WOODTURNING FUNDAMENTALS

American Association of Woodturners
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- EARRINGS FROM PEN BLANK CUT-OFFS
- ALL ABOUT PREMIUM ABRASIVES
- SHOPMADE FLUTING JIG
- TIPS FOR DRYING BLANKS
- DECORATE RIMS BY SPONGE PAINTING

AAW AMERICAN ASSOCIATION OF WOODTURNERS
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WOODTURNING FUNDAMENTALS

American Association of Woodturners

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FEBRUARY 2022 VOL. 11 NO. 1

A NOTE ABOUT SAFETY

An accident at the lathe can happen with blinding speed, while respiratory and other problems can build over years.

Take appropriate precautions when you turn. Safety guidelines are published online at tiny.cc/turnsafe. Following them will help you continue to enjoy woodturning.

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The AAW strives to cultivate an organization built on mentorship, encouragement, tolerance, and mutual respect, thereby engendering a welcoming environment for all. For more, tiny.cc/AAWDiversity.

Cover: *AAW Member #1 makes a planing cut to create his three-axis tool handles. For more, see the article starting on page 12. David Ellsworth, photo.*

Welcome

I have never attended a woodworking demonstration where the instructor started a sentence with, "The only way to do this is…." If I ever do hear that preamble, I'll likely stand up and politely head for the exit. One of the facets of woodworking (from turning to cabinetry) that makes it perpetually interesting and challenging is that there is almost never "only one way" to accomplish a task. Challenges in woodworking are usually situational, and the best solution to a problem at hand may depend on the wood species you're working with, the season you're working the material, and the limits and opportunities embodied in the tools you have at hand.

Such is the case with seasoning green blanks prior to completing a form on the lathe. Woodturners have tried a lot of approaches to this task. Because wood is a natural material, how it responds to our interventions can vary from piece-to-piece, even with blanks from the same tree. Finding a technique that works for you is mostly about improving your odds for a successful outcome. The article "From Green Blank to Lathe" (p. 28) is intended to give you an overview of commonly used techniques. I hope this offers you a path to discover what will work for you, in your climate, with your timbers.

As a precursor to drying those blanks, you'll need a safe and reliable way to hold logs for processing. Walt Wager's shopmade sawbuck (p. 26) fits the bill, and it is also portable, collapsible for storage, and always close at hand.

Elsewhere in this issue, we have four projects to keep you turning. Making a tool handle (p. 5) is satisfying and a great project for a beginning turner. It's a project you'll revisit throughout your days as a turner because it never loses its utility, and the satisfaction level never diminishes. But if you've ever placed a tool on a flat surface only to watch it roll off onto the floor (cutting edge down, on concrete—in my case), then you'll want to consider David Ellsworth's faceted tool handle (p. 12). This project is also a great introduction to multiaxis turning.

Michael Hamilton-Clark brings us two projects that make use of shop scraps. In Earrings (p. 15), Hamilton-Clark uses cut-offs from pen blanks to make beautiful jewelry. His pencil holders (p. 10) offer options for using off-cuts from bowl blanks to make functional desk accessories.

Abrasives technology has evolved dramatically in the past decade or so. If you're trying to tame your tool marks with the paper-backed sheets from the local hardware store, or if you picked a product twenty years ago and haven't thought about it since, you'll want to give Mark Palma's article (p. 18) a careful read.

Starting on page 23, Douglas Gillie shares his process for making a jig for routing at the lathe. This can really add flare to your turnings, and Gillie's jig will help you safely accomplish an otherwise tricky task. If fluting is not to your taste, check out John Lucas's article on decorating bowl rims (p. 35). His painting technique is simple, creative, and beautiful.

On page 38, contributor Dave Schell leads us into the wonderful world of birch. The many species of birch can be strikingly beautiful, easy to turn, and because some are planted as ornamental trees, often available in your neighborhood.

Enjoy!

—Don McIvor, Editor

TRADITIONAL Screwdriver HANDLE

BY RICK RICH

I enjoy reading old textbooks and reference manuals about woodturning, especially from the early 1900s. This project is from a 1901 publication called THE WOOD TURNERS HANDYBOOK, A Practical Manual for Workers at the Lathe by Paul N. Hasluck. All works published in the United States before January 1, 1925, are in the public domain, and many titles have been digitized and are readily available for downloading.

After reading the section in Hasluck's manual covering this handle, I went into my shop and began experimenting with the project. The handle can accommodate a variety of small tools from an awl to a screwdriver, but I settled on a magnetic bit holder. This is the type of holder that is marketed for a cordless drill so the bits can be easily switched out. The wood handle is pleasing to the eye, feels good in my hand, and the ability to exchange bits means I have a handy, versatile, and quiet driver on my tool board.

Before diving into turning the tool handle, here's how Mr. Hasluck describes the particulars:

A medium-sized handle requires a piece of wood five inches long and one-and-half inch thick. Beech, elm, or hickory make very good handles. Ash is best as it does not blister the hands. The wood must be well seasoned or the ferrules will drop off.

In Fig. 38 we have the finished handle with the turning centres still attached. At a, it is the full size of the wood, namely, one-and-a-half inch.

The bead is one-eighth-inch, and the fillets each one-sixteenth-inch broad. On either side of the fillets the wood is reduced by a curve, that on the right sweeping down to exactly the outer diameter of the ferrule, and making with it an unbroken surface. The curve on the left sweeps away from the fillet to c, where the handle is of the same diameter as the ferrule.

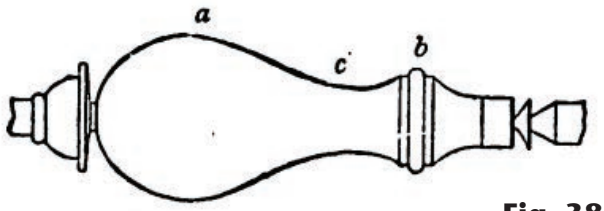


Fig. 38

My first step was finding some ash because I certainly don't want blistered hands. It takes little material for these handles, and in short order I had a piece of ash from my scrap bin. A couple of passes through the bandsaw and I had my blank sized to the recommended 5" x 1-1/2" (13cm x 4cm) square (**Photo 1**).

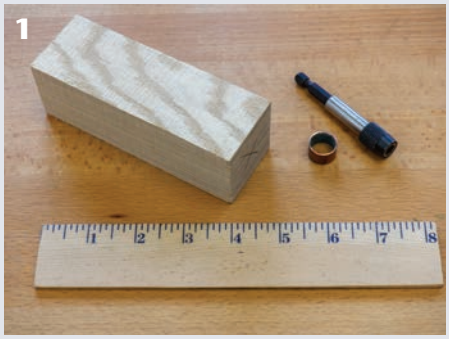
Head to the hardware store

Begin with a piece of 1/2" (13mm) copper pipe for a ferrule; the stock dimension refers to the inner diameter—the outer diameter is about 5/8" (16mm). My local hardware store stocks this common plumbing material for sale by the linear foot. A pipe cutting tool and a deburring tool are handy and are inexpensive (**Photo 2**). Less user-friendly but equally effective at cutting and deburring pipe are a hacksaw, fine file, and wet/dry sandpaper.

While at the hardware store, visit the drill bit display. Most hardware stores will have a selection of magnetic bit holders like the one shown in Photo 1 for a modest price.

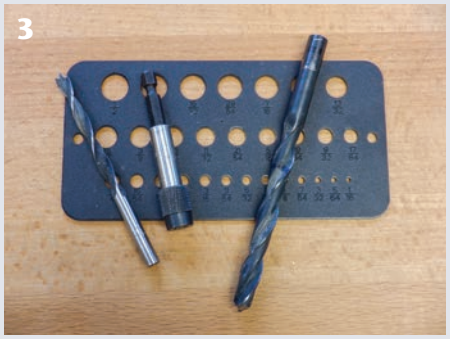
If you don't have a drill bit sizing guide, add one to your shopping cart. In this project, it is quite useful for dropping the hex shank into a hole to determine the appropriate drill bit size. In this case, the shank will press fit into a 1/4" (6mm) hole and the larger chrome portion will fit tightly into a 3/8" (10mm) hole (**Photo 3**).

Gather project materials



Start with a hardwood blank, 5" x 1-1/2", a ferrule, and the tool insert you plan to handle.

A pipe cutter and deburring tool will make clean work of a ferrule, but a hacksaw and wet/dry sandpaper will also work.



Drill bit sizing guides are a handy and inexpensive shop accessory that will help you quickly determine correct bit sizes.

Prepare the ferrule

Deburr the end of the copper pipe and cut off a 3/8" length. You only need one end deburred--the end that will slide over the tenon on the handle.

Locate the centers on the blank and mount it on the lathe for spindle turning. Use a 3/4" (19mm) spindle roughing gouge to round the blank, preserving as much of its 1-1/2" diameter as you can (**Photo 4**).

Round the blank

Use a spindle roughing gouge to bring the blank to round.

Set the outside caliper slightly larger than the inside dimension of the ferrule (**Photo 5**). The ferrule will be mounted at the tailstock end. Use the parting tool to pare waste until the caliper just slips over the turning. Continue working to the left until you create a tenon just longer than the ferrule.

At this point the tenon should be a little too large for the ferrule. A turner's trick to get a good fit is to taper the very end of the tenon—roughly the last 1/16" (2mm)—to fit in the ferrule. Then remove the blank from the lathe and twist the ferrule on the tenon (**Photo 6**). This burnishes the wood and marks the diameter for a perfect fit. Return the blank to the lathe and carefully pare away the waste on the tenon until you reach the burnish mark. Check the size frequently as you approach the burnished diameter. A loose tenon will require either thick CA glue or epoxy to fill the gap; or start over.

With a good tenon established, install the ferrule. I like to have an extremely tight fit where the tenon accepts most of the ferrule, but the last 1/8" (3mm) or so needs to be hammered into place using another piece of pipe as a driver (**Photo 7**). With seasoned wood and a fit this tight, I don't need to use glue.

Turn a tenon and seat the ferrule

Use an outside caliper set to just slightly larger than the internal diameter of the ferrule to turn a tenon on the tailstock end. Sneak up on the fit by testing frequently. If the tenon needs to be seated with a hammer, it's perfect, but a small gap can be filled with cyanoacrylate or epoxy.

Shape the handle

Place the blank with its new ferrule back on the lathe. The handle in Hasluck's Figure 38 doesn't include dimensions other than the size of the bead, fillets, and waist, with the latter described as the outside dimension of the ferrule. Because I didn't know exactly where the bead, waist, and bulbous portion of the handle should be located, I made a few handles from scrap material until I landed on the proportions for a fine-looking handle (**Figure 1**). Hasluck's instructions dictate a 1/8"-wide bead and 1/16" fillets. Mark the blank at each of these measurements (**Photo 8**).

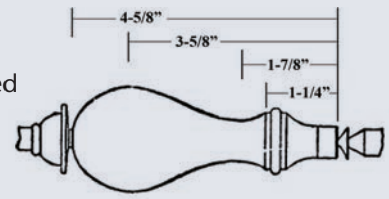
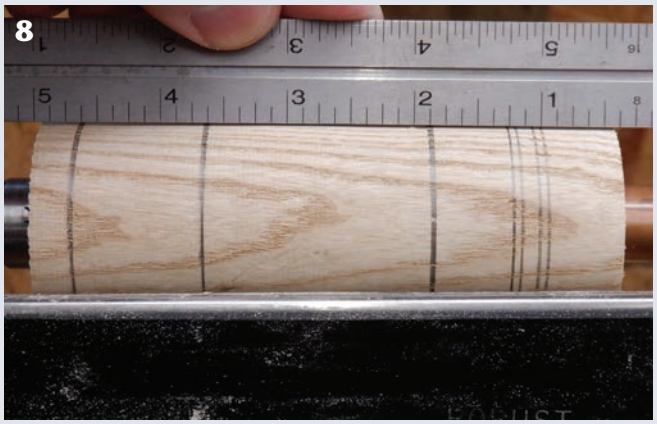


Figure 1. Hasluck's handle design, with dimensions determined by creating examples using scrap material at the lathe.

