels	HansenCrafts miniSpinner
	Kromski Sonata



Single Drive, Bobbin Led



Single Drive, Flyer Led



Drive Band

Brake Band

Single Drive

Characteristics: This system has one drive band that connects the drive wheel to the flyer assembly. This is the most common drive system in modern spinners.

Variations: A bobbin-led system has a drive band that connects the drive wheel to the bobbin, and the flyer-led system has a band that connects the drive wheel to the flyer. Flyer-led variations excel at creating a broad range of yarns. Bobbin-led variations excel at low-twist yarns.

Double Drive

Characteristics: This drive system features two bands on the drive wheel, which can be two separate bands or one long band folded in half. The first band connects the drive wheel to the bobbin, and the second band (or second loop of the same band) connects the drive wheel to the flyer. The term "double drive" refers to the fact that both the flyer and the bobbin are connected to the drive wheel. The spinning wheels that feature this system typically excel at creating high-twist yarn since most double-drive wheels, especially antiques, have a large ratio between the flyer whorl and the drive wheel.

TENSIONING SYSTEMS

A tensioning system is found on any wheel that has a flyer assembly. Its purpose is to allow the flyer and bobbin to turn at different speeds, which helps spinners in three ways.

- It helps control the amount of twist added to the yarn before it is wound onto the bobbin. A slower take-up allows the yarn to accumulate twist for a longer period of time, and a faster take-up reduces the time the yarn can accumulate twist.
- It helps control how fast your yarn is drawn into the orifice.
- It indirectly helps control the diameter of your yarn.

All three types of tensioning systems use the concept of slippage to control the rotational speed difference between the flyer and the bobbin. Slippage is inversely related to how much friction your band exerts in the groove it fits in. The more friction you have between the band and the groove, the less slippage you will have of that band. The next sections explain how slippage is used and can be modified for each tensioning system.

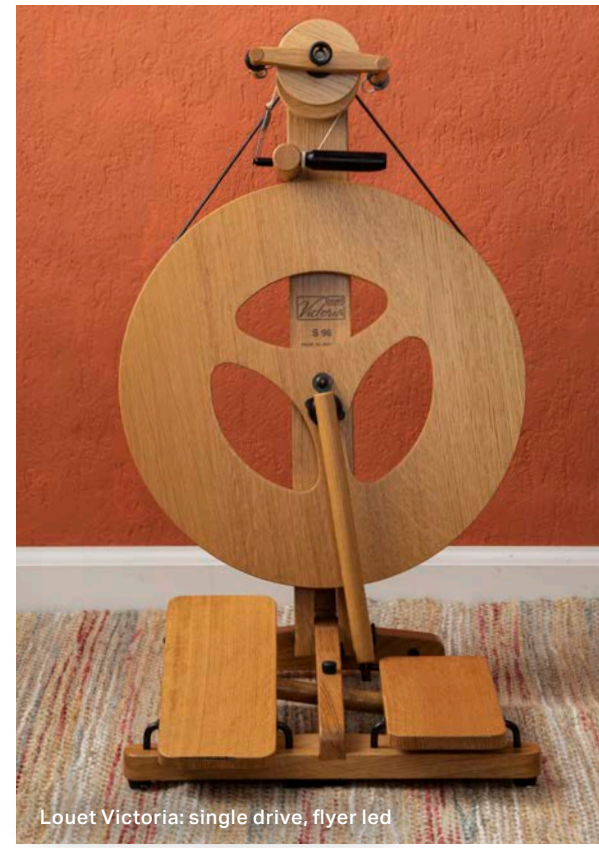
Flyer-Led Tension

In flyer-led tensioning, the drive band rotates the flyer, and the bobbin is slowed by a brake band that wraps around one end of the bobbin. The brake tension can be adjusted as needed.

In flyer-led tensioning, the flyer is turning at a consistent speed based on your treadling. The bobbin

speed changes based on the amount of slippage your brake band allows. This means that the smaller the difference between the flyer speed and the bobbin speed, the less your yarn will draw in and vice versa. The more tension you apply to the brake, the less slippage, which creates a stronger take-up and allows less time for the yarn to accumulate twist.

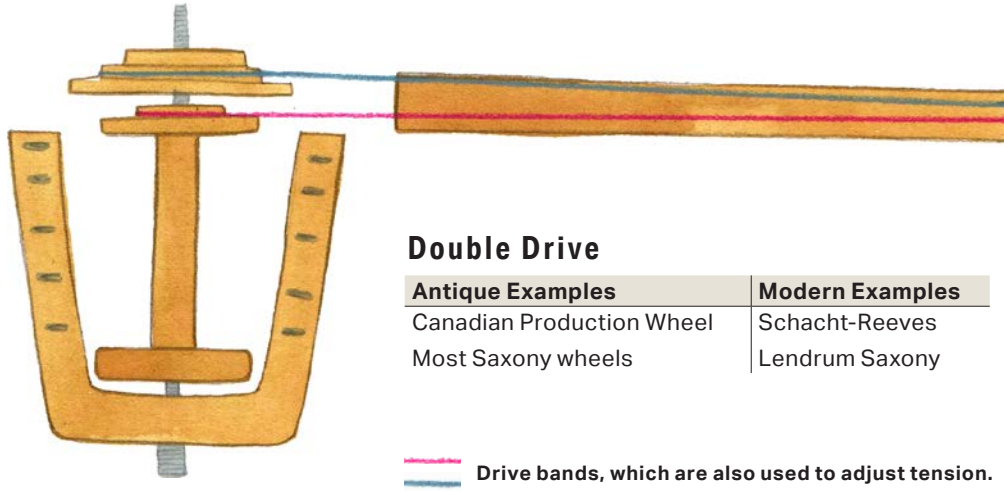
If you start spinning on a new bobbin and find just the right tension adjustment, you are still not done. As the bobbin fills—and for some wheels, as you fill from one end to the other—you will need to make adjustments to your brake tension to keep the take-up tension consistent. These are very small adjustments and are especially noticeable when spinning fine yarns where slight brake adjustments can make large changes.


Louet Victoria: single drive, flyer led

Bobbin-Led Tension

In bobbin-led tensioning, the drive band rotates the bobbin, and the flyer brake is a band or strap that wraps around one end of the flyer.

A wheel with bobbin-led tensioning feels different from wheels with other tensioning. Because the bobbin is leading the motion, it can feel like it has a stronger draw-in than the flyer-led tensioning system. Especially when spinning fine yarns, spinners will often find themselves holding the yarn tighter as it is spun to compensate for the strong take-up, but this can cause some problems. One, if you are using an e-spinner, it is harder on the motor as it will need to work more to counter your pull on the yarn. Two, regardless of which type of wheel you use, you can give yourself an ergonomic injury from gripping too tightly. It is better to work with your wheel and make adjustments to it so that you don't have to hold so tightly to the yarn you have spun.



Double Drive

Antique Examples	Modern Examples
Canadian Production Wheel	Schacht-Reeves
Most Saxony wheels	Lendrum Saxony

Drive bands, which are also used to adjust tension.

Illustrations by Katie Eberts

Spinning Fine Yarn?

What if you have a bobbin-led wheel and want to spin fine yarn? It's still possible. The main goal is to reduce the take-up, and here are some things to try.

- Loosen your brake band a small amount at a time to find the tension that produces the yarn diameter that you want. These changes should be very, very small.
- Use cross-lacing. Emonieiesha Hopkins wrote an excellent article on cross-lacing (see Resources). This technique involves both sides of the flyer, which increases resistance and slows take-up tension. See an illustration on page 82.
- Remove your brake band entirely.
- If you have a strap-style brake band, replace it with a band the same size and shape but of material that allows for more slippage, such as fabric or felt.
- Lubrication is vital for high-speed spinning but varies by wheel type. Follow the manufacturer's advice.

In bobbin-led tensioning, the bobbin is turning at a consistent speed based on your treadling. The flyer speed changes based on the amount of slippage on your brake band. The smaller the difference between the bobbin speed and the flyer speed, the less your yarn will draw in, allowing the yarn more time to accumulate twist. A tighter brake band will have a stronger take-up, and the yarn has less time to accumulate twist.

Double-Drive Tension

In the most common double-drive tensioning setup, one long drive band folded in half moves both the bobbin and the flyer. If you look closely at the rim of many drive wheels, you will see that it has two grooves in it. This is to give each loop of the drive band a place to sit on the drive wheel.

Since, in most cases, one drive band is used for both the bobbin and the flyer, you cannot use different materials to control the slippage and the drive as you do in flyer-led and bobbin-led wheels. Instead, this can be managed by different shaped grooves on the two parts of a double-drive wheel. If you look closely at some double-drive wheels, the flyer has V-shaped grooves and the bobbin has U-shaped grooves. The V-shaped groove has more surface-area contact with the band, which decreases slippage and results in a steady speed. The U-shaped groove has less surface-area contact and more slippage.

Another unique characteristic of double-drive wheels is that the whorl on the bobbin must be smaller than the whorl on the flyer. The difference in the sizes of the whorls allows the flyer and bobbin to turn at different speeds, which creates take-up. Without this critical difference, your yarn will not wind on.

When you adjust the tension on a double-drive wheel, you affect both the slippage on the bobbin and the drive on the flyer because you have only one band to control. There will always be a trade-off when you make these adjustments. For example, if you increase the tension to increase the take-up force, you also increase the force needed to turn the drive wheel, which makes it harder to treadle your wheel.

THEORY INTO PRACTICE

After reading about all of these adjustments, the most important thing to remember in your journey to becoming a confident spinner is that you will always find some variation and inconsistencies in your spinning. You are not a machine; your draft may not be perfectly the same length each time, and your drive band may slip more than you want. So breathe, give yourself a break, allow yourself to be human with all the inconsistencies, and enjoy creating your very own yarn.

Resources

Amos, Alden. *The Alden Amos Big Book of Handspinning*. Loveland, CO: Interweave, 2001.

Hopkins, Emonieiesha. "Cross-Lacing: Learn to Control Your Wheel's Uptake." *Spin Off* (blog), March 30, 2020. spinoffmagazine.com/cross-lacing-learn-to-control-your-wheels-uptake.

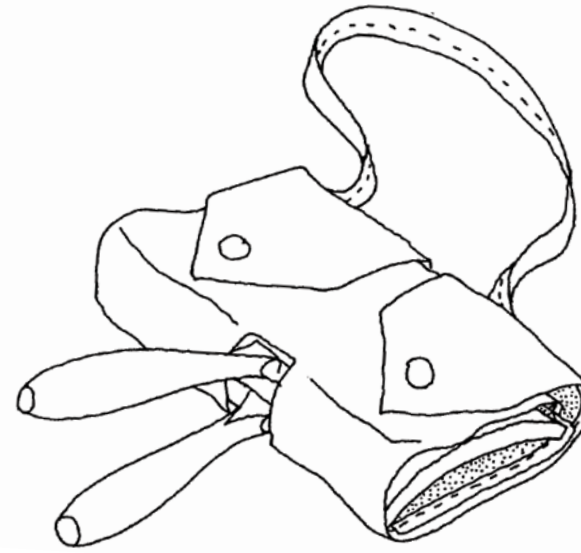
Elana Goodfellow received her Master Spinner certification from Olds College and lives in St. Albert, Alberta, Canada. She co-owns a fiber arts supply business: two times infinity. Elana's passion is exploring, continuing, and revitalizing the art and craft of the past. Teaching, writing, and sharing handspinning techniques are part of that journey.

Attention: all card-carrying spinners
Introducing the one and only

Handy Dandy Denim Card Cover

BY SUSAN BRADSHAW

Editor's Note: After several readers asked us to locate this pattern in the archive, we decided to share this fun vintage content with you exactly as it appeared in *Spin Off* Spring 1991. Current project editor Angela K. Schneider created a sample and then created a second pattern that can be adjusted to the various shapes and sizes of modern and vintage handcards. Enjoy!



Illustrations by Ann Sabin Swanson unless otherwise noted

I would like to present to you a revolutionary new card cover, which can be wrapped around any pair of handcards. It is guaranteed to protect your fingers, knitting, wool supply, and all other objects in close proximity to the cards from being snagged.

