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Robinson Table



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Building the Robinson Table

Graceful and lovely to look at, but demanding and rigorous to build, this multi-leaf Greene and Greene-inspired dining room table will test your skills. It's without a doubt one of contributing editor Mike McGlynn's finest pieces to date.

Over the years, Mike McGlynn has built dozens of Greene and Greene pieces, but prior to this project he had never found the opportunity to try his hand at one of their pedestal dining tables. When an old friend decided his card table no longer cut it as a dinner table for four, opportunity knocked.

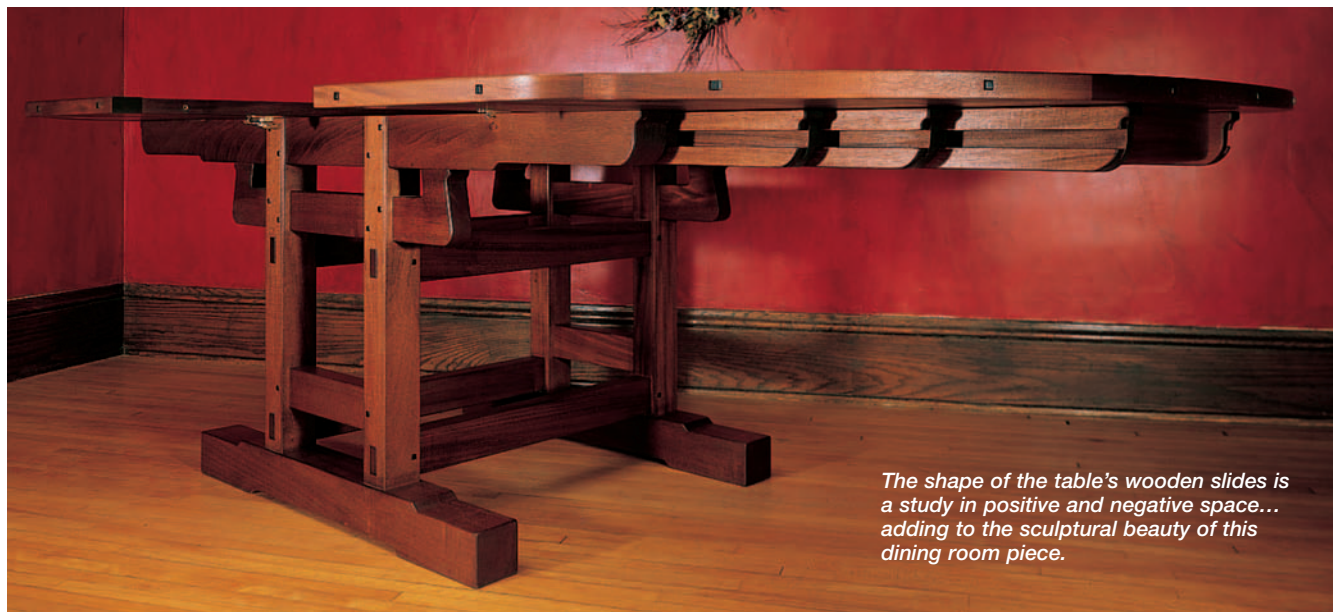
There are two main examples of Greene and Greene pedestal tables: the Robinson table and the Gamble table. Both have a pedestal that is heavy, with a timber frame and sculp-

tural look; tops that are not quite round, but not square; and massive exposed wood slides. These features are remarkably beautiful, but are also, as Mike quickly discovered, very challenging to build. His inspiration for this project was the Robinson table. For the top and rim materials he selected even-colored and grained mahogany. The mahogany for the base should be as straight-grained as possible. And you need to select the wood for the slides extra carefully. If possible, it should all come out of the

same plank, so the density is the same throughout all the slide components. As always, purchase your stock and rough-cut it to size well ahead of when you will begin machining, so it has time to adjust to your shop.

Beginning with the Base

Although complex looking, the base is composed entirely of right angles and mortise and tenon joinery. The most difficult aspect of it is shaping the feet, slide rails and brackets.



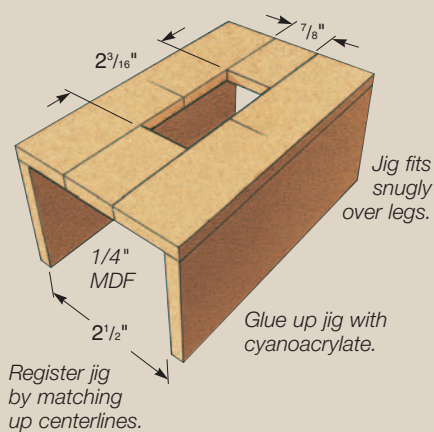
The shape of the table's wooden slides is a study in positive and negative space... adding to the sculptural beauty of this dining room piece.

The first step in constructing the base is to mill all the pieces to their correct dimensions, following the *Material Lists* on pages 149, 152 and 155. Keep an eye out for any unexpected twisting that may take place at this point—especially in the long rail members, as it may interfere with the smooth operation of the slides.

