Turn a Hollow Vessel

With green wood and modern boring tools, thin-walled vessels are within every turner's reach

BY HOWARD LEWIN

High-tech hollowing tool. Lewin uses a boring bar, which has a counterweight and a double-articulating tip that keeps the cutting edge on the centerline of the tool. It is designed to prevent violent catches, the biggest problem in hollowing. During the past few decades there has been a revolution in woodturning tools, from lathes and chucks to gouges and boring bars. As a result, what once was deemed difficult or even impossible to turn has become commonplace.

In the area of hollow-vessel turning, two innovators stand out. The first is David Ellsworth, who in the 1970s began turning vessels with small openings. His first tools were scrapers he had bent with a welding torch. Later he developed longer-handled tools with swivel tips that held machinist's tool bits. These offered more control and safety and could produce a wider variety of enclosedvessel forms. Jerry Glaser, an aerospace engineer and hobbyist wood turner, took the ball from there, working to reduce the long tool's tendency to catch and jerk downward. He came up with a doublearticulating tip that swivels to place the cutting edge at the tool's centerline. Other variations continue to emerge, making new vessel forms possible.

I use a Glaser-designed boring bar for my hollow-vessel work. The tool is available

A SHAPE EMERGES

Orienting the blank with the grain, not across it, makes the green-wood vessel more stable during the drying process. Avoid the unstable center of the log for the same reason.

Pith heartwood is prone to cracking.



End-grain orientation

from The Woodturners Catalog (800-551-8876) for \$150. The bar is filled with buckshot to dampen vibration. The tip is double-articulated, and a large counterweight attached to the bar reduces the impact of catches, which can be murder on the wrists. This tool's innovative design makes cutting into end grain much less daunting. The other key to success is using green wood.

Aside from the joy and ease of turning wet wood-ribbons just stream off the workpiece, even in end grain-I also like the subtle way green wood moves and dries. Many turners avoid green wood because of its tendency to crack as it dries. However, as I explained in an article on green-wood bowls (FWW #147, pp. 48-53), the drying process is easily controlled, reducing the likelihood of checking. The first key is to keep the vessel walls thin and uniform, which not only allow the walls to flex but also equalize drying stresses. The second is to wrap the freshly turned vessel in brown paper bags to slow the release of moisture. Following these guidelines, I seldom see checks or cracks.

Shape the outside first

Turn the outside of this piece just as you would the outside of any green-wood ves-



Don't fight the grain. With the grain running parallel to the bed of the lathe, all cuts should be made from high areas to low areas. The blank is mounted on a faceplate, with the tailstock (and a live center) engaged to steady the blank.



sel. Start by locating the blank in a log and chainsawing it free. Remember, in this endgrain vessel, the grain runs straight through the piece from top to bottom (see the drawing above). You can choose a facegrain blank with the grain running from side to side through the piece, but the endgrain orientation is a bit more stable during the hollowing and drying processes.

Rough out the general shape on the bandsaw, cutting the bottom of the blank as flat as possible for a good mounting surface. Attach the faceplate with at least six or

BOWL GOUGE

An extreme fingernail grind gets the corners out of the way. The gouge can be angled sharply in each direction to make planing cuts on convex and concave surfaces.

The last pass is a planing cut. Turn the gouge and rest the bevel against the workpiece. For a smooth cut, gently pivot the tool until it begins cutting, and keep the bevel in contact with the stock.

eight #8 by 1½-in. coarse-threaded drywall screws. After mounting the long blank on the lathe, put a live center in the tailstock and tighten it against the far end.

It helps immensely to have a variablespeed lathe, because a large blank must revolve slowly at first to create an appropriate cutting speed at the outer edges. Then, as the workpiece gets smaller, the lathe speed can be increased slowly to create the same ideal cutting speed at the perimeter. However, if you have a finite number of speeds to choose from, err on

HOLLOWING, STEP BY STEP

After drilling an entrance hole, plunge the boring bar from the center out to the inner wall of the vessel to make each cut. You'll need to readjust the articulated tip of the tool as you work your way deeper into the vessel.





1 MAKE SOME ROOM TO WORK



the side of caution. It's better to take a little more time than risk a flying workpiece.

I turn the outside using a long, hefty bowl gouge developed by Glaser, which is available from The Woodturners Catalog for \$95 to \$170, depending on the size. The tool, which features A-11 tool steel, a deep flute and an extreme fingernail profile on the tip, makes the task go quickly and smoothly (see the photos on p. 69). With the grain running parallel to the bed of the lathe, all cutting on the outside should be done downhill—as if it were a spindle turn-

2 REACH AROUND THE CORNER



ing. In other words, cut from the largest diameter toward the narrowest areas. The last pass, a light planing cut with the gouge riding its bevel, leaves a smooth surface.

