Sleek and Shapely Coffee Table

Hand-shaping brings out the beauty in this elemental piece

BY MICHAEL CULLEN

At the time I first made this table, in 1995, I had been building a lot of complex furniture full of veneering and fussy inlay. The new table was a real departure, elemental instead of elaborate, relying on graceful curves and sheer planes without a hint of ornament. Building it marked a return for me to working solid wood, and a rekindling of my interest in working with simple tools such as planes, spokeshaves, and handsaws to execute a piece. In retrospect, I see I was returning to my Arts and Crafts training and to the philosophy that went along with it—the idea that sound handwork is the foundation of good furniture making.

I've had the pleasure of building a number of these tables since that first one, and I now tend to combine machines with hand tools in the process. Machines execute the milling and joinery flawlessly, and hand tools shine during the shaping.

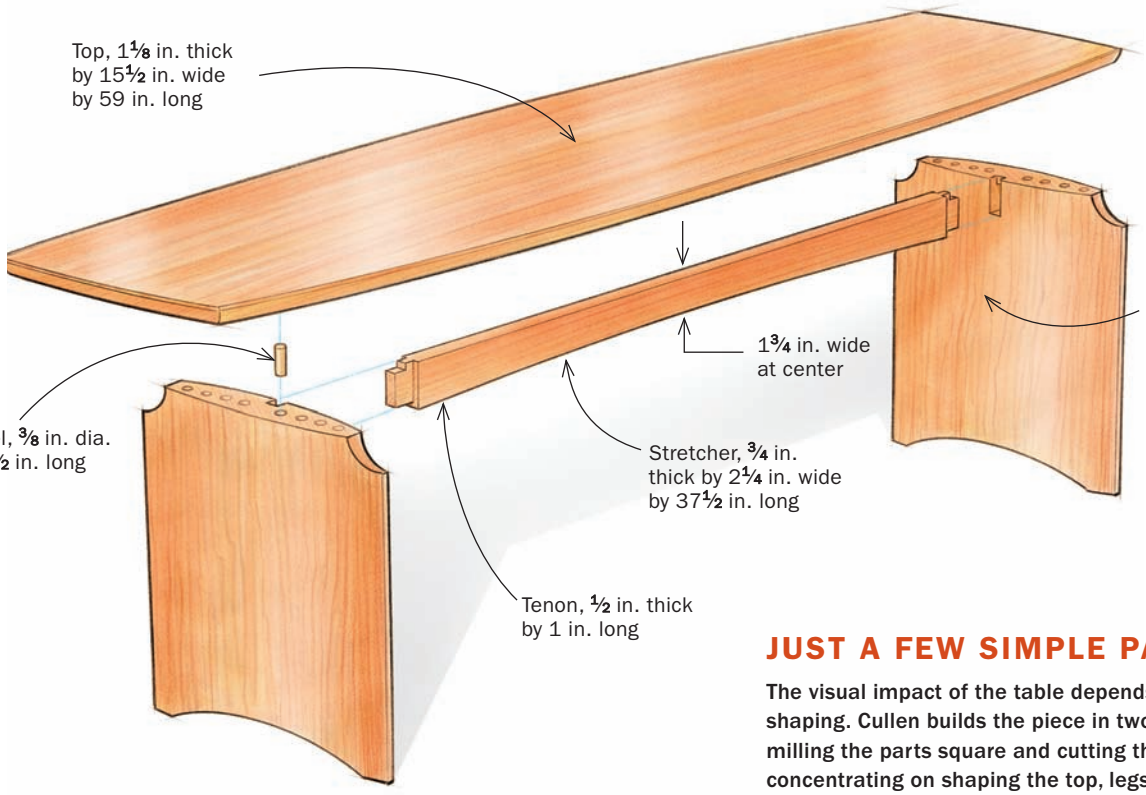
The table can be made from almost any type of wood. I'm using mahogany here, but I've used a number of other species, including ash, cherry, walnut, and even zebrawood. Whatever wood you choose, be sure to pick boards for the legs that are a good match in color and grain. And cut the top from a single plank, if possible. If you have to edge-glue two boards to make the top, plan the grain so the joint is close to undetectable. Keep in mind, too, that the more dramatic the figure in the wood, the more attention will be drawn away from the subtle curves of the piece.

The project proceeds in two stages. The first stage is milling all the parts square, cutting the joinery, and dry-assembling the piece. The second stage is the shaping: creating the curved faces and

Photo, this page: Don Russel

ARCS DEFINE THE DESIGN

Cullen makes MDF templates to lay out the curves and cutouts in the table parts. He uses trammel points to swing the broad arcs such as the one for the legs' curved faces (left). After bandsawing to the pencil line, Cullen fairs them with files.