Mark the blank

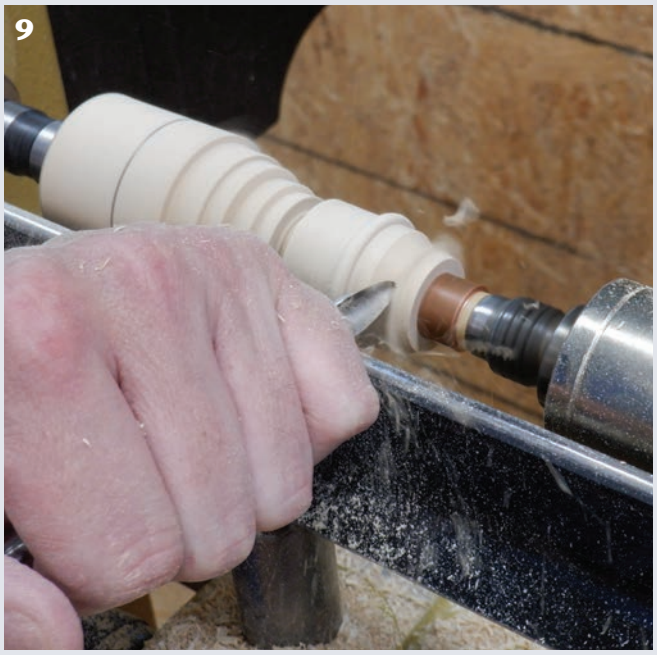


Remount the blank and mark out key features with a pencil—in this case, fillets, bead, waist, largest diameter, and top end.

Per Hasluck's guidance, the bead is 1/8" wide and tall. I set the caliper to 1-1/4" (3cm) and part to the top of the bead. Then I set the caliper to fit over the ferrule and use that measurement to part down at the waist mark. Continue to pare away waste around the bead area with the parting tool before switching to a 3/8" spindle gouge to shape the bead. Use the parting tool or a skew presented flat to clean up the fillets around the bead. Return to the spindle gouge and turn coves on both sides of the fillets (**Photo 9**).

A 3/4" skew is the perfect tool for shaping the largest section of the handle. Use shearing cuts from the largest diameter down to the waist (**Photo 10**). Start cutting near the waist, then work your way back towards your largest diameter mark. Use a peeling cut to rapidly remove the waste material on the headstock side of the handle and then turn the half bead (**Photo 11**). Clean up the top of the handle with vee cuts, leaving about a 3/8" nub connecting the drive center and the handle (**Photo 12**). Any sanding and finishing should be done now. I sand the handle just enough to smooth any tool marks or anything that would feel rough to my hand. An overly smooth handle will slip in your hand and produce blisters (even ash). I apply a bit of paste wax for a finish.

Define the key features



Use a parting tool or skew presented flat (neither shown) with a 3/8" spindle gouge to define the bead, fillets, and the coves on either side of the fillets.

Shape the handle

Use a skew to shape the bead that constitutes the large swell of the handle. This is a great practice project for the skew as it risks little material. The 3/8" spindle gouge could be used here but would not leave as clean a surface.

Leave a small nub, defined with vee cuts, connecting the handle to the drive center.

SAFETY NOTE

Do not drill at high speed (about 500 rpm is plenty) and do not retract the handle from the drill bit while the lathe is on. Doing so may pull the drill chuck and bit out of the headstock Morse taper. This can result in serious injury, or if you are lucky, just damage to your equipment.

Drill for the tool insert

Remove the handle from the lathe. The revolving center mark at the ferrule end will help center the drill bit. Exchange the drive center for a drill chuck. Install the larger drill bit—in my case is a 3/8" bit. Holding the tool handle in your hand, position the tailstock revolving center in the drive center mark on the top of the handle.

Start the lathe at a slow speed and advance the tailstock quill so that the ferrule end of the handle advances onto the drill bit. Drill about 1/2" – 5/8" deep. Turn the lathe off and retract the handle. Replace the drill bit with the smaller 1/4" bit. Advance the handle to touch the drill bit and turn the lathe on. Advance the handle another 1/2" – 3/4" onto the 1/4" bit, turn off the lathe and clean any compacted shavings from the bit. Repeat this step until the 1/4" bit has advanced the length of the 1/4" hex drive portion of the bit holder (**Photo 13**).

If measured and drilled correctly, a short length of the larger diameter section of the bit holder will seat into the end of the handle. Before dropping the bit holder into the drilled hole, take a minute to remove any excess wood that extends past the end of the ferrule. I do this with a bit of 100-grit abrasive, but if you have more than about a 1/16" of material to remove you may want to use a narrow parting tool instead.

You may also wish to dress the outer edge of the ferrule. I typically touch it with my parting tool presented as a scraper to remove the burr. I also sand the ferrule to make it shine—not an essential step, but one that adds to the overall appearance and sense of craftsmanship.

Insert the tool steel

Use a wood mallet and tap the bit holder into the handle (**Photo 14**). The 1/4" hex shank will seat firmly in the drilled hole. Because the hex corners extend slightly beyond a 1/4" diameter circle, they will dig into the wood and provide a solid fit that should prevent the hex drive from twisting.

Remove the nubbin

Cut the nub off the top of the handle using a fine tooth saw (**Photo 15**). Sand the spot where the nub was removed to blend it with the handle and apply a touch of finish. Enjoy a blister-free screwdriver handle.

Your handle makes an excellent traditional addition to your shop tools. It might also spend a bit of time in the kitchen junk drawer if you let family members borrow it! ■

Attach the tool steel

13

14

Drill the handle, using your hand as the "chuck" and the force from the tailstock to advance the handle onto the drill bit. The end of the tool should require a little force from a wood mallet to seat.

Complete the top

15

Remove the nub from the top with a fine tooth saw and clean up any remaining waste material with abrasives.

Rick Rich is a woodturner from Washington State. He is a member of the American Association of Woodturners (AAW), the Cascade Woodturners Association in Portland, Oregon and a founding member of the Southwest Washington Woodturners in Vancouver, Washington.

stylish PENCIL HOLDER

BY MICHAEL HAMILTON-CLARK

Unless you only purchase pre-cut bowl or spindle blanks to feed your turning habit, you are likely to end up with burgeoning piles of scraps trimmed from your lumber supply. You could feed your woodstove or fill your trash cans, but I find it hard to destroy even small pieces of wood with appealing grain. So, I look for ways to take advantage of this surplus material.

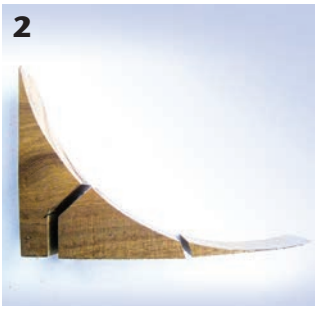
As if I don't generate enough small material on my own, a fellow turner recently called to advise he had some mill offcuts that might interest me. They turned out to be scraps from cutting turning blanks out of 2"- (5cm-) thick myrtle planks.

After a bit of thought I decided to make some writing implement holders to sit on a desk. I sketched out some cut lines and used the bandsaw to extract my forms (Photos 1, 2). I then drilled a pair of holes to hold pencils or pens (Photo 3). A little sanding and two coats of tung oil, and I had a finished product.

I went on to make similar holders to give to family members. These are simple to make, stylish, and out-of-the-ordinary gift items. ■

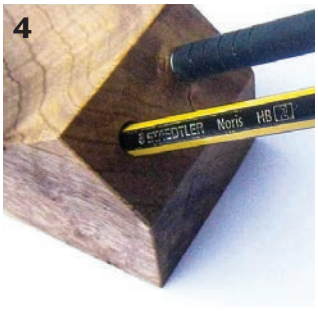
Michael Hamilton-Clark lives in the Fraser Valley, BC and has been turning for 15 years since retiring. He is a member of the Fraser Valley Woodturners Guild and the AAW. His work is sold through craft shops and at shows and can be seen at www.alberystudiowoodturnings.com.

Plan your design and cut your forms



To make pen holders, mark out your design on the shop scraps and extract them with a bandsaw.

Drill and finish



Drill holes for the pens or pencils. Sand by hand (or use a disk sander) as necessary and apply finish.

variations
ON A THEME

Here are some additional design ideas for project scraps from turning blanks.
Where will your imagination lead you?







The Ellsworth Twist OFF-AXIS Tool Handle

BY DAVID ELLSWORTH

You won't get far in your turning journey before you have this experience: you set a tool down on the lathe bed, cart, or table, only to watch it come alive and roll onto the floor. Point down, usually.

This variation on turning a standard tool handle creates a faceted shape with several benefits. The triangular shape helps reduce the tool's tendency to roll off a flat surface. The facets also help reduce hand fatigue, are easier on the joints, and help eliminate the tendency to apply the "turner's death grip" when holding the tool. This project also offers an easy introduction to off-axis turning.

Prepare the blank

This project is based on a handle for a 5/8" (16mm) bowl gouge, for which I started with 20" × 2" (50cm × 5cm) square stock.

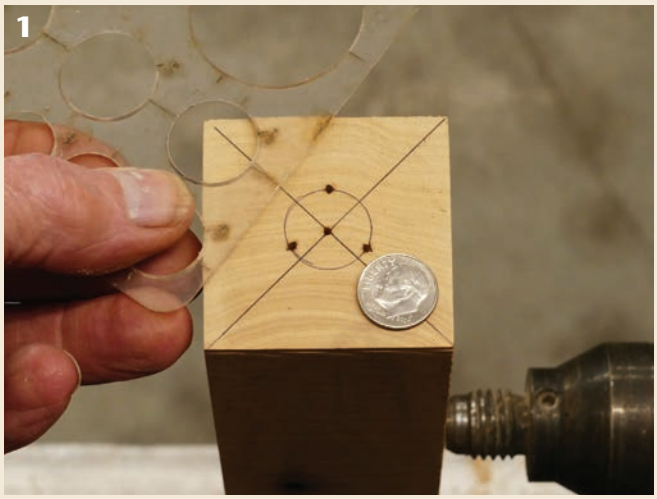
After locating the center of each end, draw a 3/4" (19mm) circle on the bottom (non-tool steel) end. Locate three points on the circle, equal distance apart (**Photo 1**). Deepen these holes slightly with an awl.

I use a Steb center to drive the handle, placing it in the top of the handle. With the tailstock live center snugged to the center hole on the bottom, turn the blank to a 2" diameter cylinder.

Drill the hole

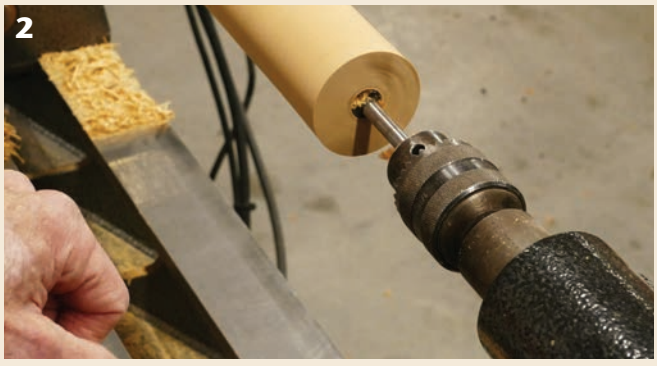
Reverse the blank, placing the bottom end in a scroll chuck. With a 5/8" Forstner bit in the jaws of a drill chuck, incrementally drill out the central hole to a depth of 2–1/4" (6cm) (**Photo 2**).

Locate turning centers



Mark the off-axis and primary centers.

Drill for the tool



Drill for the tool tang.

Mark ferrule & handle waist

Reverse the blank again, securing the top end (with the hole) in the scroll chuck, and the point of a live center into the center point of the handle end. Mark out the locations for the ferrule and the small diameter of the handle with a parting tool (**Photo 3**).

Turn the facets

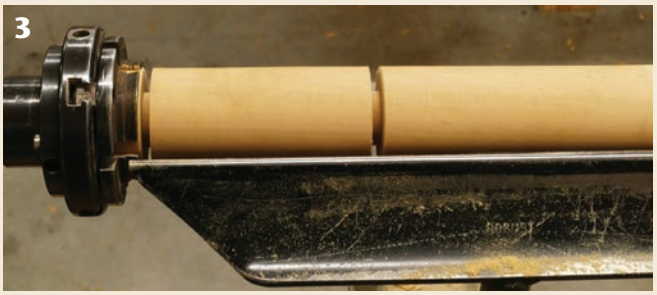
Tighten the scroll chuck jaws and force the handle end away from the center axis until one of the three points on the circle meets the point of the live center, then secure the live center against the handle (**Photo 4**).

Position the front edge of the tool rest 1/8" (3mm) from the closest surface of the handle, turn on the lathe, use a skew or spindle gouge to shave 1/8" off the handle (**Photo 5**). That surface will now be 1/4" (6mm) from the tool rest. Do not move the tool rest until you have completed this step for the two remaining facets. Hand-rotate the handle before starting each cut to assure clearance for the tool rest.

