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DECEMBER 2011 ■ #194

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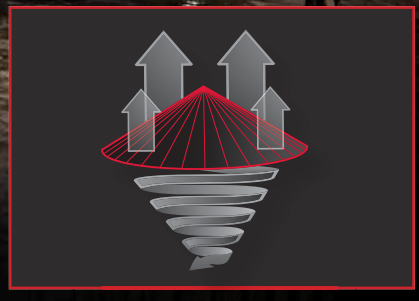

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COVER PHOTO BY AL PARRISH; ARCH TABLE PHOTO BY JEFF MILLER;
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CONTRIBUTORS

Brian Boggs
"The Myth of Original Design," page 64.

For nearly 30 years, Brian has been designing and making award-winning chairs and other furniture; solving problems in chair production led him to design tools such as spokeshaves and a shaving horse now made by Lie-Nielsen Toolworks.

He's also developed machines and joinery systems used in his shop for his unique designs, as well as tools and techniques for primitive shops for indigenous peoples in Central and South America, where he's spent time teaching woodworking.

Brian has recently relocated from Berea, Ky., to Asheville, N.C., where he and his business partner, Melanie Moeller, are developing a new business model for woodworking called the Boggs Collective.

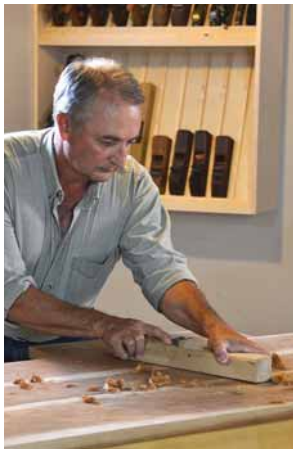
To read more about the Boggs Collective, visit the organization's web site at boggscollective.com.

Deneb Puchalski
"Straight Talk on Sharpening," page 40.

Deneb Puchalski has been working with wood for more than 25 years as a carpenter, boatbuilder and furniture maker. His first exposure to woodworking was in his father's boatbuilding school when he was a child. Later, Deneb built houses in Alaska (where he also worked on fishing boats), then moved to Florida where he got back into boatbuilding – including work on a replica pirate ship. More recently, he became interested in furniture building and attended the Center for Furniture Craftsmanship in Rockport, Maine, where he later served as an artist in residence.

Now, Deneb teaches at Lie-Nielsen Toolworks events throughout the United States and at woodworking schools.

To see Deneb in action, visit YouTube.com and search for him by name.



Ted Brown
"Krenov-style 'Memories Box,'" page 48.

Ted Brown is a furniture designer and maker from Ottawa, Ontario. He studied woodworking in Canada, and later with James Krenov at the College of the Redwoods in Fort Bragg, Calif., in 1993.

Ted ran his own furniture-making business until he opened his own school in 2002 and taught fine woodworking for five years. He now enjoys the slower pace of teaching periodically, and writing about the fine art of woodworking.

Ted enjoys the melting pot of influences he has gleaned from James Krenov, Garrett Hack and Michael Fortune to name just a few. These days, Ted likes to work at his own pace as he designs and builds fine furniture.

This is Ted's second article for Popular Woodworking Magazine. *The first, a two-part story on design, can be found in the October and November 2007 issues. For more information, visit popularwoodworking.com/dec11.*

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EDITORIAL OFFICES 513-531-2690

PUBLISHER & GROUP EDITORIAL DIRECTOR ■ Kevin Ireland
kevin.ireland@fwmedia.com, x11407

EDITOR ■ Steve Shanesy
steve.shanesy@fwmedia.com, x11238

SENIOR ART DIRECTOR ■ Linda Watts
linda.watts@fwmedia.com, x11396

EXECUTIVE EDITOR ■ Robert W. Lang
robert.lang@fwmedia.com, x11327

MANAGING EDITOR ■ Megan Fitzpatrick
megan.fitzpatrick@fwmedia.com, x11348

ONLINE COMMUNITY EDITOR ■ Ajax Alexandre
ajax.alexandre@fwmedia.com, x11008

CONTRIBUTING EDITORS ■ Adam Cherubini, Bob Flexner, Glen Huey, Christopher Schwarz

PHOTOGRAPHER ■ Al Parrish

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connie.kostrzewa@fwmedia.com

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BY STEVE SHANESY, EDITOR

From Concrete Bunker to Light-filled Workshop

At about the time you receive this issue, we'll be busy packing up our offices and woodworking shop for a move of less than a mile from our current location. You might say we lost our lease. While the rest of our Cincinnati-based parent company is relocating to a new office building, the *Popular Woodworking Magazine* editorial crew is moving into a new home in the same building as our company's photo studio.

We've carved out about 1,500 square feet for the new shop and I've handed off my shop layout and specifications for the landlord to improve the space. (As the photo shows, we started with a sow's ear.)

This will be my third new shop setup for the magazine over the years, and my fifth during my woodworking career – not counting home shops. It's always exciting, and a bit nerve wracking, but I'm convinced it will be our best shop yet. For one thing, it's somewhat larger than our current space and the rectangular footprint will leave no wasted areas. We have a large roll-up garage door to move equipment and supplies in and out – and it's on ground level. Hooray!