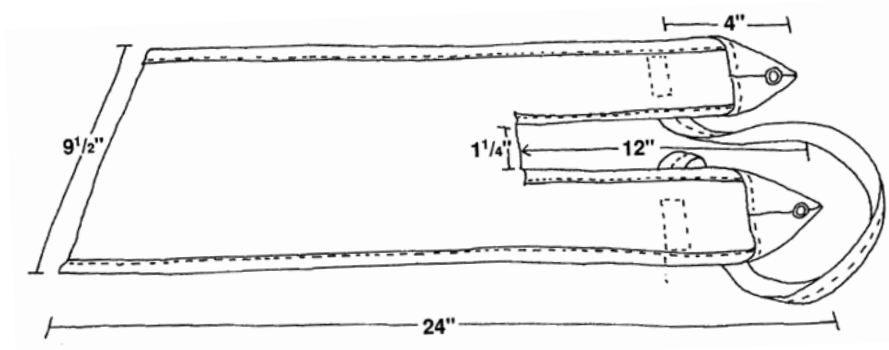
Especially recommended for spinners who travel to demonstrations or classes. Combined with a small hook and a little wall space, the card cover also offers a convenient way to store your cards at home, safely hung out of the way.

Your custom-made card cover can be secured with snaps, Velcro, buttons, bows, or ties. It can be constructed in an unlimited range of colors, materials, and sizes—your needs and imagination are in charge.

Don't be left behind—make your card cover today!

My card cover is made of brushed denim. The measurements on the drawing are finished dimensions; the actual fabric was cut larger to allow for a hem. The cover wraps around the cards almost twice. A slit cut up the middle and hemmed makes two flaps, which were hemmed to make points. I added a strap, so I can carry the cards like a purse or hang them on a wall when not in use.

To wrap a pair of cards, hold them together with their teeth facing in the same direction. Place the first part of the cover (without the slit) on the toothed side of the cards. Wrap the cover up and over the back of the pair of cards; the base of the slit should come to the base of the handles. The flaps continue around the cards, passing the toothed side and snapping down on the back side of the cards.



Susan Bradshaw of Watsonville, California, has been spinning for more than ten years. In that time, she's had the opportunity to do a lot of demonstrations and to discover the value of a Handy Dandy Card Cover.

Angela K. Schneider created denim handcard covers following *Spin Off*'s 1991 instructions (*front*) and then made an adapted pair designed to accommodate different sizes of handcards (*back*).

Photos by Matt Graves

Card Covers Revisited

ANGELA K. SCHNEIDER

When the* Spin Off *team decided to revisit Susan Bradshaw's Handy Dandy Denim Card Cover from the Spring 1991 issue, I volunteered to make a model. I had recently acquired a new set of handcards that needed a cover. I made two covers; one follows the original design, and the other is custom sized to fit my cards. The variation also has shorter flaps and a different placement of the carrying strap. To keep true to the original denim pattern, I reclaimed some fabric from worn-out blue jeans and used a salvaged side seam as a ready-made sturdy strap. Cards come in a variety of sizes so tailor your own cover to fit.

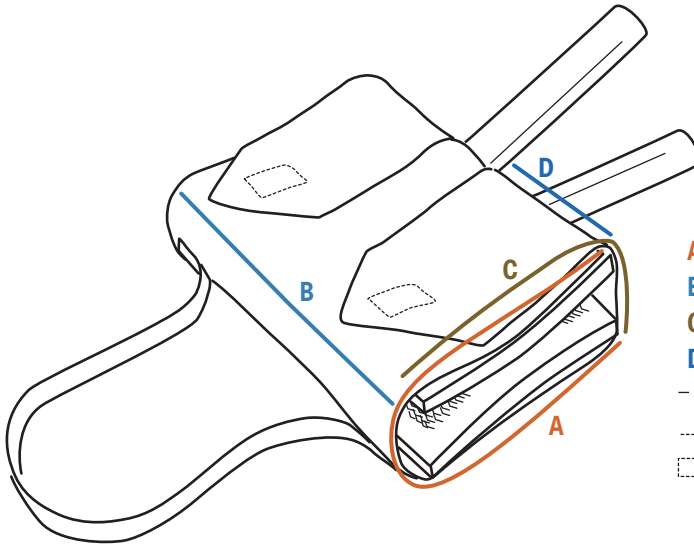
INSTRUCTIONS

Stack your cards front-to-back or face-to-face as you want to store them. Measure the cards:

- From the handle edge of one card, around the pair to the handle edge of the other card (**A**).
- The width across the back of the card (**B**).
- Along the back of one card and across the handle edge of both cards (**C**).
- The width from the edge of the card to the handle (**D**).

Decide how you will finish the raw edges. To serge the edges (as shown in the original design cover), use

The original 1991 card-cover design (*left*) and Angela's updated version (*right*)



A Length around the cards from one handle edge to the other
B Width across the back of the card
C Flap length around handle edges to opposite edge
D Width from the side of card to the handle
– – Convenient places to piece fabric
----- Stitching for carrying strap
Velcro, snaps, or buttons

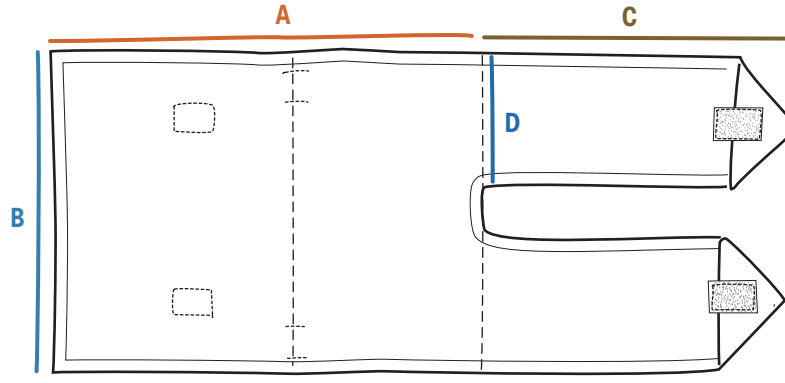


Illustration by Angela K. Schneider

¼" hem allowances; serge the raw edge, turn under ¼" to wrong side and topstitch. For double-fold hems (as shown), use ½" hem allowances; turn raw edge under ¼" twice and topstitch.

Cut the fabric according to the pattern piece, adding hem allowances all around. If your fabric isn't big enough to cut the whole cover, which might happen with recycled fabric, cut smaller pieces and join them. The dotted lines on the pattern show convenient places for seams.

Hem along three outside edges of the body and flaps and the inside edges of the flaps.

Fold the ends of the flaps to a point and stitch in place.

Wrap the cover around the cards with the flaps on either side of the handles. Mark the placement of closures of your choice at the ends of the flaps. I used strips of Velcro. You may also use snaps or sew buttons on the cover and make buttonholes on the flaps.

Mark each edge of the cover on the end opposite the handles for the carrying strap, and then remove the cover from the cards.

Make a strap 6–8" longer than the width of the cards (B). I used a side seam salvaged from the old blue jeans for a sturdy carrying strap. Alternately, use a strip of cloth 1½" wide, fold it in half lengthwise with right sides together, stitch ¼" from the raw edges, and turn right side out with a loop turner. Match the ends of the carrying strap to the edges of the cover where marked. Sew securely in place with a few rows of stitches.

Add Velcro, snaps, or buttons to the flaps.

Angela K. Schneider spins, knits, weaves, and practices a multitude of other fiber arts, including making some of her own tools and accessories. Among those handmade tools are wool and cotton cards and, of course, their covers.

Photos by Matt Graves unless otherwise noted

Technical sketches of the wheel parts that Meagan wanted to re-create and the final proof-of-concept skein she spun with the replacement parts assembled

3D Printing & Antique Wheels

A Spinner Explores Replacement Parts

MEAGAN CONDON

I don't know much of the history of my antique wheel. She was found by my mother-in-law at an Illinois flea market several years back. She's not a Frank Fell wheel, but she does have screw holes on the bottom of the mother-of-all where there once was a nameplate. I was lucky that she had all her parts intact, and I spent several months refinishing her and getting her back in working condition.

More often than not, flea market gems will be missing the flyer assembly. The bobbins are sometimes lost or broken, and handcrafted replacement parts can be prohibitively expensive. Many older wheels were fully handmade, and the bobbin from one antique wheel rarely fits the flyer from another wheel. There aren't standard interchangeable parts available, so that inexpensive

spinning wheel you spotted at an antique mall without a flyer isn't always the deal it initially seems.

However, 3D-printing technology offers a new way to look at the restoration of antique wheels. I wanted to explore how this might work, starting with a wheel like mine because I have all the necessary wheel parts. This allowed me to re-create the original pieces of a working antique wheel to get my feet wet in what turned out to be a surprising adventure into 3D-printing restoration.

LEARNING CURVE

I began by sketching a technical drawing of each part that I wanted to replicate: maiden bearings, whorl (also called a pulley), and bobbin. Then I reached out to Marcelo Mensa and Bryan Boettcher, two 3D printers who have been working with the technology since its infancy. Bryan, owner of CAD to LIFE, helped me keep my expectations reasonable when he told me, "The vast majority of printer owners just download other people's designs and print them." Looking at what others have done is a good way to learn the software.

Marcelo suggested looking for free 3D designs on Thingiverse, a website dedicated to the sharing of user-created digital design files. The 3D-printing community is strongly rooted in open-source sharing. You probably won't find exactly what you need but can use someone else's design as a starting place to practice the software. Tinkercad and Fusion360 are two programs available to edit 3D design files. Tinkercad is free, while Fusion360 is a more powerful tool. I used Tinkercad for my own designs.

As Bryan had advised, I found that designing the files for the wheel parts had a steep learning curve, and the software wasn't intuitive for a beginner. Something as simple as a bearing—a donut with a nub—took hours to create. I've uploaded the wheel designs I created to both Tinkercad and Thingiverse, free for all to use, adapt, improve, and share. Just search for my name.

We decided to do the initial run of parts in polylactic acid, a thermoplastic polyester. More commonly called PLA, this plastic is one of the most widely used materials for 3D printing. It is cheap, readily available, and, most importantly, durable.

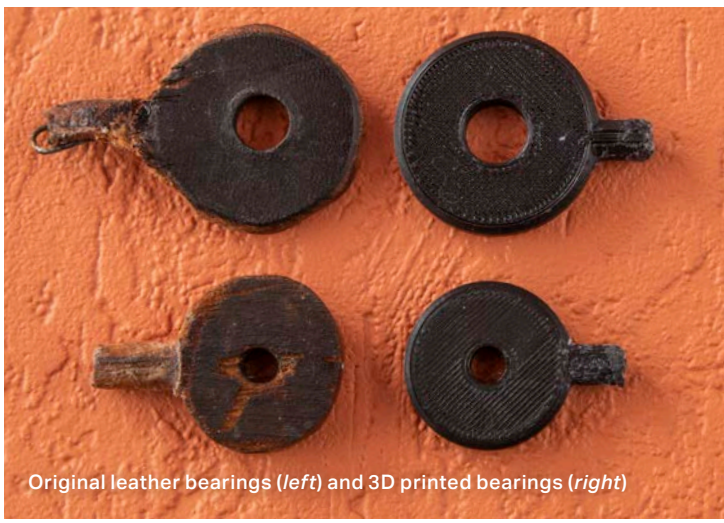
The bearing, whorl, and bobbin designs I created are available on both Tinkercad and Thingiverse, free for all to use, adapt, improve, and share.

The Bearings

We started with the easiest pieces to replicate, the bearings that hold the flyer assembly in place on the wheel. We first had to answer one question: How solid do the bearings need to be?

