WOODTURNING FUNDAMENTALS

American Association of Woodturners
August 2020 • Vol 9 No 3

Turn a rainbow bowl

- Consider carbide tools
- Shopmade center finder
- Signing your work
- Dirty pour painted mushroom

AAW | AMERICAN ASSOCIATION OF WOODTURNERS
WE ARE TEACHING THE WORLD TO TURN

WOODTURNING FUNdamentals

Linda Ferber

Phillip Cottell

August 2020 Vol. 9 No. 3

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: Shaping the outside of a rainbow bowl (inset). Phillip Cottell, photos.
See page 14 for more on this topic.

Welcome

Immerse yourself in the rich world of woodturning and it will not be long before you encounter the name Ernie Conover. Conover's *The Lathe Book* appeared about the same time that the craft turning movement took off. A seminal guide to many, it helped establish Conover's reputation as a teacher and demonstrator. David Heim reviews the latest and significantly revised edition of this classic book, below.

All three of our project-based articles in this edition feature surface decoration. Each of these articles includes an approach to painting that easily leads you beyond "round and brown." Incorporating painting into your turning is also a great way to utilize a pedestrian piece of wood that might otherwise be headed to the woodstove. If you decide not to pursue the painting steps in these projects, the forms are interesting, turning them will build key skills, and the results can still show off beguiling features in the right piece of timber.

Contributor Mark Palma also takes us on a deep dive into the world of carbide turning tools. While many a purist has scoffed at a carbide cutting tip, Palma makes a convincing argument that these tools have a useful role in every turner's shop, and may be more of a harbinger of the future than some traditionalists care to admit.

In the Pro Tips column, Kelly Dunn takes a look at signing your work. Even if you never plan to market your efforts, signing and dating each piece is a routine you should adopt early. Kelly explains the *why* and the *how*.

Enjoy this issue!

—Don McIvor, Editor

Book Review: The Lathe Book*, Third Edition, by Ernie Conover, Taunton Press, 2020, 208 pages, paperback*

Ernie Conover has been a major figure in the world of woodturning for close to fifty years—as a founding director of the AAW, a lathe designer, an instructor, a professional turner, and a prolific author. One of his most enduring works is *The Lathe Book*, and Taunton Press has just released the third edition. It's a doozy.

Conover has done much more than give the book a light dusting and polish. This edition contains dozens of new photos and illustrations and page after page of new text. Conover has worked hard to make his book current and comprehensive. He covers the latest in faceshields, dust collection, carbide-insert tools, CBN grinding wheels, sharpening jigs, and much more.

He's not afraid to name names, touting the virtues he sees in Robust and Oneway products, for instance, or expressing disdain for the spur centers included with many new lathes. He's also not ashamed to say that he's changed his mind about some things. Variable-speed lathes are no longer a luxury, for example, and carbide-insert tools do have their place.

Conover spices the new edition with personal insights. We learn that he once used butter from a high school cafeteria to grease a tailstock center. And he shares a harrowing, cautionary tale of an accident that slammed a chunk of wood into his forehead.

As Conover says in his introduction, the book "throws light on the useful machines, tools, and gadgets that will make your time in the turning shop productive and fun." He's being modest. The latest edition of *The Lathe Book* is a thorough, essential reference, especially for newcomers who want to start turning properly and safely.

—David Heim, Connecticut

Birdhouse Spindles

By John Lucas

I was at the world's longest–running flea market the other day and saw a birdhouse made from a stair baluster. It was cute, but the baluster was too long, the base was too big, and the roof was really ugly. I liked the idea and thought a little redesigning would make this a good spindle project for my workshops. At the same flea market, I also picked up some crackle paint for a dollar, the perfect companion for the birdhouses.

What I like about this project is the opportunity to play. I can practice all my spindle-turning techniques and explore some that I have either forgotten or have never tried. It is a perfect project for skew practice because the whole spindle can be turned with just that one tool. It is also the perfect project to experiment with paint, stain, dyes, pyrography, texturing, carving, fluting, or any other surface decoration technique that comes to mind. I designed this project so it can be turned using scrap wood—even construction lumber will do. That allows freedom to muck around without worrying about those "redesign opportunities" that might slip in. The idea is to play, learn new skills, relax, and enjoy the turning. There is no right or wrong, only exploration and experimentation.

Stock preparation

I make these from 1-1/2" (4cm) square stock ripped from a 2×4. Start with a piece about 16" (41cm) long. Pine will really flex when turned down to an inch or less, so this is good practice for learning to deal with chatter. These birdhouses look good with square tops and bottoms, so it's important to mark the centers accurately. The project also offers good practice for turning the transition from square-to-round.

Turn tenons on the ends

Mark a line 1/4" (6mm) from the top end, then mark another line 1/2" (13mm) from the bottom. These will become 3/4"– (19mm–) diameter tenons. After mounting the blank between centers, I use the toe of the skew (that's the long point) to start a tenon 1/4" from the top. Arc the skew down from the corner of the wood to create a square shoulder. You need to aim the bevel of the skew straight down for the shoulder of the tenon (**Photo 1**).

Cut the vee on the waste side, then use either the skew presented flat or a parting tool to create the round tenon with a peeling cut. When that's finished go to the other end of the piece and turn a 3/4" tenon, 1/2" long. Then round over the top of the birdhouse blending it into the tenon (**Photo 2**). This will give the roof a place to sit.

Define the square ends

Mark out the bottom square section and the square bird house section. I make the bottom square portion 3"– (8cm–) long. Use the toe of the skew to make two vee cuts at these marks and start shaping the transition from the square ends to the round middle. Use the skew (or a spindle gouge) to round over the squares to blend with the center section of the spindle. I like to turn a lamb's tongue to transition from square-to-round (**Photo 3**). This is basically an ogee, starting with a cove at the square corners and merging into a rounded over section.

Add details

On this design I have two beads at the bottom, one on top with a cove below, and a long ogee in the middle. After marking the locations with a pencil, I make vee cuts with the skew to clearly locate these details and to waste away a little wood to make the beads easier to round over.

On hard woods I use the toe of the skew to tuck the joint between the beads. This makes the sides of the beads clean and the area between, crisp. On wood that will be painted, I leave the bottom of the beads rounded to make it easier to paint between the beads. To do this I use the toe of the skew to clean up the side of the bead, but when I get to the bottom, I slightly twist the skew. This leaves a mini-cove that easily takes paint (**Photo 4**). Sharp edges also need addressing to receive paint, so I knock them down slightly with 220-grit sandpaper.

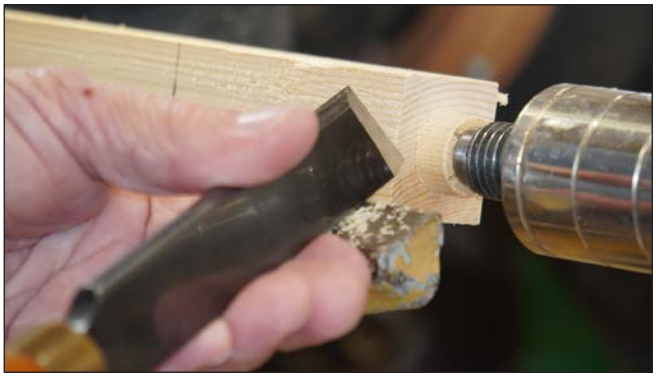


Photo 1. *Cut the tenon shoulder with the toe of the skew, following an arc towards the center of the spindle.*

Photo 2. *Round over the top of the bird house to meet the tenon using the heel of the skew.*

Photos 3-4. *Subtle details grace these forms, including a lamb's tongue transition from round-to-square features (left). If the beads will be painted, a small cove (or flat) between them will make decoration easier.*

Photo 5. *Chatter appears as the stock becomes thinner and the cut is farthest from tail- and headstock support.*

Next, I move to the ogee shape in the middle. I round over the bottom of the ogee with a spindle gouge or skew before turning the middle portion down. I approach this feature like a long, large cove, turning from large-to-small diameter. Make one pass from the bottom end towards the middle, and then from the top end to the middle. I use the skew for this task. This is usually where the chatter starts (**Photo 5**).

Sand

I sand pieces to be painted to 220 grit. Be careful to preserve crisp features when sanding the square-to-round transition. I use either stiff paper held underneath the piece or fold a sheet of paper and stretch it between my fingers to push against these areas. This keeps from tearing the corners or damaging your fingers, neither one of which is any fun.

Seal

When I've finished sanding, I apply a coat of either sanding sealer or lacquer thinned 50 percent with lacquer thinner. This keeps the paint from soaking into the wood and reduces the number of coats needed to cover the work.

The perch

Drill a 3/4" hole in one side of the top for the birdhouse opening using a Forstner-style bit. Then drill a 1/8" (3mm) hole below this for the perch. To turn the perch, drill a 3/8" (9mm) hole in the waste block. If you have a 3/8" dowel of the right wood, glue this in place. If you want a special piece of wood, mount a short piece between centers and turn a 3/8" tenon on one end. Glue this in the waste block and turn the perch (**Photo 6**). Sand and apply finish before cutting the 1/8" tenon.

Put a lid on the chatter

To keep chatter to a minimum, reduce the pressure on the tailstock and use your hand on the opposite side of the spindle to counteract the force of the bevel of the tool. My thumb pushes the tool down on the toolrest, not into the turning.

How much pressure do you use with your fingers? You'll figure it out with practice. Too much and you burn your fingers. Too little and you get chatter. Try to keep the pressure on the bevel of the tool as light as possible. Turn the lathe speed down. Make light cuts with a well–sharpened tool. If you experience chatter, change the angle of the skew very slightly so you're cutting the tops off the chatter spirals instead of just following the valleys of the spiral. These techniques help reduce chatter but may not stop it entirely. The more you practice, the better you will get at reducing chatter. Sanding will usually take these marks out easily, so it's not a big deal—it's just a goal to shoot for. This is good practice if you ever want to do long, thin spindles, which chatter badly and require a practiced touch.

Photo 6. *Turn the perch either from a dowel or a prepared blank with a 3/8" tenon glued into a waste block.*

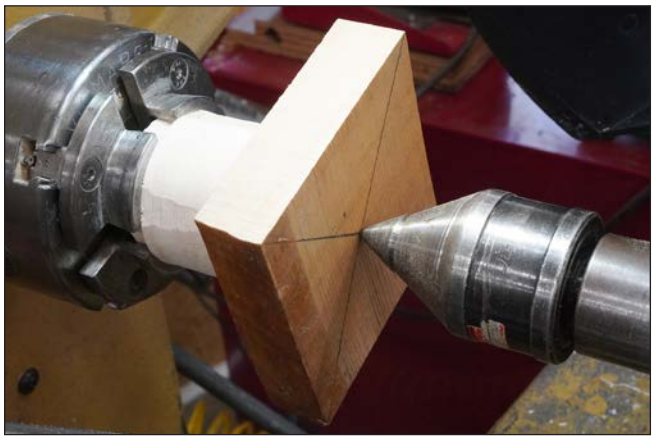


Photo 7. *Attach a 3" × 3" blank to a long-grain waste block held by a tenon to turn the base.*

Photo 8. *To maintain a flat mounting surface for the spindle, mark the perimeter of the spindle on the base.*

The base

I place a waste block in the four–jaw chuck in endgrain orientation. I use scrap or a piece of a limb and face it off. Cut a 3" × 3" piece of wood for the base and mark the center. Put CA glue or hot–melt glue on the piece and push it onto the waste block using the tailstock with the point in the center mark (**Photo 7**). Drill or turn a 1/2"–deep, 3/4" hole for the tenon using a Forstner-style bit, or turn the hole with a parting tool. Remember, this is the top side of the base. Test fit the tenon and make the hole deeper if necessary. I mark an area equal to the diameter of the spindle base with a pencil line where I will leave a level platform for the spindle base (**Photo 8**).