Shape each facet in a straight line parallel to the lathe bed. Start the cut about 3/4" from the handle butt and work toward the top end, stopping the cut about 3"– 4" (8–10cm) short of the smallest handle diameter. The cut should taper off to nothing as you approach the small diameter. Repeat until all three off-axis centers have been turned.

Check the fit of the handle (**Photo 6**), and backtrack and take another 1/8" off each facet if you wish to reduce the overall diameter. Don't take too much off or you'll end up with an offset circle instead of a triangle.

Locate the ferrule



Mark off the location of the ferrule and the narrow waist of the handle.

Turn the facets

Coax the handle to one of the off-axis marks and re-secure the tailstock.

Shave an 1/8"off the end of the handle with a skew or spindle gouge.

Check the handle for fit in your hand.

Return the live center to the center point of the handle and trim the butt end with the point of the skew or a spindle gouge (**Photo 7**).

Sand at around 50-100 rpm. I like to use a soft pad on a rotary drill to integrate the new surfaces, then hand sand with the grain to finish. You don't want the surface to be too smooth or it may be hard to keep the tool from slipping in your hand—180–grit abrasive should do it.

Install the ferrule

Reverse the blank in the chuck and place the cone point of the live center in the hole for the tool steel (**Photo 8**). Use a skew, spindle gouge, or parting tool to pare down the tenon for the ferrule. This should be a tight fit, so check the diameter frequently, even sanding the last little bit to sneak up on the perfect seating.

Add the ferrule and trim its edge with the side edge of the thin parting tool (**Photo 9**).

Attach the tool steel

The tool steel should fit snugly in its hole, but not so tightly that you can't seat it and also allow excess adhesive to escape. A piece of abrasive wrapped around a dowel can be used to enlarge the hole, if needed.

Two-ton epoxy is the best adhesive for this task. Its gap-filling abilities will be forgiving of a fit that is slightly too big. Remember to rough up the tool steel a little with 100-grit abrasive before seating the tool in the adhesive. ■

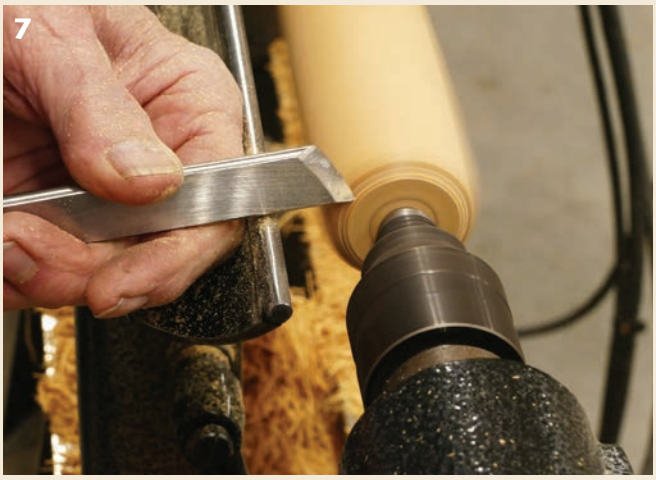
David Ellsworth has run the Ellsworth School of Woodturning in his home and studio (now in Weaverville, North Carolina) since 1990. He has been a happily unemployed studio woodturner since 1974 and is AAW member No. 1. A version of this article appeared in American Woodturner (April 2020).

EDITOR'S NOTE

This article builds on skills described in detail elsewhere in Woodturning FUNdamentals. *See Rick Rich's article in this issue, as well as Sam Angelo's "A Shopmade Tool Handle" in v9n1.*

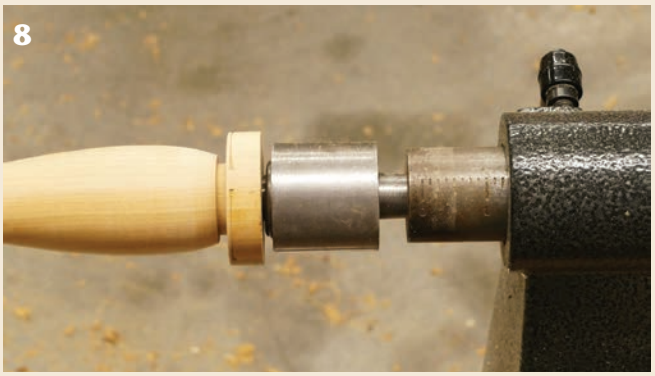
tiny.cc/HandTool

Trim the bottom

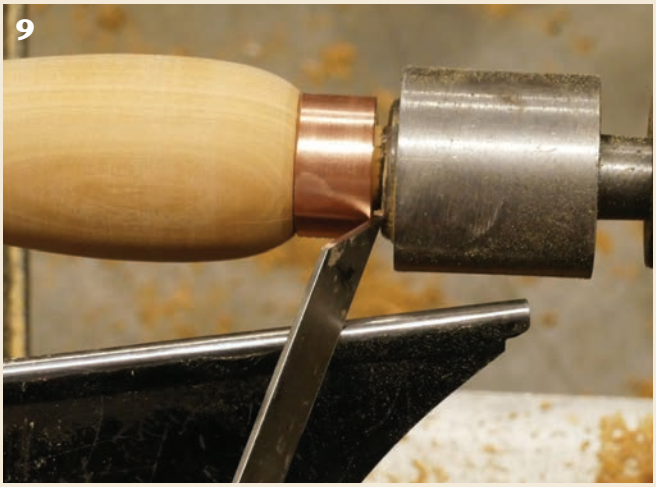


Trim the bottom of the handle with a skew chisel or spindle gouge.

Set the ferrule



Remount the blank with the hole for the tool steel positioned over the tailstock live center.



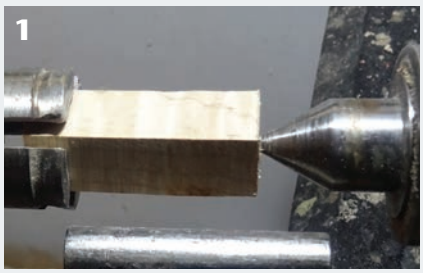
With the ferrule seated, trim the front edge with a narrow scraping tool.

EARRINGS

BY MICHAEL HAMILTON-CLARK

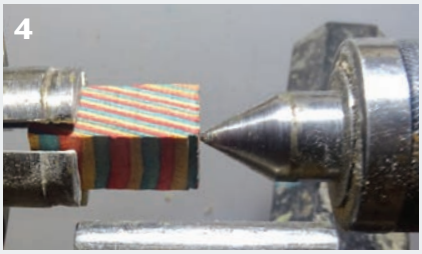
Wooden earrings are fun to make and offer the opportunity to explore myriad shapes from a variety of different woods. For earrings that dangle, I often use cut-offs from pen blanks. These are generally a bit less than 2" (5cm) long and around 3/4" (19mm) square. Using finger jaws with about 3/8" (10mm) of the blank captured in the jaws, a form between 1-1/4" and 1-1/2" (32mm – 38mm) can be turned (**Photos 1, 2, 3**).

Pen blank off-cuts make stock



Pin jaws effectively secure the small blanks needed for earrings. Each blank will yield one dangling earring.

Explore styles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5


6

Teardrop earrings can be made with the same holding technique and even less stock material.

Shorter offcuts can be used to make spherical or teardrop forms (**Photos 4, 5, 6**). More intricate shapes can be made from woods such as holly and ebony that will take fine details, like those seen in finials (**Photo 7**).

For dangling earrings, install an eyelet pin in the turned form, then attach it to the hook or stud. I buy the fittings from a specialty craft store. The pins I use are 1/32" (0.7mm), so I drill a 1/32" hole at least 1/2" (13mm) deep in the top of each earring to receive a pin (**Photo 8**). This drilling operation needs to be done at a slow speed (my lathe will drop to 100 rpm) and by gently advancing the drill chuck held in the tailstock. The pin should be trimmed to length and twisted in sandpaper to roughen the surface prior to gluing. Place a drop of cyanoacrylate glue on the pin and seat it in the hole. Once the glue has cured, pry open the loop, insert the hook or stud, and gently squeeze the loop shut (**Photo 9**).

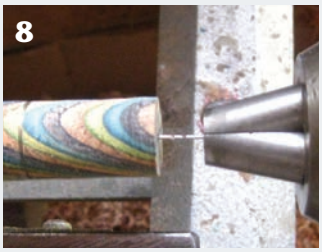
A 3/4"-square pen blank is a bit small for earrings that use studs and rest against the ear lobe. This design is made by turning a spindle to about 1" (25mm) diameter and then parting off disks. The faces of these forms can be decorated using a chatter tool, by turning grooves, or by drilling holes through the forms after parting off (**Photo 10**). I buy the studs with their push-on stops at a specialty craft store. The studs are fixed to the back of the forms using epoxy adhesive (**Photo 11**).

Fine-grained wood for details


7

Choose ebony, African blackwood, holly, or any of the other tight-grained species for earrings with fine details.

Attach findings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9

Findings are glued into a pre-drilled hole. After the glue cures, open the loop with needle-nose pliers and attach the hook or stud.

As an alternative design, I have made a pendant disk attached to a stud by a loop and ring (**Photo 12**). With this system, the ring is split so it can be opened to attach the pendant disk and is then squeezed closed.

Disk earrings


10


11

Disk earrings are made by parting disks from a spindle. Affix the studs using epoxy.

Dangling disks


12

You can also create dangling disk earrings using loop-and-ring findings.

I generally use a 3/4" spindle roughing gouge for rounding the pen blank cut-offs and the larger stock needed for the forms that rest against the ear lobe. I use a small skew and small spindle gouge along with a narrow 1/16" (2mm) parting tool to minimize material loss (**Photo 13**).

I find that a high lathe speed leaves a better tool surface on these small forms; I generally run the lathe between 1,500 - 2,000 rpm.

As illustrated in several of the photos, beads can be added to the eyelet pins. I use glass ones called bugle beads bought in variety packs at the specialty craft store where I get the various fittings.

For finish I use either walnut oil or wipe-on polyurethane—whichever I think best suits the wood and the form.

I have found that earrings are best displayed for sale affixed to a card or hung on a simple display stand (**Photos 14, 15**).

I have devised a variety of forms and styles, but I have left plenty of room for you to have fun devising some you can call your own. ■

Michael Hamilton-Clark lives in the Fraser Valley, BC and has been turning for 15 years since retiring. He is a member of the Fraser Valley Woodturners Guild and the AAW. His work is sold through craft shops and at shows and can be seen at www.alberystudiowoodturnings.com.

Few tools are needed

Tooling needs are modest for these small projects—a small spindle roughing gouge, small skew, and a narrow parting tool will cover you.

Display arrangements

These earrings have market appeal and can be effectively displayed using either card mounts or a display stand.

ADDITIONAL RESOURCES

Additional articles helpful in making and decorating these forms include Sally Ault's article on PVC jigs, and Linda Ferber's articles on embellishing turnings for jewelry. Follow the links below to see these articles.

tiny.cc/PVCJigs

tiny.cc/StockingStuffers

PREMIUM ABRASIVES ARE A CUT ABOVE

BY MARK F. PALMA

If your vocabulary includes terms like sandpaper, garnet paper, or crocus cloth, it might be time to take a fresh look at abrasives as a woodturning tool. Driven by the needs of the cabinet and furniture industries, abrasive manufacturing technology has evolved dramatically. Products for our home workshops are superior to those of a few decades ago.

Abrasives encompasses a range of products capable of removing material. The fundamental concept is simple enough—a manufactured or processed particle attached to a backing via an adhesive. Advances in technology have produced tougher particles of a more uniform size, stronger adhesives, and durable backings often tailored to specific tasks. Good quality abrasives are a cutting tool that can level bumps, address torn grain, and leave a burnished, smooth surface. These steps create the critical foundation for a quality finish.

Layers make abrasives work

Abrasives are comprised of four layers: backing material, abrasive particles, adhesive coating, and a top coating. The four-layer concept seems so simple that it's easy to overlook the engineering that goes into their construction.

Traditionally, abrasives used either paper or cloth as a backing, and they remain the most prevalent backings today. Both can offer excellent wear and are affordable. Other materials such as latex, mesh, foam, and various proprietary materials are more recent additions to backing. Cloth is sometimes subject to additional processes to make the backing softer with increased flexibility. A backing that feels soft, bends back on itself without cracking, and is hard to tear will offer an advantage on any round work, and particularly on small details such as beads and detailed transitions.