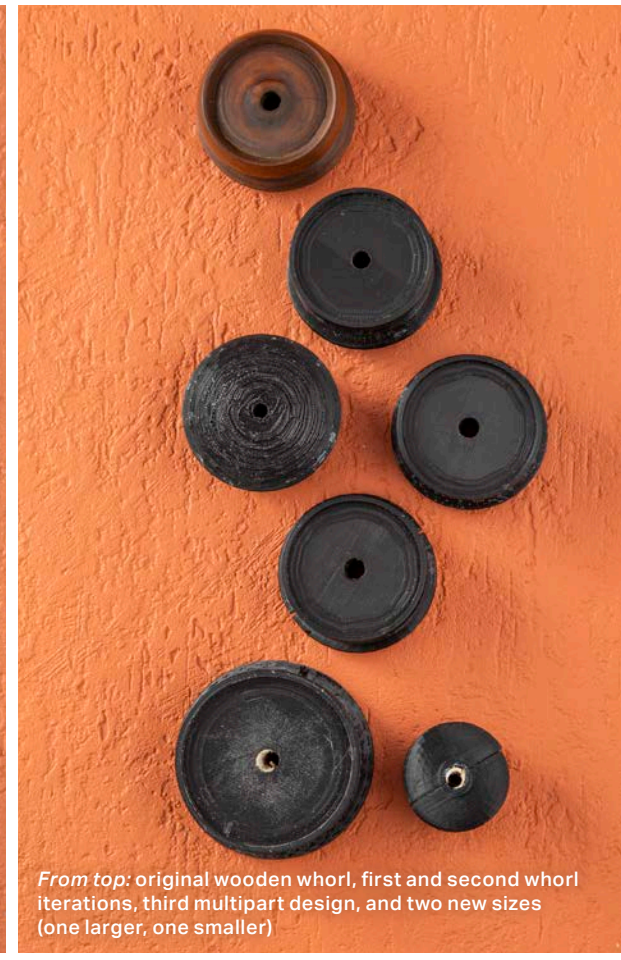
3D printed objects are usually not solid plastic. Instead, the inside of a solid object is printed as a grid matrix to save plastic, print faster, and cost less. I was certain the bearings needed to be printed in solid plastic, or perhaps a stronger material altogether, since they would be in direct contact with the metal parts of the flyer. Despite my misgivings, Marcelo convinced me to do the first run of bearings with 20% infill. That meant that 20% of the grid matrix was plastic and 80% was open space.

I attached the test bearings to my wheel and spun for six hours straight at my fastest treadling speed. No surprise, my wrists gave out before the bearings did. The bearings didn't show any signs of wear in the slightest. The 20% infill uses geometry to create



Original leather bearings (*left*) and 3D printed bearings (*right*)

Drive bands (*from top*): unused, used with the first (rough) design of the whorl, used with the improved whorl, and stretchy polyurethane band material



From top: original wooden whorl, first and second whorl iterations, third multipart design, and two new sizes (one larger, one smaller)

structural stability in the same way bridge builders use triangles and squares to reinforce larger structures. I suspect the typical spinner wouldn't need to replace these bearings for years. For those who are particularly hard on their wheels, the PLA parts cost mere dollars, making them incredibly affordable to replace.

The Bobbin

The bobbin presented its own problems. "3D printers are not good at printing over open space," Marcelo told me. "The plastic just droops." Whether the new bobbin was oriented vertically or horizontally as it was built by the printer, one thin layer of plastic at a time, this would be an issue. The ends of the bobbins needed to be printed as separate pieces, then glued to the bobbin shaft. We added a blind hole—a recess into which the shaft could sit—in each of the bobbin ends. The blind holes were important to help the shaft sit straight, otherwise the bobbin may have been off-balance. We made two test bobbins, one with and one without the blind holes. The bobbin with the blind holes proved to be better balanced and quieter on the wheel.

The Whorl

Similar to the ends of the bobbin, the grooves of the whorl acted as smaller overhangs where the printer had to print over empty air. This time, there was a different solution to keep the plastic from drooping out of shape. Marcelo said, "We can tell the program to add in supports that can be removed after [the whorl] is finished printing." Unfortunately, on the first whorl, the support plastic created a new problem. When we clipped the supports out of the whorl grooves, the grooves were left rough. It was too narrow to be easily sanded. When I tried to use it on the wheel, it tore up the cotton drive band very quickly.

We needed to find a different way to print the whorl so that the grooves would be clean. Bryan provided the key this time. He explained that if we sliced the whorl in half down the middle, we could turn each piece on its side to print and then glue them together afterward. We ended up breaking it into three pieces, with a flat base to glue the two sides onto. This worked relatively well, but I struggled with getting the pieces aligned properly. If I were to run

another draft of this piece, I'd add a blind hole to the flat base to help keep the two sides of the whorl in the correct position during gluing.

The final whorl was much kinder to the drive band, though the band still wore out quicker than with the wooden whorl. With more time to experiment, I am certain this problem could be fixed. In the short term, I opted for a polyurethane band to continue testing. Polyurethane offers resistance to cracking, tearing, and breaking. Many newer wheel manufacturers use polyurethane drive bands and footman connectors.

THE PROS

For Marcelo to print the bobbin, a whorl, and two bearings, the cost was around $13. This included time, labor, and PLA. It would be even cheaper if I printed it myself. If you have priced out custom-turned wooden bobbins, $13 probably sounds like a steal.

If you ever wanted purple and teal bobbins with a Celtic knot design on the ends, they are now within your grasp. Customizing our wheels is one of the joys of spinning. PLA and other printing plastics come in a huge range of colors, including some with glitter, metallic sheen, or color-blended gradients. There are even wood-based filaments that can be sanded to give a more natural-looking result.

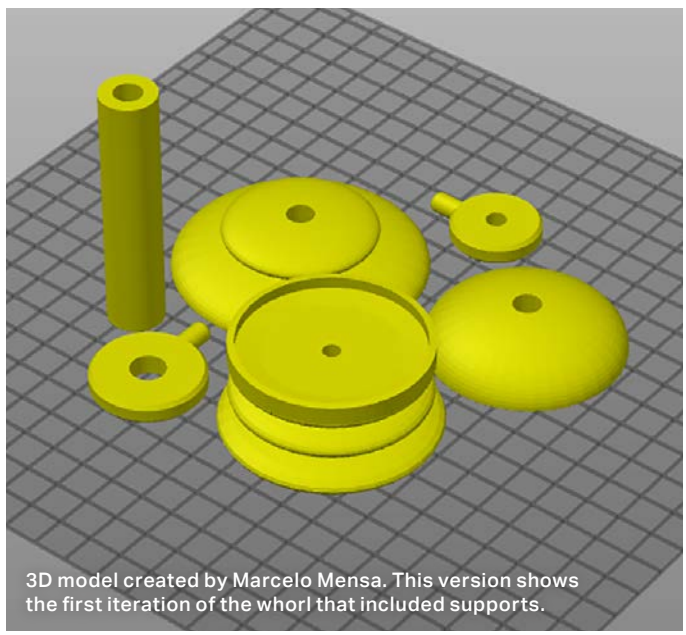
These 3D printed pieces are durable, lightweight, and inexpensive to replace, especially once you get the design right.

THE CONS

The new flyer setup was loud. I mean loud with a capital L. Well-oiled wood-on-wood or wood-on-metal makes a pleasant *shhh* sound. Plastic-on-plastic creates an aggressive *clk-clk-clk-clk* that will drive the most patient spinner insane. First, I tried oil. This eased the noise considerably, but it was still obnoxiously loud. I tried attaching felt in several places, including where the bobbin meets the whorl. Felt did nothing. This is another problem that can probably be solved with time and willpower. If you have ideas, reach out to the *Spin Off* team on social media.

Also, one of the reasons we buy antique wheels is to have a connection to our history. There's something that feels unnatural about putting a plastic bobbin on a hundred-year-old spinning wheel. That purple and teal bobbin isn't going to fit in at a spinning demo with the local historical society.

Finally, 3D printing is about trial and error. Sometimes it takes a lot of errors before you get it right. For example, it took me three runs before I arrived at a workable solution. It would have taken



3D model created by Marcelo Mensa. This version shows the first iteration of the whorl that included supports.

3D model printed

Courtesy of Marcelo Mensa

Meagan tested each design version on her antique wheel.

Photo by Meagan Condon

several more runs before I ended up at a great solution. This can negate the cost savings.

FINAL THOUGHTS

On a larger scale, manufacturers are already beginning to use this technology to cut costs on replacement parts. "One thing I'm starting to slowly see more of is manufacturers offering the STL [stereolithography] files for user-facing components of their products. There's a notable example of a keyboard manufacturer offering STL files for the slider knobs and chassis feet," Bryan said. "Some manufacturers are offering the STL files for download on their websites, just like the manuals. It costs them next to nothing to host it." 3D-printing technology has some incredible applications in the textile world as well, especially when it comes to re-creating parts for our tools.

I want to reiterate that designing for 3D printing has a steep learning curve and will likely come to you easier if you already have a background in CAD or design. Start by playing with other people's designs and don't get frustrated as you begin to create your own. Allow yourself to experiment and fail with grace. If the design process is not for you, there are many 3D designers who will work with you for a fee, including some who have additional expertise in spinning.

Either way, as the technology becomes more readily available, you can bet we'll see more 3D printed elements in the spinning world.

Resources

Bryan Boettcher, CAD to LIFE, cadtolife.com.

Meagan's designs on Thingiverse, thingiverse.com/luthvarian/collections/flax-spinning-wheel-replacement-parts.

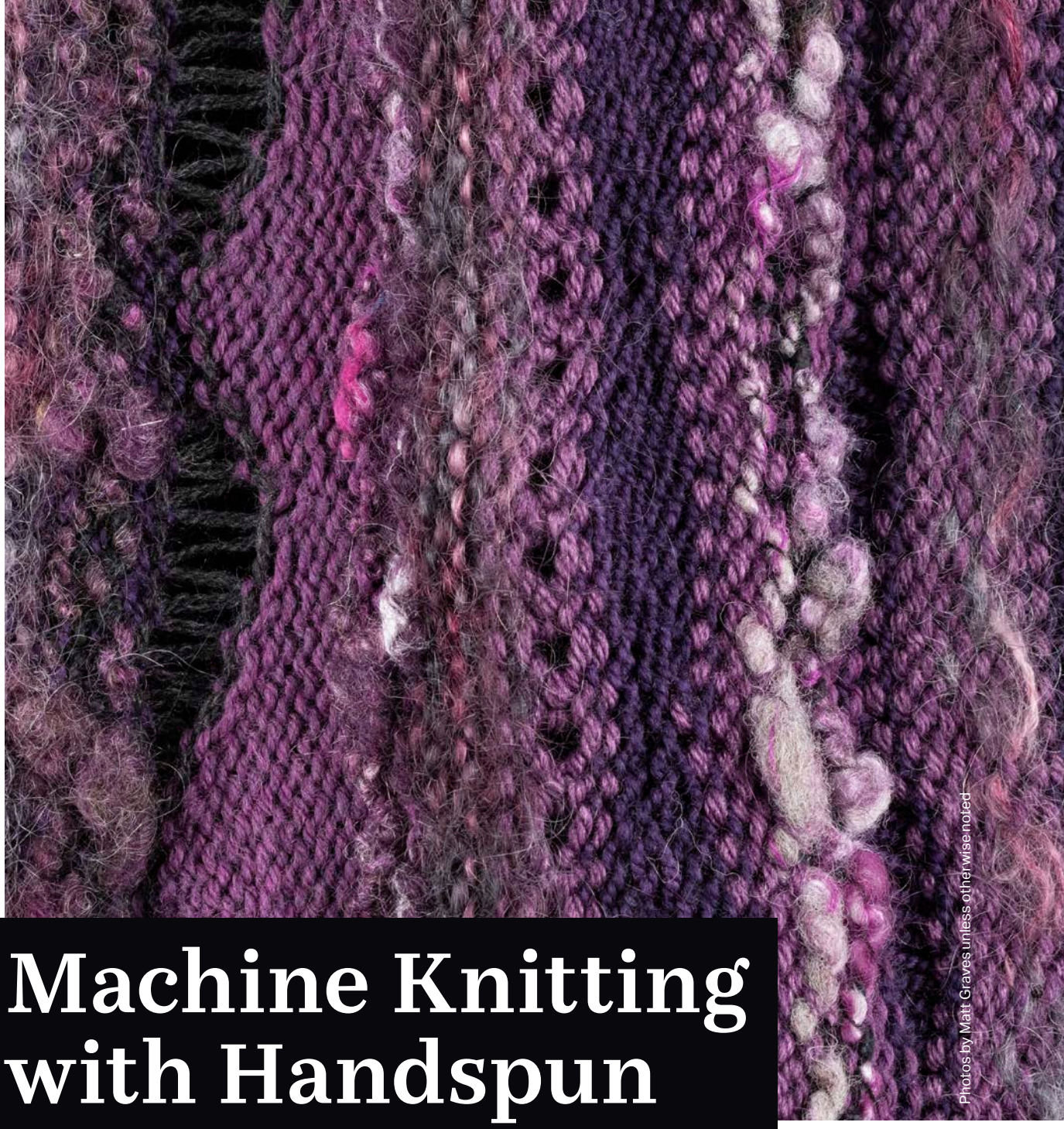
Meagan's designs on Tinkercad, tinkercad.com/users/4isjxHCq0ov-meagan-condon.

