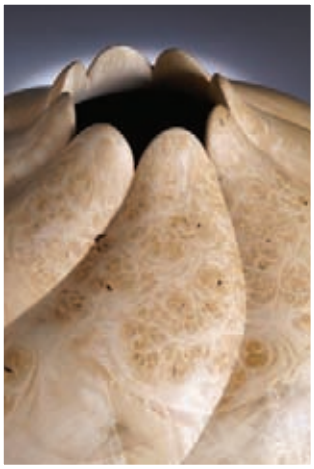
Turned and Carved Hollow Vessel

John Jordan

John Jordan, Silver maple burl vessel, 9" × 8"

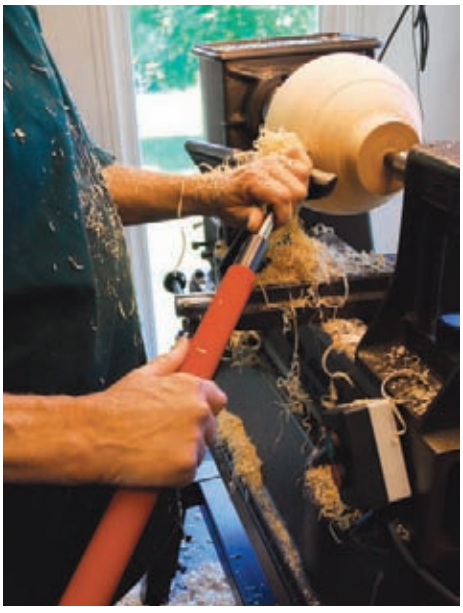
Hollow-turned vessels with fairly small openings are the basis of all my work. They provide the perfect palette for the carving, surface treatments, and textures that are an integral part of what I make. Smooth, rough, patterned, or random, it is the look, feel, contrasts, and possibilities of these surfaces that keep me interested and motivated. In this article, I describe the basic steps I use to make a hollow vessel with carved spiral flutes.

Wood selection and orientation are very important in the success of a piece. Even if you are simply practicing or experimenting (which I strongly encourage), avoid the use of crappy wood, which will produce frustration and negative results. Nice, straight-grained fresh wood is best and it does not need to be fancy. Plain wood is just fine for practice and is what I often prefer for some of my carved pieces, particularly the ones I dye black. (For more information on wood and wood selection, see "Understanding Green Wood," *AW*, Spring 1998, or John's DVD, *The Aesthetics and Properties of Wood*.)



All of my work is turned from green wood, start to finish. There is little danger of cracking, as the wood is sound to begin with and the vessel will be turned relatively thin, allowing it to dry evenly. Thicknesses for most of my pieces range from around ¼" to as much as ½" for the vessels that will be deeply carved. I turn vessels both endgrain and sidegrain, and there is not a lot of difference in the making, but the visual difference may be quite dramatic. The apparent movement of the wood as it

Rough sawn blank mounted between centers.



Rough shaping between centers.

Mounting the roughed-out vessel in a chuck. The shoulder on the wood and the shoulder of the chuck must touch.

Rough shaping between centers using a ½" side-ground bowl gouge to establish a tenon for mounting in a chuck.

dries will typically be less noticeable with endgrain orientation.

The wood I'm using for this vessel is silver maple burl. Although burl may have grain going in many directions, this piece has a sidegrain orientation. The foot is oriented toward and centered on the pith of the log. This ensures that the movement will be symmetrical and that the burl eyes and figure are strongest on the top of the form.

Each day before turning, I do a little lathe maintenance. Every time I turn, I polish the toolrest with sandpaper and WD-40, then spray the bed and the moving parts of the toolrest base and spindle threads, then wipe it all down. Just the act of polishing and lubricating will improve your turning and the lathe parts will work easily and smoothly. I am near fanatical about this. Ask anyone who knows me.

There are several ways to go about hollow turning, and the ones that are successful have one thing in common: a simple and basic step-by-step, logical approach. Everything I do in my turning is as simple as I have been able to make it. There is nothing complicated. I complete each step before moving on to the next.

Rough shaping the vessel

After selecting a log, I cut off several inches from the end, mark out my piece, and chainsaw it to square. I then cut the corners off. The first step at the lathe is to rough shape the wood. All of my pieces are started between centers, which allows me to shift the blank around. I can adjust for balance, ▸

Refining the shape.