Ideally you should turn the base from the center out so that you are cutting downhill on the grain. Depending on the design, this can be difficult. Light cuts with a sharp tool will minimize tearout when cutting from the outside in. I rotate the gouge so the tip is cutting at a shear angle. I describe this as gliding the bevel rather than riding the bevel. I would not recommend a scraper for turning the wings; it will tear the outer edge and leave a poor surface. I do use a scraper held at a 45-degree angle to flatten the top surface for the spindle. Be sure to check this area for flatness. When you finish turning this side, sand and apply sanding sealer (**Photo 9**).

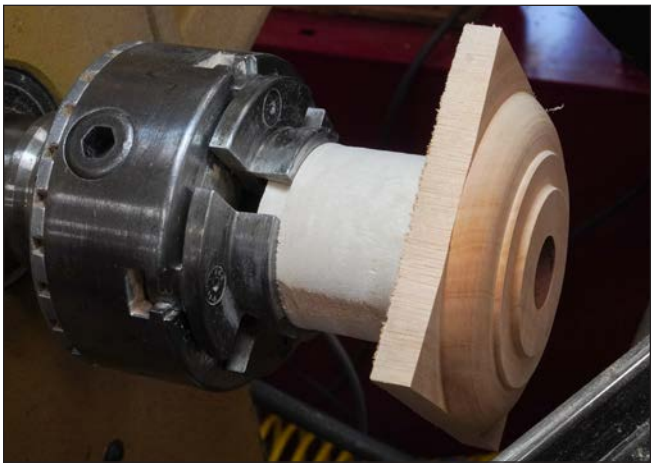


Photo 9. *Sand and seal the base after shaping, while access to these surfaces is at its best.*

I remove the base from the waste block with a chisel. If you place the chisel tip at the glue line and hit the handle sharply it will usually break the CA glue bond without damaging the wood. If you want to turn the bottom of the base, turn a 3/4" tenon on the waste block. This should be a jam fit so leave a slight taper on the bottom of the tenon. Fit the base onto the tenon and capture it there with the tailstock. If it doesn't fit snugly enough, try draping a piece of tissue or paper towel over the tenon. Holding it in place with the tailstock reduces vibration and keeps the blank from popping off the jam chuck. Turn most of the base and then pull the tailstock away to finish the last little center section. Be sure to sand and put a layer of sealer on the underside. When sanding the wings, it's very easy to inadvertently round over the edges. I often sand with the lathe off on square turnings. On this piece I added some texture because the bottom won't be painted, and I like that surprise when a curious viewer examines the base (**Photo 10**).

Photo 10. *Adding details to the bottom of the base creates surprises for viewers to discover.*

The roof

I like having a roof with square edges, so here is another opportunity to turn air. I used 2"–square × 3–1/2" blanks. If you want to stay with the 2×4 theme, you could simply glue up two pieces and mill them to square dimensions.

Photo 11. *Undercut the bottom of the roof and drill a 3/4" hole for a tenon.*

Mount the roof blank in the chuck jaws in a spindle orientation and turn the underside of the roof (**Photo 11**). I use a bowl gouge and turn a shallow depression from the center out. Drill the center of the roof with a 3/4" bit. Test fit the birdhouse to see how deep to drill the hole and re-shape the underside of the roof if necessary. Sand and seal this area.

Place a waste block in the chuck and turn a 3/4" tenon on the end for a jam chuck and mount the roof. Turn the top of the roof (**Photo 12**). Don't forget about the 3/4" hole you drilled in the bottom of the roof or you'll end up cutting through and have a very short leaky roof. Keep the tailstock in place as long as possible, leaving just the tiniest area to be removed later. If your jam chuck is good and you have a light touch

Photo 12. *After remounting the roof blank, turn the roof details, taking care not to cut into the 3/4" hole drilled in the previous step.*

with your tools you can turn this last very tip of the roof. You may need to support the top with your fingers while shaping the top of the roof. Sand and seal this area. Now you can glue everything together and start your finishing.

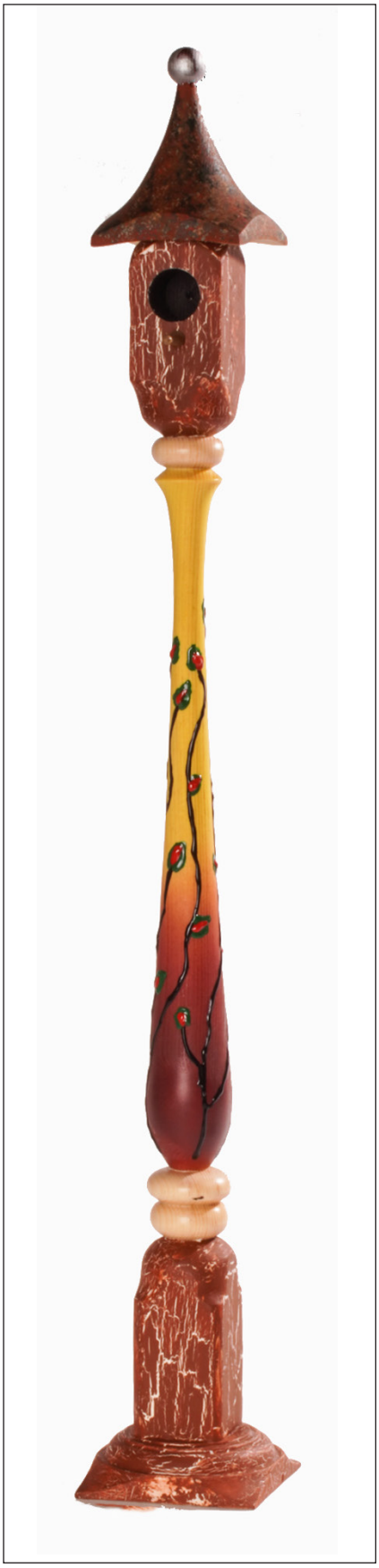
Finishing

If you buy a book on faux finishes there are a ton of options to achieve a variety of appearances. The crackle finish I cover here is only one of many options.

The simplest way to get a crackle finish is to use crackle medium. This product is readily available in art supply stores and online. To get a predictable outcome, you should use the paints recommended on the crackle medium you purchase. I like to use milk paint, but I have used lots of inexpensive acrylics and they also work well.

Paint on the base coat and let it dry. Follow this with a coat of the crackle medium, also applied like paint. Let the applied medium rest for the length of time recommended on the container.

The paint should be applied over the crackle finish with a full brush. One good stroke, and don't go back over the same area. Another attempt at coating the same area will drag paint and crackle medium together, ruining the effect. Fill the brush, do a stroke, and then fill the brush and apply the next stroke in the adjacent area. The surface will start crackling fairly quickly.



A thick topcoat of paint makes large cracks, a thin coat makes small cracks, but the temperature and humidity of your shop will determine the perfect time to apply paint over the crackle medium. This is one of the reasons working with a test board (and keeping notes) before committing to your turned piece is so important.

The crackled paint finish is a perfectly acceptable surface by itself. However, if I want a glossier look, I will apply wipe-on polyurethane over the dried paint.

When the paint (and possibly polyurethane) is dry, you are ready to glue in the perch and glue the roof to the house. I like to paint the hole in the top black so that it appears to be hollow.

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 Sycamore?

by Dave Schell

When I was a novice woodturner, I found a strange looking branch along the road and threw it in the back of my van to bring back to the shop. It was covered in grey and white bark in a random pattern and it was unlike anything I remembered seeing. I felt embarrassed asking my arborist friend what I had discovered. When he stopped laughing, he informed me it was sycamore. Little did I know that American sycamore (*Platanus occidentalis*) grows readily in my area and throughout the Eastern and Central U.S. It is also a common landscaping tree across much of the U.S. and is often planted by municipalities to shade streets and parks.

American sycamore has a few other names, including buttonwood, water beech, American planetree, Western plane, and Occidental plane. Two related species in the U.S. have much more limited ranges. California sycamore (*P. racemose*) and Arizona sycamore (*P. wrightii*) are limited to portions of their namesake states.

Once I knew what to look for, I saw the trees everywhere in my travels around Central Pennsylvania. Most of the sycamore I had seen had predominantly gray bark that lacked the eye-catching white spots. I realized that the white bark frequently flakes off, and on some trees, it is only seen on the upper branches. On the trunk, the bark can be gray with brown patches, instead of white.

Sycamore's bark pattern makes it readily identifiable, though you may need to examine the smaller branches to see this feature.

Sycamore in cross-section (above) and slabbed (right). Note the characteristic ray flecks in the piece at right.

I rarely see sycamore offered for sale in woodworking stores, on Craigslist, or on Facebook Marketplace. I can find sycamore in my local lumberyard as planks, but not turning squares. If I want to use it, I have to source it myself. That means I work with arborists to set aside pieces for me, or I keep my eyes open when driving and looking for wood piles in yards. I recently discovered a source from some local municipalities that had been trimming trees in town parks. I frequently see large sycamore trees with irregular growth patterns in the trunks, appearing like folds or small burl-type irregularities. Unfortunately, I have not been able to get my hands on any samples of that wood (but I drive by the trees regularly, always on the look-out).

Sycamore is an interesting wood to work. At 770 pounds-force on the Janka scale, sycamore is one of the softer hardwoods. In turning, it cuts easily, leaving a good surface off the tool with little tearout. The grain appearance is distinct and has an abundance of beautiful ray flecks, especially visible on quartersawn surfaces. When turning a bowl, orientation of the form in the blank can accentuate the ray flecks. With a bit of luck, a deep bowl will exhibit flecks on two sides. A shallow piece may show flecks across its surface, especially if the blank was quartersawn. It is easier to take advantage of this feature in flatwork, where I will frequently use sycamore on a project like a box to highlight the flecks. The wood ranges in color from light tan to dark brown and may contain orange-brown highlights.

Sycamore is light in weight, with a specific gravity that lies between Douglas fir and American cherry. This feature is a great conversation starter when a sycamore bowl sits next to similarly sized bowls of maple or oak, where the difference in weight is impossible to miss.

When turning sycamore, it is best to turn it after it has seasoned. Thin, wet sycamore pieces may crack, warp, and distort. Sycamore sands easily and readily accepts finish. My preference is an oil-based finish with a little paste wax to preserve the feel of the wood.

With good working properties with hand and machine tools, sycamore has many uses, including furniture, millwork, paneling, molding, flooring, kitchen counters, cabinet cases, butcher blocks, toys, and more recently as tonewood for stringed instruments.