Fusion 360, autodesk.com/products/fusion-360/overview.

Thingiverse, thingiverse.com.

Tinkercad, tinkercad.com.

Meagan Condon is a librarian and fiber artist. With more than a decade of spinning experience and a focus on digital connection, she teaches spinning in person and online and livestreams to a diverse community of spinners. You can follow her at luthvarian.com.



Photos by Matt Graves unless otherwise noted

Machine Knitting with Handspun

Would the Luddites Approve?

MARY RENSTROM

Machine-knitted sweater created with handspun and millspun yarns using a "knit-weave" technique

Using a knitting machine with handspun yarn may seem abhorrent to some purists. Nevertheless, the machine has the great advantage of speed. Knitting faster, especially those boring parts of plain stockinette, leaves more time to prepare fiber, dye, or spin. Moreover, the knitting machine is not a new textile tool. Invented by Englishman William Lee in 1589, the knitting machine is older than the sewing machine, and it is certainly older than your e-spinner!

Not everyone was pleased with the mechanization of knitting, however. Legend has it that Ned Ludd and his gang of "Luddites" smashed early knitting frames at factories in early nineteenth-century England in a series of frenzied nighttime raids. Even today, the term

Ned Ludd was a pseudonym or an outright fiction, and rather than waging an attack against all technology, the movement was pushing back against machines operated by unskilled labor to produce inexpensive, substandard goods.

"Luddite" is used to indicate anyone who opposes technological innovation. However, if we dig a little deeper, we find that Ned Ludd was a pseudonym or an outright fiction, and rather than waging an attack against all technology, the movement was pushing back against machines operated by unskilled labor to produce inexpensive, substandard goods. This more nuanced understanding of Luddism leaves us to wonder what its proponents might think about today's hobbyist knitters making use of knitting machines.

During the same period that the Luddites were active in the north of England, the community commonly known as the Shakers was established in America. The founder, Ann Lee, had worked as a factory laborer in Manchester, England. Knitting historian Susan M. Strawn tells us that the Shakers were prolific handknitters who began merging handknitting with machine knitting as they created textiles for sale and household use. The Shakers even had a special machine designed to knit their famous "Shaker stitch" sweaters.

Circular sock-knitting machines were instrumental in supplying soldiers with socks during the Civil War and World War I. Home knitting machines were popular from the 1960s to the 1980s in America, and specialty shops, patterns, and yarns were developed just for the home machine-knitting enthusiast. Since then, however, the home knitting machine has waned in popularity.

I was driven to investigate machine knitting when my wrists showed signs of the dreaded carpal tunnel syndrome. My garments were taking longer and longer to complete, and the hours spent at a keyboard at work combined with too much handknitting began to take its toll. I visited a local machine-knitting shop with a bag of my handspun yarn. At first, the shop owner was dubious that my handspun would work on a machine. But after a bit of experimenting, we discovered that, within limits, handspun yarns work just fine on knitting machines. However, I do have a few words of advice for those of you who haven't yet tried your handspun yarn on a machine.

CHOOSING A MACHINE

My default yarn is somewhere between fingering and DK weight, and so I use machines that are suited to those yarn weights. Knitting machines come in different "gauges" and each gauge works best with yarns in a particular weight range: standard-gauge machines

Knitting machines can accommodate a range of yarns; some models can handle finer or heavier yarns more easily than others. Mary uses several machines to work with handspun yarns that range from fine to bulky.

take laceweight to fingering-weight yarns (Craft Yarn Council 1 or 2); mid-gauge machines take sport to worsted weight, with DK weight being the ideal (Craft Yarn Council 3); and bulky machines like worsted to bulky weight (Craft Yarn Council 4 or 5). While there are ways to make your machine use thinner yarns (plating technique) or heavier yarns (knitting on every other needle), it is best to use a machine suited to the weight of yarn you like to spin and use. I use a simple nonelectronic Silver Reed LK150 mid-gauge machine for most projects, but I occasionally use an electronic standard-gauge machine for finer yarns. I find the simplicity of the "hobby" LK150 model complementary to my style of spinning and knitting. I like to show off the true characteristics of my yarn and avoid complicated pattern knitting. The LK150 is also relatively inexpensive and easy to use.

SPINNING CONSIDERATIONS

Fabric is created when a knitting machine's carriage conveys your yarn across a row of latch-hook needles spaced out on the machine's bed. The spacing on the bed and the size of the needles determine the yarns you can use.

Yarn used with a knitting machine should be relatively smooth and usually plied. It is possible to knit with blocked and sized singles, and that can be done very effectively in Fair Isle designs. However, fabric knitted with singles will lose some of its elasticity.

Mary enjoys working with mixed yarns and materials.

Courtesy of Mary Renstrom

Mary creates two swatches when planning a large handspun project and then calculates an average stitch gauge. Starting and ending with scrap yarn allows her to get a more accurate swatch with a small amount of handspun.

Avoid over- or under-plied yarns and watch out for deadly pigtails—those overtwisted bits that might not knit smoothly or might even jam your machine's carriage. Because the yarn is under tension as you knit, weak spinning joins may break. If you want to incorporate textured yarns or art yarns, you can use them "woven" onto the garter-stitch side of the fabric rather than knitting with them. This is an easy technique that can be done with any machine, electronic or manual.

SELECTING PATTERNS

Of course, there are no patterns written for the yarn you have spun. And while it is technically possible for the fastidious handspinner to match a commercial yarn gauge, that might grow tiresome to the free spirits among us! As a result, most spinner-knitters eventually become pattern designers.

Machine knitters have turned to several software options over the years. DesignaKnit (DAK) and Seedling Software are well-known products. DAK is the more professional-level product, while Seedling Software offers a budget-wise alternative. I personally like Knit it Now's dynamic pattern system. This online program allows you to input any gauge of yarn and customize the fit and style for any number of patterns.

While it is technically possible for the fastidious handspinner to match a commercial yarn gauge, that might grow tiresome to the free spirits among us!

You can save them online and return to them again and again. This requires you to purchase an annual subscription, but there are many pattern choices, from the basic to the modern, and the subscription comes with access to a huge library of tutorials and online video courses on machine knitting.

If you are unfamiliar with machine knitting, use commercial yarn that mimics your handspun for your first project. Avoid fancy stitchwork at first and make a simple stockinette sweater. You might try a cardigan first, as shaping a neckline on the machine has a learning curve. Make up the garment and modify the pattern as needed before you use your handspun. While you can always rip out and reknit your piece (it may be less painful if the piece is machine knitted!), tender yarns may not hold up well to that abuse, and "sticky" yarns, such as kid mohair and angora, may not cooperate at all. It is best to be confident in your machine and your pattern before using your handspun. If your gauges are close and the commercial and handspun yarns are the same type of fiber, you will be able to check your pattern and garment fit.

YARN PREP AND MAKING A GAUGE SWATCH

Prepare your skeins of handspun by washing thoroughly, drying, and winding into very loose center-pull balls. If the ball is too tight, it will affect the tension. Rewind until the yarn runs loosely and smoothly through the knitting machine.

When making a swatch to determine gauge, make sure to follow the instructions in your machine manual carefully. With handspun yarn, I usually do two swatches from two skeins of yarn and take the average stitch gauge. Wash and dry the swatches exactly as you will the final garment. Let the swatches rest for at least 24 hours before measuring. This is necessary for machine knitting, as the yarn is under more tension while knitting, and the swatch will be distorted when it comes off the machine. Even with careful measuring, sometimes handspun yarn has a mind of its own and continues to change after a second washing or a weeklong holiday in my purse (my way of doing a "wear" test).

Machine-knitted ivory cardigan embellished with silk chiffon flowers and beading. Mary created a 60/20/20 blend of hand-combed Targhee/Rambouillet fleece from Ranching Tradition in Montana, bombyx silk, and natural kid mohair roving from Primary Fiber in Georgia. She blended the fiber on a drumcarder and spun a two-ply yarn using a long-draw technique. The pattern was created with Seedling Software.

If you aren't confident you have chosen the right gauge, make several swatches at looser and tighter tensions. Remember, you may be able to rip out the ones you don't use to avoid wasted yarn. Once you have a yarn that runs smoothly through the machine, know your yarn gauge, and have a pattern you feel confident will work with your handspun, you are ready to knit.

Machine-knitted cardigan body and sleeves with handspun, handknitted collar and cuffs. The body of the sweater was knitted sideways on the machine using freeform knitting techniques and a variety of commercial and handspun yarns. The handspun yarn used in the sweater body was knitted with a machine surface-design technique called "knit-weaving."

KNITTING THE GARMENT

When you are at the machine, check your row count and stitch number frequently, making sure you have not dropped any stitches. Machine knitted fabric must be weighted while it is being knit to keep the stitches from popping off the needles. However, be careful with soft or delicate yarns. Heavy weights at the edges can distort the knitting permanently. In that case, use lighter weights and go slower. You may be able to use your hands to pull the fabric down just as the carriage moves over the end stitches. This can slow the knitting down but may enable you to use softly spun yarns. Move your edge weights up frequently and watch for knots or pigtails. I find it helpful to keep a bright lamp aimed at the knitting from slightly below, especially when working with dark-colored yarns.

I don't always use my knitting machines. Some projects, such as traditional Aran patterns, can't really be done on my machines. Other times, I want a small portable project. Frequently, I handknit ribbings and use the machine for the body of the sweater. Because I work many hours during the school year and have limited time for spinning and related fiber arts, I find the knitting machine makes me more productive. While I love relaxing in the luxury of spinning my yarn by hand, it is nice to have a finished product to show off. For me, the knitting machine is a vital textile tool with an old and fascinating history.

In the last decade, home machine knitting almost disappeared. The machines were no longer manufactured, and most local shops closed their doors for good. Recently, there has been a resurgence of interest in machine knitting. New machines are once again available, and the internet has created a small community of avid home knitters. If you have a machine and haven't used it for a while, why not get it out and try some of your handspun on it? If you don't have a machine but are curious, ask a guild member who has one if you could try it out, or purchase a used machine. These are infinitely creative tools, and when combined with your handspun artistry, they produce distinctive and

personalized garments you will be proud to wear—and won't take you several years to produce!

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Thirty years ago, **Mary Renstrom** taught herself to spin from a book while living in Washington, DC. Now she lives in Colorado, where she practices many fiber arts and wrangles multiple textile tools, including knitting machines. Most recently, her knitting has been inspired by two very different sources: her small collection of vintage embroidered sweaters and the work of Russian knitwear designer Elena Kondrina (livemaster.ru/elenakondrina). She never has enough time to complete all the projects she dreams up.

Handspun yarns knitted with a Fair Isle (color-stranding) technique on a knitting maching designed to accommodate bulky yarns. The wool handspun yarns were a natural brown and white. After knitting, Mary dye painted the swatch using acid dyes.