Laying out the joints and plug holes comes next, and it is the most confusing step in the construction of the base. Lay out one part (such as a foot or upright) completely, and then mark out all other like parts with a joint or plug centerline and, if need be, an orientation mark. This method works well for Mike, as he uses a multi-router to cut the majority of these

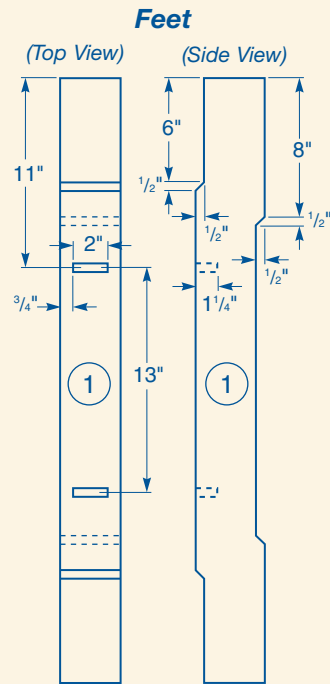
FAUX TENON ROUTING... BEAUTIFUL TRICKERY

To rout these mortises, use a solid-carbide 1/4", downspiral bit with a 5/16" (3/8" o.d.) rub collar. Like the other plug holes, cut them 3/16" deep and clean up the corners with a chisel.

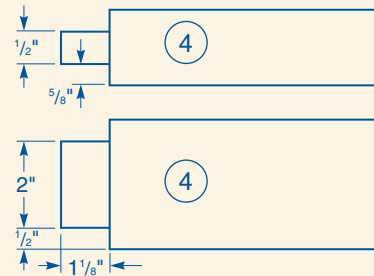


Make the faux tenon routing jig so it has a nice, tight slip fit over the leg. Precisely mark the centerline on the inside edges so you can line it up with the centerlines on the legs.

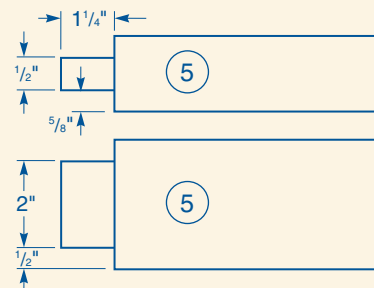
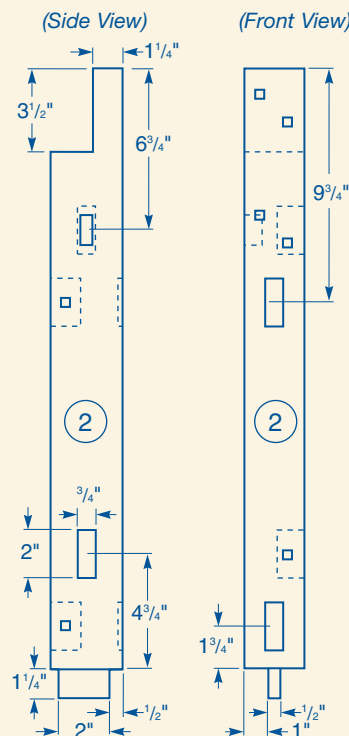
Base Exploded View



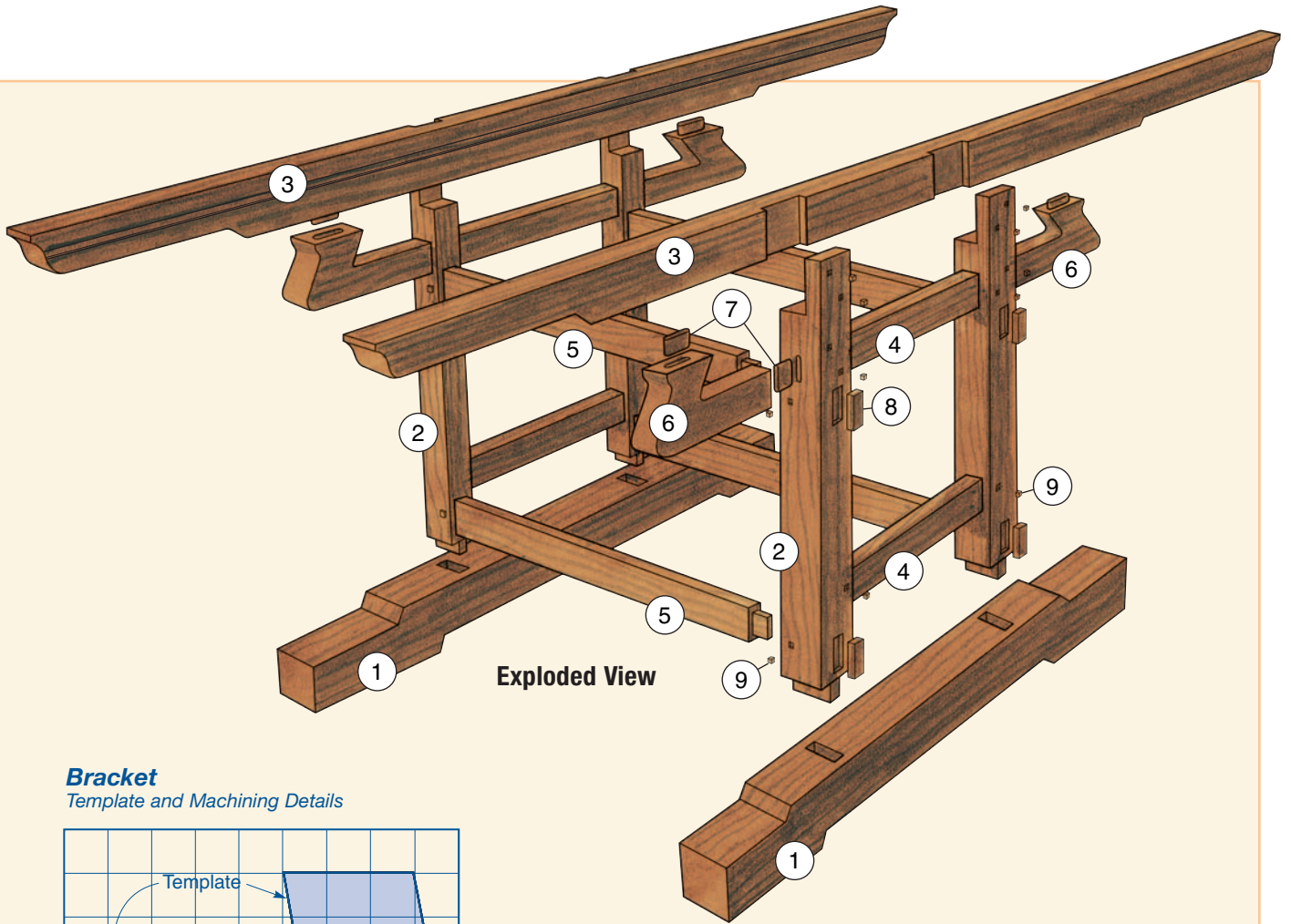
Side Rail Tenons (Top & Side Views)