I enjoy turning sycamore and wish I had more in my shop. Branches are easier to obtain in my area, and I use these for small bowls. I also use the branches to make magic wands for children of all ages at shows. Sycamore is susceptible to heart rot but will continue to grow long after the center of the tree has rotted away, and consequently a large tree may contain no large turning blocks.

Sycamore has little odor, nor any known allergen or toxicity concerns.

Give sycamore a try. I think you will be pleasantly surprised!

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

Wood Database

Eric Meier's Wood Database is available as a book or online. Both are excellent sources of information about a remarkable number of wood species, covering attributes such as working qualities and allergen or toxicity concerns—all good things to know before the tool contacts the wood. Check out the listing for American sycamore—and explore other species in the catalog—by following one of the links below.

tiny.cc/Americansycamore

Turn a Rainbow Bowl

by Phil Cottell

Rainbow bowls are eye-catching, and will please family, friends—and even customers. They are easy to make, but offer a few interesting challenges including beads on the face grain, an undercut rim, and on-lathe painting.

Tools and materials

I use the following tools for this project: 3/8" (10mm) spindle (detail) gouge with a swept-back grind; 1/2" (13mm) bowl gouge; negative-rake scrapers (about 1" and 2" (25-50mm)); drill for sanding (with pads/disks); rotary cutter tool with a round burr; acrylic paints or inks (opaque or transparent); small paint brushes; archival black ink in a brush-tip pen; and a 3" × 8" (8cm × 20cm) blank of light-colored, dense hardwood such as eastern sugar (hard) maple. You will want to choose timber that will provide a smooth finished surface and little interference with the paint colors.

Shape the bowl & make beads

To start this project, you will need to turn a basic bowl with a wide rim that will receive the surface decoration. As many articles have covered the details of basic bowl turning, I will not repeat those steps in detail here, but refer you to other articles and videos on the topic (see sidebar).

For more guidance on basic bowl turning and bead cutting, use the AAW's Explore! tool to read Turn a Simple Bowl *(Glenn Lucas) and* Bead-and-Cove Sticks *(Mike Peace). You can search AAW's library of publications, including videos on related topics by scanning the QR code, clicking the link below, or navigating to www.woodturner.org.*

Woodturning Resources
Explore!

Photo 1. *After chucking the form by its foot, face off the top and smooth the outside with shearing cuts.*

Photo 2. *Using a pencil and ruler, mark off even divisions for the beads.*

Photo 3. *Define and shape the beads with the detail gouge. Light cuts yield wispy shavings and a refined surface.*

Photo 4. *Start hollowing the form until you have room to undercut the rim.*

I mount the blank on the lathe with a screw chuck with the outside of the form facing away from the headstock. I bring up the tailstock for support and true the blank and turn a basic bowl form, with a tenon on the foot for chucking. I aim for a smooth, continuous curve from rim-to-tenon. I then reverse mount the blank with the tenon held in a four-jaw chuck.

I use a freshly sharpened detail or bowl gouge to true the face and underside of the bowl, and remove any edge roughness on the outer rim (**Photo 1**). Next, I make the wide rim using a pull cut to produce a smooth surface, which tilts slightly—about 5 degrees—toward the center of the bowl. With a pencil and ruler (or by eye), I mark the divisions that will define the rainbow beads (**Photo 2**). Use the tip of the detail gouge to vee-cut in at these marks from each direction (**Photo 3**). With the same tool, round the beads from their top surfaces into the vee cuts—this is the standard bead-cutting technique. Remember to touch the bevel to the wood, then gently raise the tool handle until the edge begins a fine cut. Care here will save sanding time later. If the beads appear uneven in width, take a few light cuts to adjust them.

With the beads all in place, it's time to undercut the rim. This makes a wide-rimmed bowl look and feel lighter, and the shadow lines created within the bowl are attractive. Start hollowing with the detail gouge where the last bead ends, working part way into the bowl (**Photo 4**).

Photos 5, 6. *Undercut the rim using either the detail gouge or round–nose scraper.*

Photo 7. *Complete the hollowing using a bowl gouge and scraper.*

Photo 8. *Sand the interior. The over–sized disk conforms with the curve of the undercut rim.*

Then, using the same tool with the slightly open flute facing toward the rim, begin a very gentle undercut (**Photo 5**). Aggression does not pay here, as it's easy to get a catch and knock the bowl off the lathe. An option for the nervous (or aggressive) turner is to undercut the rim before shaping the beads; a scraper could also be used in lieu of the gouge I use. A freshly sharpened, 1" negative-rake round-nose scraper smooths the undercut. Having the toolrest as close to the cutting tip as possible will minimize tearout (**Photo 6**). Hollow the rest of the bowl with the bowl gouge (**Photo 7**), then smooth the inner surface with the larger scraper. Aim for a sturdy 1/2"-thick wall, which is stable for painting, and feels good in the hand.

Prepare the surface

Power sand, beginning with 80– or 120–grit and working up to 320–grit abrasive. Lathe speed for power sanding should be about 350 rpm. Frequently stop the lathe to assess sanding progress. Wipe the form with a piece of shop towel after each grit to remove particles of broken abrasive. Pay special attention to the undercut area, using a slightly oversized sanding disk on the pad to wrap into the curve of the undercut (**Photo 8**). Work with the coarsest pad until there is no sign of tearout. Inspect your sanding before changing grits to ensure tearout is removed and sanding marks are uniform and becoming increasingly fine with each grit.

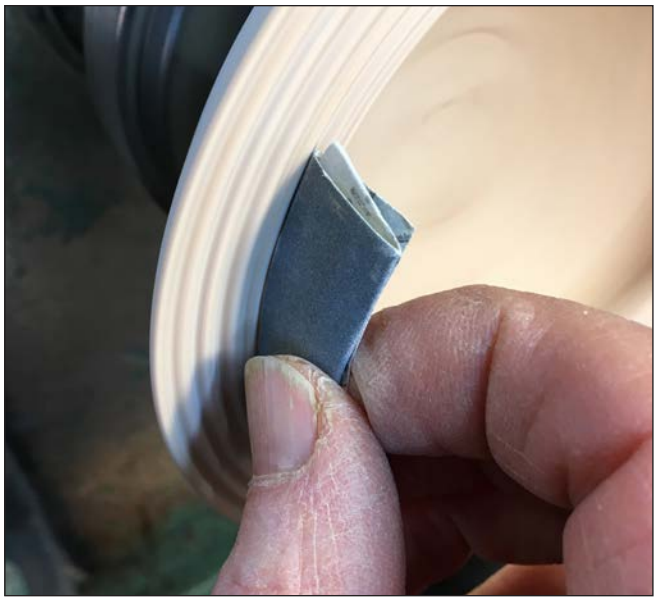


Photo 9. *Sand the beads by hand to preserve their shape. Beads sand quickly, so don't be too aggressive, especially with coarse grits.*

Photo 10. *A decorative element in the center adds a thoughtful design touch.*

The beads are sanded only by hand (**Photo 9**). I generally start with 180–grit abrasive and end with 320–grit (though ending with 220–grit will give the paint a little more "tooth" to grip). I have a locking chuck, which allows me to run the lathe both forward and backward with each grit, which I feel produces a better surface. However you approach the task, care with sanding will make the painting task easier. An optional step at this point is to cut in a small decorative feature around the center of the bowl with the detail gouge, then sand it by hand with 320–grit only (**Photo 10**).

Paint the rainbow

Remember the mnemonic for the spectrum of rainbow colors—ROY G BIV? Seven colors, but you only need red, yellow, and blue; combining red and yellow will make orange, yellow and blue will make green, red and blue will make purple, which can substitute for indigo and violet. A white plastic lid is helpful for laying out drops of paint to see the mixed colors better than on a colored surface (**Photo 11**). A drop of acrylic flow medium helps the paint spread.

Photo 11. *Prep for painting by mixing and laying out your colors in advance. A white plastic lid makes a fine pallet.*

While you have your paints mixed and at the ready, make a few swatches of each color on a scrap piece of wood. This will be helpful for testing the compatibility of finishes.

Place a long toolrest across the full face of the bowl, an inch or so away from it. This provides a view of your progress while supporting your painting hand and allowing for correction of any deficiencies. Reduce lathe speed to about

60 rpm, if possible, or, rotate the bowl with one hand, or, ask a buddy to help. Begin with the archival black ink pen, defining a thin black line at the outer rim and at each of the bead divisions (**Photo 12**). A black outline makes the colors pop.

The brush tip delivers a reliable, steady line. Acrylic paint begins to dry quickly, so move right into the first color, loading up the brush with red, but not so much as to drip, gently applying paint to the first bead as it slowly rotates by (**Photo 13**). Reverse the rotation and apply paint in both directions, stopping often to examine coverage. When you are satisfied with the coverage, wash and blot the brush, then move on to the next color. The last color, purple (or violet as the case may be), can slightly wrap around into the bowl; try for a sharp line where the paint ends (**Photo 14**). The paint will dry to the touch in an hour or so; it can be gently encouraged a little with a heat gun, held about 18" (46cm) away.

Finishing

Many finishing options are available. Using an oil finish allows me to wet sand the undercut rim with 320–grit to remove any residual tearout that may have revealed itself (**Photo 15**). I like to use Osmo Top Oil, but other options abound. Just be sure to use your sample board to test your finish for compatibility with your paint. It's convenient to apply the first coat with the piece on the lathe when it is still possible to correct defects. Gently wipe off

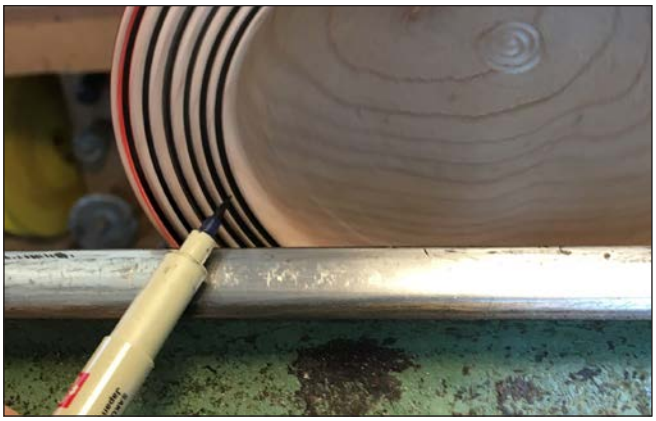


Photo 12. *Define the divisions between the beads using black ink. A fine-tip pen makes the task simple.*

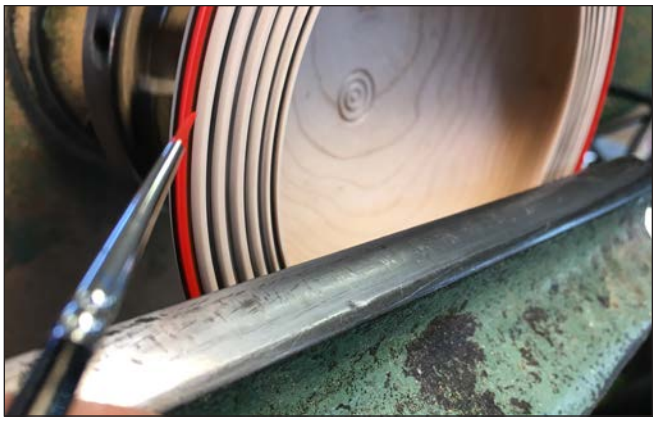


Photo 13. *Rotate the lathe slowly to apply an even coat of paint. Reversing the rotation ensures even coverage.*

Photo 14. *Wrap the last color (violet) into the bowl, aiming for a clean line where the paint ends.*

Photo 15. *Carefully wet sand the undercut rim using the finishing oil as a lubricant; avoid sanding into the paint.*

the excess finish with a paper towel, but avoid dragging one color across another. Allow the finish to dry for about twelve hours before proceeding. Apply the second coat of finish off-lathe, after the foot is complete.