The abrasive particles themselves comprise what may be the least understood layer. Quality abrasives use uniformly sized particles to create an even scratch pattern. The particles are both sharp and brittle. They are designed to fracture in use to create new cutting edges, sacrificing themselves to remain sharp as they wear away. Manufactures often leave open areas on abrasive sheets (usually indicated by the term "open coat") to create areas for dust to accumulate so that sanding generates less heat.

The adhesive coating is designed to hold the abrasives to the backing. Quality coatings are soft enough to allow the backing to flex, but a good adhesive will retain the abrasive particles even as the backing flexes. Some may be moisture proof to allow lubricated sanding with water or more often in the case for wood, oil. Bend the abrasive sheet back and sharply crease it--a quality adhesive will prevent abrasive particles from breaking free and you shouldn't hear any cracking.

The hidden layer is the top coating that is often added to premium abrasives. These coatings usually contain stearates that act as a lubricant to cause dust to fall away and not clog the abrasives.

The six sins of sanding

The origin of most of our sanding problems arise from the following six issues: inferior abrasives, purchasing the wrong abrasive for the job, using abrasives beyond their lifespan, starting with the wrong grit, generating excessive heat while sanding, and trying to do all the sanding under the power of a spinning lathe.

Abrasive choices

Abrasive quality varies, usually in relation to the expense of the product. High quality abrasive products have a uniform particle size, longer lasting and effective cutting abrasives, adhesives capable of holding the abrasive particles onto the backing, and a variety of backing choices to suit different tasks to bring added performance to the product. If you can interpret the back of the packaging, you should be able to learn all you need to know to make an informed decision. Look for information about open vs. closed coat, the type of abrasive material, and the type and weight of the backing material.

For most woodturning tasks, aluminum oxide offers a good compromise between performance and cost. An open coat abrasive is important at the lathe to minimize the heat of friction. Choice of backing is often a personal preference, but flexible cloth backing will conform to curves better than paper, while paper-backed abrasives can be creased in a tight fold to easily address details like beads. Gold backing (available from several manufacturers), abrasive mesh, commercial grade foam backed abrasives, and modified cloth backings are all good choices for woodturning applications. Avoid stiff cloth backed abrasives (C weight), and stiff and easily torn paper backing.

Using old abrasives

Abrasives are a sacrificial tool; they are designed to wear and be thrown away. Applying a piece of abrasive to a 6" (15cm) bowl spinning at 300 rpm exposes the abrasive to the equivalent area of a 48"- (122cm-) diameter table every two minutes. Turners should be throwing away abrasives faster than furniture makers, not hording piles of old abrasives. Many professional turners use abrasives so that each inch of the abrasive is only used for seconds, then they advance the sheet to a fresh inch, proceeding through the sheet as they sand. Watch the dust stream as it decreases in quantity, move to a new area on the abrasive sheet, and when you have used the whole piece, toss it and grab another. Do not use the backing as a gauge of abrasive life, as the backing should always outlive the abrasives. Old abrasives burnish wood, crush wood fibers, and create heat--not what you want to accomplish. In the grand scheme of things, the cost of abrasives is probably less than a dollar or two per piece, so why be cheap?

Wrong Starting Grit

The purpose of the first grit is to remove minor imperfections and efficiently create a uniform scratch pattern. Before you start sanding, examine the piece critically. Tearout or a bump that breaks a flowing curve may be removable with abrasives, but these types of defects are best addressed with a sharp tool. The wood species will also influence initial grit selection. Some species are forgiving while others (for me, walnut) show every little scratch. With a less forgiving species, be cautious with coarse grits as they may leave scratches that seem impossible to remove with finer grits.

Using too coarse of an abrasive will create scratches you will need to remove; too fine and you will not be able to remove tool marks and you will generate heat that can damage the work. Sanding may require one or more pieces (or disks if power sanding) of the first grit to correct defects. Look carefully at the work. If the problems such as tearout or radial scratches are not corrected, drop back a grit and see if that fixes the issue.

Heat is bad

All wood contains trapped water within its cells, whether it is air or kiln dried. Sufficient heat of friction makes water boil and as it does it can crack the walls of the wood cells. This causes micro cracks that show up in finished work.

Sharp abrasives used at lower speeds cut wood without creating excessive heat. If you use sharp abrasives and slow speeds, you should be able to sand without feeling the work get warm. If you are power sanding, keep in mind the synergistic effect of the rotating wood and the spinning disk. Slow the lathe and disk speed even further when power sanding.

If you see the amount of generated dust declining, or if your hands start getting hot, exchange your abrasive sheet for a fresh one and consider slowing the lathe.

Power sanding

Sanding wood with a spinning disk powered by a drill or other device can be a great labor saver. However, your work will be better of you shut off the lathe periodically and look for problem areas that are not being addressed by power sanding. In my experience with sidegrain work, the disk tends to lift off the work as it goes over the hard endgrain. This leads to uneven sanding as the pad returns to the surface and approaches the facegrain. You may need to address this type of problem by hand sanding with the lathe off.

Power sanding on a spinning lathe can create radial scratches that will require judicious hand sanding between power sanding grits. With problematic species you may spend as much time hand sanding between grits as you do power sanding. One last tip—toss your used disks as they are used up quickly by power sanding.

Professional quality abrasives

Unlike consumer products that often present a compromise between cost and performance, professional products need to perform at their best (**Photo 1**). Professional quality abrasives should have uniform particles, high quality backings, and strong adhesives bonding the abrasive to the backing. They may also feature a backing that has been strengthened with an additional manufacturing step, and a stearate coating. In use these abrasives seem to cut longer before wearing out, have longer edge life, and have coatings that keep the dust from clogging the abrasives. They create a uniform scratch pattern and the flexible paper backing contours well to turned work. A personal favorite is 6" pressure sensitive adhesive backed gold disks. Folding them in half creates a half round, two-sided pad with two sharp corners, a sharp straight edge, and two large round areas that do not catch easily in spinning work.

Foam-backed abrasives

These work well for continuous curve objects but are challenged by small details and corners. They are comfortable in use and can be washed to clean out dust. Foam-backed products range from poor-to-professional quality. Avoid inexpensive products--they do not last. Commercial foam pads are a sanding system marrying a specific density foam to a high-quality abrasive (**Photo 2**). Quality foam-backed products have consistent density foam that does not tear or shred in use.

My personal favorites are the thin, high-density foam-backed pads. Thick foam pads seem to be too soft to allow any feel of how your sanding is conforming to the work. The thin high-density pads allow some flexibility while delivering feedback to your hand. Look for cabinet shop-grade pads. Cabinet shops use them to sand around door molding; turned work has similar features.

Mesh-backed abrasives

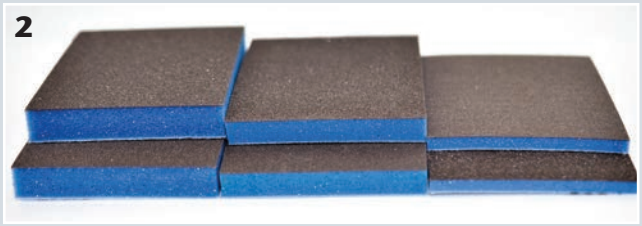
Mesh-backed abrasives make intuitive sense in their ability to shed sawdust and allow cooler sanding temperatures (**Photo 3**). By releasing sawdust, their "self-cleaning" feature reduces heat build-up and keeps the abrasive clean and cutting. The backing has just enough grip to allow them to be easy to hold at the lathe. They are flexible and conform to small details. A little dish soap removes build-up and returns them to a nearly-new state. In my shop, they seem to be durable and are a favorite for spindle projects and pens. The material is available in small sheets and disks and works well with 2" (5cm) and 3" (8cm) hook-and-loop power sanding disks.

Be aware that the backing will outlast the abrasives. Watch the dust coming off the work and when it declines, replace the abrasive pad. Mesh-backed abrasives are more expensive than most other options, so I reserve them for situations where I will most benefit from their use. I wouldn't use mesh-backed abrasives for initial big bowl sanding but would turn to them for detail work. Mesh-backed abrasives are also excellent for sanding green timbers and oily tropical hardwoods.

Production abrasives by the roll

Whatever sanding tools they use, you can be sure a commercial woodshop goes through a lot of abrasives. Thus, production grade abrasives are often purchased in large quantities.

Foam accommodates contours



Foam-backed adhesives are well suited for many turning tasks as they excel at conforming to curved surfaces.

More air-than-there, but effective

Mesh-backed abrasives resist clogging, and when they do clog, they are easily cleaned with compressed air or with a brush.

Variable grit abrasives

These are a relatively new product available in disk form (**Photo 4**). Each foam-backed abrasive pad lists a grit range (e.g., 1,200-1,500). At lower rpms, the abrasive acts at the lower end of the range, while at higher speeds they act as a finer grit abrasive. The coarsest available grit is 700 and the finest is 3,500, so they are clearly designed for fine sanding applications. I have found they work well for pens, acrylics, and some exotic hardwoods.

Latex-backed disks and sheets

If you've done any sanding with powered discs, you know the edge gets more use than the interior and is prone to wear. Manufacturers have developed a latex-backed disk that offers better edge wear properties. The latex backing bonds the abrasives into a tough matrix that prevents the disk edge from tearing and keeps the abrasive particles in contact with the work.

Latex disks are available in 2" and 3" sizes, as well as in sheet form. They are between paper-backed and mesh-backed disks in expense and provide good disk life. They make sense for initial sanding of a bowl or vessel. The first grit takes on all the hard work of removing problem spots and is subject to the most wear.

Modified cloth-backed abrasives

Cloth backing is strong and durable, but consumer grade cloth abrasives tend to be stiff and unwieldy. In contrast, higher-end cloth-backed abrasives are supple (**Photo 5**). In fact, many are more pliable than comparable paper-backed versions. Manufacturers accomplish this with a careful selection of cloth weight and by rolling the abrasive sheets at an angle over a roller (one or more times) to relieve stress.

These products are tough, long lasting, and cut well. They conform to tight curves and hold up to tough applications. Unlike the consumer grade cloth-backed abrasives, these are a wonder.

Micro abrasives

Micro abrasives have been used for decades by high end model makers who want to replicate the finish of production vehicles on their model cars. They are also used in a variety of industrial applications to put a mirror finish on clear plastic lenses. The grit range usually starts at 1,000-1,500 and proceeds through 12,000-15,000. It is important to note that micro abrasives were designed as a system, with the user proceeding through all the grits in succession according to the manufacturer's instructions (**Photo 6**). They are meant to be used with a lubricant (water or oil) and flushed repeatedly as they are used. They do not cut unless they are kept clean. Most can be washed and reused for years.

The most popular use for micro abrasives for turners is in pen making, acrylic casting, and sanding a CA finish. As they were designed for all types of plastics,

Multiple grits in one pad?

Variable grit abrasives may look conventional, but note the grit range stamped on the back.

Modified cloth for durability and flexibility

Modified cloth-backed abrasives marry the flexibility of paper with the durability of cloth.

Micro-mesh for that glass-like polish

Micro-mesh abrasives come as a graded system, often color-coded (with an accompanying chart) to help distinguish between grits.

these abrasives can leave a finish that can be buffed to perfection. One manufacturer uses color coding to identify their grits, while others rely on you to mark the grit on each pad. Wash them frequently, dry and store them flat, and they will last for years.

Non-woven abrasive pads

Non-woven abrasive pads were designed for industrial applications to replace steel wool and to perform a variety of metal sanding tasks. They have become a staple of professional woodworkers and cabinet shops, and the technology also benefits woodturners. Steel wool can introduce oil to the wood surface, as well as fine strands of metal that may stain or rust, especially in combination with water-based finishes. Steel wool is also dangerous when applied to a spinning blank as it can tangle and pull the turner into the work. Woven abrasive pads perform like steel wool with none of those drawbacks.

Non-woven abrasives come as nominally 1/4"- (6mm-) thick pads cut to a variety of shapes (**Photo 7**). They are a mesh comprised of plastic fibers with abrasive particles embedded within the fibers (as opposed to being on top like other types of mesh abrasives). You can cut them to shape with scissors. Many manufacturers color code their pads to distinguish grits.

Non-woven abrasives do not clog easily and can be cleaned with soap and water. They are safer for lathe work as they tear if they catch on the work. They can be used to sand, apply wax, or to cut back the sheen on a finish. From cleaning rust from a lathe to burnishing work after sanding, their applications are limited only by your imagination.

The myriad abrasive products on the market can be bewildering to navigate. Generally, more expensive products use higher quality materials and more costly manufacturing processes. Cheap abrasives are unlikely to lead to a quality outcome. Do some research and choose a product to suit your task. One of the best ways to find abrasive products is to pay attention to what the cabinet manufacturers are using. They need a product that performs in a demanding environment. ■

Mark Palma is a cook, woodturner, educator, prolific writer, and reformed attorney in Cameron, WI.