Uprights



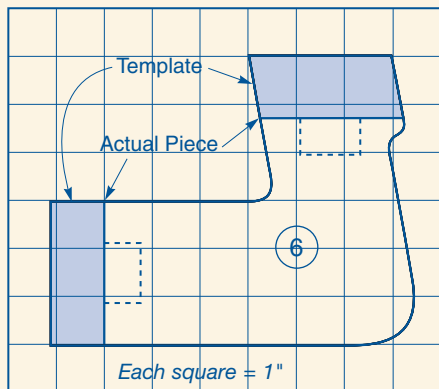
End Rail Tenons (Side & Top Views)



Exploded View

Bracket

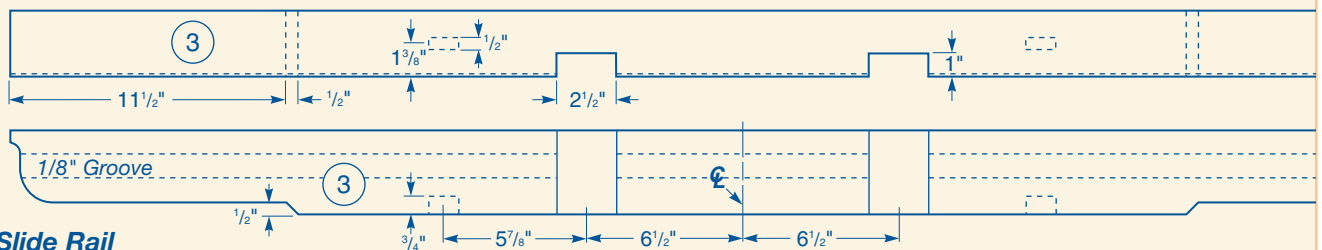
Template and Machining Details



Attaching the brackets is the one operation where a little "slop" is acceptable. In order to slide the brackets onto their floating tenons when assembling the base, the tenons need to be just a bit undersized.

MATERIAL LIST – Base

	T x W x L
1 Feet (2)	4" x 3 1/2" x 35"
2 Uprights (4)	3" x 2 1/2" x 26 1/4"
3 Slide Rails (2)	3 1/2" x 2 3/4" x 61"
4 Side Rails (4)	3" x 1 3/4" x 12 3/4"
5 End Rails (4)	3" x 1 3/4" x 27"
6 Brackets (4)	1 3/4" x 4 3/4" x 6 1/2"
7 Floating Tenons (8)	1/2" x 1 1/4" x 1 1/2"
8 Faux Tenons (8)	3/4" x 2" x 3/8"
9 Ebony Plugs (60)	3/8" x 3/8" x 5/16"



Slide Rail

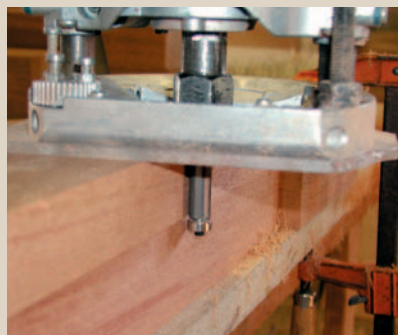
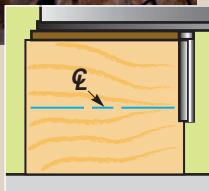
(Side & Top Views)

TAKING THE NEXT STEP IN TEMPLATE ROUTING

The feet and a couple of other parts of this table are too thick to be template-routed in a single pass. To solve this problem, the author devised a slick, two-step process. First, attach the template guide to the stock and, using a pattern routing bit (bearing at the shank of the bit), shape the foot, reaching slightly past the centerline of the stock (see *drawing* at left). Next, switch to a flush-trimming bit (bearing at the end of the bit), flip the stock over, and use the already routed shape to guide your cut.



