

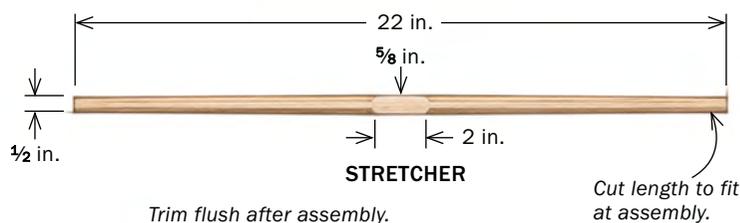
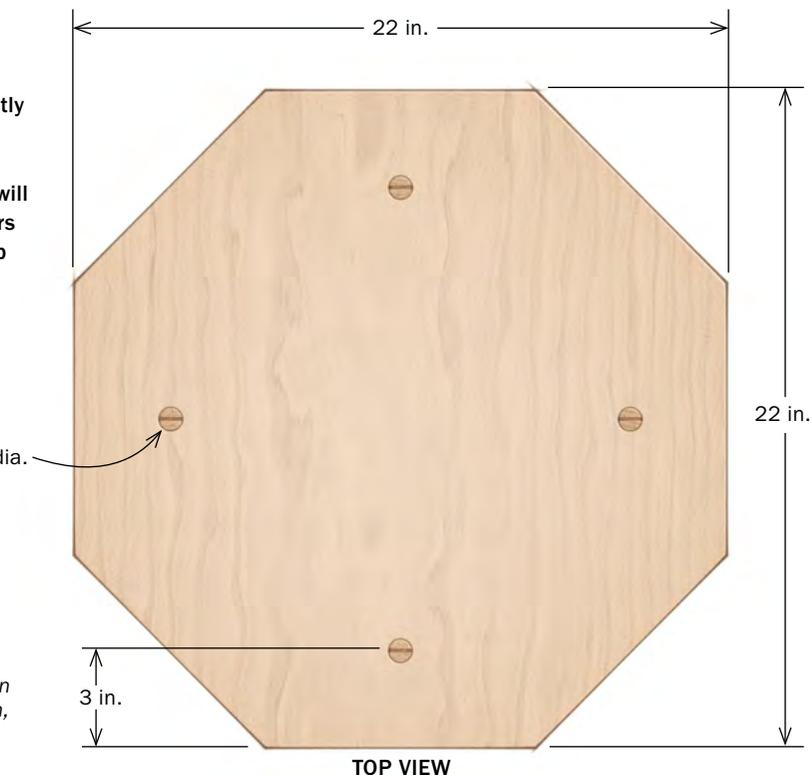
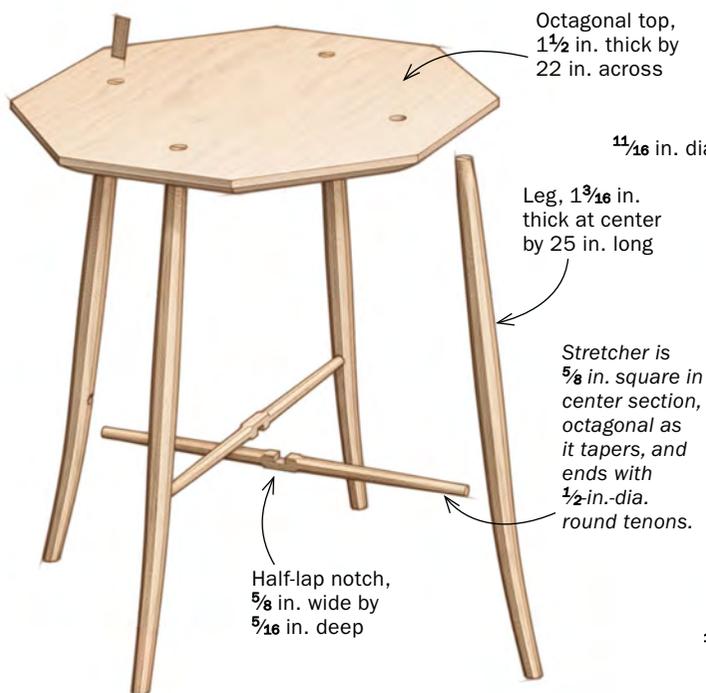
Eye-Catching Octagonal Table