Photo 16. *Use a vacuum chuck or a jam chuck with abrasive disks to access the foot for final turning.*

Photo 17. *Shape the foot with a detail gouge, and add any decorative embellishments.*

Turn the foot

A vacuum chuck is generally the easiest method for reverse-chucking a vessel to finish the foot, but it entails a bit of a financial investment. Absent that, anyone can use the method shown here—a rounded wood driver, or jam chuck, placed in the chuck and trued up. I use a caliper to measure the thickness of the bottom and verify how much material I can remove from the foot before creating a funnel.

I put a few used sanding disks between the driver and the bowl for cushioning; a scrap of split leather or suede also works well (**Photo 16**). A 320–grit disk oriented with the grit towards the bowl will encourage any slippage to take place between the driver and the disks, rather than against the wood surface. That said, the objective is to snug up the tailstock enough that no slippage occurs. Whether using a jam or vacuum chuck, make sure the chuck fits inside the bowl and does not touch the painted surface, which is easily marred at this stage.

With the detail gouge, shape the foot, cut in any decorative lines, then hand sand forward and back from 180– through 320–grit (**Photo 17**). Off lathe, the tailstock nub can be cut off with the burr in a rotary tool, and any marks from the nub sanded away with a 1" sanding pad and 1–1/2" disk, using only 320–grit abrasive (**Photos 18, 19**).

Photos 18, 19. *Remove the nub from the base with a burr grinder or carving tool and sand away any tool marks.*

Photo 20. *Sign your work using a fine tip archival ink pen or a pyrography tool.*

Sign the piece with an archival-ink pen—a 1mm nib works well (**Photo 20**). Apply the first finish coat to the foot, wiping away excess oil. I give the finish on the foot a day or so to begin curing, then apply a second coat of finish to the entire piece, again wiping off excess oil before allowing the finish to cure.

As with most lathe-based designs, options abound for improvising on the basic theme. Other interesting variations might include a loose-lid rainbow box, platter, plate, hollow form, or wall plaque. The closing image shows a birthday rainbow lidded box I made for my wife in which the edge of the lid covers the violet bead. I made the lid from purpleheart to further the rainbow theme, and added an ebony handle.

Enjoy brightening your world with rainbow bowls, and let us know how you get on.

Philip Cottell is a founding member of Island Woodturners Guild, Vancouver Island, a Chapter of AAW, and has served on the executive. He and his wife, Donna, enjoy retirement in Brentwood Bay BC, with their re-homed smooth collie, Raven.

Turn a Groovy Multiaxis Painted Mushroom

by Linda Ferber

Turning a mushroom offers a basic spindle-skills-building exercise. There are many variations to explore, including a dip into multiaxis turning. The beauty of mushrooms is that they come in an array of shapes, sizes, and colors. This diversity in the natural world opens opportunities to incorporate natural edges, pyrography, painting, and carving.

I have been turning mushrooms for over ten years and have tried all the variations I can think of. My current mushrooms range from boxes to one-off painted creations. This project is influenced by the work and teachings of Barbara Dill (multiaxis turning) and Carol Hall (dirty pour painting).

Prepare the turning stock

For this project I am using 6" × 1–3/4" square (15cm × 5cm) birch blanks (**Photo 1**). Select similar material from your wood stash. Birch is ideal because of its uniform grain, and it often has slight variations in color tone that contrast nicely with paint.

Start by marking centers at both ends with an awl or center punch. Mount the blank between centers and turn a rough cylinder with a spindle roughing gouge or spindle gouge. I like to use

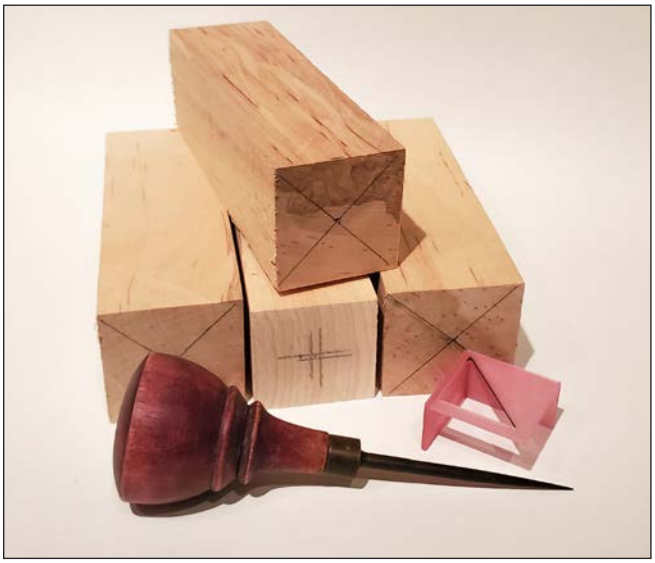


Photo 1. *A light-tone, fine–grain timber works best for painting—note centers located and marked.*

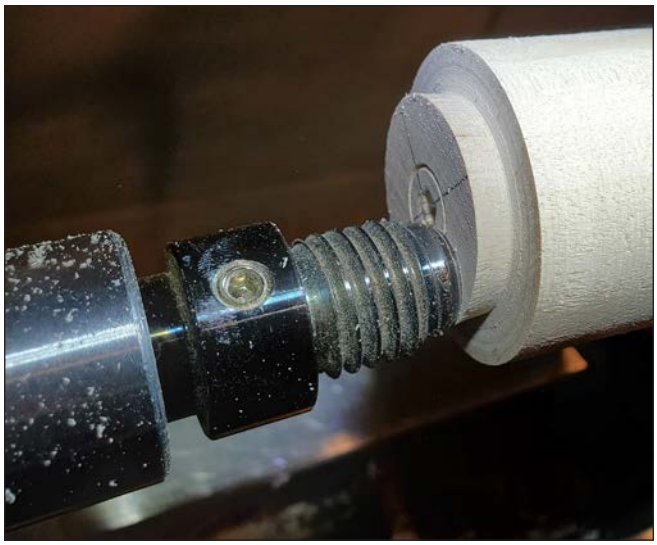


Photo 2. *After turning the blank to a rough cylinder, establish the secondary axis by moving the center at the headstock end. The offset distance need not be exact, but the author uses the diameter of her cup drive as a handy measurement.*

a cup center, as it will leave a reference circle in the endgrain that will be handy when it comes time to locate the secondary axis. When roughing the cylinder, you can leave some slight flats to maximize the diameter for the off–center base of the mushroom.

Form a tenon using a parting tool. I use an Apprentice 4–jaw chuck with either the No. 1 or No. 2 jaws for small projects. Use calipers to transfer an accurate measurement from your chuck jaws to the tenon. After a little experience, you might be able to use the outside diameter of your tailstock quill or headstock spindle as a guide to estimate the approximate diameter of your tenon.

Turn the base

The secondary axis for the base of the mushroom is located by moving about one cup-center diameter away from the central axis (**Photo 2**). I move the blank at the headstock end toward me to the edge of the cup circle indent.

To turn the base, make a mark to identify the length of the mushroom stem; 1" or 1–1/2" measured from the tailstock end is about right.

Photo 3. *Turn the secondary axis base for the mushroom. Make sure to remove material until you are cutting wood continuously around the new axis.*

Using a spindle gouge, cut an arc below this mark at the headstock end. In this project, the blank on either side of this secondary axis section will be turned back on the original central axis. Continue turning the arc until reaching solid wood all the way through the cut. Remove enough material to establish a clean peak at the transition points (**Photo 3**). Sanding for this stem section should be done now because we will not rechuck the blank on this axis.

Multiaxis Techniques

Barbara Dill, a master of multiaxis turning, significantly influenced the author's approach to this mushroom project. For more of Dill's writing on the topic of multiaxis turning, follow one of the links below or use the AAW's Explore! tool to search for Dill's article in the publication archives (A Systematic Approach to Multi-Axis Turning, AW Fall 2007).

tiny.cc/Multiaxis

Turn the stem and cap

Remount the blank using the 4–jaw chuck. This will return the blank orientation back to the original central axis. The next step is straightforward spindle turning for the stem and the slight undercutting of the mushroom cap. The chuck will also allow complete access to the top of the blank to create the smooth curve of the mushroom cap. There are no exact measurements that make this project right or wrong. Use your own sense of design, which may vary from mine.

Continuing with the spindle gouge, turn a narrow cylinder to form the stem of the mushroom (**Photo 4**). Blend the transition with the base so that the bottom of the stem sweeps outward to meet the top edge of the secondary axis base.

Slightly undercutting the cap will make the form look more natural and help with the painting step. Start with a narrow parting tool to set the diameter of the stem. The bottom of the stem with the arc curve will be the widest, reducing to its narrowest right under the cap. The parting tool used at an angle will give you a nice cut. With skill and practice a small spindle gouge presented on its side for a light shearing cut will work well for this task. The curve joining these two points should be gentle and flowing.

Turn the top of the mushroom, using shearing cuts with the spindle gouge starting at the outer rim and cutting towards the tip. The cap should be fairly thin with the bottom curve matching the top curve. Dirty pour painting will be most successful with a relatively shallow slope on the top of the mushroom—ten degrees or less. The paint cells created in the dirty pour process work best when gravity does not distort the wet the paint, as would happen with a steep mushroom cap.

Keep the tailstock in place as long as you can, as this will provide support for the cut and reduce vibration. To finish the top, you will need to

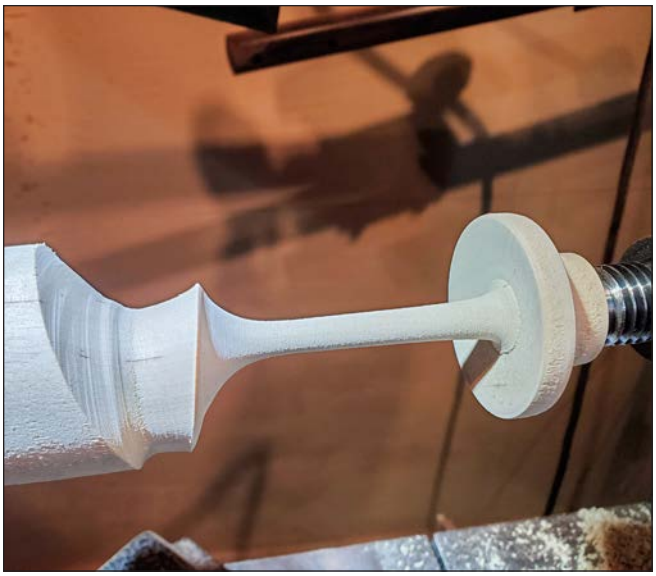


Photo 4. *With the blank re–mounted on its original axis, turn the mushroom stem and shape the top.*

Photo 5. *Remove the tailstock to complete the top of the mushroom. Sand the entire form using a light touch.*

retract the tailstock and make a series of gentle cuts to remove the nub at the top and blend the surfaces (**Photo 5**).