The first cut, using a template as a guide, allows you to shape more than half the thickness of the foot accurately.



Flip the foot over and switch to a flush-trimming bit, and you can complete the shape of the foot using your previously routed profile to guide the router bit.

joints. Re-measure at least twice—it can save you a lot of heartache later on. (Mike incorrectly laid out and cut the lap joint in one of the rails—which he had already shaped—ruining six hours of work.)

Form your tenons and mortises now, while the stock is stuck up. The lap joint between the slide rails and uprights is a simple, yet extremely precise joint requiring patience and a light touch. These joints are easily visible and need to be tight. The best way to ensure precision is to dry-assemble each side of the base and take measurements directly at the top of the uprights. First, cut the notches at the top of the uprights, then follow with precision chisel clean-up. Cut the slide notches last, as it is their edges that will show the most where they intersect the uprights. Work carefully on these joints,

as it is difficult to get a perfect fit on two lap joints at the same time, which is what is necessary.

Before you begin profiling the base parts, the faux tenon mortises and plug holes need to be cut. Double-check your layout—now is not the time to drill a hole in the wrong place. Cut the plug holes with a mortise chisel in a drill press or mortising machine. Cut the false mortises using the shop-made jig shown on page 148.

Making the Templates

Profiling the feet, slide rails and brackets involves making complicated and precise templates that you will most likely never use again. However, this is the only way to get the multiple parts with the precision required.

Make your templates out of 1/4" MDF and use the table saw for as many

of the cuts as possible to ensure accuracy. It is critical that all curves be symmetrical, fair and true. Run your finger over the edges to test for bumps or divots. Make all the templates following the *Elevation Drawings*. Again, these templates ensure your success or failure...take your time and build them accurately.

The last step before you proceed to round over and detail the base pieces is to cut a groove in the slide rails. These pieces (as well as eight of the 12 slides) have a 1/8"-deep groove to accept the back of the T-rails.

Before you start to round over and detail the base pieces, raise the grain of all pieces with water and give them an initial sanding to 120 grit. Pay especially close attention to the template-routed areas, as you must smooth out a bit of unevenness between the passes.

Rounded edges and softened corners are part of the distinctive Greene and Greene look, and it is important to take your time with these details. The first step is to do a complete roundover of all the appropriate edges with a 1/8"-radius roundover bit. Just make sure you don't round over any of the tenon or lap joint shoulders. Once they are done, go over all of them with sandpaper to blend them perfectly.

Before proceeding to assembly, raise the grain once again and carefully sand everything with 220-grit sandpaper. Now is the time to decide whether or not the table will be stained. It is far easier to stain the pieces when they are apart than when they are assembled. Mike stained this table with one coat of water-based aniline dye stain.

The assembly of the base is very straightforward. Start by bringing together the uprights and the side and end rails with epoxy, checking often for squareness. Next, glue on the feet, and



The bold use of Asian-influenced timber frame construction stands in stark contrast to sparsely placed delicate ebony plugs.

then glue and screw on the slide rails. The final step is to glue the brackets into place, using the floating tenons. Here you'll need just a bit of "slop" to be able to fit the brackets.

Building the Slides

The main thing to keep in mind as you build the slide assembly is that it needs to slide freely. Every milling operation in its construction is going to release tension in the wood, which will make the parts want to warp minutely. So you must mill and fit, mill and fit, and mill and fit. Patience is indeed a virtue, and you will be rewarded for it.

The slides consist of interlocking T-slotted slide members and T-rails, along with stop blocks and closing plates. The best place to start is with the slotted slide members.

Begin by milling the pieces to size, making sure you give them time to adjust before final dimensioning. As Mike learned the hard way, it is best to profile the ends of the slotted members before you mill out the T-slots. Double-face tape the template into position,

and use a template bit in a router table.

Cutting the T-slots into the sliding members comes next. The first step is to waste away most of the center groove with passes on a table saw. Then use a T-slot cutter in a router table, making two passes to complete the shape. There is one vitally important thing to keep in mind during this process: you are making six members with the slot on one side and six with

the slot on the other! Mark them with chalk so you don't end up with four slide sets that all work on the same table side.

Once you have shaped the sliding members, flip them over and rout the slight groove in eight of the twelve. The innermost members don't need it because they won't have a T-rail glued to them.

Milling the T-rail is next. Keep in mind that you want a smooth sliding fit. Don't make the T-rail much longer than the necessary length as it will tend to distort. With a piece this small in cross-section, it's difficult to get an accurate cut out of the profile.

For the best results, rough-cut the T-profile on the table saw to about 1/16" oversized, let it sit overnight to straighten any resulting twist, and cut to size.