Spindle Whorl, Mexico, before 1521 (1916.918). Toads and turtles were used in Mesoamerican art as symbols of the earth, not only in the sense of land and soil, but also in these cultures' understanding of the cosmos, with the turtle's shell representing the earth as it floats on the surface of a watery underworld.

Courtesy of the Cleveland Museum of Art

Spinning Symbols

Three Embellished Tools with Stories to Tell

RILEY KLEVE

For thousands of years, spinning has been an important aspect of life in cultures around the globe. Typically, a culture's spinning tools reflect the type of fibers available to them or the technology available at the time. What we often overlook are the histories of how spindles and wheels are more than just the products of their cultures. Through their design, depiction in art, or use on a large scale, spinning tools can actually invent, reflect, or transform a culture in return. Here are just three of the many fascinating examples from around the globe and throughout human history.

MESOAMERICAN SPINDLE WHORLS

Mesoamerica, a region that includes portions of Mexico and Central America, was occupied during pre-Columbian times by peoples such as the Olmecs, Maya, and Aztecs, who shared many cultural features. Looking at archaeological and museum collections of clay spindle whorls from Mesoamerica, it becomes clear that they were often carefully decorated with various motifs that were stamped into the clay. There are designs that look floral, some that are geometric, and still others that depict animal figures. While many of these designs might appear to be solely decorative to us

today, they are actually part of the rich visual language of ancient Mesoamerica.

Analyzing a collection of whorls found at a pre-Aztec archaeological site, the late feminist archaeologist Elizabeth Brumfiel observed recurring imagery among the artifacts. She has identified these symbols as references to the belief system that would later become the foundation for Aztec state religious practice, with glyphs that refer to solar energy, the natural order of the universe, the cycles of life and the seasons, and rotational energy as a whole.[1]

These images occur on spindle whorls found all over Mesoamerica, some of which have made their way into museum collections. Frequently, however, very little information is known as to where these objects originated or were discovered, as is the case with the whorl shown here. Brumfiel's work in Xaltocan, Mexico, allowed her to observe nearly one hundred whorls found at a single location. Most of the whorls were excavated from pre-Aztec strata dating from about 900–1430 CE.[2]

To Brumfiel, this indicates that the women who used these whorls were interested in the concepts behind the designs, writing, "the popularity of these themes suggests that the women of Xaltocan were interested not only in domestic activities but also in abstract and large-scale cosmological concepts."[3] She goes on to note that the conventional motifs that appeared on the whorls she studied "duplicated many that are found in other parts of Mesoamerica. This indicates that the women of Xaltocan possessed substantial knowledge of Mesoamerica's symbolic vocabulary."[4] This imagery is evidence that through daily activities such as spinning, these women were engaging with ideas central to ancient Mesoamerican life and, more specifically, to what would become Aztec state religious practice.

EARLY EUROPEAN WHEELS

In Renaissance Europe, spinning wheels often reflected women's role in society. Although there are fewer surviving spinning wheels than ancient clay spindles, artworks from the Renaissance period offer historians insights into how spinning wheels were used symbolically to indicate evolving moral sensibilities in society.

". . . the women of Xaltocan were interested not only in domestic activities but also in abstract and large-scale cosmological concepts."

The most striking object in Maerten van Heemskerck's *Portrait of a Lady Spinning* (circa 1531) is the ornate spinning wheel held by the unnamed subject. The wheel, carved by hand, spares no detail or expense: a dolphin supports the drive wheel with its nose, the distaff's design echoes Greek columns, and the wheel has flourishes of golden leaves throughout. Mounted on the wall behind our spinner are a niddy-noddy that matches her wheel, a basket of wool and shears, and a coat of arms. In comparison to the wheel, the subject and her room are relatively plain. Her wheel and the embroidery on her collar both indicate that she is a wealthy woman, but her clothing is otherwise simple and unadorned.

During van Heemskerck's time, spinning was considered a moral duty for a wealthy housewife in many parts of Western Europe. Art historian Cordula Grewe points to stories of Roman noblewoman Lucretia and portrayals of Saint Elizabeth as examples of women who dutifully worked at their wheels and would have been known to van Heemskerck and his audience.[5]

The Renaissance period saw a re-evaluation of the role of women within an evolving domestic ideal. While women had worked in a great number of professions through the Middle Ages, this declined during the sixteenth century. Women found themselves restricted from guilds, and few attended the increasingly important universities. Grewe notes, "this process of exclusion was also possible because women were not able to maintain in law the opportunities they had during the High Middle Ages."[6]

What is left unspoken in van Heemskerck's painting is that the woman is clearly wealthy through birth or marriage, not through her work as a spinner. Due to tightening guild regulations, women who spun for pay were often very poor.[7] In fact, the connection between spinning and a woman's moral household

Portrait of a Lady Spinning by Maerten van Heemskerck, circa 1531 [183 (1969.14)]. Oil on panel

While paintings were typically flattering portrayals of the wealthy, woodcut prints were cheaper and more easily circulated, often portraying spinning in a much less flattering light. In woodcuts, depictions of women spinning were often a metaphor for sex work, as they are purportedly selling themselves.

duty could be seen as a double-edged sword. While paintings were typically flattering portrayals of the wealthy, woodcut prints were cheaper and more easily circulated, often portraying spinning in a much less flattering light. In woodcuts, depictions of women spinning were often a metaphor for sex work, as they are purportedly selling themselves.[8]

Thus, in the Renaissance, images of spinning wheels reflected virtue, either as a manifestation of a woman's goodness (as in van Heemskerck's painting) or as a shorthand for the culture's perceived moral failure by working in the sex industry. Using images of spinners to stand in for larger ethical concepts benefitted the ruling class, particularly men, who enjoyed access to cloth spun by working women as well as the unpaid domestic work done by their wives and daughters. Representations of spinning from this era served wealthy men by reflecting an evolving moral code back to society as a whole.

CHARKHA: A SYMBOL FOR POLITICAL CHANGE

India's connection with handspinning spans centuries, and the charkha, a driven-spindle device similar to a great wheel, is the foundation for all spinning wheels today. For centuries, cotton grown in India was spun and woven into cloth for both domestic use and as a key export. However, under British colonial rule (1858–1947), cotton grown in India was shipped to cotton mills in England for manufacturing, then exported back to India at a markup. By making sure that Indians were consumers of cloth instead of producers, manufacturers in England were able to accumulate wealth at the expense of an entire industry.[9]

In 1905, a growing independence movement (*Swadeshi*, or "my country") called for a boycott of imported textiles and a return to homespun, hand-woven *khadi* cloth. Those supporting the independence movement wore khadi during demonstrations to show that they were self-sufficient without British imports, and they called on others to join them. Realizing that not everyone could travel away from jobs and family to participate in direct action, Mohandas K. Gandhi identified spinning as a way to involve more people in the movement towards *swaraj*, or self-rule. He called for Indians to participate in 30 minutes of spinning every day as a way to physically practice the ideology of the Swadeshi movement.[10]

The traditional upright charkha wheel was a familiar object across the Indian subcontinent and was adopted as an image for the independence movement in the 1930s. It was originally placed at the center of the new government's flag. Images of charkhas were used across caste, language, and religious barriers in the diverse Indian subcontinent, allowing the movement to spread through the population. However, art historian Rebecca M. Brown writes that despite its use as an icon for the movement, the traditional charkha wheel did not continue to be the spinning tool of choice for the movement. Instead, most of those involved chose to do their daily spinning on a book or box charkha.[11]

In addition to the practical reasons for this choice (a box charkha is, after all, far easier to bring to demonstrations), Brown points to other reasons for this preference. Spinning had traditionally been the work of women, and that association was difficult to shake among the men leading the independence movement.[12] By separating the symbol of the traditional charkha wheel from the practice of spinning using a box charkha, the Swadeshi movement was able to establish that spinning was not just women's work; rather, it was the work of all Indian people fighting for independence.

Charka Wheel, India, 1880–1930 (31.945.2). This spinning wheel is decorated with faded designs in black, red, and yellow pigment, as well as traditional inlay worked in concentric circles around the wheel's hub.

From the Collections of The Henry Ford

These three case studies illuminate different ways that spinners and their tools interacted with their cultural context. We see how whorls reflect the roots of an empire's religious symbology, how paintings reinforced social mores that disenfranchised working women, and how activists used spinning as a practice towards independence. While many spinners today might not have the same visibility and impact within their culture as in these examples from the past, history can inspire us to imagine a world shaped by spinning in the future.

By separating the symbol of the traditional charkha wheel from the practice of spinning using a box charkha, the Swadeshi movement was able to establish that spinning was not just women's work; rather, it was the work of all Indian people fighting for independence.

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Special thanks to Dr. Deirdre Carter for her contributions to this article.

Riley Kleve is a nonbinary handspinner, artist, and educator in Minnesota. Their work draws from craft traditions to imagine new queer futures for textile art. Find them on Instagram at @lezphair and @betterdaysyarnco, or at rileykleve.com.

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Onions, members of the lily family, yield glorious color.

An Ode to Onion Skins

Modifying a Humble Dyestuff

MADELINE KELLER-KING

O' humble little onion
Grown round beneath the ground,
Staple of our pantries
And of dishes the world 'round.

O' what cheerful surprise to see
Golden shades brought forth from naught,
As if the sun's own rays
Come into my little dyepot!

—Madeline

Most of us can recall our first project—that awkward scarf, a woven swatch, or the somehow over- and underspun skein of yarn. Natural dyeing is the same, and most dyers I know can tell you where their joyful journey began.

My moment of curiosity was sparked by a book I still hold dear. I had already begun shifting away from acrylic yarns toward natural fibers when I scored a copy of *The Natural Knitter* by Barbara Albright, on sale at a local used bookstore. My 20-year-old self was drawn in by the lovely patterns and information on different types of natural fibers. Then it happened. I noticed something toward the back of the book—just a small excerpt that was only a few paragraphs long—that suggested that one could dye natural-fiber yarns with onion skins. Onion skins? Such a humble, yet key, kitchen staple could also be used as a dye? I was immediately hooked on the idea and began collecting them in a paper bag on top of the fridge.

Having no context for how many onion skins would be enough, I saved onion skins for more than a year, till my paper bag was nearly overflowing. (I can only sing the praises of my spouse for his patience with me, as my collecting habits have increased over the years.) It was all worth the wait when I finally created my first onion skin dyebath and saw the results.

At the time, I thought that an acid was needed for the dye to work, so I put all the onion skins in a giant canning pot with several glugs of white vinegar. After straining the onion skins and tossing them on the compost pile, that first dip of fiber into the pot was magical. I was not expecting the bright gold that I pulled out of the pot, so cheerful and solar. I hadn't looked up any results online and had this experience with a fresh eye. Reading that you can "dye yellows, browns, and oranges" with brown onion skins is much different than viewing those colors coming out of a pot. Suffice it to say, there was no going back; I was now a dyer.

GET YOUR FEET WET

There are several things that make onion skins an ideal beginner's dye, and accessibility is the first. If you don't want to wait as your collection at home grows, most grocery stores are happy to let you clean out the onion skins at the bottom of the bin, and I highly recommend outsourcing collection efforts to family and friends. You'll get a communal "Wow!" when you share the results. Both brown (yellow) onions and red onions have outer skins that yield great color. White onion skins don't produce much color.

Onion skins are also kitchen safe, and you can get color using no additional reagents.[1] Simply simmer the skins and add wool. This means that you could use enamel or stainless steel pots already in your kitchen, making onion skins a perfect place to start without needing to invest in equipment. From there, you can explore the addition of mordants and assistants or

Yellow onion skin samples (*from top*): onion skins only, alum and onion skins, alum and onion skin exhaust, alum and onion skins with vinegar, onion skins and iron

modifiers. Some of these compounds are food grade, but as you explore additional reagents, it is always wise to use dedicated dyepots (see safety notes).