Sand the stem and mushroom cap to completion. Use a gentle touch, letting the abrasive do the work, and avoid putting too much stress on the stem.

Photos 6, 7. *Part off the mushroom with a parting tool below the widest diameter of the secondary axis base. The completed mushrooms should sit solidly on their off–axis bases.*

Part-off

I use a cover over the point of the tailstock for added support (and to protect the top of the mushroom) while parting-off (**Photo 6**). Part the mushroom about 1/4" (6mm) below the widest part of the arc—on the headstock side of the piece—creating a flat base on which the mushroom will sit (**Photo 7**).

Decoration

The dirty pour inspiration comes from Carol Hall's demonstration at the 2018 AAW Symposium in Raleigh. The objective is to create an eye-catching, multi-colored mushroom cap—think *Alice in Wonderland* (**Photo 8**). You achieve this by layering various colors of acrylic in a container that is smaller in diameter than your mushroom cap. Some of the paint colors will be modified with additives (like WD–40) that make them repellent to the non-modified colors. The modified colors will rise to the top of the paint layers and create cells of color. The dirty pour process is easy, but I recommend reviewing Carol Hall's video (see sidebar, next page) to fully grasp the technique.

You will need three or four colors of acrylic paint, flow medium, and silicone (liquid or spray). These supplies can be purchased at retail or online craft suppliers (**Photo 9**). Painter's tape, small plastic containers, disposable gloves, and stirring sticks will be needed. I have a cardboard box with a grate prepared for the pour; the grate allows paint to drain away from the base of the mushroom. You will also need to protect your work surfaces and, unless you want

Photo 8. *The distinct islands of paint are "cells," created by additives in some of the paint colors that discourage their blending with neighboring colors.*

Photo 9. *Supplies assembled for the dirty pour decoration. This gets messy, so cover yourself and your work space, too.*

to look like a psychedelic experiment, a way to protect your hands and clothes.

The containers for this project will need to hold a much smaller quantity of paint than the projects illustrated in Carol Hall's video. I found a package of small containers with covers to mix the acrylic paint and additives; yogurt cups also work. Containers with lids are convenient for storing the premixed paint for future projects. I selected my dominant colors—black, white, grey metallic, and gold metallic. I can add additional colors to this base plus a little metallic pigment for extra punch. For the pour, I use caps from empty acrylic paint jars. Stir sticks are handy, using one per color. Selecting colors is fun and you can experiment, but you can find color wheels online for some guidance for pairing colors.

Paint the top

From the covered containers of premixed paint, select four colors. The first color will be your base. Add smaller amounts of the next three colors with only a dollop or two of the last color. Draw an x through the paint with a stir stick. Let the mixture sit for a couple of minutes.

While you are waiting, prepare your mushroom, protecting the areas you do not want painted with blue or green painters' tape, and I mean cover it all but the top and bottom of the cap. Pouring paint is messy! After you have masked the mushroom with tape, make sure it can stand upright.

Place the mushroom top–down over the container filled with paint, flip the pair upright and set them on your grate inside the box (**Photo 10**). Wait a minute or two to allow the paint cells to start forming. Now lift the container and let the paint pour, giving it guidance by rotating the mushroom to make sure paint covers the entire area. The paint cells give the project a unique organic look. If no cells formed don't worry, just wipe off the paint while it is wet and try again. If the pour is successful, gently wipe the underside edges with your finger to remove excess paint or drips.

Photo 10. *Cups of paint inverted over prepped mushrooms. Note the painter's tape and the re–purposed oven racks to allow paint to drain away.*

It can take quite a while for the thick coat of paint to dry—be patient and give it adequate time. When the paint is dry, remove the painter's tape. If paint has seeped into unwanted spots, gentle sanding should clean it up. To complete the project, I add some simple lines using pyrography on the underside of the cap. I find little touches like this add to the work, plus these lines blend any small ridge of paint around the inside perimeter with the stem.

Linda Ferber recently retired from her position as AAW's Program Director. She is the founding editor of Woodturning FUNdamentals.

Dirty Pour

Carol Hall demonstrated her dirty pour painting technique at the 2018 AAW Symposium. If you missed the event, check out Hall's "Getting started with color" (Woodturning FUNdamentals, Nov. 2019 (V8N4), available from AAW's online archives at woodturner.org). You can also review her instructional video on the topic by using one of these links.

http://tiny.cc/DirtyPour

Shopmade Tool Finds Center

by John Kelsey

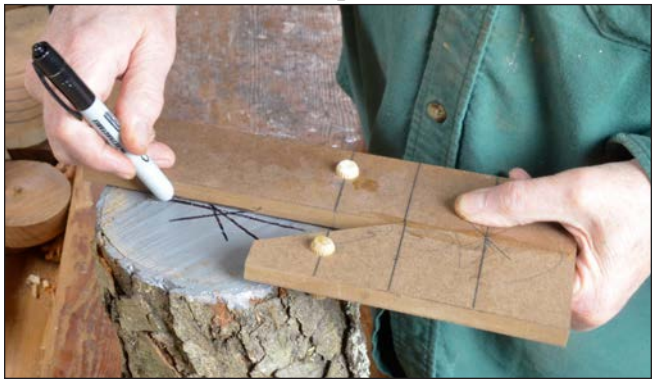
The Stanley Center Square quickly and easily locates the middle of any circle, even rough–sawn disks (**Photo 1**).

I probably bought my center square when I was a student in 1974, along with my "new" tape measure, and did not realize it is now an out–of–production antique until I went looking for another. Tracing around it clarified the geometry—its tangents, normals, and diameters—with the dowels on a line square and equidistant to the beam, and the (not critical) clearance angle of 30 degrees.

To prove the concept, I made a model from a scrap of 1/2" (13mm) MDF; I'll probably make the next one out of hardwood and a bit bigger. MDF is easy to cut square and straight on the chop saw or table saw (**Photo 2**). For a good joint it needs to be sized (sealed) with dilute glue before clamping up with a thick glue smear on both pieces and a small biscuit or spline.

The center square works on irregular log rounds too — just press the two dowel pins against the bark and draw lines from several places around the edge. They'll average out around a workable turning center.

John Kelsey is editor emeritus of Woodturning FUNdamentals and a member of the Lancaster Area Woodturners, an AAW chapter.



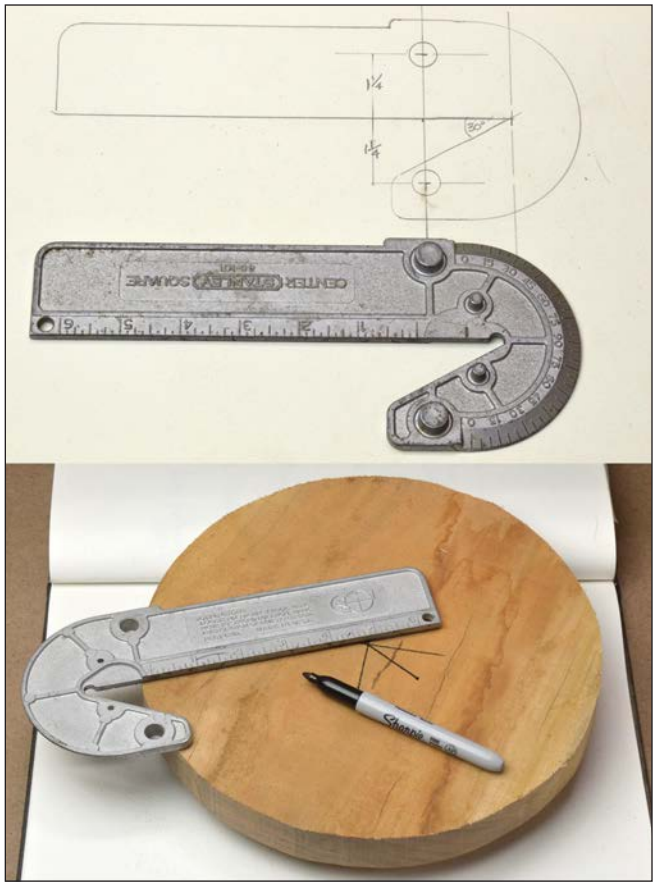


Photo 1. *Antique Stanley Center Square quickly finds center of disks and log rounds.*

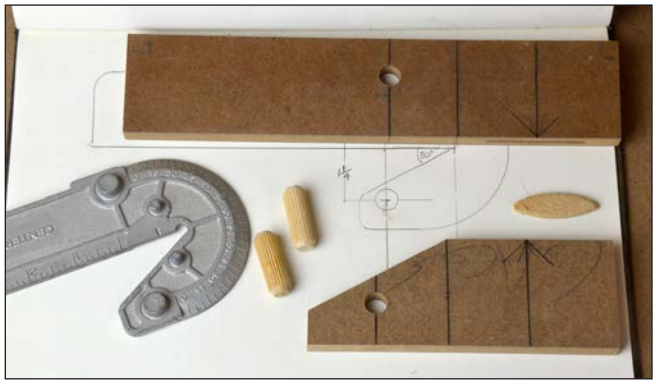


Photo 2. *Bill of materials: MDF 1/2" × 2–1/2" × 11" and 2–1/2" × 6" cut 30°, two 1/2" dowels spaced 2–3/4" apart, #0 joinery biscuit.*

Photo 3. *On a rough log end, press the shopmade tool against the bark and draw several lines. They'll converge around a workable center.*

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Fitting the Lid

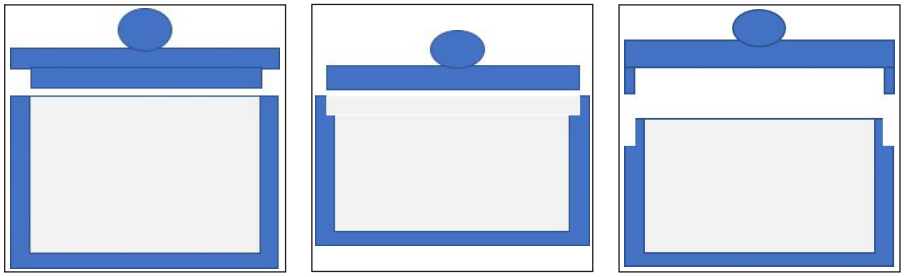
by Walt Wager

There are basically two types of box lids. Some lids fit loosely on the box so that they are easily removed with one hand, while other lids fit tightly and require that the box be held in one hand while removing the lid with the other. Loose lid boxes are containers that often sit on a horizontal surface, like a dresser or counter top, and hold objects or ingredients that can be easily accessed (**Figures 1, 2**). A tight lid secures the box's contents for small loose items; a pill box, for example, should have a Type 3 lid (**Figure 3**). Boxes with Type 3 lids can also be filled to the top and still have the top close completely.

Making Type 1 & 2 lids

Loose lids are the easiest to fit. Starting with the box itself, turn the inside edge so that it is straight and parallel to the lathe bed. I use a 1/2" (13mm) skew on its side to make a straight cut down the inside wall (**photo below, right**). When the box is hollowed to the desired depth, sand the inside and apply a finish.