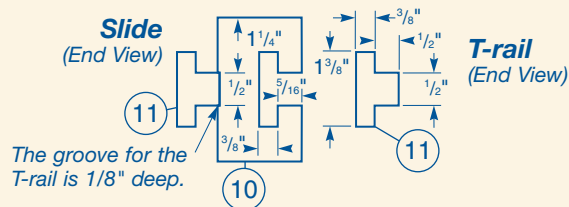
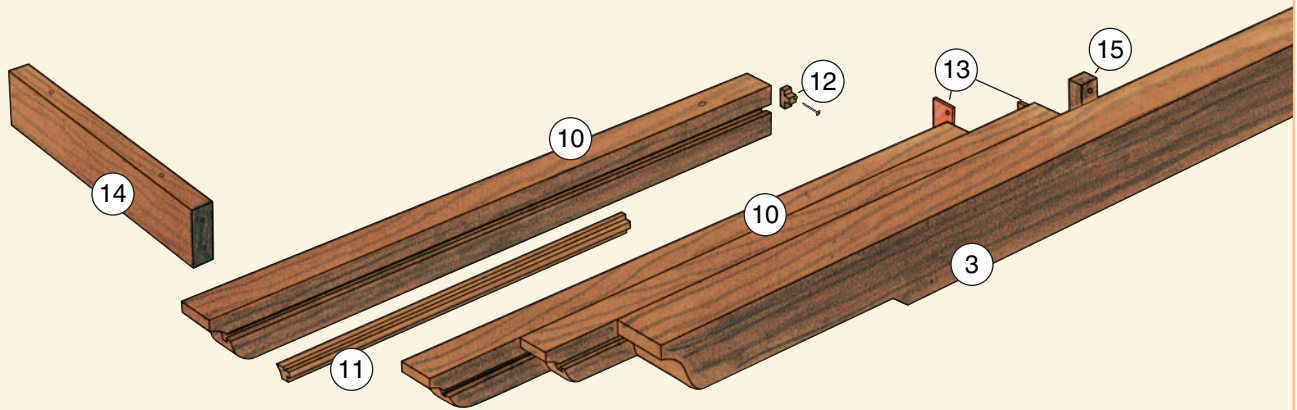
You should now have 12 slotted members and T-rails that will fit together with a tapping but not a sliding fit. This is exactly what you need for the next operation: profiling the ends of the T-rails.

When profiling the ends, keep in mind that six are for the left side, and

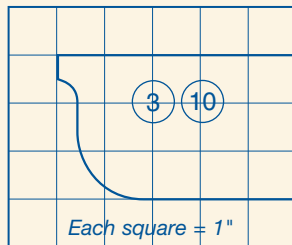


After plowing a simple groove into the slide member, expand the slot with a T-slotting router bit.

Slide Assembly Exploded View



Slide Profile Template



MATERIAL LIST – Slide Assembly

	T x W x L
10 Slides (12)	3" x 1 3/4" x 30"
11 T-rails (12)	1 5/16" x 1" x 20"
12 Stop Blocks (12)	1" x 1 3/8" x 7/8"
13 Closing Plates (8)	2 1/2" x 1 1/4" x 1/8"
14 Slide Stretchers (2)	1 1/4" x 2 3/4" x 14"
15 Center Stop Blocks (2)	1" x 3" x 1/2"

Slide Stretcher Pocket Hole Locations (Inside View)



Brass closing plates are mounted as shown above. Also note the T-shaped stop blocks (pieces 12) secured with screws in the T-slots next to the closing block.

six are for the right side. The T-rail ends are profiled by sliding them into the T-slots, marking the ends with a pencil, trimming them oversize, and reinserting into the T-slot with about 1/16" protruding. Then, clamp them into place and, using the already profiled member as a template (see *photo*, next page), rout them to shape with a template bit. To prevent blowout, put a shim between the ends of the T and the slot. After profiling the ends, you can cut the rails to final length, and you're ready for fitting.

In a perfect world, all the members of the slides would be interchangeable.

But, wood being what it is, this just won't happen. Before starting to fit the slides, it is best to match them up into four sets and label them with tape and a marker so you can keep the sets together through final assembly.

The first step of fitting is to pair the T-rails with the 1/8"-deep grooves. This will take a little sanding and scraping of the T-rail sides. The next step is to raise the grain and thoroughly sand everything, including the inside of the T-slot. Sanding the inner faces of the T-slot takes care of any minute vertical warp; sanding the underside faces of the T-rail takes care of any horizontal warp.

When testing, it is important to press-fit the T-rail into its proper groove, as this will show you the true horizontal alignment and spacing. Be patient at this stage. The fit you want is a nice, smooth slide without a hint of binding.

Once you're pleased with the fit of the slides, joint 1/16" off the tops of each of the two slide members closest to the slide rails. This clearance allows the top to slide much freer, as the leaves rest entirely on the slide rails and innermost members, which are screwed to the top. To prepare for attaching the top, drill three stepped holes in each of the inner slides for the attachment screws.

All the slide pieces can now be rounded over, with either a 1/8" roundover bit or by hand with sandpaper. Before finishing, you should raise the grain again and sand everything with 220-grit paper.

The next pieces to make for the slides are the stop blocks and closing plates. The stop blocks are nothing more than 7/8"-long pieces of T-rail made to fit without slop. As can be seen from the *Exploded Drawing* on the previous page, they are secured in the T-grooves with countersunk screws. The closing plates are made of brass and attached with countersunk screws.

The final step to making the slides is to glue the T-rails into their appropriate grooves. Before doing this, it's a good idea to go over the fit of the slides one last time; better to catch problems now than when you're finished. Don't forget to glue T-rails to the outer slide rails.