Raising a burr with ceramic slipstone.

Shear scraping with gouge.

Shear scraping for a clean-cut, final surface on the wood.

grain patterns, and defects at any point during the rough shaping. This degree of control is very important.

With the base of the vessel toward the tailstock and the toolrest set at a 45° angle, I start shaping with a ½" side-ground bowl gouge (see "Side-Ground Gouges," *AW*, vol 9 no 1, and AAW's DVD, *Woodturning: Fundamentals of Sharpening*) on the corner of the piece. There is no need to round it into a cylinder first; that's just extra effort. As the piece becomes rounded into shape, I turn an area at the base that will be used for mounting in a chuck. It's important to establish this area in order to visualize where the actual shape or curve of the piece goes. It is clearly defined as a waste area, not as part of the finished shape.

After rough shaping the lower half, I move the toolrest around to the top and rough shape it in the same way, stopping often to look at the wood to check for defects, balance of grain pattern, or any surprises. I will shift the piece as needed. I want to get the shape of the piece very close to its final form while getting it balanced and adjusted. I don't worry about finish cuts until it's mounted in the chuck.

The last thing I do before removing the piece from between centers is to form a clean, square tenon and shoulder for chucking. It's important that the shoulder of the chuck and the shoulder I just turned touch. This is what gives the mount strength. Having the shoulders touch provides

Shaping the inside of the vessel's lip and making a dimple for centering the drill bit.

Drilling the hole in the vessel.

Marking drill bit for depth of drilling.

First hollowing cuts, using a straight tool.

a mechanical advantage. I usually undercut the shoulder a bit to be sure it touches at the outer edges.

Shaping cuts

With the headstock spindle locked, I thread the chuck onto the spindle, making sure it's snug. This makes it easy to remove later. There's no need for plastic washers; they contribute to chatter. A little lubrication and a light, but firm tightening is all that's needed. I place the vessel into the chuck, making sure the shoulders touch, then firmly tighten the jaws.

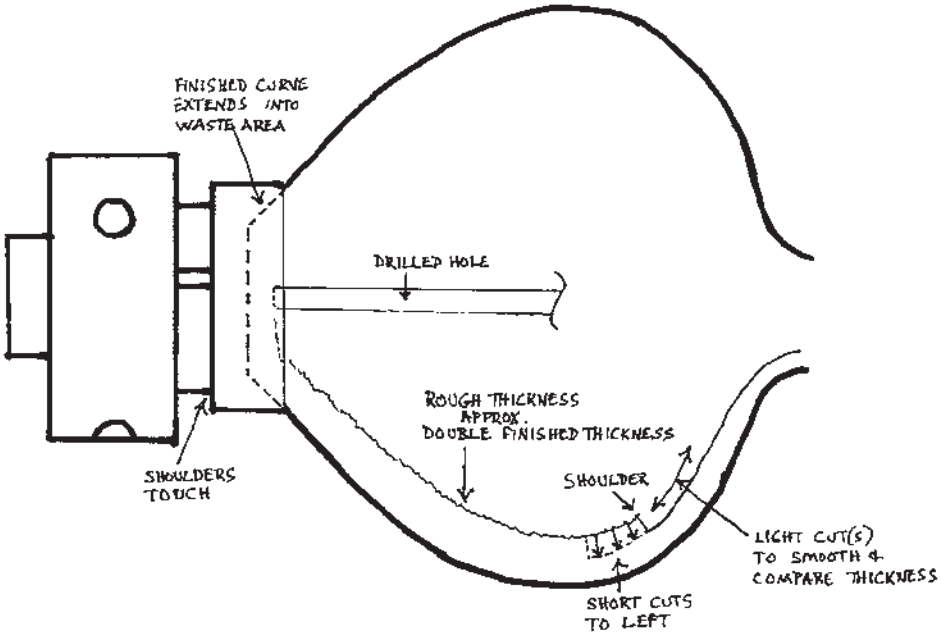
With a fresh edge on the gouge, I start on the top of the piece, taking light cuts to refine the shape. The toolrest is moved around to the lower part of the vessel and I continue with light finishing cuts. I may go back and forth several times until the shape is right. It is the elegance of line and form that determines the success of the piece. There is not space here to get into form and design, but I'm after a simple shape with continuous curves and no flat spots. Sometimes the shape comes very easily, other times it takes more effort, but I will spend as much time as needed at this point. I may take the piece off the lathe (in the chuck!) and view it upright.