It is easy to over–sand the interior rim or the edge of the lid that will meet the box. In many species, the difference in sidegrain and endgrain density leads to disproportionately removing material from two sides of the blank, creating an oval form and a poor–fitting lid.



Figures 1, 2, 3. *Loose lids generally have a short tenon that fits into the opening of the box, either protruding above the sides of the box (Type 1,* **left***), or flush with the box sides (Type 2,* **center***). Although Type 1 and Type 2 boxes can be made with tight lids, it is more common to see Type 3 (***right***) boxes with a lid that fits snugly so that it can be carried around without falling open.*

Cut the box's walls parallel with a flat–end scraper so that the lid will fit properly.

After hollowing, sanding, and finishing the box's interior, use a Vernier caliper to measure the interior diameter.

With the lid mounted in the chuck (bottom facing the tailstock), transfer the caliper measurement to the lid. This should be done with the lathe off, using the Vernier caliper to make two marks equidistant from the edge of the lid blank.

Turn on the lathe and use a pencil to connect the marks, making a line that represents the inside diameter of the box.

Use a parting tool to cut a tenon *almost* down to the line.

Check the fit by bringing the box up to the lid. If it doesn't fit over the tenon, use the parting tool to reduce the diameter a bit at a time until it fits snugly. Now you need only a slight scraping cut with the parting tool to make the lid slip on and off easily.

Sand the bottom of the lid, and only lightly sand the sides of the tenon.

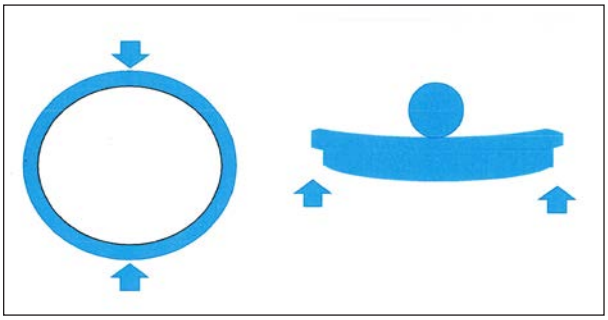
This same series of steps can be used with a Type 2 box lid, except that you measure the diameter of the lid with the caliper set to the inside of the mortise.

When the top fits, re-chuck the box and use it as a jam chuck to finish the top. If the top is too loose to stay on the box, a piece of paper towel in the joint should snug the fit. Bring up the tailstock while turning the top of the lid.

After shaping, sand the lid and the outside of the box.

Grain orientation

Boxes can be made in endgrain orientation, aligned as if turning a spindle with the opening in the endgrain, or facegrain orientation with the opening in the sidegrain. But even if the wood is kiln dried, a facegrain box can warp into a slight oval shape, or the lid may cup slightly. The lid will fit tightly in one orientation and loosely when rotated to the other.



Making Type 3 lids

An endgrain box made with kiln dried wood is less likely to warp, but achieving a snug fit requires sneaking up on the final cut. The next sequence of photos shows the steps I use to get a good fit.

Rough the blank between centers and put a tenon on both ends. In this case, the grain is running parallel to the lathe bed.

Determine the length of the lid, remembering that the tenon on the box will come up into the mortise on the lid. Because the lid will be grasped to remove it, don't make it too short to grab.

If you use a thin parting tool, the grain on the side of the top and box will virtually match.

Hollow the box and use a parting tool to create the tenon at the top. Make the tenon about 3/8" (10mm) long.

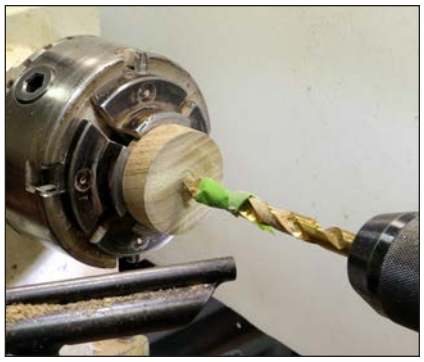
Make the edge at the bottom of the tenon square (perpendicular) to the side of the box so the lid will fit squarely onto it.

Sand and finish the inside of the box. Lightly sand the tenon. For safety, the narrow interior of a box should be sanded by wrapping a piece of abrasive around a dowel, rather than sticking your fingers in the spinning blank.

Remove the box from the chuck.

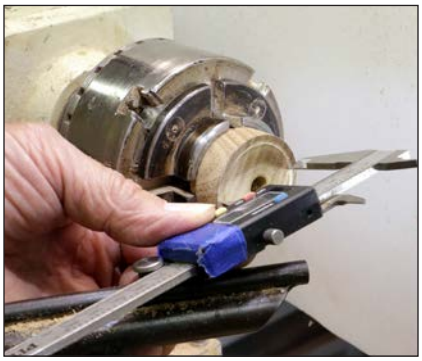
Measure the length of the tenon and mark it with tape on a 3/8" drill bit.

Mount the lid in the chuck and drill a hole to the depth of the tenon.



Measure the outside of the tenon with a Vernier caliper.

Transfer that measure to the lid blank.



Remove the wood from the center of the lid working from the hole in the center to just shy of the caliper line. Here I use a 3/8" spindle gouge.

Cut the inside of the lid to about 1/8" (3mm) deep and shy of the mark from the caliper. The purpose of the shallow cut is to have a place to test fit the tenon before hollowing the lid to its final depth.

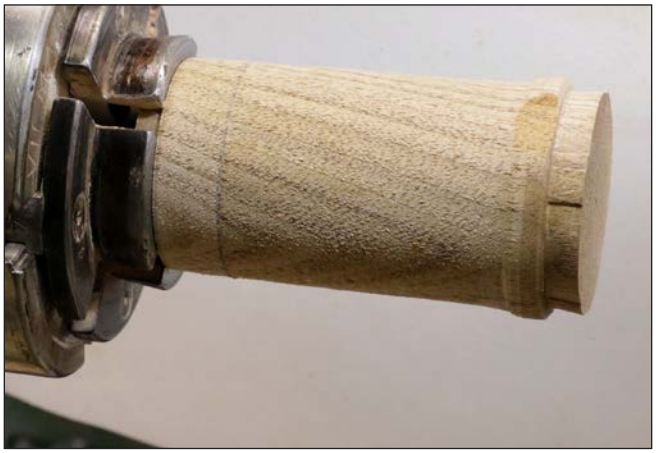
Test to see if the tenon fits into the hollow you just cut in the lid. If you stopped short of the caliper line, it should not fit yet.

Cut a slight taper in the lid from the mark left by the caliper to the bottom of the 1/8" hole.

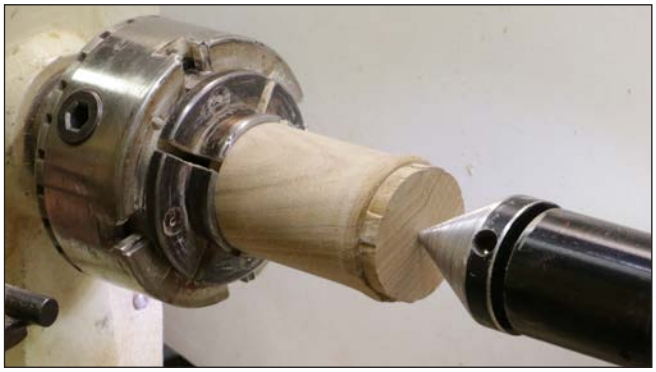
Check the fit again. If the tenon doesn't fit into the hollow in the lid, take another thin cut on the taper.

Check the fit. The tenon on the box should begin to fit into the tapered hole in the lid. Note where the outside edge of the box's tenon hits the inside of the lid. Twisting the box often leaves a mark on the inside of the lid. Widen the 1/8" inch deep mortise until the tenon on the box fits snugly.

Finish hollowing the lid to the depth of the drilled hole. Use a parting tool to square the mortise to the final depth. Sand the inside of the lid but don't sand the sides of the mortise unless the fit to the box is too tight. Just a little sanding with 240– or 320–grit sandpaper can change the fit of the lid to the box.



The box should fit snugly onto the lid and the edges meet squarely (note the joint faintly visible as a pencil line near the jaws). A bit of wax can be applied to the tenon and the inside of the lid but do not sand the tenon or the lid unless it is too tight to remove easily. If the lid will not pull straight off, twist it as you pull it apart.



Re–chuck the box and use it as a jam chuck to hold the lid. Finish turning the top of the lid. To finish the bottom of the box, reverse its orientation on the lathe and gently clamp the tenon on the top of the box in the scroll chuck. If you are concerned about marring the tenon, wrap a layer of shop towel around it before snugging the chuck jaws. Bring up the tailstock and engage the live center. Take light cuts to remove the bottom tenon, and finish the bottom.

Walt Wager is the president of the North Florida Woodturners chapter of AAW. He teaches woodturning at Camelot's Woodturning Studio in King Arthur's Tools, Tallahassee, FL. He can be reached through his website at waltwager.com. ❐

Carbide Tools? Fad or Future?

Carbide in action. Note the presentation, with the tool level and the cutting tip at the center of rotation. To make this cut, the tool is simply eased forward into the wood.

by Mark F. Palma

In 1960, Jerry Glaser set out to make gouges for Bob Stocksdale using new–fangled aircraft steels. The debate at the time revolved around whether anything could surpass the widely used carbon steel of the day. The same questions lurking then can be heard around discussions over carbide tools as they gain popularity in the marketplace. Will the tool take a sharp edge? Hold an edge? Are they worth the money? Why would an experienced turner want them? Why change what is working?

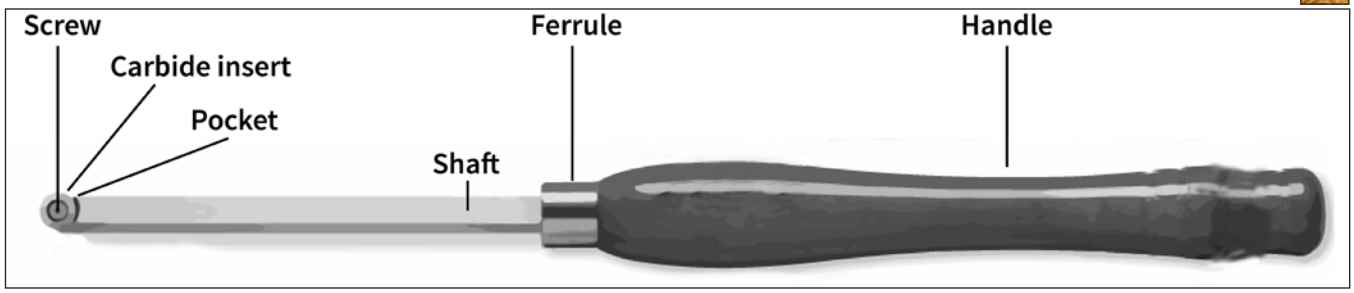
Jerry and Bob were on to something; carbon steel tools are less known to younger turners, who have only seen marketing for modern tool steels. With that in mind, let's approach carbide tools with an open mind, see why they are so popular, and understand the situations in which they can help turners of all levels.