After the glue has dried, slip all the slide members into their proper places on the base, install the stop blocks and closing plates and make sure the slides work well. The slide stretchers join the two banks of slides. They are attached (use pocket-hole joints) to the two

innermost slides on each end of the table. Cut and fit them now, and prepare their surfaces as you did the slides. If you plan to stain the table, you can then disassemble all pieces, stain them, and set them aside.

Making the Top

Mike prefers to have the rough-cut top wood sitting in his shop for at least a month before he mills it to final dimensions for glue-up. The top has very little secondary structure—such as an apron—and it needs to end up as flat as possible.

Your first step is to joint and plane the boards to 1 1/8". After thicknessing, lay out your boards on a benchtop and arrange them to achieve both the best grain pattern and even board widths. Then joint, rip, and joint your boards to width.

With your boards cut and jointed to size, lay out the two top halves and the leaves. Mark the leaves and tops for biscuit joints and cut. After cutting the biscuit joints, glue up the top and leaves with epoxy, taking care to equalize the clamping pressure with clamps on both faces. This will help prevent warped panels. Once the glue has dried, sand the tops and leaves to a uniform 1" thickness with a wide belt sander.

As you did with the base, you will now need to spend a bunch of time making very precise templates for the top and the outer and inner rim edges. While they will help you achieve a perfect job, it is likely you will only use



Profiling the T-rails is one of many pattern-routing tasks required in the building of this project. Here the author uses the shape of a T-slotted slide member to guide the router as he shapes a T-rail end.

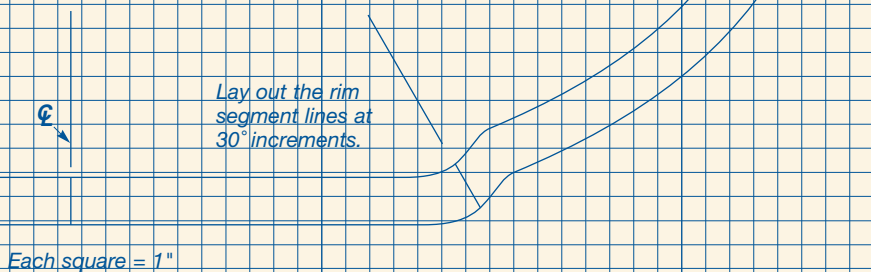
them once. The keys to the top templates are symmetry, smoothness, and perfectly interlocking joints. The *drawing* on the next page will help, but you will still need to carefully smooth the template and check its symmetry by tracing one side onto onion skin and flipping it over to see if it matches the other side. Make minute corrections and check again. It is best to make all three templates at the same time.

All aspects of these templates are very important, but the gapless fit between the top template and the inner rim edge template is the most critical aspect to a good job. To put this into

Top Exploded View



To make perfectly accurate mating templates requires patience and perseverance. Think of the template-making process as a meditative experience, (similar to that of sleeping on a bed of nails).



Lay out the rim segment lines at 30° increments.

NOTE: Building the templates used to shape the table's top elements is perhaps the most significant challenge of this project. Use the drawings at left as a starting point for the three templates you'll need: one for the top, one for the inside edge of the rim and one for the rim's outside edge. The top and the inside rim edge template should mate perfectly. This is done by aligning the edges of the templates, marking the areas where they touch (by doing so, they actually hold the templates apart) and then carefully sanding those spots. These areas where the templates touch will get larger and larger as the templates become more accurate. This process took the author the better part of three days to complete.