Built simply, this one-of-a-kind table
is light, strong, and graceful

BY ELIA BIZZARRI

BEVELS, FACETS, AND WEDGED THROUGH-TENONS

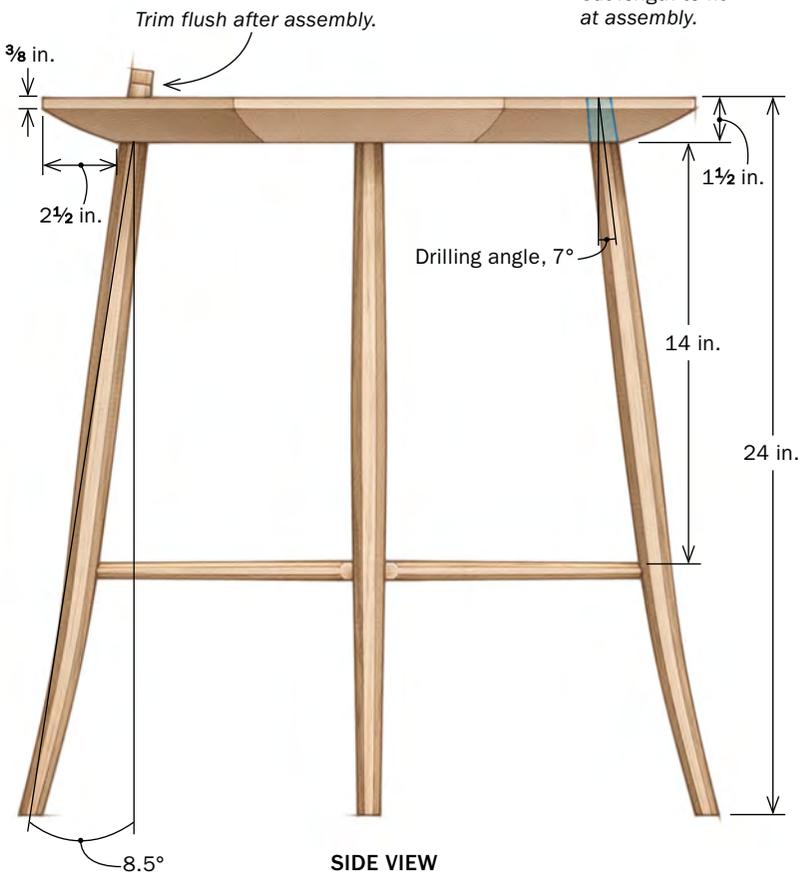
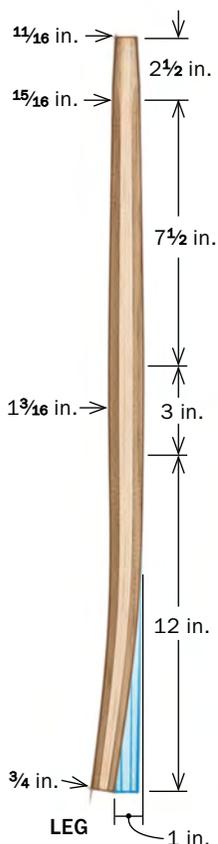
The table's tapered, octagonal legs and stretchers are shaped slightly over thickness at first. After drying in a kiln, they get shaped to the final dimensions shown here. If working green wood, $\frac{1}{8}$ in. of extra thickness should suffice; for air-dried or kiln-dried stock, a bit less will do. The legs and stretchers start out overlong as well. The stretchers are cut to fit before assembly; the legs are trimmed flush to the top after glue-up.



I designed this table to be very accessible to build. Its structure is borrowed from the bottom half of a Windsor chair, but while Windsor chairmaking can seem to require a forester's access to trees, turning skills to match Richard Raffan, and a laundry list of unusual tools, this table can be made from sawn lumber, doesn't involve a lathe, and requires only a few specialized chairmaking tools.

Riving and shaving the parts

The table's legs and stretchers are best made from ring-porous hardwoods like oak (used here), ash, or hickory, which are prized for their strength and bendability. But many other woods will work just fine. The straighter the grain, the better the bending will go (and the easier it will be to achieve smooth surfaces with a spokeshave). Splitting the parts from a log is the most accurate way to follow the grain and get parts with continuous long fibers. Don't have a log? You can split the parts from



Shaping the legs

SPLIT IT OUT



Getting long grain from lumber. If you don't have a log to split for the parts, you can use air-dried, or even kiln-dried, lumber. To be sure you get continuous grain, split the plank and pry it apart, then bandsaw out the parts parallel to the split.



a board. Using green or air-dried wood will minimize breakage during bending. But the bend is shallow enough that kiln-dried lumber might work, even without a bending strap, though the shaping will take more effort.