History

The origin of carbide tools for turning is a little murky and probably in dispute. The Hunter Tool Company began manufacturing carbide tools in 2005 and is probably the first commercial manufacturer in America. The first tool review I could locate discussing the original Hunter Tool appeared in 2006. Craig Jackson started Easy Wood Tools, another leading purveyor, in 2008. Digging deeper, Jerry Glaser made three proprietary carbide bowl gouges around 1970; at least one of those tools is in a private woodturner's collection. But in my research I found a February 1948 *Popular Mechanics* article, "Turn with Carbide Tools," that shows wooden handled carbide tools that look surprisingly like modern tools, with a wood handle and a screw that secures a carbide insert on a hollow shaft. So, the idea isn't new, and the seeds planted decades ago have grown into a market segment.

Components

At a glance, a carbide insert tool appears to have three parts—a handle, a shaft, and an insert. Simple enough. Many a hobbyist or small machine shop has knocked together a tool on this basis. In fact, quality carbide tools are a system of six components that work together to create a safe, efficient tool.



The handle

The handle gives the user a comfortable way to grip and manipulate the tool. Shape, length, diameter, and material are variables to consider. Depending on your hand size, grip strength, type of turning, lathe size, and turning style, one design may have benefits over others for you. Most carbide tools come with wood handles.

The ferrule

The metal ring encircling the end of the handle where it meets the shaft ensures tool safety. Without a ferrule, the forces exerted on the handle could cause the handle–shaft connection to loosen, or the shaft to act like a wedge and split the handle.

The shaft

Shaft shape, cross section, length, and material vary from tool to tool. A hidden but important feature is how far the shaft is set into the handle. The deeper the shaft is set into the handle, the stronger the tool. Also, the tool balance changes depending on the depth that the shaft is embedded.

Users have a tendency to allow the tool shaft to overhang the toolrest farther than is appropriate or safe. I readjust my toolrest whenever the insert is one-to-two lengths past the toolrest.

The pocket

Quality carbide tools have a well-formed and carefully engineered pocket to hold the insert. Its shape supports the cutter recommended by the manufacturer, often in two directions. The pocket should be perfectly flat. This may take an initial light touch up with a diamond sharpening stone if any burrs are present.

Keep the pocket free from debris and make sure the carbide insert sits in the pocket without rocking or touching the pocket edge. Although there is sometimes temptation on the part of turners to grind away the pocket or attempt to shim a larger insert than the tool is designed to accommodate, avoid those practices as they compromise safety and the tool may not perform properly. The pocket also keeps inserts that are not round from accidentally rotating, should the insert work loose, a happenstance that could cause a serious injury.

The screw

The screw is the unsung hero and the most abused part of the carbide insert tool. Although it is the least expensive part, if not properly cared for, it can ruin the entire tool. The socket hole in the screw must have all debris removed before the tool is inserted into the socket to remove the screw. You can use a toothpick, dental tool, bent paperclip, sewing needle, or anything that can dig out the debris without damaging the socket. All but Hunter Tools use an Allen socket. Hunter Tools use a Torx screw, which can handle about twice the force of an Allen screw before stripping.

Do not substitute a different screw. The taper and diameter of the screw head and how it fits into the insert are critical to securing the cutter. Whenever you loosen the carbide insert, lubricate the screw with machine oil. If you turn wet wood, you should take the insert out at the end of the session and wipe oil on the pocket and place a drop on the screw threads.

If your Allen wrench has rounded corners at the tip (a common wear pattern), replace the Allen wrench so that you do not strip the insert.

Carbide insert

Carbide inserts vary in size, shape, and profile. For example, round inserts vary from 6–18mm in diameter. Shapes range from round–to–square, square–radius, diamond, hexagon, teardrop, and rectangular. Profiles include flat top, cup top cutters, to negative–rake scraping inserts. For safety, only use the replacement cutter designed for your tool. The wrong insert can create risk of either the cutter breaking, binding, or working loose.

Manufacturers also design inserts to be indexable (so you can rotate them to expose a fresh edge) and replaceable. They are designed to wear and be replaced inexpensively. Just as using a dull conventional turning tool puts the operator at risk, the same holds true for carbide inserts.

Safety and carbide insert tools

The same guidance for Personal Protection Equipment applies to conventional tools and carbide insert tools. This includes adequate face and lung protection.

Carbide insert tools come in an array of shapes and sizes. Like conventional tools, each is designed for a narrow range of tasks.

The toolrest should be adjusted so that the tip of the carbide insert is at center height when the handle and shaft are level. Do not overhang the toolrest excessively. Replace any chipped or cracked inserts. Carbide is relatively brittle and can become shrapnel if it shatters. Dropping a carbide insert onto a concrete floor necessitates exchanging the impacted insert for a new one—a trip to the emergency room is not worth the risk.

Make sure the insert is not moving on the shaft. Lastly, do not over-engage the insert in the wood. Note where the insert is cutting and only use a portion of the insert at a time. Radiused and round tools are generally safer than square inserts, and smaller inserts are safer than larger ones. Never let two sides of an insert engage the work at once; the tool may grab or become trapped in the wood. Lastly, never use any tool that is damaged.

How carbide inserts work

The profiles of flat top, cup, and negative–rake inserts determine how the tools behave when they touch spinning wood.

Flat–top

Flat–top inserts are most prevalent. These inserts have a profile (or relief angle) on the underside. They come in square, radiused, diamond, teardrop, hexagon and round forms, and they are all scraping tools. If you hold a flat–top tool next to a traditional scraper, you will see they effectively have the same profile. These inserts can remove wood quickly and cleanly. Most flat–top cutters are designed to be rotated in increments as they dull.

Cup

Introduced to the marketplace by Hunter Tools, cup inserts use a sharp, upwardly projecting rim that severs the wood fibers. They can cut

Cup inserts excel at cutting endgrain cleanly. they can cut and catch aggressively. Even the small cup can quickly remove a lot of material.

Negative–rake inserts look superficially like other flat top inserts, but their cutting action is subtle and produces a cleaner surface.

wood aggressively and must be respected as they can catch if you attempt to remove too much wood at once. Many hollowing systems use a cup type cutter either as their standard cutter or an upgrade because they cut endgrain fibers well. Cup inserts should be randomly rotated after each use to evenly wear the cutter. This is accomplished by loosening the screw and spinning the cutter.

Negative–rake

Introduced by Easy Wood Tools in 2018, the negative–rake profile reflects the geometry of negative–rake scrapers in traditional tool lines. They are not susceptible to catches, scrape wood in a more conservative, controlled manner, and work well on difficult materials like acrylic pen blanks. They are intended to be rotated in the same manner as flat–top inserts. This style of insert is currently sold as a replacement insert for existing tools, rather than as stand-alone tools.

Sharpness

A frequent criticism from turners who use traditional tools is that carbide inserts are not as sharp as a tool fresh from the grinder. There may be some truth to this contention, but there are important subtleties lost in that argument.

A properly sharpened steel tool (particularly if it has one of the more exotic metallurgical compositions) coming off a CBN wheel or wet grinder almost certainly exceeds the sharpness of a carbide insert. However, that initial sharpness disappears with use. As long as the tool is contacting rotating wood, the edge is becoming duller. Add into account knots, bark inclusions, and the inherent variables of wood, and a sharp edge can be short-lived. Having watched turners use a conventional turning tool for long periods of time without returning to the grinder, I am sure that their "sharp" tool is often far duller than a carbide insert tool.

Carbide inserts may not have the same initial sharpness as a freshly sharpened conventional tool, but their edge retention exceeds conventional turning tools. In a recent experiment I turned one hundred 4–6" (10-15cm) bowls with one carbide insert.

Probably the best compromise between the two camps is the most obvious. Do ninety percent of the work with a carbide insert tool, then take a freshly sharpened traditional tool to the work for the last pass or two to take advantage of the best features of each tool.

In the workshop

The simple presentation of carbide inserts to the wood blank reduces the learning curve for new turners. There is no bevel to learn to ride. The widespread availability of carbide tools and mini lathes has made woodturning more accessible and increased the likelihood of first project success.

If carbide insert tools have a fault, it may be that their simplicity can lead to carelessness. With traditional turning tools, little metal touches the work at one time. Properly used, the same is true for carbide inserts. Things go wrong when too much of the insert engages the work at once.

Unlike traditional tools that need frequent sharpening, carbide inserts can hold a functional edge through several projects. Because they dull at an imperceptibly slow rate, we tend to compensate by pushing ever harder on the tool without recognizing it is past time to rotate the insert. Perhaps a worse habit is the turner that keeps rotating the cutter to search out the least dull edge, rather than replacing the insert. These inserts were made to be replaced, and neglecting this simple task ensures a poorly performing and potentially dangerous tool.

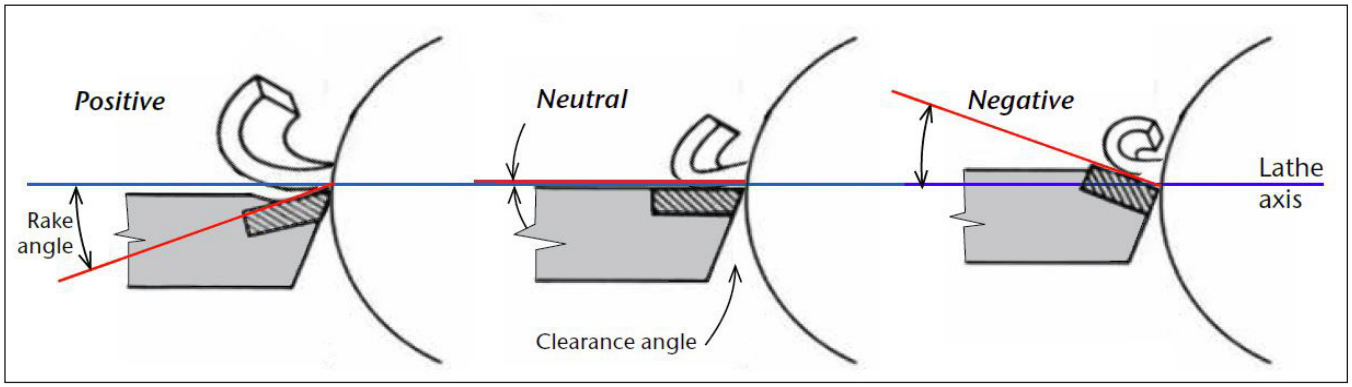
Carbide insert tools provide an easy way to enter the craft and achieve success with little or no frustration. If it brings gratification to these folks, and perhaps they develop enough interest to join a club or the AAW, how could that not be a positive outcome? My conversations with tool reps indicate that it is the influx of turners into this hobby through developments such as mini lathes and carbide tools that has funded the research and development of many other turning products.

These tools offer options for turners who trained on traditional tools. It's worth asking whether a tool that can turn a hundred 5" bowls without any trips to the grinder could have a role in your shop. I use only carbide insert tools to rough-turn bowls. Any dirt or bark comes off quickly and the carbide inserts seem to endure more abuse than the sharpened edge of a bowl gouge. I do all my hollowing and box making with a cup insert, as I find they cut well in situations where traditional tools struggle. In difficult grain and in situations where I am working deep in a vessel, a small cup or negative–rake insert can get me out of trouble. For acrylic pen making a negative–rake insert does a superior job to a traditional tool.