Resource guide

3M (www.3m.com) manufactures a broad line of abrasives, sold primarily through third parties. Check out Stikit PSA backed or Hookit Hook and Loop backed 5" (13cm) and 6" (15cm) disks, 3M Production Resinite Gold production paper in 8-1/2" x 11" (22cm x 28cm) sheets, and Scotch-Brite non-woven abrasive pads.

Uneeda (www.sandpaper.com) manufactures commercial grade abrasive products that can be purchased directly from their website, including EKASILK PLUS and EKADIAMOND foam-backed aluminum oxide sponges in various foam densities, from 5mm to 1/2" thick. Check out EKAFLEX modified cloth backed abrasives and UAOFG film backed abrasives.

Klingspor (www.woodworkingshop.com) offers a wide variety of products mentioned in this article, including Ultraflex foam backed sanding pads, KlingNet mesh-backed abrasives in disks and pads, Fusion Foam variable grit abrasives, latex backed abrasives in various configurations, and Klingspor Gold.

Mirka (www.mirka-online.com) makes several products mentioned in this article, including Abranet mesh-backed abrasives in sheets and disks, Abralon foam backed micro abrasives in disk form, and Mirlon non-woven abrasive pads in various grits.

Micro-surface (www.micro-surface.com) manufacturers Micro-Mesh and offers a selection guide on their website to guide you through their product line.

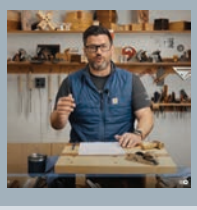
Like artificial steel wool

Non-woven abrasive pads replace steel wool, offering similar performance but avoiding the latter's drawbacks. They can also be used with oil to reduce friction.

ADDITIONAL RESOURCES

For an in-depth review of a selection of modern abrasives, check out Jonathan Katz-Moses' video at the link below.

tiny.cc/sandpapertest



ROUTER FLUTING JIG

BY DOUGLAS GILLIE

Fluting is a design element that has long been incorporated on furniture components like table legs or bed posts. Fluting dresses up a plain surface and can evoke a classical or formal look—think of fluted Greek columns. Carving flutes into the exterior of a bowl adds texture, visual complexity, and a sense of upward movement. And using a router to add these elements is far easier and more predictable than carving by hand. The challenge for woodturners is safely routing a curved surface; the answer to the challenge is to build this simple jig to allow your router to follow the turned form and use your lathe to hold the work.

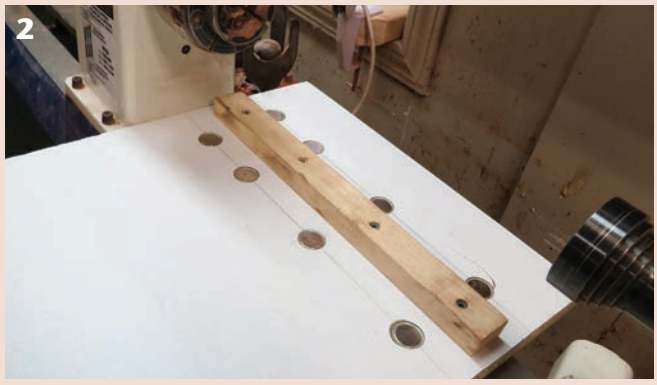
The jig is easy to make and uses materials many of us have lying around as scrap or cut-offs. It's possible your only expenses will be some rare earth magnets and a spring clamp.

Jig base

The jig base is made from an 18"-long x 12"-wide (46cm x 30cm) piece of melamine-faced sheet material. This offers a slick surface for the sliding router carriage (**Photo 1**).

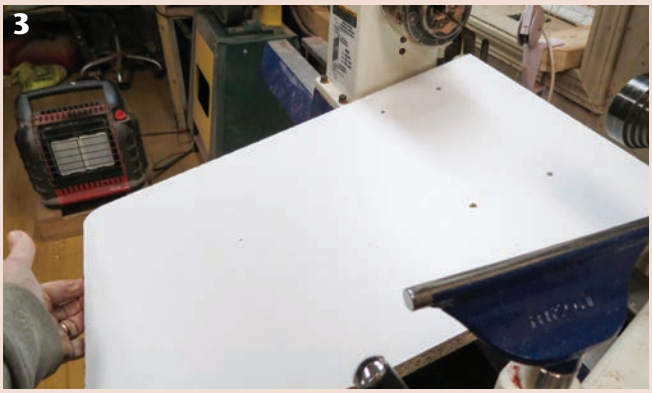
I rip a strip of lumber barely narrower than the gap between my lathe ways (1-1/4" (3cm) in my case). The length is not critical, but it should come close to the 12" width of your base. I attach the strip to the underside of the base, perpendicular to the long axis, using wood screws. The alignment should be offset from the back edge of the base by the approximate width of a lathe way (**Photo 2**).

Build a jig base



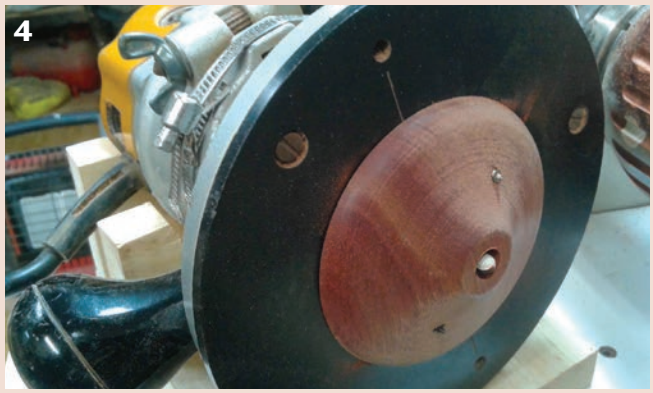
Use a piece of melamine-faced board as a sliding surface for the router carriage. Secure the board between the lathe ways with a strip of dimensioned lumber and eight rare earth magnets.

Release the base



To break the magnetic force and release the base, press down on the end of the board.

Turn a collar



Turn a simple, convex disk and attach it to your router with short woodscrews.

The base secures to the lathe with eight 3/4" (19mm) rare earth magnets—four along each side of the lumber strip (shown in Photo 2). I seat the magnets in metal cups which are optionally available with the magnets. These increase the strength of the magnets and assure the magnets stay with the jig rather than transferring to the lathe bed. I countersink the magnet cups into the underside of the base using a Forstner-style bit. The cups are fastened in place with small screws.

Each magnet exerts twenty-two pounds of force, so removing the jig from the lathe requires pushing down on the outer end of the base to leverage the magnets free (**Photo 3**).

Collar

The router bit needs to follow the contours of the turning—whether a table leg or the curve of a bowl. To accomplish this task, I turn a collar to mount on the base of the router (**Photo 4**). The collar comes to a rounded tip that rides the surface that is being cut. The collar helps follow the turned contour and can also regulate the cut depth.

My router has a cut depth adjustment that determines how far the bit protrudes beyond the collar. Alternatively, you can make multiple collars of varying thicknesses to control the cut depth—a thinner collar will allow the bit to protrude further to make a deeper cut. Keep in mind that you should take no more than a 1/4" (6mm) of material with each pass of the router, so you may need to make a few collars to reach your desired final depth.

I turned the collar from dense hardwood so that it will be durable over repeated fluting operations. The collar is easiest to turn with a blank mounted on a faceplate or in a four-jaw chuck, but it could also be turned between centers.

The collar I made for my router base is 3" (5cm) in diameter, 1/2"- (13mm-) thick at the center, and tapers to 1/4" (6mm) on the outer perimeter. I attach the collar to the router base with two short woodscrews. The collar requires a hole in the center to allow the bit to protrude. Creating the hole can be done on the lathe if your blank is mounted in a chuck; simply use a drill chuck in the tailstock to create the hole. You could use a drill press instead.

Cradle

The cradle needs to be customized to fit the router you intend to use. The key to determining the dimensions for your cradle is to know that like your turning tools, you want the router bit to cut at the center height of the lathe.

Start by cutting a platform for the cradle. I used a piece of 3/4" dimensioned pine, which I ripped and crosscut to the approximate width and length of my router.

You will need to attach the cradle elements—the two vertical upright boards that will hold the router in position on its side—to the platform (**Photo 5**). The uprights are crosscut across their bases and attached through the bottom of the platform with woodscrews. The top of the uprights—the cradling part—are half circles large enough to accommodate the diameter of your router (**Photo 6**).

The length, which determines the cutting height, is a little trickier to calculate. With your jig base on your lathe, measure the distance from the top of your cradle platform board to the spindle center. If you subtract the radius of your router body from this number, you will know the length of your uprights, as measured from their base to the bottom of the half-circle.

If your uprights are too long, you can trim them to suit. If they are too short, try adding one or more shims under your cradle platform (**Photo 7**). The shims should be fixed to the platform, rather than loosely stacked like a house of cards.

I secure the router to the cradle with a spring clamp (shown in Photo 5). The spring clamp is fastened to the cradle with woodscrews. This simple clamping system still accommodates adjusting the bit depth.

I use a 1/4" round bit to make flutes, controlling the depth of the flute by retracting or extending the router bit. I also integrate my lathe's indexing feature to control the spacing and number of flutes. Make sure your lathe spindle is locked so that your blank stays stationary while you are routing each flute. ■

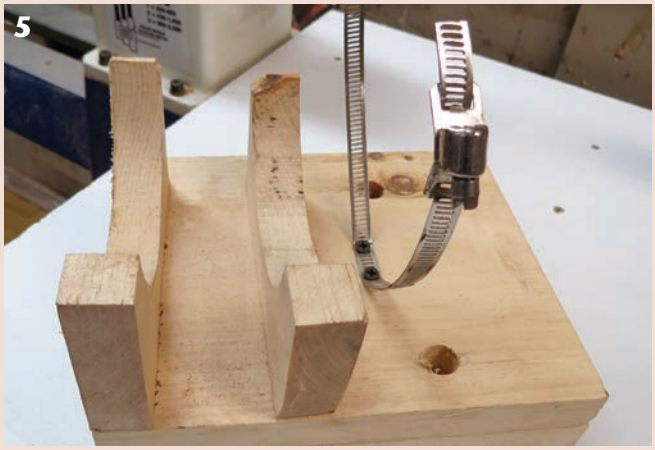
Douglas Gillie started woodworking at the age of 15, expanding his interest to woodturning about 12 years ago. Douglas' woodturning journey began with pen turning and then branched out to pepper mills and bowls. The biggest reward, he says, is seeing the beauty of the wood come to life when you apply the finish and see the completed project.

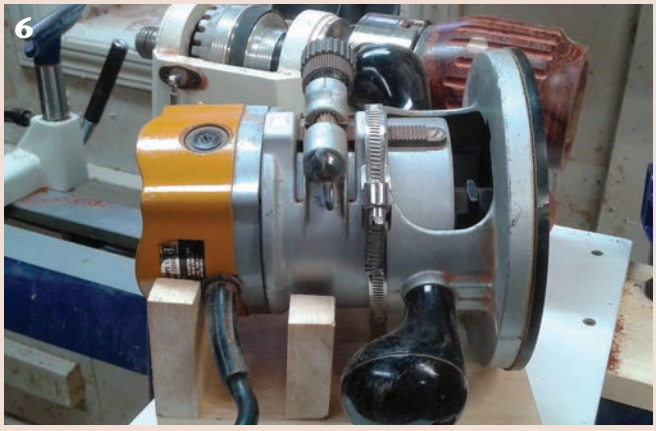
ADDITIONAL RESOURCES

For an even deeper dive into this topic, see John Lucas' article "Using a Router at the Lathe" in the February 2020 issue of American Woodturner—linked below.

tiny.cc/UsingRouter

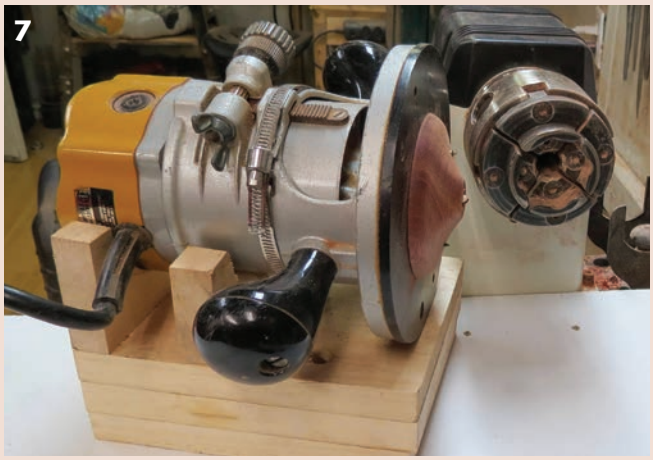
Cut uprights





Crosscut uprights to length, cut semi-circles in their tops to cradle the router, and attach these to the cradle platform.