The drawknife is my favorite shaping tool. It is fast and precise and follows the grain—and it's fun! First, shave two adjacent faces of a leg blank so they are perpendicular with each other and parallel with the grain. When you can take a thin shaving in both directions on a given face and get minimal tearout, you are cutting parallel with the grain.

With the first two faces finished, scribe depth lines with a marking gauge on the other two faces, then use a drawknife to

SQUARE IT UP



Smooth, straight, and square. Use a drawknife to flatten one face of the leg blank from end to end, aiming to get it perfectly parallel with the grain. Then shave an adjacent face square to the first one. Use a marking gauge to scribe width lines and shave the final two faces.



TAPER IT AND CHAMFER



Two tapers. After laying out the length of the tapers and the tenon, shave both ends of the blank to a square taper (above). Once the blank is squared and tapered, shave off the corners to create the octagonal leg (right).



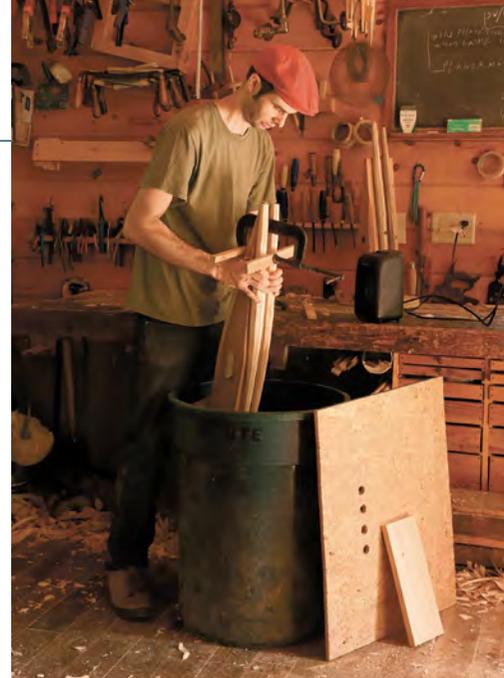
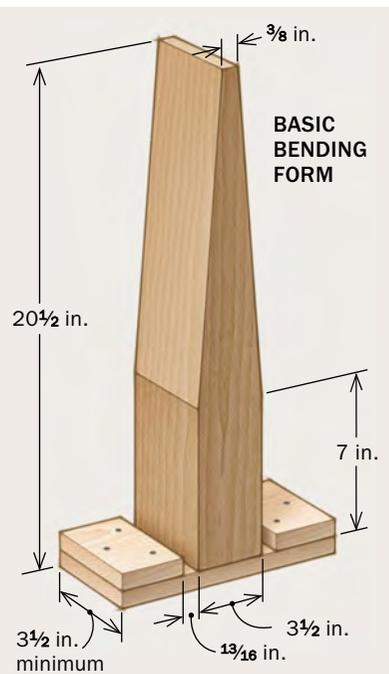
BOIL BEFORE BENDING



No need for a steambox. You can use a stockpot for these legs. After half an hour in 8 in. of boiling water, the legs are ready to bend.



Two-sided form. Bizzarri bends four legs at once. He inserts the feet in a groove and draws the legs tight to the form with a clamp.



Drying time. After bending the legs (and after setting them aside for a month or so if they were made from green wood), place them in a low-heat kiln for several days. Here Bizzarri improvises a kiln with a trash can and an electric heater.

TAPER THE TENONS



Turn to the spokeshave. After drying the legs, use a spokeshave to refine the drawknifed facets, and then to roughly round and taper the top section to prepare for tenoning.

shave to the lines to create a blank with a square cross-section. Next, shave the leg's double taper, and once the legs are tapered, shave them to an octagonal cross-section with the drawknife. You don't need to make the surfaces perfect; you'll use a spokeshave to clean up these facets after the legs have been bent and dried. Also, leave the leg oversize at this point so that when you do final shaping, you can cope with any shrinkage (up to 10% if the wood starts out green) and slight warping. Prepare the stretcher blanks now, too. Use a drawknife or plane to bring them to a 3/4-in.-square cross section, leaving some leeway for drying.

Boil, bend, and dry the legs

When bending legs like these I find that boiling is often easier than steaming. Boiling serves exactly the same function as steaming, without the need for a bulky steambox. Only the bottom



Keep drying the tenons. Right up until assembly, whenever the legs are not being worked on, keep the tenon ends in the kiln. This ensures maximum expansion of the tenons after assembly, creating supertight joints with the tabletop.