While onion skins will dye protein fibers without the help of a mordant, many dyers do use mordants to increase the longevity of the color (fastness) or to extend the range of colors possible. Some of the most common mordants are metallic salts, with several aluminum salts being the go-to mordants for most dyers. You will see many dye recipes call for alum, and food-grade potassium aluminum sulfate is readily available at most natural grocers or where canning equipment is sold. For my samples, I used aluminum acetate, which, while typically used for cellulose fibers, works equally well on protein fiber and was what I had on hand at the time.

Iron salts are also a favorite of natural dyers. Natural-dye specialists Catharine Ellis and Joy Boutrup tell us, "Iron is seldom used as a primary mordant but is more often used in combination with aluminum or as a post-dye treatment to alter color." Iron "saddens" colors by adding gray, which, in the case of yellow onion skins, produces greens. In my samples, I used ferrous acetate, which I obtained by soaking rusty nails in a vinegar and water solution.[2] (Any use of iron requires dedicated dye equipment.)

Mordants and modifiers allow us to expand the colors we can create with our dear onion skins. From food waste alone, shades of brown, orange, gold, yellow, and green can be achieved! The versatility of this dye is partly why it is one of my favorites to this day. I've done a few dips modified in different ways for you to see here.

What You'll Need

- Alum (aluminum acetate or potassium aluminum sulfate)
- Iron solution (ferrous acetate created with nails, vinegar, and water)
- Dried onion skins, whole or crushed
- Enamel or stainless steel pot
- Stainless steel spoon or tongs
- Digital scale

I hope you'll grab a pot, hit up your supermarket, and give it a try! Perhaps you will become as enraptured by pulling color from accessible natural dyes as I am.

THE RECIPES

Make your dye plan based on the materials you have on hand, your experience level, and the colors you wish to achieve. The five steps below can be used in several different ways. The simplest approach is to just follow steps 2 and 4 to dye with onion skins alone. Or you could use steps 1, 2, and 4 to create a range of bright yellows that are progressively lighter with each dip, or 1, 2, 3, and 4 for a range of slightly brighter yellows. Follow steps 2, 4, and 5 for olive greens and browns. Following steps 1, 2, 4, and 5 will create a range of long-lasting greens.

1. Premordant Bath with Alum

Fill a pot with cool water, leaving enough room to add the yarn. Add alum at 15%–20% weight of fiber (WoF). For example, if you are dyeing 100 grams of wool, use 15–20 grams of alum. Add fiber or yarn and slowly bring the pot to just below a slow simmer. This will be around 185°F (85°C), and you will begin to see wisps of steam rise from the water and maybe an occasional bubble. Maintain this temperature for 30 minutes to an hour and allow your fiber to cool in the pot

Madeline created the Kitchen Cast Off Cowl using dye samples. Linen stitch lends itself well to a smooth fabric made from small samples in a sunny palette.

Red onion skin samples (*from top*): onion skins only, alum and onion skins, alum and onion skin exhaust, onion skins and iron, alum and onion skins with vinegar

Safety First

While onion skins can be safely simmered in your kitchen, safety precautions become very important when working with reagents.

- Work outside or in a well-ventilated area.
- Use dedicated dyepots and tools.
- Always use gloves and a mask when working with iron.
- If handling rusty nails or scrap metal, make sure your tetanus booster is current.

overnight. Remember to keep an eye on your dyepot and maintain this low temperature so as not to risk damaging your wool.

2. Onion Skin Dyebath

When dyeing, I tend to start with baths that create colors that are as saturated as possible and then use successive dyebaths to achieve lighter colors. In the case of onion skins, I use 50%–100% WoF depending on the amount of dyestuff I have on hand (and my patience at the time.) As with the mordant step, heat your onion skins in a pot of water to a slow simmer. Maintain this slow simmer for around an hour and let the pot cool with the dyestuff in it overnight. Note that boiling your dyestuff may cause a shift in color. Boiling is one way to get duller yellows on purpose, for example, and other dyes such as madder will go brown with high heat exposure. In the morning, strain out your onion skins.

3. Acid Modifier

If you'd like to try adding in an acidic modifier, do so after you've strained your onion skins from the dye bath but before you add your fiber or yarns. I tend to use white vinegar for my dye baths, adding two "glugs" (about a half cup) to the dye bath and stirring before proceeding to step 4. Citric acid is another common acidic modifier, which can be used at about 5%–8% WoF.

4. Add the Wetted Fiber or Yarn

Whether it was mordanted or not, for even color, fibers and skeins should be soaked and have any excess water

squeezed out before being added to the pot. Repeat the heating process to the same temperature once again, maintain for at least an hour, and then let the fiber/yarn cool in the pot overnight.

5. Post-Dye Treatment with Iron

If you'd like to go for darker browns, or olive green from red onion skins, you'll need some iron to modify your color. If you have access to rusty nails or other rusty hardware of some kind, you can make your own iron solution by putting those items in a jar and adding a 50/50 water and vinegar solution. Give it a shake, let it sit for a few days to dissolve the iron from the nails, and you'll be ready to go!

When using this solution as an afterbath to shift colors, add a bit to a pot of water and heat it slowly with your dyed textile. This method isn't very scientific as far as measuring goes, so remember that a little goes further than you think! Also, iron can and will damage fibers if left too long, so make sure to rinse thoroughly to remove any stray particles.

Finishing

Rinse your dyed fiber or yarn in cool water, adding a bit of pH-neutral soap during a second soak, and remember not to agitate too much. Hang skeins to dry or lay fiber in a spot with good air circulation, and then stand back and admire!

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Madeline Keller-King is a fiber artist and natural dyer who lives in the woods of northwestern Montana in the company of her spouse and family of pups. You can follow her adventures on social media where she goes by @woolywitchofthewest.

Looking for an easy cowl pattern that highlights your colorful handspun odds and ends? *Spin Off* magazine subscribers can log in for your bonus knitting pattern at LT.Media/KitchenCowl.

Detail of the Kitchen Cast Off Cowl shown on page 75

Cotton and hemp blend from the One Acre Exchange project

Photos by Matt Graves

The One Acre Exchange Blend

Spinning Cotton and Cottonized Hemp

KERRY BULLOCK-OZKAN

The goal of the One Acre Exchange project, according to organizer Tyler Jenkins, is to engage in regional economic development through "organizing local seed-to-product regenerative agriculture projects with farmers and workers along the supply chain." Hemp is a crop that requires little to no pesticides and relatively little water, and it was historically grown in North Carolina before drug laws made growing hemp illegal. Cultivation was reintroduced under a pilot program beginning in 2016, and as of 2022, hemp can be grown with a special license from the US Department of Agriculture.

One Acre Exchange has been test-growing varieties of hemp for fiber since 2017. The project started with a quarter-acre field trial of 10 organic varieties of hemp and moved to a full acre of a single variety the following year, which is how the project acquired its name. That fiber was used by local fiber artists to create pieces for an art exhibition, which is where I first encountered the project. The project expanded to 50 acres in 2020 and by the spring of 2022 involved around a half dozen farmers.

PROCESSING HEMP FIBER

One of the biggest challenges to using hemp for commercial-scale textile production in North America is the lack of processing equipment that can handle a long-staple fiber such as hemp. Hemp is a bast fiber similar to linen, and thus the process for taking hemp from stalk to finished yarn is very similar to the process for linen. The raw hemp must be subjected to mechanical or chemical processes to soften the fibers and separate them from the outer part of the stalk and the inner, woody core (hurd). There are currently very few processors in the United States that can work with these fibers; Tyler knows of fewer than five. One Acre Exchange and other projects like it are working to build a supply chain for hemp fiber in the United States.

Hemp is a bast fiber similar to linen, and thus the process for taking hemp from stalk to finished yarn is very similar to the process for linen.

One option that is more accessible in the near term is blending hemp with other fibers through a cottonization process. Cottonization is a chemical process to degum and delignify the long bast fibers. Removing the natural compounds, such as pectin and lignin, that connect individual hemp fibers within the long strands of bast results in short, softer fibers that can be more easily blended with other short-staple fibers. Resulting blends, such as cotton/hemp and wool/hemp, can then be processed and spun into yarn using existing mill infrastructure. Researchers are currently working to develop more mechanical, environmentally benign ways of processing hemp fiber. The sliver I received was processed in North Carolina through a partnership with Guy Carpenter of Bear Fiber.

SPINNING THE COTTON/HEMP SLIVER

I received just under 4 ounces of sliver—a blend of 70% certified organic cotton grown in the United States and 30% hemp grown in North Carolina. (The hemp is grown using organic practices but is not currently certified organic.) The fiber has a very short staple of about 1 inch and looks and feels much like an all-cotton sliver. Looking closely, one can see short, slightly coarser hemp fibers within the staple and an occasional longer hemp fiber. These fibers tended to stick out of the singles a bit once the fiber was spun.

Being new to plant fibers, I spun an initial sample on one of my light Turkish spindles to see how it handled. It produced a soft, fluffy yarn that I knitted into a washcloth. Next, I wanted a stronger, finer yarn with more twist, so I set about figuring out how to spin the sliver on my trusty wheel, a 1970s-era Ashford Traditional.

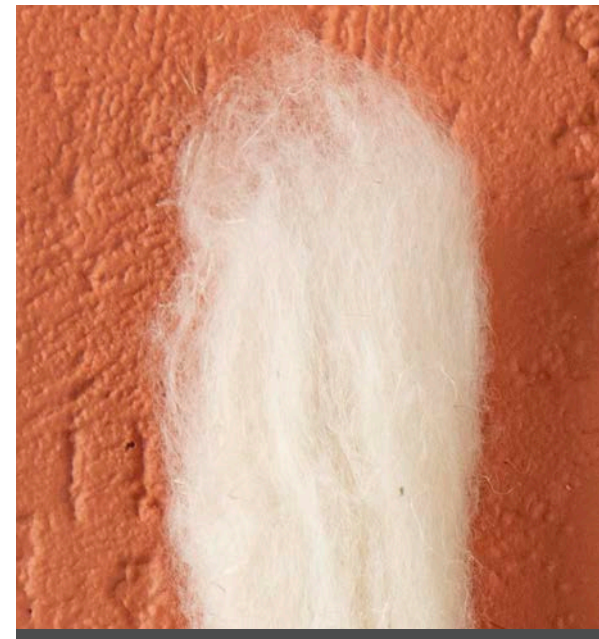
The main challenge in spinning the short fibers is managing the take-up of the wheel. I needed to be able to get enough twist into the fiber without it being pulled out of my hands or breaking. Although my wheel is scotch-tensioned, I find it difficult to reduce the tension enough when spinning fine yarns, and that proved particularly challenging with this short, slippery fiber.

After some research, I decided to try switching out my nylon fishing-line brake band for a piece of fine jute twine. The twine is thicker than the standard brake band, so it touches more of the surface area of the groove in the bobbin. I found that with almost no tension applied to the jute brake band, I could adjust the wheel to have the very gentle take-up that I needed. A brake band that touches more of the groove could also be used with more tension to create a very aggressive uptake, so I was happy to find that it could also work for a gentle uptake on my wheel.

The fiber has a very short staple of about 1 inch and looks and feels much like an all-cotton sliver. Looking closely, one can see short, slightly coarser hemp fibers within the staple and an occasional longer hemp fiber.

In my initial experiment, I didn't use a spring, which is typically included as part of a brake system to allow for adjustment, but I added one to my next iteration to allow for finer control. When I set to spinning my cotton/hemp blend again, I adjusted the

Retted hemp before cottonization. Pectins and lignins hold many short fibers together in long strands of bast.



A close look at the blend of cotton and cottonized hemp

wheel so that there was as little tension on the band and spring as possible without it being slack.

I also found that using a wooden bobbin, which had a more textured groove for the brake band and a slightly thicker core than my 3D printed plastic bobbins, helped reduce the take-up. Finally, I tried cross-lacing at the beginning of every bobbin to further reduce the tension; I found that after the bobbin began to fill up, I no longer needed to cross-lace and could manage the take-up by simply adjusting the brake band as needed. Another option, though I didn't try it for this project, would be to add a foam core or use a fat core bobbin.