I use a shear-scraping cut with the long edge of the gouge for the last bit of subtle shaping and refine it even further with a double-ended shear scraper with opposing angles on each end. On my shear scraper, I raise a ▸

Hook tool.

Blowing out shavings with compressed air.

Body position is upright and relaxed, tool handle next to body.



burr using a ceramic slipstone and use that burr to make the cut. The edge of the tool is presented to the wood at a 45° angle and pulled along the surface. This cut allows for a fine refinement of the shape and leaves a very smooth surface. This surface requires minimal sanding and it allows me to draw my layout lines without sanding.

Next, I use a small detail gouge to do any remaining shaping on the lip, which in this case is a simple rounded shape that will fit nicely with the carving to come. I use the same gouge to open up the vessel a bit, just inside the lip. I make a small dimple in the center as a point to start the drill bit.

Drilling for depth

I mark a ⅜" drill bit with a piece of tape to indicate the inside depth of the vessel. I typically eyeball the distance, but a straightedge can be helpful to lend accuracy. Accuracy is important, as too much wood left at the bottom is not desirable and too little wood is unfortunate indeed! The drill I use is about 15" long and I hold it in a pair of locking pliers. It's necessary to push the drill bit in an inch or so at a time, then pull it out to clear the chips, in order to keep the chips from swelling and binding the drill bit.

Tools for hollowing

The hollowing process is done with tools that I make: a straight tool and two different hook tools. This vessel will only require the #1 hook tool. These tools use a 3⁄16" square HSS

First cuts with a hook tool to open the shoulder.

Hollowing tools.

Expanding and contracting of left hand controls the tool movement.

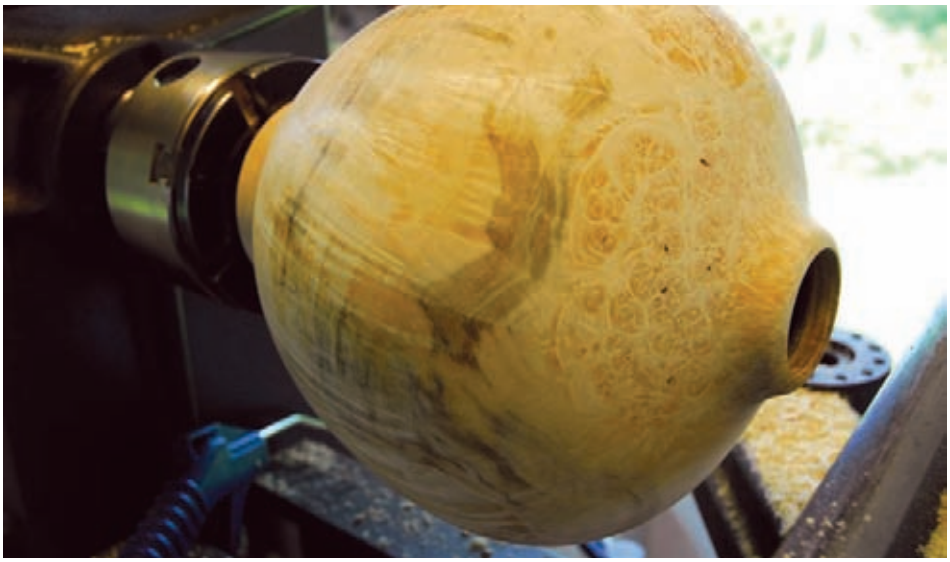
Measuring wall thickness with calipers.

scraper tip with a full-round fingernail shape on the end. Larger tips can present too much cutting edge when working into the shoulder areas, making the tool difficult to control, which can lead to a catch. I sometimes use a slightly larger tip in the straight tool if I think it will allow me to take a somewhat larger cut without creating problems.

The design of this hook tool works because the cutting tip is near the centerline of the tool, so there is no rotational force or twist, as long as the toolrest is behind the hook portion of the tool. This geometry and the small-diameter scraper tips make these tools very easy to control.