We'll have all-new wiring, lighting, heating and air-conditioning. Holes were knocked in walls and windows were installed in what would have been a cave of a space. And most of the windows are north-facing – the best natural light there is.

The landlord is springing for plywood sheathing to cover the concrete-block walls, so hanging cabinets and tools will be a breeze. About the only thing we'll be lacking in the shop space is running water. Maybe we can catch rain water on the roof and install an on-demand water heater! (The real problem is there's no drain to tie into.)

A shop move always feels like a chance for a fresh start. We'll sort through all the stuff we've accumulated over the 10 years we've been in the current location. There's probably enough to fill a dumpster. And we'll likely find a bunch of stuff we forgot we had. The new space ought to prompt ideas for new shop-storage projects and different ways to set up benches and equipment. Don't be surprised if you see a handful of such projects in the magazine and online in the coming year.

Now I have to get busy with my last shop-related planning chore – "engineering" the ductwork for our dust-collection system. Then there's the layout of the our workstations in the new office space. Let's see … where's that hat? Was space planning on the job description? It's a good thing that one of the joys of woodworking is the allure of problem solving. **PWM**

Steve Shanesy

PHOTO BY THE AUTHOR

POPULAR Woodworking MAGAZINE

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Safety Note

Safety is your responsibility. Manufacturers place safety devices on their equipment for a reason. In many photos you see in *Popular Woodworking Magazine*, these have been removed to provide clarity. In some cases we'll use an awkward body position so you can better see what's being demonstrated. Don't copy us. Think about each procedure you're going to perform beforehand.

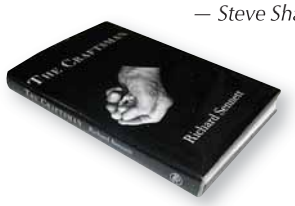
Highly Recommended

"The Craftsman" (Yale UP), a book by Richard Sennett, was not written for those who practice a craft. But for those who do, it is a particularly fascinating (if sometimes difficult) read.

In many ways the book is a mirror of our motivations and pleasures derived from craft. It describes the impact craft has had on society throughout the ages – not just in producing goods, but in making good citizens. It amplifies the basic human need to do a job well for its own sake. Examples abound, such as the inner workings of Stradivari's shop and how craft guilds were run.

Even if you decide to skip the discussions on Kant and Wittgenstein, you'll enjoy the book for its rich detail. I liked it so much I did a second read – a rarity for me. Paperback, $18.

— Steve Shanesy



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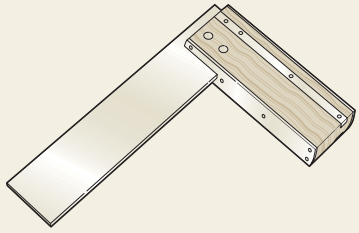
Brass Stock for Try Square

Do you have a recommendation or a source for the brass items to build the Bridge City try square (from the October 2011 issue, #192)?

John L. Wohlgemuth
via e-mail

John,
John Economaki, the author of that story and the founder of Bridge City Tool Works, recommends McMaster-Carr (mcmaster.com) for the brass. Here are the McMaster-Carr item numbers he's provided for the square supplies:

- *1/8" x 1 1/2" 360 brass flat stock, #8954K251*



- *1/16" x 1" 360 brass bar stock, #8954K44*
- *1/4" x 1/4" 360 square stock, #8951K22*
- *1/8" drill rod, #8893K18*
- *3/16" brass round stock, #8953K43*

Megan Fitzpatrick, managing editor

How is the LVL Bench Holding Up After Two Years of Use?

After a few years, how is the LVL workbench (from the November 2009 issue of *Popular Woodworking Magazine*, #179) performing? Is there anything you would now do differently? I haven't read any mention of it in the magazine since it was originally presented. I ask because there are a lot of us out here who can't afford to build a bench out of hard maple and could use a less-expensive alternative.

Louis Armstrong
via e-mail

Louis,
The LVL top is awesome; it's still dead flat after two years of hard use, and there's hardly a mark on it.

However, were I to build it again with the same knock-down joinery, I'd use Southern yellow pine or some other relatively inexpensive lumber to build the base. Why? Because in its intended orientation (that is, glued up into thicker stock without ripping and re-orienting the laminations, as we did to create the top), the LVL compressed a bit – especially in the bolt holes.

And while it's not a huge problem, the force of the leg vise has pushed the top off the left front leg about 1/8". We "fixed" this for a short time by inserting a "bullet" to connect the top to the left front leg, but that hole also has been stressed by the vise; so, again, the top is no longer flush to the front of the bench. It still works fine, but it bugs me.

So I heartily endorse LVL for the top (with an edge band of a hardwood front and back to keep the fragile edge from getting knocked off), but the compression issue is why I'd use something else for the base.

I've heard from readers, however, that not every lumberyard carries LVL – though they can all order it.

Christopher Schwarz wrote a "real-world" review of the LVL bench (that is, how it performed in use) in "The Workbench Design Book" (Popular Woodworking Books), as well as a review of the other eight benches for which we included plans.