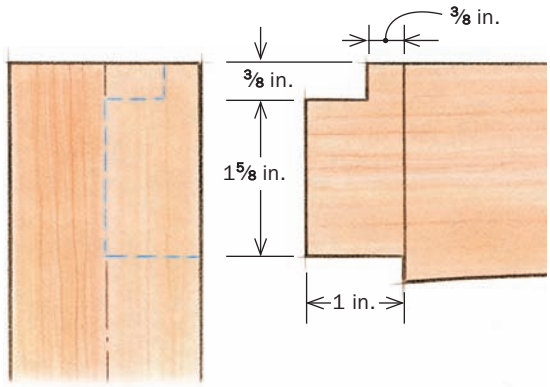


JUST A FEW SIMPLE PARTS

The visual impact of the table depends on flawless shaping. Cullen builds the piece in two steps, first milling the parts square and cutting the joinery, and then concentrating on shaping the top, legs, and stretcher.

Drawings: Dan Thornton

HAUNCHED TENONS FOR THE STRETCHER



Plunge right in. *Cullen begins the haunched mortise by cutting the full-depth section with a plunge router. Then he squares it up, chopping the ends of the full-depth mortise with a chisel before moving on to the haunch.*

Haunch last. *With the full-depth mortise finished and the fence still clamped in place, make a shallower pass with the router to create the haunched section of the mortise.*

Make a mate. *Cut a haunched tenon on the stretcher to fit the mortise. Cullen cuts the cheeks using a shopmade tenoning jig (left), and the shoulders using a miter gauge (above).*

cutouts on the legs, and cutting the arced and profiled edges of the top.

Make templates for layout

I draw the curved layout lines on the legs using templates made from ¼-in. MDF or Masonite. Make one template for the leg cutouts and a second template for the curved faces of the legs. I use trammel points to draw the broad arcs for the foot cutout and the face curve. For the shoulder cutouts, which are elliptical, I trace a French curve.

Cut right to the pencil lines with the bandsaw, then fair the curves with sandpaper on a flexible block. Because the template material is just ¼ in. thick, the work goes quickly.

When you've finished the templates and used them to lay out all the curves on the legs, lay out the joinery—the haunched mortise for the stretcher and the dowel holes where the legs attach to the top.

Cut the joinery

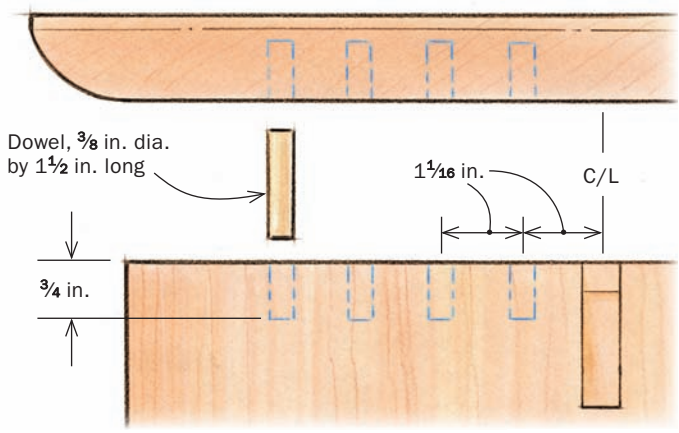
I cut all the joinery at this point, while the parts are still square blanks. I start with the haunched mortise, which I cut in three steps: first plunge-routing the full-depth section, then squaring the ends of that cavity with a chisel, and finally going back with the router to cut the haunch. That done, I cut the mating haunched tenons at the tablesaw.

For the doweling, I create a simple jig by face-gluing two scraps of ¾-in. MDF. I cut guide holes in the jig on the drill press and then use it with a hand drill.

Photos, except where noted: Jonathan Binzen

Rig up a custom doweling jig. *All the drilling for the dowels is done with a handheld drill and guided by a 1½-in.-thick MDF jig. The holes in the jig are made on the drill press.*

DOWELS CONNECT THE TOP TO THE LEGS



Clamp and locate. *Cullen centers the dry-clamped base on the inverted tabletop blank and marks the leg locations (left). A piece of melamine cut to the exact length of the stretcher serves as a spacer as Cullen uses the doweling jig to drill for the dowels (above).*