I set up my wheel using a 12:1 ratio, the highest my wheel can easily manage. If I had the option, I would have used a higher ratio for even more twist. I spun the singles from the sliver with no additional preparation. Because of the way fibers align in sliver as it is created, spinning from one end was much easier than from the other. This is usually much more pronounced in cotton than wool. Once I figured out the correct end to spin from, I found that relatively few slubs developed in my singles.

Because of the way fibers align in sliver as it is created, spinning from one end was much easier than from the other. This is usually much more pronounced in cotton than wool.

Sampling with a short-forward draw produced a nice yarn with a bit of shine. However, I soon found my hands tiring, and I settled on using a long-draw technique. I drafted using a supported long draw, pausing to allow more twist to build up and to smooth the bits of hemp fiber that stuck out from the singles before winding on. Spinning this way was a much

From left: cotton and hemp sliver, the first soft-spun two-ply yarn, and the final higher-twist two-ply yarn

more enjoyable experience, and I was able to produce a consistent, fine yarn with this technique.

I rewound the singles onto storage bobbins before plying. I plied the singles with the same 12:1 ratio on my wheel, creating a two-ply yarn at about 6 twists per inch with a twist angle of around 25 degrees. I finished the yarn by soaking it in very warm water with a bit of castile soap, rinsing and thwacking it lightly, and then hanging the skeins to dry unweighted. The resulting yarn came in at approximately 29 wraps per inch with a grist of around 2,350 yards per pound, and I ended up with a total of 382 yards of my final two-ply yarn.

THE FUTURE OF ONE ACRE EXCHANGE

One Acre Exchange hopes to continue to produce sliver for handspinners; the challenge is that most of the production capability is for one-off projects or is done overseas. The organization is currently focused on developing two products that can be consistently produced on the farm—hurd-free, long-staple hemp fiber and sorted hemp hurd—and it is also piloting some small-scale natural-dye extractions.

You can learn more about the One Acre Exchange project at fibershed.org/category/bast-fiber/one-acre-exchange or follow it on Instagram at @one_acre_exchange. ●

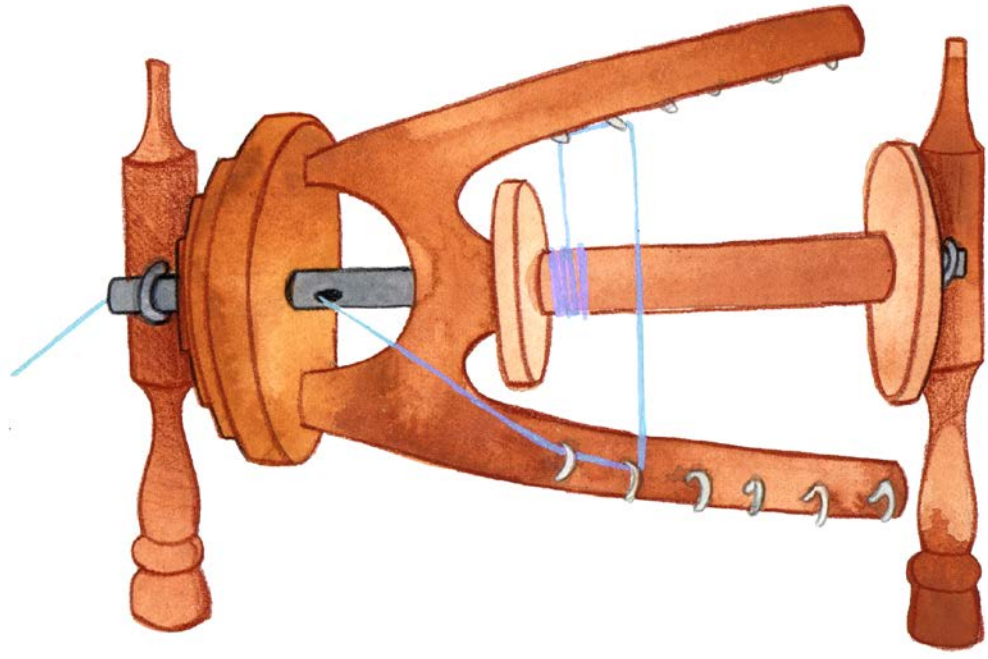
Kerry Bullock-Ozkan is a knitwear designer and textile artist living in the beautiful Piedmont region of North Carolina. She loves working with local fibers and breed-specific wool to create modern, wearable garment and accessory designs. Follow her adventures in fiber arts at bullockozkandesigns.com.

Resources

Manich, Albert M., Manuel J. Lis, Sonia Perez-Rentero, Ines Algaba, Meritxell Marti, and Diana Cayuela. "Influence of Alkaline Delignification on Moisture Uptake Behavior and Bonding Enthalpies of Hemp." *Journal of Applied Polymer Science* 138, no. 39 (2021): e50990. https://doi.org/10.1002/app.50990.

North Carolina Department of Agriculture and Consumer Services. "Hemp in North Carolina," ncagr.gov/hemp.

Ruane, Joan S. "Spin It! Cotton on a Wheel." *PLY Magazine*, Spring 2016, 38–41.



Cross-lacing a flyer can help reduce the take-up tension when spinning fine yarns. Some flyers, including Ashford models, have hooks on opposite sides of the flyer arms, but cross-lacing still works just fine.

Illustration by Katie Eberts

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SCHIFFER CRAFT

Malynda used handspun silk singles to weave a stunning scarf. *Shown here:* unspun hankies from Outback Fibers and Golding ring spindle

Photos by Matt Graves

Autumn Forest Scarf

Silk Hankies and Undulating Twill

MALYNDA ALLEN

My local spinners' guild, the Wasatch Woolpack, has a gift exchange every Christmas. A few years ago, I went home with 2 ounces of lovely hand-dyed multicolor silk hankies. I had never spun silk before, so I was eager to experiment and learn. I played with the silk hankies and enjoyed spinning the irregular silk on my drop spindle. I decided that the singles would make a beautiful weft for a twill scarf.

I chose a dark commercial wool for the warp and tabby weft to make the bright silk colors pop. The shifting colors and shining silk remind me of the mountain forests with their pine trees and bright leaves in the fall.

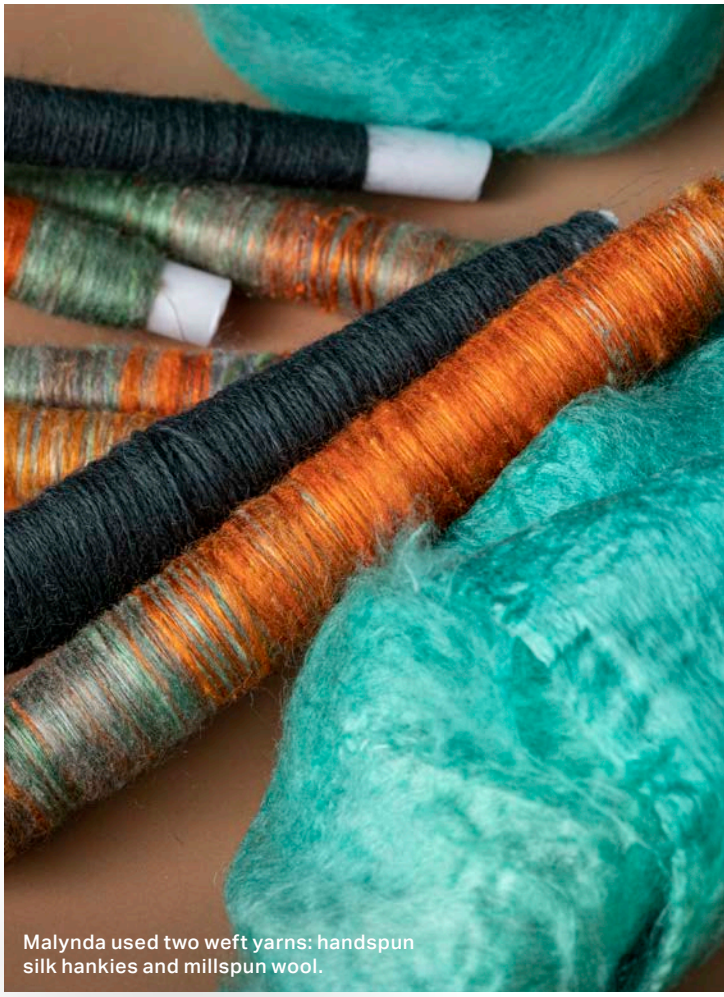
SPINNING NOTES

I began by searching the internet for everything I could find about spinning silk hankies. I held the hankie in the center and spun from there. I really liked this, but the colors became muddied. I also tried starting in one corner and spinning across the hankie to the other corner. In the end, I spun most of them by poking a hole in the center and expanding the edges to partially predraft the fiber. This allowed me to keep the colors somewhat organized by starting with the same color each time. I used a worsted drafting technique with plenty of twist to make fine singles. While working my way through the stack of hankies, I also took a local class in spinning silk.

I spun most of the silk on a drop spindle, and then, to hurry the project, I spun some of the remaining hankies on my wheel. However, I had trouble drafting the silk as thin as I wanted it at the wheel and finished spinning the stack of hankies on my spindle. To free up my equipment, I wound the nubby, uneven, inconsistent silk singles onto paper quills for weaving, and there it sat until I decided to weave it into a scarf.

WEAVING NOTES

I warped my loom with a dark wool yarn and began to weave with the silk singles as weft. I soon discovered that the silk beat down and hid the undulating twill pattern, so I inserted a wool tabby weft pick between each pattern pick. This particular undulating twill does not have a true tabby, but I used odd versus even shafts as if they were tabby. This worked well, and the finished scarf has a lovely shine and nubby texture from the



Malynda used two weft yarns: handspun silk hankies and millspun wool.

Nubby silk singles add texture to the undulating twill pattern.

inconsistent silk. I twisted the wool warp ends into a neat fringe and am very happy with the finished scarf.

Resources

Chiu, Tien. "How to Show Off the Colors in Your Painted Warp." *Warp and Weave*. warpandweave.com/show-off-colors-in-painted-warp.

Dixon, Anne. *The Handweaver's Pattern Directory*. Fort Collins, CO: Interweave, 2007.

Pacific Wool and Fiber, pacificwoolandfiber.com/20-2-wool-yarn.html.

Tyler, Amy. "Spinning and Knitting Silk Hankies." *Spin Off*, Spring 2019, 41.

POSTSCRIPT

After I finished spinning the silk, Amy Tyler's excellent article "Spinning and Knitting Silk Hankies" was published in *Spin Off* Spring 2019, page 41. Her article describes my spinning process beautifully.

I used less than half of the 2 ounces of silk I spun. I was surprised at how much was left over, but I did draft most of the silk very thin in a worsted manner. I estimate I used less than 1 ounce of fiber. If you spin a bit thicker, you may need 1½ to 2 ounces of silk. My beat varied between 26 and 31 picks per inch (ppi) due to the variation in the silk yarn.

MATERIALS

Fiber Kitty-Rabbit Kreations, David Keller, silk hankies, custom color (green/orange/silver in three stripes across the hankies), 2 oz.

Yarns ***Warp:*** 20/2 worsted-spun wool (5,600 yd/lb; Pacific Wool and Fiber), Black Forest, 1,122 yd. ***Pattern weft:*** Handspun silk (40–60 wpi; about 16,000 ypp), 733 yd. ***Tabby weft:*** 20/2 worsted-spun wool, Black Forest, 739 yd.

Equipment 4-shaft loom, 12" weaving width; 15-dent reed; 2 shuttles; 2 bobbins.

Other Supplies Tapestry needle for hemstitching; fringe twister (optional).

Structure Undulating twill with tabby.

Warp 345 ends 3¼ yd (117") long (includes floating selvedges; allows 7" for take-up, 40" for sampling and loom waste; loom waste includes 12" for fringe).

Setts ***Warp:*** 30 epi (2/dent in a 15-dent reed). ***Weft:*** About 56 ppi (28 ppi for pattern; 28 ppi for tabby).
Dimensions ***Width in the reed:*** 11¹⁰⁄₁₅". ***Woven length:*** (measured under tension on the loom) 69½".
Finished size (after wet-finishing) 9½" × 68" plus 4" fringe.