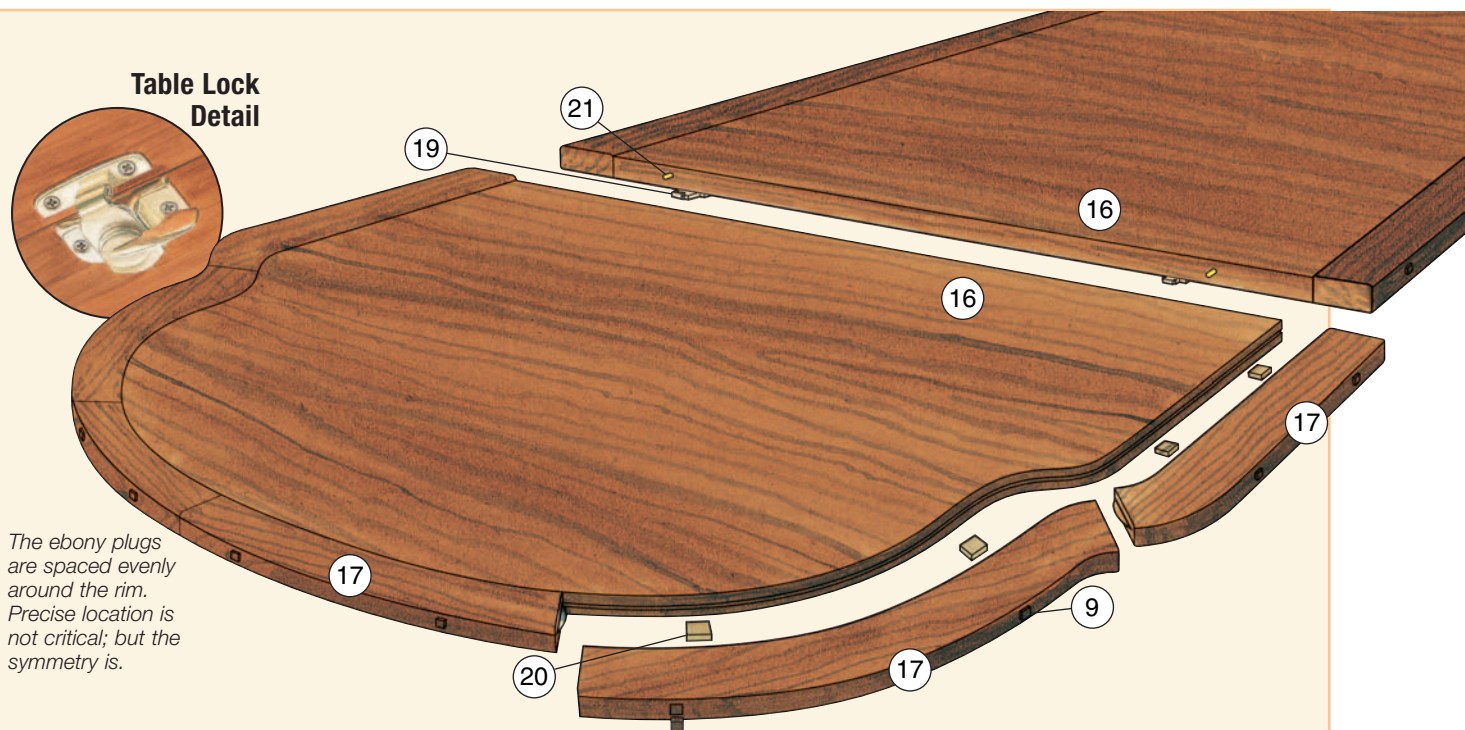


Clamping the rim to the tabletop is a significant task. Affixed with epoxy and located horizontally with the aid of multiple small splines, this is the most visible joint on the entire table project.

perspective, Mike spent the better part of three days making and fitting these templates.

Once you have your templates made, you can rough-cut your tops to shape, double-face tape and clamp your template into place, and rout the top to shape.

It is now time to move on to the rim. Mill the rim stock to $1\frac{1}{16}$ ", taking care to keep the stock as flat as possible. The drawings indicate the sizes and angles of the pieces that make up the rim blanks. When cutting the pieces for the rim blank, take extra care to get the end angles right on, as even a half-degree mistake can make a huge difference. Once satisfied with the fit, you can biscuit joint the ends and glue them up with epoxy. As is obvious from the drawing, it's critical that you place the biscuits where they won't be exposed when the outside is routed to shape. When the glue has dried, clean up both faces and sand to 120 grit.



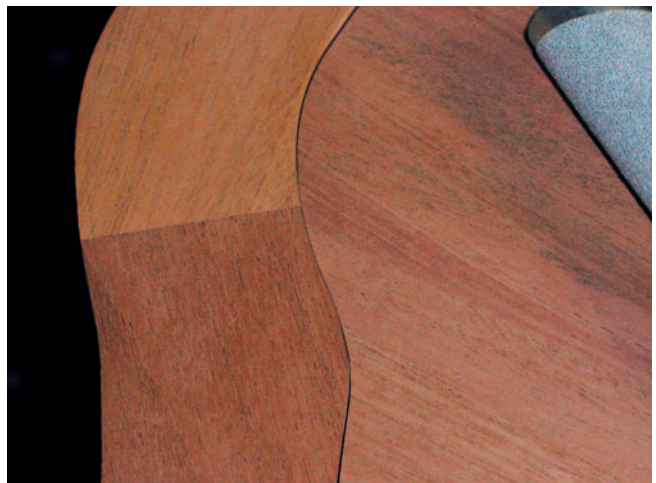
MATERIAL LIST – Top	
	T x W x L
16 Tops (2)	1 x 31½" x 56"
17 Rim Material (1)	1¼" x 4½" x Varies
18 Leaves (2)	1" x 31½" x 24"
19 Table Locks (2)	Brass
20 Splines (32)	¼" x 1" x 7/8"
21 Leaf Pins (6)	Brass



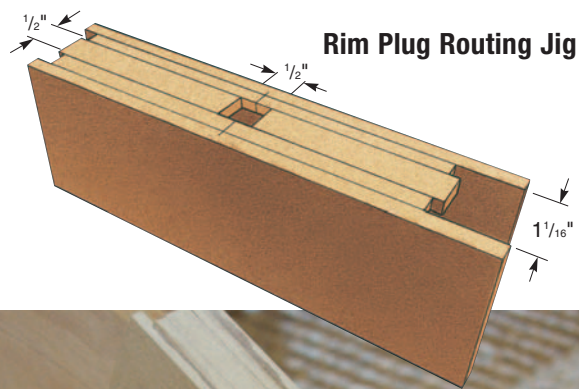
Using the two rim templates, trace the inside and outside lines on the blank rims, and then band-saw to within 1/16" of the inside line. Leave the outside rough for now. After carefully taping and clamping the inside template down, rout the inside rim edge with a template bit. When both inside edges have been cut, the outside edge can be cut 1/16" oversize on the band saw.

Mike spent quite a bit of time thinking about how to attach and align the rim with the top. He finally decided to use a spline system in conjunction with glue relief grooves to get the strength he wanted without producing any glue squeeze-out at the top surface/rim joint.