Shim as needed



If your uprights are too long, they can be trimmed. Too short and you can place shims, secured with screws or adhesive, to the bottom of the cradle.

MAKE A FOLDING SAWBUCK

BY WALT WAGER

Turners who want to turn locally acquired woods usually end up with a chainsaw in hand and the need to cut a log into bowl blanks. There are many safety protocols when using a chainsaw. These include techniques to avoid kickback and use of safety gear like eye and hearing protection. Cutting wood at a comfortable height—off the ground—encourages safety and extends the life of your chain by keeping it from contacting the ground.

To get the most from your saw, you need to use a sharp chain, adjusted to proper tension, the right (non-ethanol) fuel/oil mix and bar oil, and keep the saw clean. Cutting a log on the ground and getting dirt in the chain is a quick way to dull your chain, wear out the bar, and create a saw that won't cut efficiently or straight. This article demonstrates the build of a simple sawbuck to help with safely and cleanly processing logs into turning blanks.

To complete this build, you'll need five lengths of 2" x 4": four pieces 24" (61cm) long, and one 16" (41cm) long. I suggest pressure treated lumber if you are going to leave the sawbuck outdoors.

The author demonstrating the use of his foldable sawbuck.

You will also need two 3/8" x 3-1/2" (10mm x 9cm) carriage bolts, two washers and 3/8" nuts, and four 2-1/2" (6cm) deck screws. I suggest using self-locking nuts if you have them. ■

Walt Wager is a 19-year member of AAW and the North Florida Chapter in Tallahassee, FL. He works in his home studio and demonstrates for local and regional clubs. His work and videos can be viewed on his website http://waltwager.com.

Step 1: Gather the materials

You may already have the modest list of materials on hand: five short lengths of 2" x 4"s and a few fasteners are all that is required.

Step 2: Drill holes for bolts

Start by drilling 3/8" holes through the centers of the 24"—2" x 4"s.

Step 3: Recess the nut

Using a 1" Forstner-style bit, make a recess in the leg to receive the 3/8" nut and allow it to sit flush with the wood surface.

Step 4: Assemble the legs

Assemble two Xs with pairs of 2" x 4"s, using the carriage bolts and self-locking nuts. Use a pencil to mark the alignment of the legs when they are positioned perpendicular to each other.

Step 5: Join the legs together

Finally, the two leg assemblies are held together by the 16" cross piece. Attach the cross member to the legs with the deck screws.

Step 6: Family gathering

Secured in the sawbuck, a log can be easily cross-cut or ripped into turning blanks. One word of caution—don't try to use the sawbuck with a log that is too short to reach both cross braces. A short log is braced inadequately, and the force of the rotating chain can easily pull the log out of position.

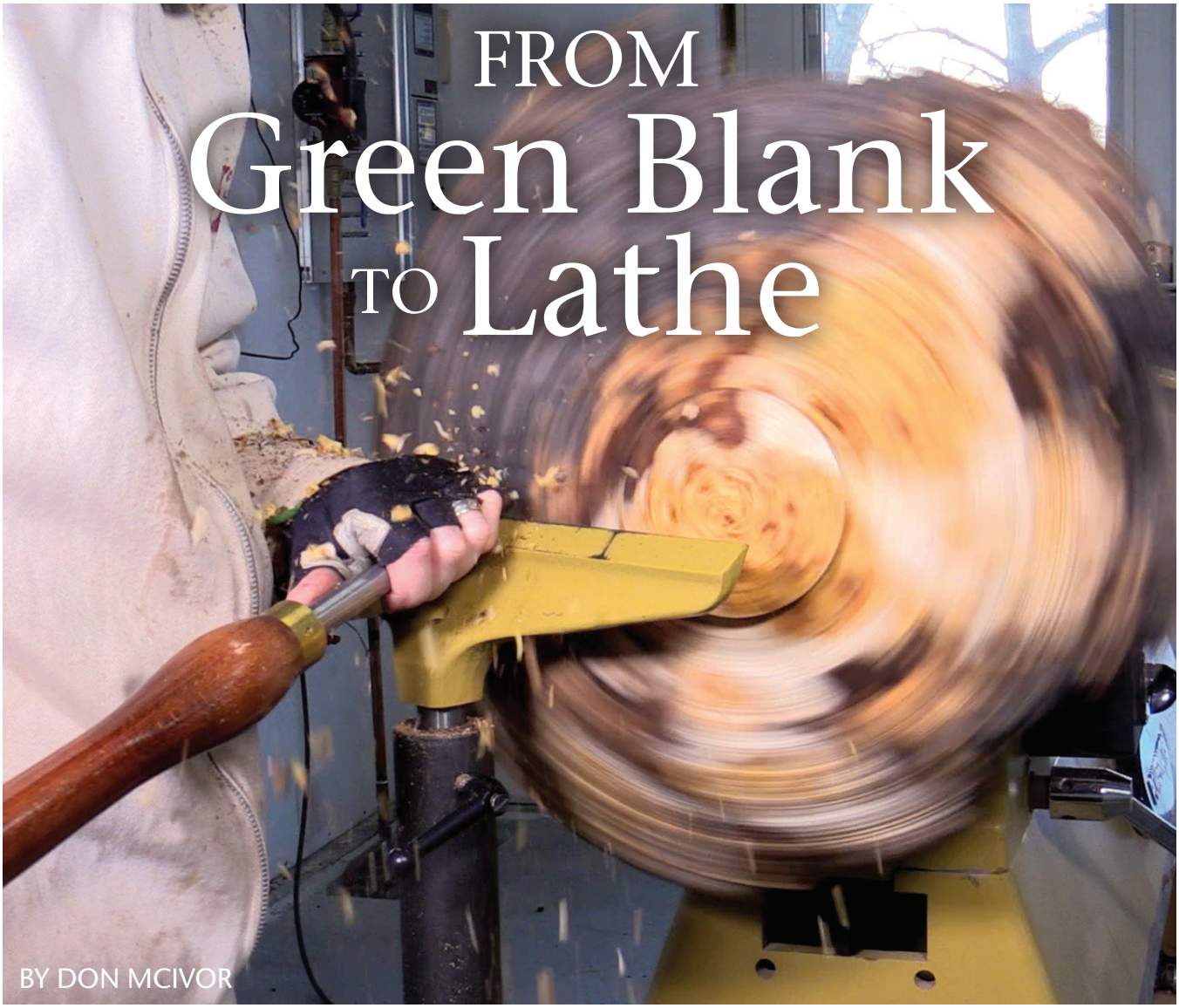
Step 7: Folded for storage

The design includes the ability to quickly and easily fold the sawbuck for compact storage.

EXPLORE!

Using the Explore! tool, search under the "safety" category and use the keyword "chainsaw" to learn more about this topic. The AAW offers both print and video resources to learn more about safely breaking down logs for turning blanks.

FROM Green Blank TO Lathe



BY DON MCIVOR

The step between learning to turn and beginning to acquire a wood stash is a short one. Gain a little confidence at the lathe and your eye will soon start wandering to dead trees and downed limbs, and the distant sound of a chainsaw will have you salivating like Pavlov's pooches. Without a bit of preparation, you can also set yourself on the road to heartbreak as you discover your wood hoard splitting itself into firewood.

If you hope to make something other than firewood of your wood cache, you need to put some effort into stabilizing the material. This generally means two things: slowing the rate of moisture loss and reducing the amount of tension embodied in the wood. How you choose to exert this control depends on the characteristics of the wood species and how much effort and expense you're willing to invest.

Many articles have described extracting blanks from a tree. Understanding how to optimize your cuts for the most efficient use of the material, and to select and show-off the best grain figure, are the first steps to success. This article presents an overview of techniques for stewarding timber from the green block of wood stage to a dry blank ready for finish turning.

Tension

Depending on the conditions in which a tree grew and where in the tree a particular blank comes from, the wood can embody enough tension that it will tear itself apart as it dries and those tensions try to come to equilibrium. Trees produce tension wood in response to stresses like growing on the side of a hill or another tree falling on them. The curly figure often found where a limb joins the trunk or the roots spread out from the

bole are also a response to stress, as is the feathering of crotch figure. While these situations often create the most desirably figured wood in a tree, they can also be the hardest to successfully dry. Another general rule of thumb is that branches contain far more tension wood than the trunk of the tree, and therefore can be harder to successfully process. Tension is also created when the wood's exterior dries too quickly, leaving the outer wood under tension and the interior of the blank in compression.

Rough-turning a blank removes wood with embodied tension. In creating a rough-turned form, you provide some room for the remaining material to move as it releases tension in drying. The accumulated experience of turners indicates that a blank whose wall thickness is equivalent to ten percent of its diameter hits the sweet spot. Uniform wall thickness is also important, although some turners report greater success by turning the bottom of a rough bowl form slightly thinner than the upper walls. With these two traits, your blank will have improved odds of making it through the drying phase with little enough distortion to yield a round finished form.

There will be shrinkage

A resource like Eric Meier's Wood Database is a great place to find general information about the stability of a particular species of timber—referred to as dimensional shrinkage. The most useful at-a-glance metrics are tangential and radial shrinkage expressed as a ratio (T/R ratio), and volumetric shrinkage, which expresses cumulative shrinkage in all dimensions. Taken together, a species with low volumetric shrinkage and a T/R ratio close to 1 would be stable. Armed with these data, you'll have a sense of how much TLC to administer to your blank.

The real world

Nothing beats experience for understanding how timber is likely to respond to drying. Old growth timber from a tree grown in natural forest conditions will often behave quite differently—all the way down to turning properties—than a tree of the same species grown in the open with free access to sun and water. An apple tree grown in a yard with too much water will almost have enough movement in its timbers to run itself to the woodpile; a decades-neglected apple from an abandoned farm will be more manageable, but like all fruitwoods, still a challenge.

ADDITIONAL RESOURCES

Learn more about the properties of specific wood species through the Wood Database—follow one of the links below.

Wood Database

Faster Drying

Employing one or more of the following techniques, you can complete a turning project with your freshly harvested wood long before stickered slabs from the same tree are dry enough to use.

All of the following techniques are based on the premise that you have a roughed-out form like a bowl, vase, or box blank. Drying dimensional lumber is a topic for a different journal. Some of the techniques are cumbersome or expensive enough that they are not intended for every blank you process, but it's good to have these tricks up your sleeve for the day that exhibition grade walnut log appears at your shop.

Detergent

Soaking a blank in a solution of detergent and water reportedly reduces checking as the wood dries. Use clear dish washing liquid detergent. Recommended dilution ranges from 1:6 (detergent:water) to 50:50. Soak the blank for three days. Dry the outside, then wax and store. The detergent soak does not appear to interfere with oil-based finishes, but it may interfere with lacquer.

Boiling

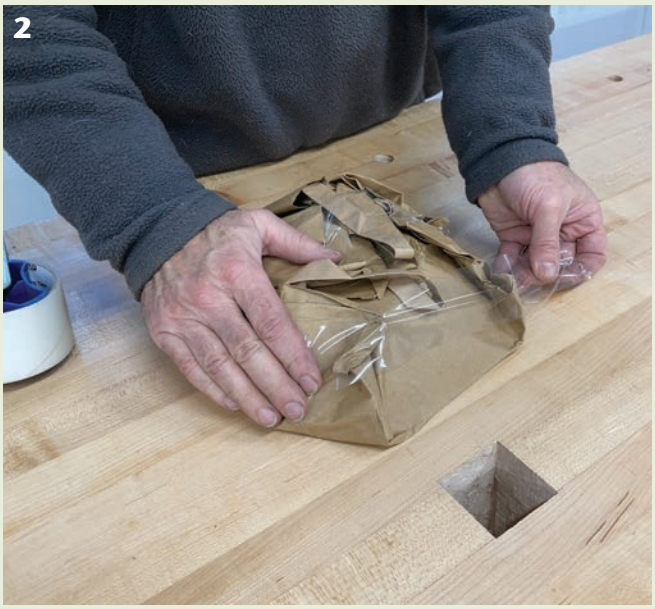
Boiling is a reliable way to both reduce the tension in a blank and speed the drying process by breaking cells and driving out bound water. It's possible to accomplish this on a small scale on the stove top. For larger pieces or if you plan to apply this technique more frequently, cut the top off a 55-gallon drum, set it on blocks, and position a propane burner underneath. Oh, and keep this operation clear of flammable materials.