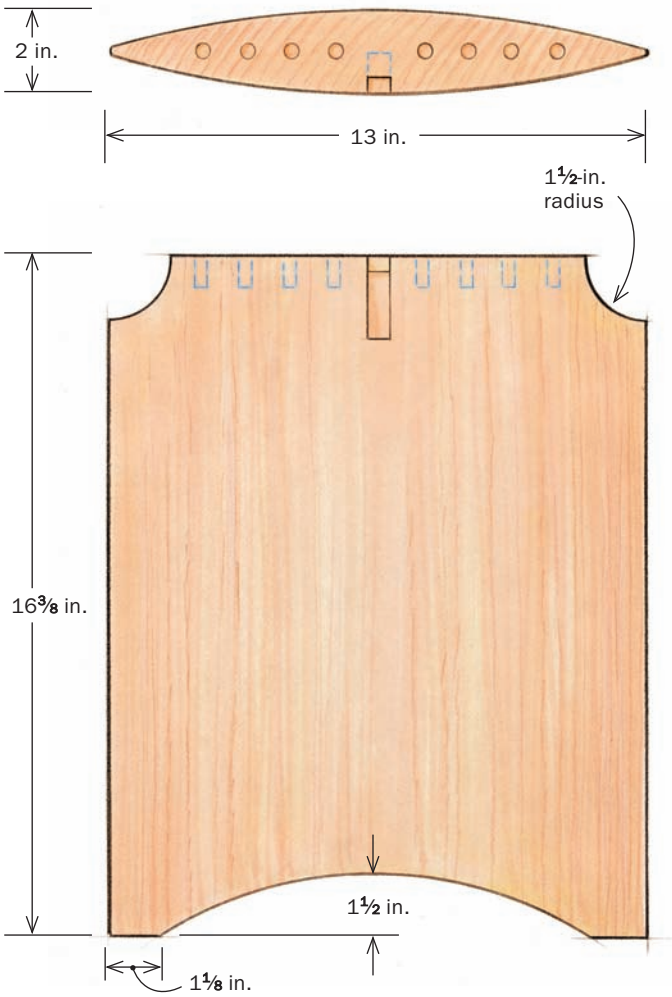
To establish the location of the dowel holes in the tabletop, I dry-assemble the base and center it, inverted, on the underside of the top. Then I make pencil marks along the inside faces of the legs.

Make the leg cutouts

Now that the joinery is cut, I create the cutouts in the leg. These should be carefully cut out on the bandsaw or with a coping saw. The trick is to cut as close to the line and as smoothly as possible. If you're using a handsaw, be aware that it's very important to cut square to the faces along the entire curve. The freshly cut areas should then be smoothed of any inconsistencies with a rasp and file. Follow that with a careful sanding to finalize these details. The best way to test the quality of

Mating holes in the leg. *With the jig clamped flush to the inside face of the leg blank, Cullen drills the mating dowel holes. Tape on the drill bit acts as a visual depth stop.*

SAW AND SHAPE THE LEGS



Saw out the foot scoop. *The bandsaw makes quick work of cutting the curved cutout at the base of the leg.*

Filed fair. *Files and sandpaper combine to fair the bandsawn curve (above). A half-round file and handheld sandpaper smooth out the tight cutout at the shoulder of the leg (left).*

the surface is to run a finger along the curve. It should feel smooth and free of any bumps or jogs.

Shape the leg's curved faces

You've now arrived at the most fun and most important passage in the project: shaping the broad, curved faces of the legs. The shape is simple, but that doesn't mean it's easy to execute; the utmost care must be taken so that the final curving surface appears flawless.

To start, put the curved waste piece back into the cutout at the bottom of the leg, holding it in place with double-sided tape. You'll need it there throughout the shaping, as it has your layout lines on it.

Set the jointer plane for a deep cut and begin shaping the radius at the outside edges, creating facets from end to end of the blank. Work quickly but with care, first roughly defining the arc then continuing to refine it as you work toward the line. The objective is to split the ridges created by the plane passes into finer and finer facets until they become almost imperceptible. This work is a combination of strength, stamina, and skill. It's important to

Coarse shavings start the curve. *Cullen roughs out the curve quickly with a jointer plane set to take thick shavings (left). Periodically he checks end-to-end flatness with a straightedge. Cullen then fairs the curved surface of the leg and brings it right down to the layout line with a smoothing plane set fine. He checks for fairness of the curve by running his fingers across the face.*

A final shave. *Set to take whisper-thin shavings, Cullen's block plane (left) addresses any slight imperfections. Though he's already reached the layout line, Cullen leaves the foot cutout in place to provide clamping purchase. After planing both faces of the leg, Cullen hand-sands to 220 grit (above).*

use your whole body and not just your arms for the task. As the shavings get deeper on the floor and you begin to get closer to the final shape, continue to adjust the iron in the plane for finer and finer cuts.