An arm-brace handle of my own design is my preference, and the Stewart and Sorby handles work well, too. These arm-brace handles are particularly well suited to short-bed lathes. Your lathe should be about elbow height at the spindle to get the most out of the arm-brace handles. Some people like straight handles and others use some of the various versions of a captured handle. The captured handles or systems are fine and may be helpful to the casual turner, but I prefer handheld tools because they are less cumbersome. As much as possible, simple is better; however, I do on occasion use a captured handle on a really large piece. Often, these types of handles/systems use a laser as a thickness gauge. Again, there is nothing wrong with that, it works well, but it does add complexity. Regardless of the type of handle, the ▸

Wiping paraffin (wax) on toolrest and tool to reduce friction before final cuts are made.



Ready to reverse turn.

Checking finished thickness, shoulder, and rough thickness with a light.

Turning a tenon and shoulder on a waste block to fit the vessel's opening.

hook tool advantages are the same, as is the process of hollowing.

Hollowing the vessel

In a sidegrain piece, the direction of cut is not too important, so I'll cut whichever way is most convenient or easiest. On larger pieces there may be chatter when cutting to the side, so I'll make the cuts toward the center, which puts the load along the axis where there is more support. As most of the mass is removed, this tendency to chatter lessens. I use the straight tool first and alternate with the hook tool, using whichever is most convenient for removing the bulk of the wood, yet still leaving plenty of thickness.

It's important to stop often and blow out the shavings since fighting them will result in difficulty and possibly breaking something. As more waste is removed, I can make more progress each time because there is more room for shavings inside the vessel. This rough shaping of the inside continues until the depth of the hole is reached.

The next stage is to reduce the wall to a fairly even thickness and to smooth the inside surface. At this point, I'm aiming for a wall thickness approximately double the finished thickness. I make short cuts to the left, then move the tool back to compare that cut to the previous cut and I smooth the wall as I go. These cuts are controlled by my left hand expanding and contracting on the toolrest to make short, smooth movements. The only cuts up and down

Revolving tailstock center is used to put light pressure on the vessel against the waste block.

The newly turned area is finished with a shear scraper.

The vessel's bottom is made slightly concave and the nub is turned smaller.

Waste area is carefully turned away.

the wall are to lightly smooth the previous inch or two.

Finishing cuts

I *always* put a fresh burr on the cutter for the finish cuts. I also wipe a block of paraffin along the toolrest and the shaft of the hook tool. This helps me to feel the tip cutting rather than feeling the tool dragging along the toolrest and it's also helpful in getting smooth, even surfaces inside the vessel.

Starting inside the top of the vessel, I make several cuts reducing the thickness by about half, smoothing along for an inch or two, leaving a distinct shoulder where I stop. I measure the thickness, using just my fingers for this first section. Farther in I will use calipers to measure thickness. There are now two references: the known thickness of the part I just finished and the shoulder that was left. I locate the shoulder with the tip of the tool and just lift away. I turn the lathe on and make one, two, or three cuts to the left, then move the tool up the wall and compare those cuts to the known thickness, smoothing as needed. There's a rhythm to this that is pretty easy to pick up.

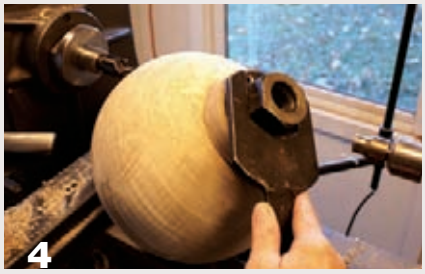
I blow out the shavings and then check the thickness with calipers. This vessel will be about ⅜" thick, leaving enough thickness for carving. I may take a look with my light, which helps me keep a mental picture of where I am. I want a relatively smooth and even surface inside the vessel. Tool marks are appropriate to the piece, but lumps and bumps are not. If there is a bump or rough area, I ▸

Faceplate Attachment

For larger vessels or for an alternative to using a chuck, a faceplate provides a secure and solid mount that's hard to beat. In these photos, the piece has a bit of extra wood so that the screw holes will not be an issue. If you need to use the full depth of the wood, a larger faceplate and/or consideration of the shape of the vessel will allow the finished form to fit within the holes made by the screws.

Remove the waste nub if it is too long.

Measure the inside opening of your faceplate.



Slightly thread the faceplate onto the tenon.

Add a few thousandths of an inch and turn and measure a short tenon on the bottom of your vessel.

I'm using #12, 1¼" screws (SPAX brand) to secure this particular faceplate to the vessel.