INSTRUCTIONS

1 Wind a warp of 343 ends 3¼ yd long. Wind 2 additional ends for floating selvedges and set them aside. Warp the loom using your preferred method following the draft. Centering for a weaving width of 11¹⁰⁄₁₅", sley 2 ends per dent in a 15-dent reed. Sley the floating selvedges in empty dents on each side of the warp and weight them over the back beam.

2 Spread the warp with scrap yarn. Wind bobbins with each of the wefts. Weave a sample as desired. After sampling, leave at least 6" for fringe before starting the scarf.

3 Leaving a tail 4 times the width of your warp for hemstitching, weave 4 picks of tabby with Black Forest wool, and then begin the pattern treadling with silk, alternating with wool tabby as you weave. Use the tail to hemstitch in groups of 5 warp ends and 2 weft picks.

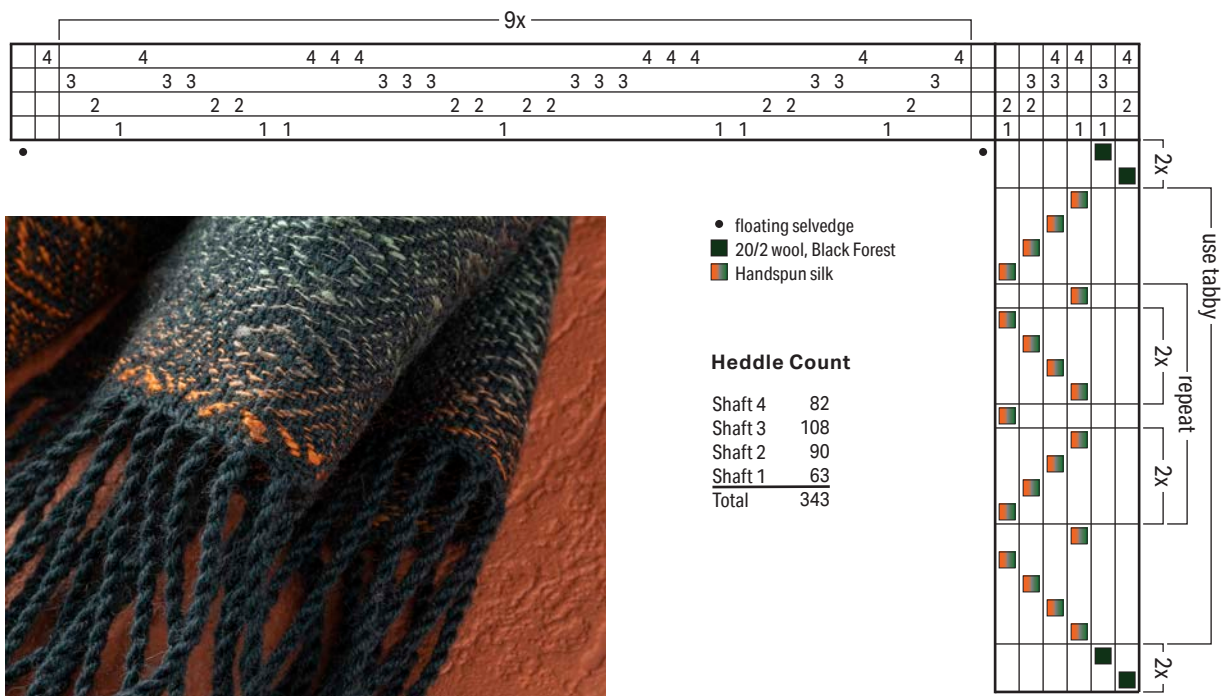
4 Continue weaving following the draft for about 69". End with 4 picks of tabby and hemstitch as you did at the beginning.

5 Leaving at least 6" for fringe on both ends, cut the fabric from the loom. Trim the fringe ends to 5". Prepare a twisted fringe using 2 hemstitched groups in each fringe. Include extra ends in one or two fringes to adjust for the odd number of bundles.

6 Wet-finish in warm water by gently agitating and leaving the scarf to soak for 10 to 15 minutes. Line-dry. Press.

A mother of nine, **Malynda Allen** loves to read books and learn new things. She also enjoys sewing, knitting, spinning, and weaving for her family and home.

Draft



Heddle Count

Shaft 4	82
Shaft 3	108
Shaft 2	90
Shaft 1	63
Total	343

Hemstitching and twisted fringe add a tidy finishing touch.

The 2022 *Spin Off* Tote-Along

In January 2022, we invited handspinners to join us for a spin-along focused on "keeping it together!" Bags, baskets, totes, and vessels needed to be created using handspun and any craft of the maker's choice.

For months, this cheerful group of makers dyed, blended, spun, knitted, wove, and crocheted while providing support for each other along the way. Many of the participants customized their bags to suit their needs either for getting out and about or for containing various fiber tools at home.

We asked the spinners to share a photo and a few words about their handspun creations for our first Tote-Along. Thank you to everyone that joined in!

—Spin Off *editorial staff*

Courtesy of Gina Geaudry

Gina Geaudry of Greenleaf, Wisconsin

For the *Spin Off* Tote-Along, I decided to use a filthy, unknown fleece that has been intimidating me for some time. I finally washed, picked, carded, spun, and dyed it. I then knitted and felted it using the Fulled Bag with Slot Handles pattern published in *Spin Off* Winter 2005. Finally, I embellished it with needlefelting using some of the same wool with angora from each of my 12 Angora rabbits.

Courtesy of Jennifer Comstock

Jennifer Comstock of Edmonds, Washington

I made a little one-strip bag on my Cricket loom. The rainbow colors are DHG dyed cotton sliver, and the natural white is Brookmoore Easy-to-Spin cotton. I also went on a little quest when I received a bundle of silk samples and decided to spin and knit a wee bag to hang on my wheel. The fiber is peduncle silk from Muezart in a natural toffee color spun into a fine three-ply yarn.

Jill Fry of Millarville, Alberta, Canada

I participated in the *Spin Off* Tote-Along this year and was amazed at the variety of yarns, bags, and baskets the participants came up with. There are so many beautiful finished objects, and I think all of the participants inspired each other. Once I got started, I kept going and ended up with four knitted woolen containers, three of them felted.

First, I spun a three-ply worsted-weight yarn from Suffolk fleece and made the Woolly Basket *Spin Off* pattern designed by A. Sabine Schröder-Gravendyck.

I then used some remnant Icelandic/Romney along with some other handspun to knit and felt two Felted Spinning Wheel Bags designed by Shannon Geddes.

Courtesy of Jill Fry

Martha Driscoll of Danvers, Massachusetts

I created the wooly spindle basket to keep top-whorl spindles from rolling off the coffee table. It is long and narrow and just high enough to contain the spindles. I used spindle-spun carded gray Texel and knitted the basket using a tight gauge to ensure the sides would stand up. I added a bright aqua Corriedale trim for a pop of color. My spindle bag was spun from a braid of handpainted Hill Radnor roving with the colors kept mostly together. I used 4-inch pin-loom squares for the bag and added 2-inch squares for a sturdy handle join. The garter-stitch handles are sewn on with buttons made from small white oak branches.

Courtesy of Martha Driscoll

Courtesy of Stefanie Johnson

Stefanie Johnson of Blandinsville, Illinois

I created the Golden Hour Bag designed by Kate Larson by using two plies of coarse alpaca from a friend (dyed to exhaust a marigold dyebath and drumcarded) with one ply of red eri silk top from Hearthside Fibers for the main color (three-ply, 1,540 ypp). The complementary color is Leicester Longwool locks in shades of greens and blues from Berryhill Farm spun from flick-carded locks (three-ply, 1,369 ypp average). Next, I spun and knitted the Spiral Vortex Bowl by M'Lyn Walther (*Spin Off* Summer 2004) using Lincoln roving from Richert Ranch as the main color (two-ply, 907 ypp) and Lincoln roving from Richert Ranch drumcarded with some coarse wool dyed with leftover Easter egg dye for the complementary color (two-ply, 918 ypp). To achieve a repeating stripe sequence in this project, I used multiple skeins rather than a self-striping yarn.

Enrica Hofer McMillon of Elkins, West Virginia

I used handspun bleached flax top for the main body of my crocheted bag. I then dyed some of the same yarn in two colors. To create the inkle band, I paired the two dyed colors with unbleached flax to create a colorful, sturdy edging.

Courtesy of Enrica Hofer McMillon

Spin-Along 2023

Would you like to participate in our next spin-along? Join us! We'll kick off 2023 with a new challenge for our fiber folks in February—stay tuned!

Dominique Voisin of Marcinelle, Belgium

This is my basket for handspun socks. I used a rare French breed, the Thônes et Marthod. This is the kind of breed often discarded for spinning because it's on the sturdy side, with hair and kemp. It was perfect for my basket and holds its shape quite well, straight or folded. Every breed deserves to find its best use.

Courtesy of Dominique Voisin

Courtesy of Sandy Van Liew

Sandy Van Liew of Heppner, Oregon

I used a range of handspun yarn: Karakul (overspun for the base), and three shades of Shetland, Corriedale, and Merino. I used dyed rovings and natural-colored rovings. The pattern was inspired by the On-the-Go Bike Basket-Purse in *Knitting Green* and used a honeycomb design. I made a fabric liner with berries to match the "berries" in the honeycomb and added leather handles.

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

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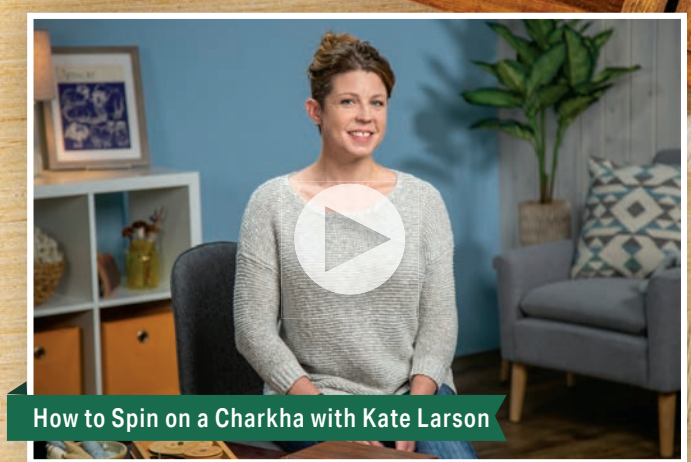

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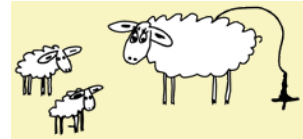

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Advertiser Index

Photos by Peter Fabricius

Peter Fabricius

Spindle-maker

HANOVER, ONTARIO

Peter's love of wood turning began while he was in high school under the tutelage of a beloved shop teacher, Mr. Linton. Originally from Denmark, Peter Fabricius and his family moved to Canada in 1957. He went on to join the Canadian Armed Forces and spent 26 years as a health-care administrator with the Armed Forces. Since his retirement in 2006, Peter has had time to pursue wood turning as what he describes as a serious hobby. "It is not a business, since that would take all of the fun and relaxation out of it!"

In 2015, Peter was asked to explore making spindles using Tom Forrester's famous designs when Tom developed an allergy to wood dust. Tom sadly passed away in 2016.

Peter is thrilled to watch spinners enjoy the spindles he turns—to him it makes all the work worthwhile. In addition to crafting the Tom Forrester spindle designs, Peter crafts spindles in a variety of his own designs, focusing on the artistic nature and accuracy of each one.

Because his sales are predominantly based on word of mouth, Peter has just enough business to allow him to make spindles as time permits and test each one before it leaves his workshop. Riverside Yarns in Ontario carries Peter's work, which also includes needle holders, sock-darning eggs and mushrooms, and wraps-per-inch gauges. Learn more at riversideyarns.ca.

We love the makers in our community! Is there a dyer, toolmaker, fiber producer, or mill we should feature? Tell us about your favorite makers—large and small—at **spinoff@longthreadmedia.com**.