Be sure to check periodically with a straightedge along the length of the leg to make sure that your passes are flat, not diving down at either end. Switch to a smoothing plane set for fine shavings as you approach the layout lines, and take some passes at 45° across the surface to fair the curve. Take your final strokes with the grain, going right to the layout lines. A razor-sharp block plane can be useful to resolve any issues with reversing grain.

Follow up with 220-grit sandpaper on a cork or felt block, slightly angling over the curve and the fine facets left by planing. Check for inconsistencies or ridges by running your fingertips across the curve. Last, eliminate any cross scratches by sanding along the grain. Then finish-sand with 320-grit paper.

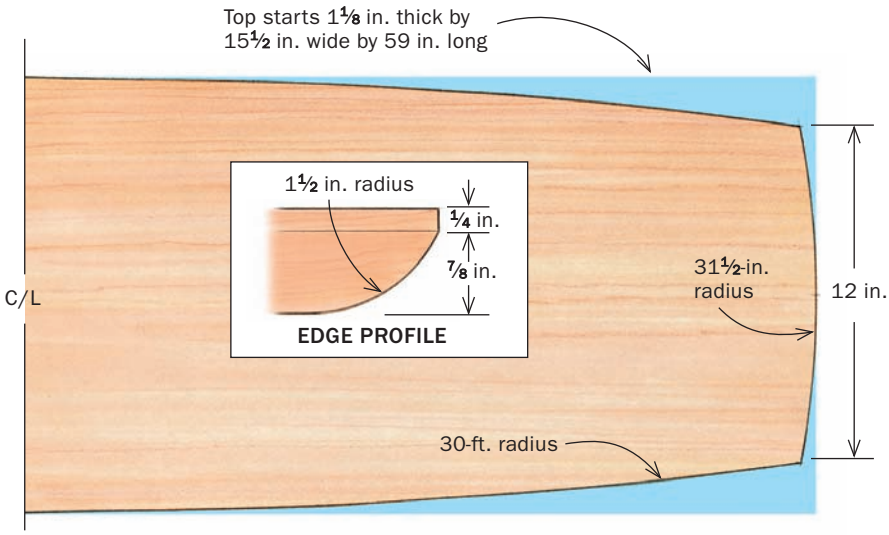
When you've finished shaping the second face, create the small radius along the sides, where the inside and outside faces meet, with a combination of block planing and sanding.

Rounding the corner. *Guided by layout lines on either side of the edge, Cullen uses a block plane to create a carefully rounded corner.*

SUBTLE CURVES ENLIVEN THE TOP

Saw and smooth. *At the bandsaw, cut the four arcs that form the perimeter of the top. Then smooth these cuts with a handplane, checking to be sure the edges are square to the top.*

Shape the edges. *Use a pencil to lay out the limits of the top's underturned edge profile, marking one line on the edge and another on the underside (top). Then use a smoother followed by a block plane to cut the curved profile, working from a faceted surface to a smoothly rounded one. Tweak the end and side profiles if necessary to produce a straight line at the corner where they meet (above).*



Now shape the top

I use a pencil and a trammel made of scrap plywood to draw the arcs for the perimeter of the top and then I bandsaw to the lines. After sawing out the shape, place the top in a vise at the bench and begin defining the curves along the length using both a smoothing plane (No. 4) and a block plane. Check the edge periodically to be sure it's square. Careful planing will render a final curve that needs little if any sanding. Repeat the process on the ends.

To lay out the edge profile, use a marking gauge fitted with a pencil to draw lines on the edge and underside. Rough out the rounded profile with a smoothing plane, and then use

a block plane to refine the radius. The trick to this profile is to create a rounded element that has crisp transitions to the flats beside it. Finish up with 220-grit and then 320-grit sand-paper backed with a felt block, breaking all necessary edges.

Put it together

I assemble the table in steps. First dry-fit all the parts, and drill for and drive the screws attaching the stretcher to the top. Then disassemble and glue the legs to the stretcher. When that has cured, commence the final assembly, gluing the stretcher to the legs and then the legs to the top. Finally, with the clamps in place, drive the screws through the stretcher and into the top.

For a finish, I use Wipe-On Poly by Minwax, or pure tung oil wiping varnish from Sutherland Welles. Both are excellent. □

Michael Cullen works wood in Petaluma, Calif., and will be a featured presenter at Fine Woodworking Live 2017 this April.

TWO-STAGE ASSEMBLY

Start with the stretcher. *First glue the legs to the stretcher, measuring to be sure they don't toe in or splay out.*

Try it with dry dowels. *After the first glue-up has cured, test the fit of the base to the top to be sure everything is set for the final assembly. Cullen finds it simplest to do the final assembly with the table upside down. For best clamp purchase, he blocks the table up off the bench and places cauls beneath each leg (left).*