With the help of a scrap piece of rim material to check alignment, rout a groove in the tops with a ¼" three-wing cutter. Then, using the same bit in a router table, rout the rims with a corresponding groove. When used with a spline, the



The joint between the tabletop and the border must be without visible gaps. Accurate template work is the only way to achieve such a long, continuous joint.



Routing the mortises into the rim for all the ebony plugs is achieved using a small clamped-on jig. The router is outfitted with a 1/4" bit and a 3/8" o.d. rub collar.

rim should be flush with the bottom and stand 1/16" proud of the top. The groove should stop just short of the center joint.

It is easiest to cut the glue relief grooves now, before you start fitting the rim to the top. Do this—very carefully—with a utility knife and a fresh blade.

To ease the process of fitting the rim, which involves holding the rim against the top a number of times, glue some short pieces of spline material in place so that when you push the rim in place you don't have to worry about holding it up.

The fit between the rim and top must be perfect. Mike's motto for this type of fitting is "slow and cautious." At this point in the process, if you decided to leave your table natural, the rims can now be glued on, using the splines, epoxy, and a lot of clamps. If your table is to be stained, it is far better to complete building the rims and stain them, along with the top, before the rim is glued into place. Without the rim glued in place, you will need to temporarily affix it so you can rout the outer edges and cut the plug mortises. The best way to do this is to accurately locate the plug mortises and use those holes to sink #6 screws. The screws need to be sunk at least 5/16" below the surface. Only after routing the rims to size should you make the rims for the leaves.

Made the rim plug mortises with a combination of router template, guide-down spiral bit jig and a chisel. Mike's jig for the plug mortises (shown in the *photo* above) indexes off the centerline for each plug, so you will need to carefully lay out the centerlines. The last steps before staining are to round over the rim edges with a 1/8" roundover bit, flush up the ends of the rims with the top and leaf edges, raise the grain, and give it a pass with 220-grit sandpaper.

When the staining is complete, the rim can be glued into place. The temporary screws can be used to great effect for clamping purposes.

Choosing Finishing Materials

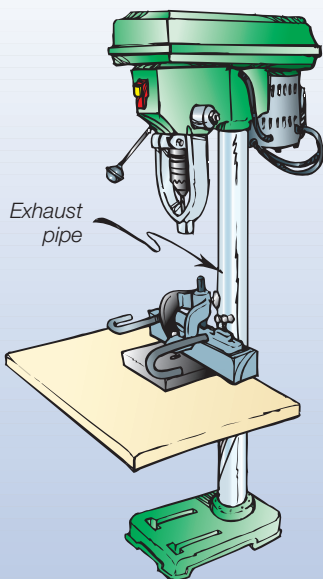
There are two different finishes used on this table: catalyzed lacquer on the majority of the table, and Sam Maloof's oil on the slides. Mike used three coats of oil, which makes for a slippery finish that can be renewed as needed. The base, top, and leaves are all sprayed with four coats of catalyzed lacquer with careful sanding and buffing between coats. If you don't own spray equipment, you could use a wipe-on gel varnish instead to achieve a similar sheen and durability to lacquer.

After the oil on the slides cures for several days, buff out all the surfaces with a fine Scotchbrite® pad and give all the parts several coats of paste wax.

QuickTip

Tailpipe Drill Press Extension

If you wish you could extend the spine of your benchtop drill press to expand its capacity, maybe you can. Try using a length of automotive tailpipe as a replacement for the column.



Details, such as exposed end grain on the faux tenons and the mirror-image symmetry of the overall design, join together as a harmonious ode to the Greene brothers' legacy.



Conducting the Final Assembly

The final assembly of the table involves four steps: First, install the leaf pins; second, install the table latches; third, install the slides and fourth, screw down the top.

Mike preferred to install two leaf pins per edge, so that if some seasonal vertical movement occurs the leaves still fit together. He used brass pins and sockets as they look nicer and last longer. Install them using a centerline indexing drill jig.

Lay the tops and leaves upside-down on a padded bench and attach the table latches. It is important that the latches work in all possible leaf configurations and do not interfere with the slides or the base. The slide members

can now be slid into place and their stop blocks and closing plates installed.

To attach the top to the slides, lay the top upside-down on a padded surface and latch it together. With the help of a couple of friends, set the base upside-down onto the top. After much measuring, mark the slide screw holes by dropping a screw in each of them and tapping with a hammer. Before removing the base to drill the screw holes, carefully mark the base position with tabs of masking tape. After drilling the screw holes, screw the top to the slides with 3", #8 flathead screws onto which you've threaded a #6 washer. This combination of washer, screw and oversize hole allows the screws to rock slightly with seasonal changes.

Plugs Before Guinness

Now, before you can go and have that celebratory Guinness, there is one last amazingly time-consuming step that needs to be done—making and installing the 72 ebony plugs. Mike uses a similar method for installing plugs in many of his furniture designs. The basics are to mill a 3/8" by 3/8" stick, sand and buff the end to a dome on a low-speed grinder, cut it off, and repeat. To install the plugs, slightly bevel the inside end, put a drop of glue in the hole, and tap it gently into place with a hammer.

After all these plugs are properly installed and you're finally through, the celebration might actually require two Guinnesses!