Of course I still rely on traditional tools! But I have found that carbide insert tools are serious tools that have earned a place in my shop.

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

What is "Negative Rake"?



by Chris Caliendo & Nancy Napurski Grove

Rake describes the geometric orientation of the cutting angle at the tip of a tool in relation to the material being cut. Rake affects cutting force and power, cut thickness, and tip lifespan.

Scrapers cut best when held flat and level on the toolrest with the cutting edge at center height. This is the safest way to use the tool because it keeps the sharp edge from biting into the workpiece.

There are three types of rake: positive, neutral, and negative, typically with a variation of 15° to 20° +/- from 0 (neutral). There are advantages and disadvantages to each. In woodturning, positive and neutral rakes perform similarly; every turner should have neutral and negative-rake scraping tools in the shop.

POSITIVE/NEUTRAL RAKE: Standard steel scrapers, some gouges, and most carbide cutters have a neutral rake. Bevel–rubbing tools like gouges and skews cut at a positive rake angle. These tools cut aggressively and you can quickly remove a lot of material without a lot of force. Because the rake can be quite aggressive, it's easy to remove material too quickly, affecting finish and shape. When turning hard materials like acrylic or mesquite, the tool can bite and tear. Aggressive cutting also wears the edge quickly.

PROS:

- Removes a lot of material quickly.
- You don't need to apply a lot of muscle.
- Good for starting a project.

CONS:

- Mistakes are easy to make.
- More chipping and blown-out walls.
- Steel tools need frequent sharpening.
- Carbide tips may wear prematurely.
- Difficult to use for hollow forms.

NEGATIVE RAKE: A negative rake point or edge offers control, making it generally safe to use. The negative angle can't cut aggressively, so you have to go slowly. It greatly reduces the chance of a catch, so it's a good choice for hollow forms, manmade materials, and hardwoods.

PROS:

- Safer to use than positive/neutral profiles.
- Reduces the chance of a catch.
- Doesn't require as much sharpening.
- Easy to use for hollow forms.
- Longer tool life.
- Easy to control path of cut.
- Produces a refined surface.

CONS:

- Cannot cut aggressively.
- Doesn't take off a lot of material at once.
- Less effective on soft or wet woods.

The authors represent Easy Wood Tools.

Sign Your Work

by Kelly Dunn

Have you ever picked up a bowl and turned it over only to find nothing on the bottom? You may have been hoping to find an artist's signature, wood type, and the year it was made. Or maybe you've looked for a signature and found only illegible scribble? What about a code that makes no sense to the holder?

Why should we bother with legible signatures, wood, and date? Many of us will not get our work into a permanent museum collection, a corporate setting, or even a private collection. If we are fortunate and someone takes note of our work, all information on the bottom of the bowl becomes vital; but including this information creates a valuable record, even if it's only for ourselves.

In 1990, a gallery owner requested that I not date my work. He held that an older date led clients to believe that something was less than perfect with the piece. I followed his request for part of that year.

I had a conversation with Bonnie Klein at a symposium dinner that same year. Bonnie picked up one of my pieces without a signature. Bonnie's view was that I was the artist. She suggested that the gallery owner did not care about the artist's reasoning for wanting a date on the work, merely the marketability of a bowl. Bonnie stated, "In 150 years, the date on the bottom may be more important than the signature."

I reverted to dating all my work after that conversation. Occasionally, I stumble across one of those pieces without a date. I can pinpoint the time frame to that brief period in 1990 when I did not sign work.

A locally known turner/gallery owner signs and fully dates his pieces—month, day, and year.

D.E. McIvor

His clients will ask if something is wrong with a piece with an old date. He jokingly tells them he made the piece just for them and suggests that it took them a while to get there.

The notable Jack Straka had a long career as a full–time woodturner in Hawaii. Early in his career, he would only sign to indicate the type of wood. Jack considered most of his work as functional and did not feel the need to add a signature. A gallery owner told him she was not just selling a functional bowl, but a Jack Straka bowl.

Jack would then sign each bowl bottom with "Straka" and the type of wood. There is no time line for his work because he did not date his work until after retirement. In a recent conversation with Jack about signatures, we discussed the lack of dates on his work. The added year was prompted by request of a gallery owner. The gallery owner impressed upon Jack the importance of dates for clients that collect his work.

Bob Stocksdale also had a long career as a woodturner and produced many bowls. Each

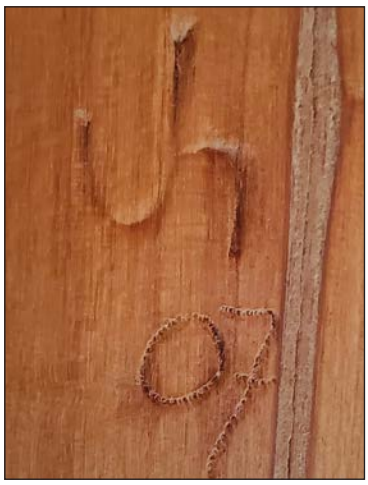
piece included a legible signature, the wood, and year made. Bob was known to occasionally include a bit of history on the bowl bottom. Seeing the extra information is delightful.

One option some artists use is a numerical code. The issue with coding work is that unless the code is available, the holder has no idea what it means. The artist may be able to track work utilizing that code and give a full accounting of a piece, but unless this information is shared, no one else understands.

When I taught a hands–on class a while back, I brought out my vibrating engraver and demonstrated control for signing work. This led to a class discussion where a member revealed that he finishes his bowls with nothing written at all. I asked if he was proud of his accomplishments. Of course, he was, but offered that he did not care about identifying his work.

Consider heirloom woodwork passed down within a family or finding a beautiful piece at an estate sale or on the secondary market. How does a signature or maker's mark make you feel? How do you feel when you see a date on something handcrafted long ago?

From our own collection, we have work that we can no longer identify. At the time of purchase, we knew the artist's name, or had a business card. Over the years, memories fade and business cards are misplaced. In several cases, the pen used to sign was not archival, so that too has faded. Initials may not evoke a full name after a time. We may recall where and when we purchased the artwork, but initials are not enough to identify the maker.



D.E. McIvor

I am a proponent of signing all work with a legible signature, the species of wood, and year. I recommend utilizing a vibrating engraver, a pyrography tool, or archival ink. By signing each and every piece, you offer a chronological journey through your development as an artist, and keep yourself connected to your own history.

Award-winning wood lathe artist Kelly Dunn lives on the Big Island of Hawai'i. Kelly specializes in woods grown on the Big Island. He creates bowls, hollow vessels, and art forms full time for art galleries and private collectors.

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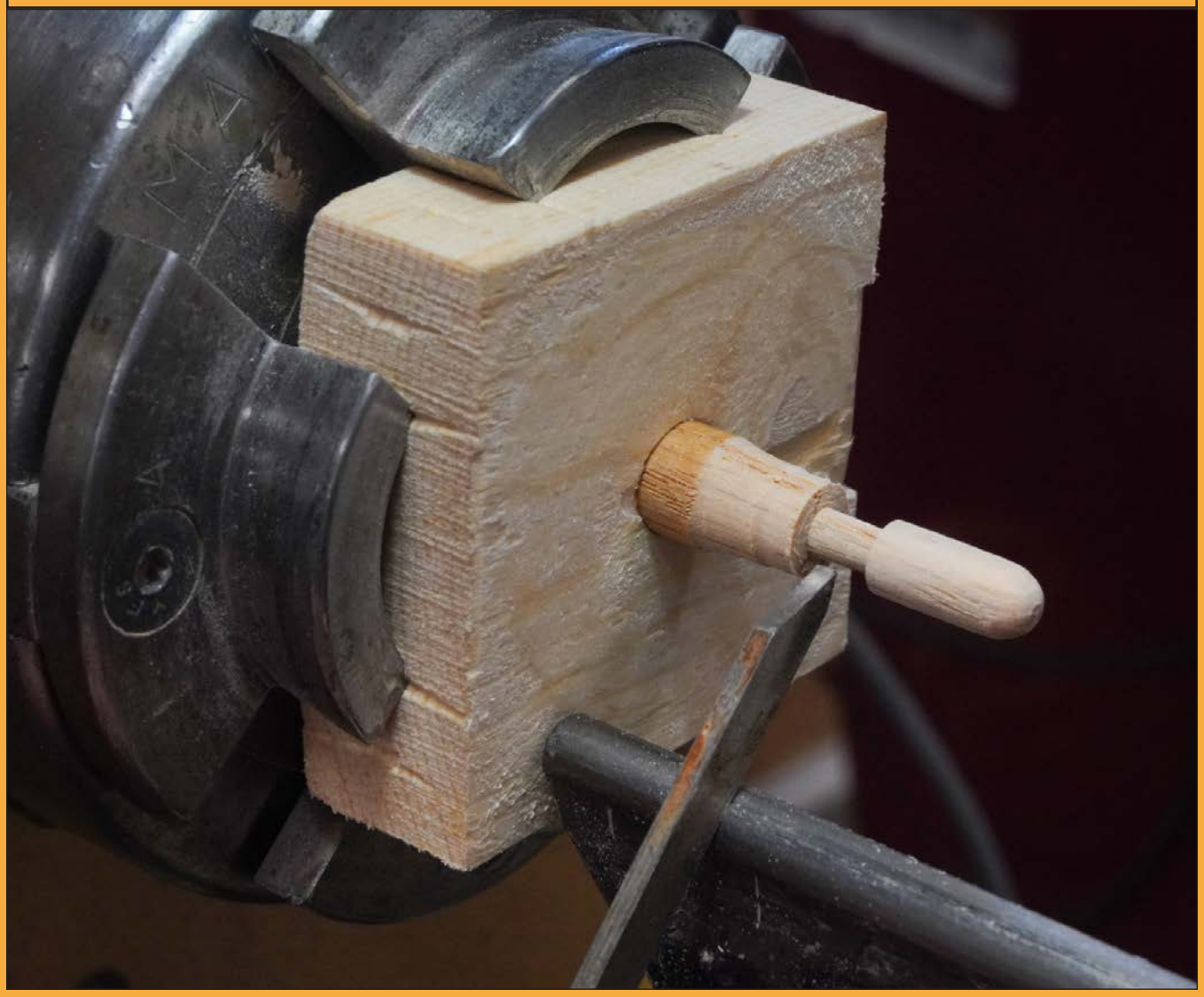
Woodturning FUNdamentals

is an informative digital publication and online learning portal aimed at new turners. Whether you're starting a new hobby or plan to become a pro, the projects, techniques, tips, videos, and resources in Woodturning FUNdamentals *will help you build essential knowledge and skills. The AAW publishes* Woodturning FUNdamentals *digitally, four times each year and free to members.*



John Lucas

A waste block held in a four-jaw chuck makes a useful drive for small spindles. Drill a hole in the waste block to receive a tenon turned on the end of the spindle blank. Performing this task on the lathe with a drill chuck ensures alignment with the rotation axis. The tenon should be glued in, but little holding power is needed, so choose a quick setting adhesive such as CA or hot-melt glue to quickly get back to turning.

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