Tenon time. Bizzarri uses a tenon cutter to produce the tapered leg tenons. He sells these and other chairmaking tools, which he and a partner make in his shop (handtoolwoodworking.com).

Cut the top joinery



Octagonal layout. To lay out the octagonal top, Bizzarri uses a compass, a straightedge, and a framing square. He starts with a circle, then draws a square tangent to it. After splitting the square with diagonal lines, he lays the framing square on the diagonals to finish the octagon.



Inside circle locates the legs. Use a smaller circle swung from the same centerpoint to situate the four leg mortises. The mortises are centered where the circle crosses the diagonals.

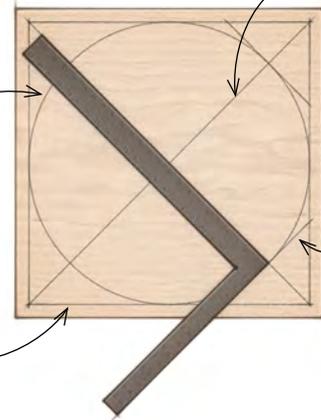
LAYING OUT THE OCTAGON

1. With a compass, draw a circle whose diameter equals the intended width of the tabletop.

2. Use a framing square to draw a square that is tangent with the circle.

3. With a straightedge, draw diagonals that bisect the square.

4. Place one leg of the framing square along the diagonal and draw a line along the other leg; flip the framing square to finish the line.



Online Extra

To see two methods for laying out an octagon, watch the video at FineWoodworking.com/278.

third of the leg needs to be softened for the bending, and that much will fit nicely into a stockpot filled most of the way with water. To prepare for bending, build a bending form and then boil or steam the legs for about 30 minutes. Bend the legs in the form and use clamps to hold them in place.

If I've used green wood, I now set the legs aside in the bending form and let them air-dry for about a month. Drying time will vary depending on heat, humidity, and air flow. If you're working air-dried or kiln-dried stock, you can skip this step.

Next put the legs, still in the form, into a simple kiln with a small heat source inside. (Insulation board duct-taped together makes a good rudimentary kiln—or use a large trash can, as I did.) A few days in the kiln at around 140°F will help set the leg bend, reducing springback. Once the legs fall out of the form, remove them from the kiln. After that, unless I'm working on the parts, I keep the tenons dry by inserting them through holes in the top of the kiln. The dry tenons swell after assembly, locking the joints tight.

MAKE LEG MORTISES



The drilling angle. Bizzarri drills the leg mortise using a bevel gauge set at 97° to establish the inside angle and a square to keep the side angle at 90°.



Go under afterward. To avoid chipout while cutting the through-mortises, Bizzarri stops drilling when the lead screw emerges and finishes off the mortises from below.



Create the taper. Following the angle of the drilled hole, Bizzarri uses a reamer to taper the mortise.

FINE-TUNE THE FIT



Straight line on a curved leg. With the leg supported at its ends on two blocks, turn it so the bend faces downward. Then, with a straightedge resting on the same blocks, draw a reference line on the leg.



Ream to the reference line. Set the bevel gauge to 98.5°, then re-ream the mortise so the reference line matches the gauge.



Get the right rotation. When the leg is properly oriented it should appear straight when viewed from the corner of the top.

I rough-shape the leg tenons with a spokeshave, then true them with a tenon cutter. Alternately, you can shape the tenons completely with a spokeshave and rasp, and check your progress with a tapered test hole: Drill and ream a block of wood, coat the inside of the hole with pencil lead, rub the tenon in the hole, and remove high spots until the fit is right.

Time for the top

The tabletop can be made of most any kind of wood. I like light-weight tables so I use woods such as pine, tulip poplar, and basswood; for this table I used buckeye. Once you've flattened the blank, lay out the octagon. But don't saw it out yet. The corners will be useful for clamping the top to the bench while you cut the leg joinery.

On a table like this, the angled legs usually look best when the tips of the feet are roughly even with the edge of the top. If the legs were straight, determining the drilling angle would be easy.



Make your mark. Once each leg is fitted, mark it to record which mortise it belongs to and how it should be rotated at assembly.

Leg and stretcher work

MORTISE THE LEGS



Two-step layout. A compass works nicely to strike height lines for the stretcher mortises. And a rubber band looped around the opposite leg makes it easier to center vertical cross marks accurately by eye on the octagonal leg.



Scrap support. To be sure his bit stays level, Bizzarri drills a hole through a scrap at stretcher height and puts an extension rod through it. And to control side-to-side swing, he sights over the rod as he drills, keeping it parallel with the diagonal layout line on the underside of the top.