Photos: John Jordan


The remaining nub is pared away using a hand chisel.


Turning is complete.

note it relative to the shoulder, which makes it easy to find and smooth up. I continue this process until I reach the bottom of hole I drilled. The shorter the sections, the less danger of cutting too thin, but on a good day I can do a long section before stopping to measure. Also, at this stage, shavings will accumulate and may interfere with the cut.

This step-by-step process of small cuts reducing the thickness and smoothing short sections at a time continues right to the bottom. When I reach the bottom, I make a light pass across, blending the bottom into the side. If the cuts look good and the thickness is correct, hollowing is finished.

Preparing the vessel for remounting and finishing the bottom

Turning away the unfinished area at the base is next. Insert a waste block into the chuck and turn a tenon and shoulder of a size to just fit snugly inside the opening of the vessel, but not tight or tapered, as that would split the piece. I place the opening of the vessel over the tenon and rest it against the shoulder, then bring up the revolving center of the tailstock. On the bottom of this vessel, there is an accurate center mark left over from the initial rough turning, which helps center the vessel. The piece will be held with light pressure from the tailstock.

I turn away the excess wood with light cuts. The vessel is being driven by friction only. At this point, I'm

Initial carving is done with a reciprocating carver and V-gouge.

Spiral flutes are partially roughed in.

Rough shaping with pneumatic die grinder and carbide burr.

Defining the spiral lines with a small round rasp.

careful not to remove too much wood too soon. I want the shape to continue, flowing down to the base or bottom. I use the gouge and shear scraper to smooth up this last bit before turning a slight concavity in the bottom and turning away most of the remaining nub.

When finished with turning the vessel, I remove it from the lathe and use a sharp carving gouge to remove the last bit of the nub. The bottom will have a subtle carved texture at the very end of the carving process.

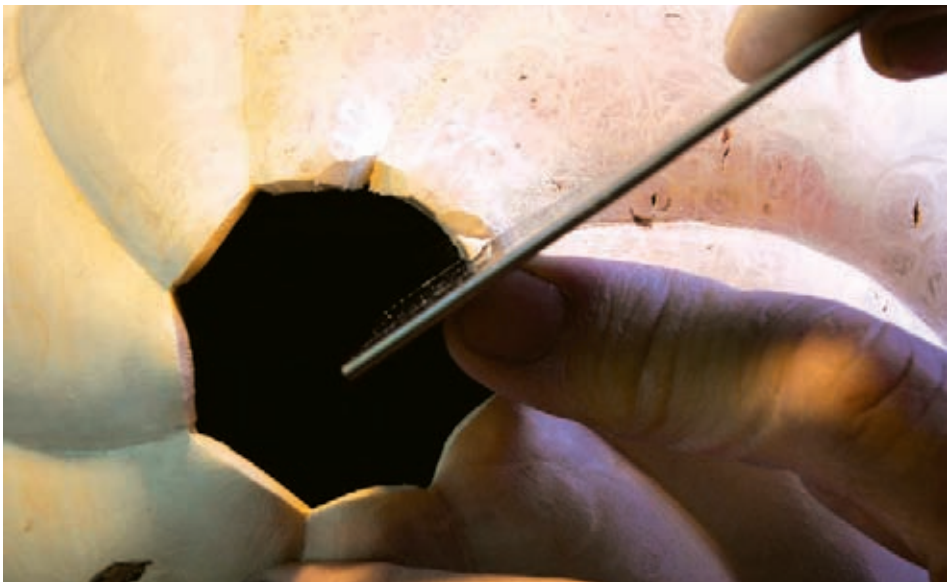
This piece is still quite wet, so I use compressed air to blow out the free water. This will help prevent light-colored wood from becoming stained as a result of fungal growth. There is some evidence of staining in the wood already, but I don't want it to go all gray and muddy looking. After spending a few minutes blowing out the free water, I put the piece into a cabinet, to moderate the air flow and slow the drying enough to prevent cracking. It will take a week or two to dry and I don't want to start any heavy carving before then, as the wood could crack along the thinner areas. Some textures and carving can be done on the green vessels, if the thickness isn't changed very much.

Carving the vessel

My friend Carol Ventura, who did the photography for this article, is going to be the owner of the vessel. She requested spiral flutes and a smooth surface, a good choice for this highly figured burl.