I like to turn a shallow foot at the bottom of my vessels, roughly one-third of the vessel's diameter and long enough to contain

Watch it on the web To see a video clip of Howard Lewin hollowing a vessel like this one, go to finewoodworking.com.

3 COMPLETE THE HOLLOWING



the screw holes. Later, after hollowing the inside of the vessel, I'll hollow the foot as well, which will remove the screw holes and keep the walls of the vessel roughly ¼ in. thick for successful drying.

Hollow out the inside

After sliding the tailstock out of the way, drill a hole to establish the depth of the cavity and to give the boring bar a place to start. You can put the bit in a drill chuck and hold the chuck in your hands to drill the hole. Just support the bit on a tool rest



Drill a deep hole to establish the final depth. Lewin uses a long drill in a handheld chuck, supporting the bit on a tool rest. He pauses every 1 in. or so to clear chips, and he checks the depth frequently near the bottom.

as you feed it into the center of the stock. As the hole nears its final depth, check it frequently against the overall height of the vessel. Be sure to figure in the height of the foot and thickness of the bottom wall.

The ³/₆-in.-square tool bit on the Glaser boring bar can either scrape the wood or slice it, depending on the angle at which it's held. Scraping is not usually feasible with green wood, but this small bit resists catches, which happen when the tool gets stuck in the wood, often drawing it in more deeply and damaging the workpiece. The angle I favor for hollowing is halfway between the two—sort of a peel. The mass of the boring bar and counterweight keep it steady. The tool bit is cobalt high-speed steel and will hold an edge for a long time.

After the hole has been drilled, set the double-articulated tip of the boring bar in a straight line (see the drawings on the facing page) and begin to widen the opening to give yourself enough room to work. Then articulate the end into the hook shape to reach around the inside corner. As soon as possible, realign the tip of the tool bit with the centerline of the bar to reduce the torque on your wrists.

The diameter of the entrance hole is an important design consideration. Many turners try to keep this opening very small to demonstrate their skills and to confound collectors. I don't go to those extremes, but I like to keep the hole small enough to be pleasing to the eye and keep probing fin-



Open the entrance. This is done with the articulating tip of a boring bar set in a straight position.



Then swivel the tip and begin hollowing. All cuts in this end-grain vessel start at the center hole and are pulled toward the inner wall of the vessel.



FINISH THE FOOT

Reverse-mount the vessel to hollow the foot. Use a jam chuck (left) and a cup center (right). The cup center is less likely to split the bottom of the vessel than a live center.



Use a thin gouge to work around the center. Hollowing the foot removes the screw holes and leaves the walls and bottom the same thickness as the rest of the vessel, which is important to the drying process.

gers and eyes from the interior. That way I don't have to attempt to sand the inside.

Cut from the center out-The order and direction of the cuts when hollowing is the same for any end-grain vessel, open or closed; it's just a little more painstaking and time-consuming with the boring bar and the small tool bit than it is with a bowl gouge. Each cut starts at the center and is pulled toward the inner wall of the vessel. Green wood is especially pliable, so once a thin wall has been established, it becomes too floppy to return to later. So work toward the wall, establish the right thickness and then move back to the center of the hollowed area to begin another cut. Don't attempt to take a little off an area that you turned five passes earlier. There won't be enough material nearby to support the cut, and you will risk stressing and breaking the wall. I use long calipers after each cut to check the wall thickness. I also periodically hold a portable lamp against the outside of the vessel and examine the light getting through, which highlights any inconsistencies in thickness.

You must remove shavings from the inside as you go. Centrifugal force will plaster them against the side of the vessel, making the surface very difficult to penetrate. Trying to force the tool through this layer generally ends in disaster because the tool catches and goes through the side. I stop the lathe every two passes and use compressed air and a shop vacuum to clean out the vessel.

When you reach the bottom of the drilled hole, the hollowing is done. Check the bottom thickness with the lamp just as you did the sides.

Leave the vessel on the faceplate for about a day to let the surface moisture flash off, then remount it on the lathe and sand the outside.

Hollow the foot and dry the vessel

Last, remove the vessel from the faceplate, mount it in the reverse position and hollow out the foot, so all the walls are the same thickness. The reverse position is achieved with a jam chuck and a live center with a cup-shaped tip. The cup center is much less likely to split the bottom than a pointed center. I do this hollowing with a thin bowl gouge, which allows me to work around the live center. The small tenon left connecting the vessel to the center can be knocked off later with a sharp chisel.

Now the vessel is ready for final drying. With three or four paper bags wrapped around it and curled shut, the vessel should be able to relieve its own stresses as it slowly releases moisture. Be ready for some subtle warps or bulges as the vessel goes from wet to dry. I think of these mysterious changes as the character of the tree revealing itself.

> When the bags feel dry to the touch usually after five to 10 days—the piece is dry. Give it a fine sanding by hand and seal it with your finish of choice.

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The finished piece. One last sanding after it's dry, a few coats of lacquer, and the vessel is ready for display.