MAKE THE STRETCHERS



Stretcher session. After straightening and squaring up the stretcher blank, and then drying it, Bizzarri shapes all but the center 2 in. of it into an octagon.



Unturned tenons. Once the ends of the stretchers have been roughly rounded, a dowel plate and a little pounding make quick work of producing nice round tenons. Afterward, use a spokeshave to fair the facets to the tenon and transition the arrises to it as well.

HALF-LAP WHERE THE STRETCHERS MEET



Start with a subassembly. To lay out the lap joints, first glue each stretcher to its pair of legs.

But since the legs are bent and the bends will likely vary from leg to leg, the initial angle for boring the leg mortises is an approximation. During the reaming process, you'll correct for any variations in boring, tenoning, or bending. Bore the through-holes 7° off vertical with a $\frac{1}{16}$ -in. bit. I use an auger bit in a bit brace, but a brad-point bit in a power drill will also work.

Now start reaming. When the tenon seats in the hole without wobbling, check the leg angles. Use a bevel gauge set at 98.5° to assess the interior angle and a square to check the side angle. For the interior angle you'll need a reference line on the leg (see top photos, p. 35). Let's say the leg needs to go to the right. Remove it and continue reaming. Push the reamer straight into the hole, but put some extra pressure diagonally back and right. Ream a few turns, then reinsert the leg and check the angles again. Keep reaming and checking until the angles are right and about $\frac{1}{4}$ in. of tenon protrudes from the top.

Stretcher mortises and shaping

Next, with the legs fitted, bore the mortises for the stretchers. Then it's on to shaping the stretchers. To make a clean half-lap joint, the stretchers need to be straight and square. I use a block plane to straighten the faces and bring the piece to $\frac{5}{8}$ in. square. Next, use a drawknife to turn the stretchers into a tapered octagon, leaving a $2\frac{1}{2}$ -in.-long section square at the middle of each stretcher.



Clamp and scribe. With one subassembly fully dry-fitted into the tabletop and the other lowered in until the stretchers make contact, use a knife to mark where the stretchers cross. Remove the subassemblies and finish the layout with a square and a marking gauge.



Hand tool half-lap. Cut to your knife lines with a handsaw, then chisel out the waste between the sawkerfs.



Test time. To dial in the width of the half-lap, test it on the un-notched section of the other stretcher. Adjust the cheeks with a chisel if necessary.

Shape the top and assemble the parts

OCTAGON WITH AN UNDERBEVEL

Saw out eight sides. Bizzarri uses the bandsaw to cut out the octagonal top.



Rough out the underbevel. With the bandsaw table tilted to 45° or so, Bizzarri cuts the big bevels by eye, being sure to leave an uncut band at the top about 1/16 in. wide.



Hand tools follow the bandsaw. A drawknife and spokeshave smooth the bevels and pillow them slightly, leaving crisp tool marks behind.



The stretcher tenons can be cut in a variety of ways. I usually roughly round the tenons with a spokeshave, then use a steel dowel plate with a 1/2-in. hole drilled in it. Relieving the underside of the hole with a larger bit or a file can help reduce drag and unpleasantness. Try a test joint to make sure your dowel plate and mortise bit match. As an alternative to the dowel plate, you can carefully shape the tenons with a spokeshave, file, and sandpaper. Tenon shoulders don't appeal to me, so once the tenons are cut, I use a spokeshave to flush the octagonal facets to the tenon, and to transition the arrises down to the tenon as well.