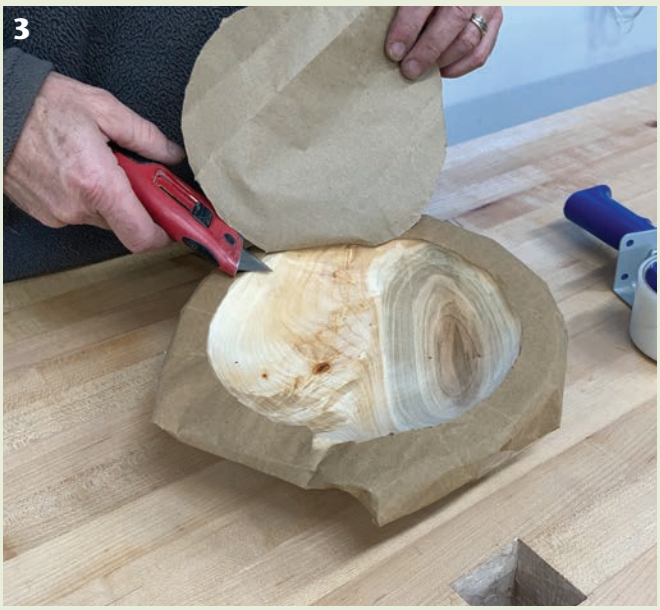
Boil the rough-turned piece for about an hour per inch of wall thickness. Leave it in the water to cool or take it out of the hot water and plunge it into cold water to prevent mold spores from gaining a foothold. Set the blank aside to dry in as much of a controlled environment as you can muster.

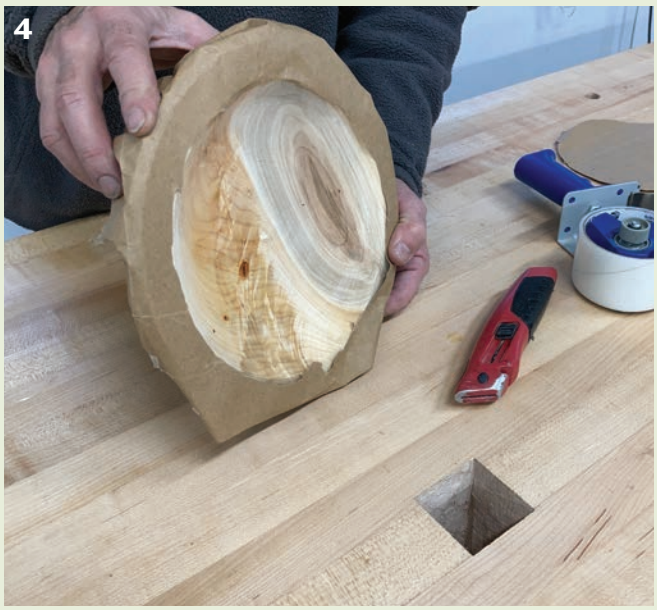
Paper bag

Wrap the outside of the blank in a paper grocery bag (a few layers of newspaper will also work) (**Photos 1-4**). Make sure the interior of the bowl is open to air movement. For most blanks, I simply put them in a grocery bag, tape the top of the bag and the sides down so they conform to the outside of the blank, then use a utility knife to cut out an opening for the interior of the bowl. This helps slow the loss of moisture from the outside of the form while encouraging the moisture to leave from the interior. I have read but cannot verify that this creates compressive force (which holds the form together) rather than expansive force (which tears it apart).

Wrap in sturdy paper







Place your blank in a paper grocery bag or face down on a sheet of kraft paper. Fold the excess paper snugly over the outside of the form and secure it with a couple pieces of strapping tape; no extra points are awarded for neatness. Remove the portion of the paper covering the interior to allow air flow.

Plastic bag

A plastic bag will certainly slow moisture loss; its drawback is that it eliminates any moisture exchange with the environment. With a species inclined to spalting, you can create a bag of mulch in a week or two (**Photo 5**). Some turners get away with long-term use of plastic bags to prevent checking, but your wood will not be drying in this environment, which is usually the goal. I tend to use plastic bags for short-term storage, like taking a lunch break or perhaps overnight when I'm not finished turning (**Photo 6**). Be aware that trapping moisture against the lathe or the chuck with a plastic bag will encourage rust.

Shavings

Place the blank in a pile of shavings, or a grocery bag or cardboard box filled with shavings (**Photo 7**). After a few days, replace the shavings. Continue this pattern for at least a couple of weeks before moving the blank to a rack where it will continue to dry.

I use this technique at the end of the day when I don't have the energy to apply any of the long-term solutions listed here. Don't wait too long before swapping out shavings or moving to a different drying solution, as this is a good way to let mold and fungus get established.

Alcohol

For a while I maintained a five-gallon utility bucket with a gamma lid and about three gallons of denatured alcohol, which I occasionally replenished. I would soak a blank in the alcohol for about 48 hours, which allowed the alcohol to displace the water in the wood. After the soak, the blank would dry quickly (another day or two) as the alcohol readily evaporated.

I never lost a blank using this technique, but it has its drawbacks. Alcohol is expensive. It's also highly flammable. While its health risks are moderate compared to most other solvents, they're not negligible. The alcohol extracts tannins, so the solution soon takes on the appearance of first tea and then coffee, though I never noticed the tannins staining even light-colored blanks. The water extracted from blanks must accumulate in the bath, and, I assume, decrease its efficiency. I never identified the point at which the alcohol became too dilute but assume it would be about the time I dropped a five-hundred-dollar amboyna burl in the bucket and smugly walked away.

Plastic creates a greenhouse

This birch log stayed in a plastic bag for about a week as I struggled to find time to turn it. I unwittingly created the perfect environment for fungal growth.

Plastic for short-term protection

A better use of plastic bags is short-term protection against checking.

Pack in shavings

Place your blank in a container filled with shavings (or in a pile of shavings on the floor if you like to create tripping hazards). Change the shavings every few days for about two weeks, then move the blank to a drying rack.

Sealing emulsions

This may be the most common approach to managing blanks—it certainly is for me. There are many wax emulsions on the market and with generic brands available, the price has dropped considerably since Anchor Seal ruled the marketplace. The emulsion is applied like paint (usually with a brush) to the blank (**Photo 8**). It goes on milky and dries slightly opaque (you can easily read a pencil mark through it). I paint only the outside of the form, encouraging the moisture to leave from the interior. Some turners apply the emulsion only to the endgrain, and some apply it to the endgrain on the outside and inside of the form. Some apply it inside and out—this is probably the most conservative approach, forcing all moisture to find its way out of the wood very slowly.

Wax emulsion is also useful for sealing the cut ends of a log. This is handy if you don't have time to process the log the moment it hits the ground. Be aware, though, this is not a permanent solution—wax emulsion applied to a log just delays the inevitable.

There is also a more recent competitor in this niche called Tree Saver Green Wood Sealer. It is PVA based, rather than wax based. It is worth considering this as an alternative to the wax formulations.

Paraffin

If you purchase a blank from one of the better-known national distributors, chances are it will arrive with the ends sealed with paraffin—especially if you buy a spindle blank.

To replicate this technique, I acquired an inexpensive hot plate and an old Dutch oven with a lid (**Photo 9**). I melt an inch or two of paraffin in the pot to the point of just starting to smoke—the wax needs to be above the boiling point of water. Then I dip the ends (or sides for bowl blanks) in the liquid paraffin, leaving each end in the pot about 30 seconds. The heat will drive some of the water (and air) out of the end of the blank and coat it with wax.

This is an operation that must be conducted out in the open, away from flammables, and with a fire extinguisher at hand. Do not, under any circumstances, put the pot of wax on the burner and walk away from it—it must be monitored, always. The other factor to consider is the size of the pot. While this works great for spindle blanks, you'll quickly find the size limit of your pot by trying to fit a bowl blank in it.

Sealer slows moisture exchange

Paint wax or PVA emulsion on your blank to slow moisture loss. Whether you paint the entire blank, just the outside, or just the endgrain is up to you.

Seal endgrain with paraffin

Most of what you need for a hot wax bath can be found at a thrift store or yard sale. Monitor this process carefully as over-heated paraffin will burst into flame.

Stretch wrap

Stretch wrap comes on a handy roll dispenser. It has self-adhesive properties, so if you give the last wrap a little extra tension it should seal itself to the layer below (**Photo 10**). I find it's worth adding a strip of tape to the loose end for security. The concept is the same as other approaches to sealing the blank exterior, but like any plastic, stretch wrap creates a total moisture barrier.

This is a quick and cheap solution, but it also has some drawbacks. Trapping moisture against the blank can lead to mold and fungus. And even after applying tape to the last wrap, I find that some timbers move enough in drying to separate themselves from the plastic layer, reducing its effectiveness. And, a curved surface like the exterior of a bowl blank can be challenging to wrap.

Freeze dry

Place the roughed-out piece in a plastic bag in a deep-freeze for 48 hours. The plastic bag does nothing for the wood but minimizes icing up the freezer walls. The freezing cracks cell walls and expels some free water. Remove the wood from the freezer and from the plastic bag. Allow it to thaw for 24 hours in a cool and shady place. Label the item with the wood type and date. Weigh it and record the weight. Place the piece, without any wrapping, in a refrigerator. A refrigerator draws water from the wood. Weigh it every two-to-seven days and record the weights. When the weight loss ceases, the wood is dry. This may take up to ten weeks and the wood should lose 20-to-50 percent of its starting weight.

Microwave

The limiting factor in this technique is the size of your microwave. You'll need to weigh your blank on a reasonably accurate kitchen scale before you start cooking, as tracking its weight loss is the key to this technique. There are two basic approaches based on power settings.

Using a low power setting, set the microwave timer to thirty seconds for every 100g of wood. At the end of cooking the wood will be warm but should never be too hot to hold firmly in the palm of your hands. Allow the wood to cool completely. For subsequent rounds, adjust the cook time depending on the warmth of the wood at the end of the initial cycle. Timbers likely to crack will need to be kept at lower temperatures. Let the piece cool completely between cooking rounds. As the water content of the wood decreases the piece may again get too hot, so reduce the cooking time. Weigh the piece at intervals until it ceases to lose weight. In all, 20-to-50 cooking rounds may be needed.

Stretch wrap while turning

Stretch-wrap inhibits moisture exchange. It's best use is to prevent too much water from leaving a green blank as you work to hollow the interior.

For an alternative approach, you can microwave the blank continuously with the highest power setting for as long as there is moisture in the wood, and water vapor escaping from the wood. Allowing that water vapor, or vapor from a cup of boiling water in the microwave to wet the outside of the wood helps reduce surface checking. The initial full power cook may be 15 minutes. Some turners like to leave the wood in the oven to cool. Others check that moisture is still coming out by holding a room temperature piece of glass (or mirror) near the wood to see if water condenses on the glass. Some like to weigh the wood at intervals. Repeat the microwaving until there is just a little moisture coming out or there is no further weight loss.

After microwaving you may finish turning the blank. Or it may be wise to leave the wood to stabilize for a week or so.

I recommend buying a used microwave and placing it in the shop for this task. I once tried this technique in the kitchen with a piece of cottonwood, which generated an aroma reminiscent of a barnyard full of livestock eating a poor diet. I didn't give my wife the satisfaction of throwing me out of the house—I swiftly accompanied my project out the door.

Kiln

A simple kiln can be made from old upright refrigerator or chest freezer stood on end, or a shopmade insulated box. Holes are drilled at top and bottom to allow limited air circulation. A low wattage incandescent light bulb in the bottom of the box provides gentle warmth. A temperature of about 85°F (30°C) is ideal. This is a good technique to combine with wrapping or waxing the exterior of the blank to help regulate the direction of moisture loss.

Dehumidifier

Fridges and rooms fitted with dehumidifiers will dry wood quickly as they draw the moisture from the wood at a high rate, but if it is too fast this may also increase surface checking. Many household dehumidifiers require the water tank to be emptied daily; a continuous drain is preferable.

Knowing when your blank is dry and ready to finish-turn is another key variable. A rough-turned blank in my part of the world (the High Desert of Central Washington) placed on a shelf with good air circulation will be ready to finish in about three months. But ambient temperature and humidity (influenced by season and your local climate) as well as air circulation all influence the rate of drying. A dense hardwood like cocobolo will also lose moisture at a slower rate than most of our domestic hardwoods or softwoods.

EXPLORE!