I start by dividing the vessel into eight segments using vertical lines. I ▸

Further shaping with wood rasps and files.



Shaping the vessel's lip with small saw.

Sanding, using a flexible, leather-padded stick.

Further shaping of the lip using a carving knife.

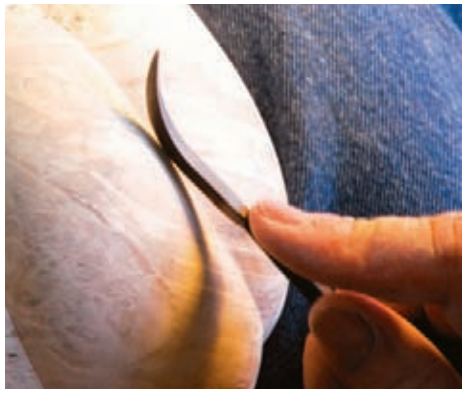
then draw one line around the circumference about two-thirds of the way up. This forms a very simple grid for drawing spirals from corner to corner of each grid block. I do the layout and drawing by hand and by eye. I like the quality that results from this type of process. Using an index causes the work to look like it has been jigged and machined.

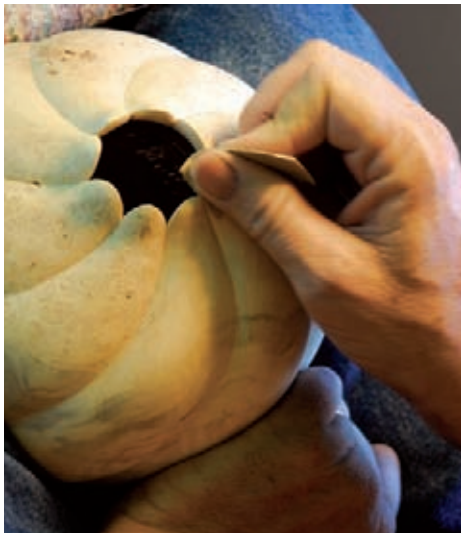
I start by defining the spirals with a reciprocating carver using a V-gouge. The spirals are then rough shaped with a pneumatic die grinder and a nonferrous "Aluma-Cut" spiral-cut burr. These burrs also come in a steel or ferrous metals cutting version that have twice as many teeth and are less aggressive. This tool removes the excess wood quickly, but it is very aggressive and things can go wrong rather quickly, so I take care at this stage. I used to carve by hand with large carving gouges. That works well and is considerably less violent, but is much slower.

The rough-carved spirals are then defined further with rasps. I use the Nicholson 49 and 50, and I really like the Auriou rasps from France, although they are currently hard to come by. Sanding sticks, padded with leather and sticky-backed paper are very effective for further refinement. I make these from sawn strips of thin hardwood for flexibility. I also use fine jewelers files, in addition to finer grits of sandpaper. After the spirals have been sanded to about 150-grit, I

Refining the lip with a file.

Detailing the spiral line with fine-tooth riffler.





Sanding the lip.

The surface of the vessel is wetted between each round of sanding and detailing.

Some of my favorite carving tools.

use a small craft saw, a carving knife, V-gouge, and rasps to shape and refine the tips of the spirals at the opening of the vessel.

After each step of sanding, I wet the piece. This pops up any damaged grain and makes it easy to see where I need to sand, file, or carve. These final steps take a large investment in time. It's all about the detailing. There will be many small adjustments with the small V-gouge and files along with using more sandpaper. I will continue wetting the piece between rounds of 320-grit until the vessel is completely smooth and no defects can be seen. I use a small riffler to provide a shadow line between the spirals. Finally, I flatten the bottom with a sanding block and lightly carve it with a shallow gouge.

I use acrylic artist's fixative for finish, Krylon Crystal Clear in matte or Krylon Matte Finish. I spray a couple of light coats, let it dry and rub with 0000 steel wool, then apply a couple more light coats. I usually rub with the steel wool again and polish with a paper towel. If it looks just right, I'm done. If not, I'll do another couple of light coats. The last thing I do is sign my name, using an electric engraver. ■

John Jordan is a woodturner from Cane Ridge (Nashville), TN, and has been an AAW member since year one. John's work, articles, and tools can be seen at www.johnjordanwoodturning.com.

Photos: Carol Ventura