Subassembly required

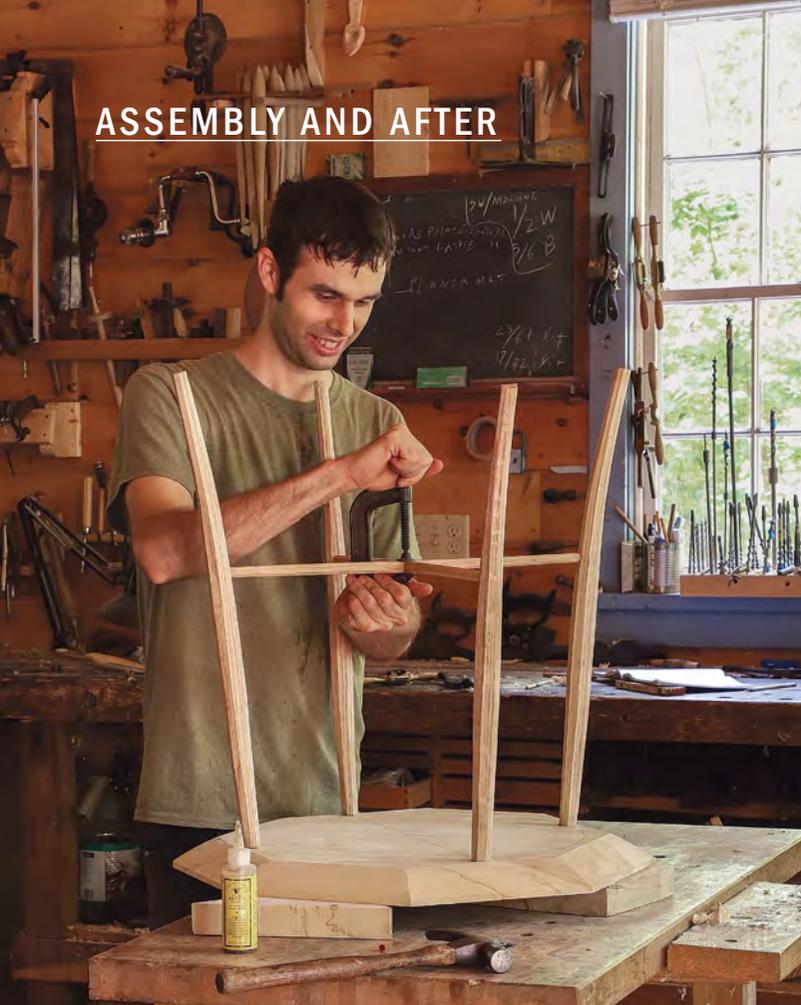
To lay out the half-lap that joins the stretchers, first glue each stretcher to its pair of legs. With the tabletop upside down, dry-fit one leg assembly into its tapered mortises and then carefully insert the other assembly until its stretcher rests on the first one. Rotate the assemblies a bit if need be so that the stretchers line up with the diagonal lines on the underside of the top. Then clamp the two stretchers together. Scribe two lines onto each stretcher where they cross each other, and use a marking gauge to mark half the thickness of the stretcher. Then use a square to connect the scribe lines to the marking-gauge lines.

Saw the sides of the notch, chisel out the waste, and pare the sides until they fit over the other stretcher. Chisel the bottoms of the notches until the two stretchers are almost flush—you will plane them perfectly flush after glue-up. Now test the fit of the leg assemblies into the tabletop and mark the leg tenons for wedges oriented perpendicular to the grain of the top. Then remove the legs, cut kerfs in the tenons, and make some 8° hardwood wedges.

Glue up and finish up

Now at last you get to saw out the top. At the bandsaw I cut the octagon and then bevel the underside to make the top look thin and light. I clean up the bevels and give them a slightly pillowed surface using a drawknife and a spokeshave. When the top is ready, glue in both subassemblies and clamp the stretchers together at the half-lap. Then turn the table right side up, glue and drive the wedges, and smile a smug smile of success.

ASSEMBLY AND AFTER



Final assembly. With the tabletop inverted and elevated on blocks, Bizzarri uses a few hammer blows to knock the two subassemblies home. Then he clamps the half-lap joint.



Wedge and trim the tenons. With the table fully assembled, drive the tenon wedges, saw the tenons nearly flush, and finish up with a shallow gouge and a handplane.

But wait—only three legs touch the ground. Maybe the top is sloped, too! On a flat surface, shim the legs to get the top level left to right and front to back. Find which leg is farthest off the surface and mark all four legs at that height; use a handsaw to cut the legs to your lines. Saw the leg tenons protruding through the top, then use a gouge and plane to trim the tenons flush. While you have a plane in your hands, you can add a chamfer to the perimeter of the top. I finished the table with milk paint in a black-over-red combination often used on Windsor chairs. □

Elia Bizzarri makes chairs, tables, and tools in Hillsborough, N.C.



Make it level without a wobble. When trimming a leg to length, aim the saw handle and the saw plate at the ends of the adjacent legs. To mark the legs for cutting, Bizzarri first set the table on a flat surface and wedged beneath the feet until the tabletop was level and didn't wobble.



Fine-tuning the feet. A flat bench with an inverted handplane in the vise is a fine setup for flattening the feet. Before and after trimming, chamfer the perimeter with a spokeshave to prevent the feet from splintering.



Homing in on the halving joint. The half-lap is a focal point of the piece, and Bizzarri flushes it off with a block plane.