Use the AAW's Explore! tool to search for articles related to kiln drying your own lumber. Larry Zubke's article, "Kiln for Drying Wood," outlines a shopmade solution and is a good place to start.

tiny.cc/KilnDrying

If you weigh your blank when it is green and write this number on the blank along with the date, you can track the weight loss as moisture leaves the piece. When the weight stabilizes for a week or two, your blank will be in equilibrium with its environment and ready to turn. A more quantitative approach is to buy a moisture meter. An inexpensive pin meter is accurate enough for this purpose—I look for a reading in the 8-12 percent range to confirm the blank is ready to finish turn. ■

Don McIvor is the editor of Woodturning FUNdamentals. His woodturning articles have appeared in American Woodturner and Woodturning Design.

BY JOHN LUCAS

Sponge Painted Natural-edge BOWLS

Saving a naked natural edge

If you are like me, sooner or later you will attempt to turn a natural-edge bowl and discover that the bark just won't cooperate. Sometimes parts of the bark fly off and other times the whole edge comes loose due to uneven shrinkage. You may have also wasted time crawling around on the floor trying to find that little chunk that flew off so you could glue it back on. Heck, I've even gone so far as to save bark from the rest of the tree so I could glue on pieces. I know others have had this problem—many years ago I read an article on carving off the bark and burning the edge or using a permanent marker to color the edge black (**Photo 1**).

I completed many bowls over the years with blackened rims before discovering sponge painting. I don't remember where I learned this technique; it wasn't

1

A common approach to saving a natural-edge bowl that loses its bark is to darken the rim, usually with pyrography, paint, or a magic marker.

in the context of coloring wood. But I did make the connection that I could use this technique to color a natural-edge bowl so that the edge looked like lichen or moss on a rock and could have a texture like fine bark—only better.

This technique is simple, and you really can't screw it up. At first, I tried to copy photos of moss and lichen on trees and rocks, but later I found that anything I did was fun and looked great (**Photo 2**). Now I hold a mental image of moss and lichens and just follow where the paint leads me.

Gather supplies

You will need a selection of acrylic paints—greens, grays, browns, and tans, and probably some gold, red, orange, or yellow. You will need natural sponges; get several to choose from, as each creates a unique texture. Natural sponges are easy to find at hobby or craft stores and sometimes grocery or hardware stores (**Photo 3**).

Prep the bowl

This decorating technique begins where the turning and sanding part of a natural-edge bowl project ends. After sanding, I apply a coat of wax to the bowl, but avoid waxing the rim I'm about to paint. This will make any subsequent clean-up easier, and at least a little paint over the edge of the bowl is inevitable. Then I carve off the existing bark edge. I have used just about everything from a carving knife to rotary burrs and even sanding drums. Simply use what's available to you. Accuracy is not important—just get rid of the bark and cambium layer. Next, I paint the edge of the bowl with a base color. I usually choose brown or green, but this can be any color you want. I cover all the wood on the rim so there won't be any natural wood showing through the texture (**Photo 4**).

ADDITIONAL RESOURCES

For more information on turning natural-edge bowls, use the AAW's Explore! Tool to search for articles and videos. Gord Rock's video, linked below, is a great place to start your journey.

tiny.cc/GordRockBowl

Seek inspiration

MARTINA LEITSCHUH, COURTESY OF PIXABAY.COM

Moss and lichens add beautiful textures and often color to tree bark and rocks.

Supply yourself

A supply of natural sponges, a selection of acrylic paints, and a paper plate for a palette will supply your project needs.

Apply paint layers

I use a paper plate to pick up the color on the sponge and begin stamping on the plate until I get the texture I am looking for (**Photo 5**). Then I apply the paint by stamping randomly around the lip of the bowl (**Photo 6**). Applying subsequent colors is where the choices really get personal. Next, I might use a light green, then a slightly darker green, then an even darker shade of green. I might next pick up tan or brown and add

Apply the first paint layers

Start with a uniform base coat—typically of a darker color—applied with a brush. Follow with the first sponge-applied paint color, dabbing the loaded sponge first on the paper plate until a suitable pattern emerges.

Build complexity


7


8


9


10

Switch to a third color and continue applying with one of your sponges. If you get too much paint in one spot or don't like the color, go back over the spot with a previously applied color. Finally, choose one or two bright colors to add visual power. Your palette will reveal the path of your journey.

several shades of this color (**Photo 7**). Don't worry if you get a blob that is too large and ugly (**Photo 8**). You can always go back to any previous shade and disguise the blob by applying lighter or darker textures over the top.

When I feel like I'm getting the rim covered to my satisfaction, I pick up one or two of the bright contrasting colors like gold or red and add just a few dabs here and there (**Photo 9**). These additions often stand out too much, so I go back with some of the original colors and texture over the bright colors to tone them down a little. You want to see the gold or red without having it slap you in the face. The contrasting colors add interest to the edge. I prefer to add smaller applications of a lot of colors. It adds interest and looks more natural. My paper plate palette reveals how many colors I added (**Photo 10**).

FINISH

Once I have a design to my liking, I let it dry. Then I use wipe-on poly over the paint to protect the edge and give it a little shine (**Photo 11**).

I have decorated a lot of rims with this technique. To my surprise, even a thin bowl with a narrow rim looks great accented with color. Customers pick these pieces up and at first, they don't notice the rim color. Then they are surprised and delighted when they discover the decoration. As you can see in the opening image, sometimes I just use one or two colors.

This same technique can be used to decorate vessels or platters. Mask off an area and then cut out an opening using the toe of a skew to leave a circle or ring to receive your paint. Use the sponge painting technique to color this circle. Peel off the tape when it's dry and you have a professional looking decorative ring. Quick, easy, and lots of visual interest added to your piece. ■

TIP

When it comes to masking against paint, look for Frog Tape at your local hardware store. It's a little more expensive than the standard blue tape, but it contains a compound that repels paint and creates a neat line (left side of the photo). It is not nearly as effective with dyes, however (right side of photo).


D.E. MCIVOR

Add a finish


11

Adding a wipe-on poly after the paint has dried will provide some protection against bumps and bruises.

Retired photographer John Lucas has been working in wood for more than 35 years and also dabbles in metalworking. He enjoys modifying machines, making tools, and sharing his knowledge through written articles and videos. He has taught classes at John C. Campbell Folk School, Arrowmont, and The Appalachian Center for Craft.

Have you tried BIRCH?

SUNGMU HEO. ROYALTY FREE, PEXELS.COM

BY DAVE SCHELL

When I moved four years ago, one of the things I was excited about was a gray birch tree (*Betula populifolia*) in my new backyard. There is a large burl at the roots, and I'm waiting for my wife to give me the okay to cut the tree down and dig it out. Unfortunately, I don't think that will happen anytime soon.

There are almost sixty species of birch worldwide, sixteen of those in North America. Some of those species of *Betula* never reach a stature beyond low shrubs browsed by moose in the subarctic, but a few members of the species reach sizes suitable for turning, furniture making, cabinetry, and lutherie. The primary species of interest for woodworking in North America are yellow birch (*B. alleghaniensis*), sweet birch (*B. lenta*), river birch (*B. nigra*), water birch (*B. occidentalis*), and paper birch (*B. papyrifera*).

Birch is one of those timbers I rarely see at woodturning shows here in Pennsylvania. In fact, it seems rare to find pieces of birch marketed to turners. As a turner, you're more likely to obtain stock by watching for yard trees coming down or by establishing a good relationship with an arborist.

Gray birch. Named for the color of its trunk—note the contrast with paper birch in the opening image.

Birch is a pioneer species—so called in forest ecology because it can be the first species to start growing after a catastrophic event like a forest fire or flood. The tree can rapidly colonize a plot of land because of the plentiful catkin seeds that are easily dispersed by wind. Birch—especially paper birch—is a popular ornamental tree because it is fast-growing and the peeling sheets of bark on mature trees make them visually interesting, even in winter.

Birch is used in a multitude of products, including furniture, veneer, plywood, flooring, popsicle sticks, and other utilitarian products. Birch is sought after as a tonewood for use in speaker cabinets, guitars, and percussion instruments.

Some species of birch are used as food or medicine. Native Americans used to grind part of the bark of some birch trees into flour and use some birch to make a drink similar to tea. And there are few objects as iconically American as the birch bark canoe. Birch beer soda relies on extracts from birch bark for its unique flavor. The naturally occurring oils in birch make it appealing as a firewood because they encourage ignition and combustion.

I love turning birch. In my part of the US, obtaining birch for turning is a challenge, even through arborists or Craigslist—two otherwise reliable sources. My birch supply is therefore limited and when I make a birch bowl for a show, it usually sells quickly, in part because of its relative rarity in my area. I have benefitted from the hoarding tendencies of woodturners and have obtained most of my supply from retiring woodturners who never quite got back to that corner of their cache.

With sixty–some species in the world, there's bound to be some grain and color variation. In general, the wood tends to be fine-grained and pale in color. Color may vary from white to yellow/cream with a darker heartwood with hints of red, pink, or brown for some species. Most of the birch I have used has had sapwood with a light cream color and darker heartwood.

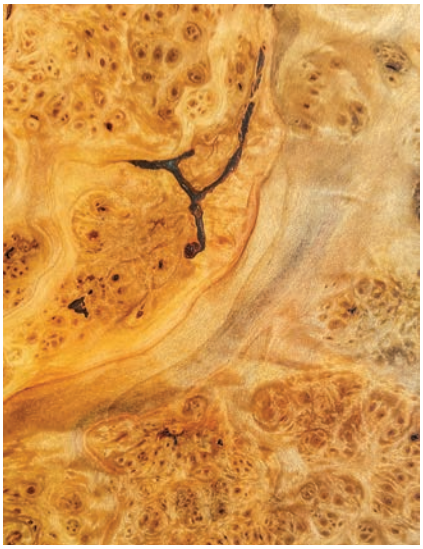
ROSENDAHL. ROYALTY FREE IMAGE, PIXNIO.COM.

Birch leaves vary slightly by species, but in general are slightly ovoid with serrated edges.

D.E. MCIVOR

Paper birch bowls. Grain color in birch varies from almost white to orange-brown heartwood. 14" × 6".

Water birch burl. Birch can form dramatic burl figure, though some species appear more susceptible to forming burls than others.



D.E. MCIVOR

Masur birch is popular with woodturners. Endgrain hollow forms do a particularly good job of showing off the dramatic grain.

WIKIMEDIA COMMONS

Birch can display high figure. Curl or flame figure is highly prized for flooring, furniture, and veneer. While curl in maple and cherry can be thin and faint, curl in birch can be extensive and travel across the entire width of the tree. I have yet to find the elusive flame birch in any pieces I have turned.

Birch occasionally forms burls featuring dramatic and dense clusters of swirls and eyes. Though from a region overlying Finland and Russia, Masur birch is popular among woodturners. The characteristic burl-like grain and swirled dark-and-light wood pattern has been found to be an inherited trait, leading to the host trees being classified as *B. pendula* var. *Carelica*.

"Three foggy mornings and one rainy day will rot the best birch fence a man can build," cautioned Robert Frost, but this quality also makes the wood highly susceptible to spalting. Because the wood is relatively soft, the spalting process needs to be intercepted quickly, but it can yield dramatic figure with strong contrast between the spalt stains and the surrounding pale wood.

Birch is a great wood to turn. I notice little difference in hardness between the sapwood and heartwood. Gouges and scrapers work equally well and if your tools are sharp, the cuts are clean with little tearout. I do not notice any odors from the wood.

Birch sands easily. When finishing a piece, I can often produce a noticeable luster at 220 grit. I have finished pieces with 400 grit and it looks as if I used wax to polish it. My favorite finish on birch is a tung oil-based finish.

Now that my birch supply is gone, I might have to go out to my gray birch in the backyard and "accidentally" bump it with my chainsaw a few times to build my supply. I suggest contacting your local arborist or landscaper and see if they might have any birch in their waste pile and ask if you can have a few pieces. You might just get a stunning piece for your efforts. ■

Dave Schell lives in Mount Joy, PA and is a Main Street Executive Director by day, and bowl turner by night and weekends. Email Dave questions dave@imakebowls.com or view his work online at imakebowls.com.

ADDITIONAL RESOURCES

Learn more about birch, including toxicity data, by checking out Eric Meier's Wood Database through one of the links below.

Wood Database

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D.E. MCIVOR

Even if you use a sharpening jig (and you should), it's easy for tool angles to drift off their ideal over time. Forty degrees is a good angle for most turning tools. After years of use, the cutting edge (in this case, the included angle on a skew chisel) has drifted to 41 degrees—I can live with that!

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