Megan Fitzpatrick, managing editor

Kudos to a Classy Toolmaker

What an incredible article by John Economaki ("Try for Your Best Work," in the October 2011 issue #192). Imagine a manufacturer telling us how to build one of his tools. That is incredibly generous and classy.

Tom Walz
Tacoma, Washington

Raking Light Can Help Find Glue Spots Before Staining

I read with interest a letter in the August 2011 issue (#191) responded to by Glen D. Huey, who said he wets his projects before final sanding so he can better see and eradicate any remaining scratches.

I use a lot of alder. One problem I have after glue-up is that there often are spots of glue and fingerprints on the light-colored wood that I do not see prior to staining; these then appear in the finish as white spots.

I'm wondering: Would wetting the project before staining it identify these glue spots?

Mike Millikin
via e-mail

Mike,
Glue spots are a real disaster when found during stain applications. Wetting the surface does expose some sanding deficiencies, and it also can help to discover glue problems. However, it is better to sand and/or prepare your surface for finishing using a raking light. Light highlights glue stains due to the variations in sheen. I have a regular shop fluorescent light attached to a 2x4 post on a wheeled platform so it's easy to move around the shop for just such a use.

Glen D. Huey, contributing editor

Thank You, Toshio Odate

I commend you for publishing a fantastic article by Toshio Odate in the October 2011 issue of *Popular Woodworking Magazine* (#192).

Odate managed to put into words the often indescribable feeling that I get as a woodworker when holding a quality-made tool. It's nothing less than the inspiration to make something as

CONTINUED ON PAGE 12

ILLUSTRATIONS BY MARY JANE FAVORITE

CONTINUED FROM PAGE 10

well as I can, and as well as the tool is made.

I know little of Japanese woodworking, but this article makes me want to learn.

Bill Lattanzio
Spring City, Pennsylvania

"Live your questions now, and perhaps even without knowing it, you will live along some distant day into your answers."
— Ranier Maria Rilke (1875 - 1926)
Bohemian-Austrian Poet

How to Pick Moulding Profiles

I'm in the process of building a workbench similar to the Shaker bench that Glen D. Huey built for the December 2007 issue of *Popular Woodworking Magazine* (#166). I am interested in what type of cutter was used to create the picture-frame moulding that was used around the beaded panels.

Gary Williams
Mechanicsville, Virginia

Gary,
I have a router bit profile that I particularly like (it's a classical cove-and-round bit) and I use that profile on many of my projects – simply because I like the way it looks.

If you have a favorite profile, I suggest that you use it for your bench moulding (and any time you have a project that calls for moulding).

Glen D. Huey, contributing editor

Proper Burl-drying Technique

I have a cherry burl from a tree that I had taken down. It's about the size of a small watermelon. Do I slice it into slabs to dry or do I wait until the whole chunk is dry? Or does it not matter?

Kirk Brinker
via e-mail

Kirk,
How to proceed depends on your plans for the burl. Is it destined for the lathe (a turning could be a great choice) or a small project – or maybe it will be sliced into veneer?

Regardless, you want to carefully control the drying process. Grain direction of burl is in every direction and it will have far more stress than typical lumber. Also, no matter how you cut it, there will be end grain on every surface.

If you decide to slice it up, make your best guess as to how you may use it and consider a thickness that will allow flattening after drying and possibly resawing.

No matter what, generously coat all surfaces (whether it's whole or in slices) with paraffin, about 1/8" thick. (Commercially available end sealers, such as Anchorseal, will require numerous coats, and even then may not be effective for a cantankerous burl.) Inexpensive paraffin can be purchased at the grocery store. Remember, paraffin is flammable so when melting it on your stove, don't let it overheat or spill on to a hot burner or open flame. PWM

Steve Shanesy, editor

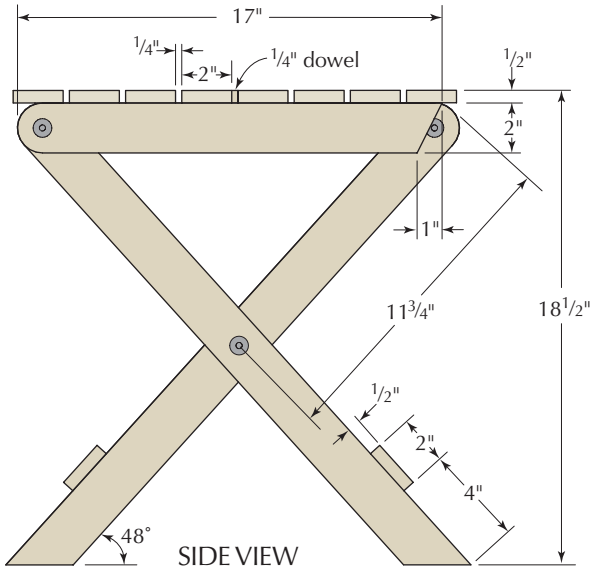
Corrections to the Portuguese Folding Table Article

In the October 2011 issue (# 192), there were errors in the SketchUp model, cut list and illustrations for the Portuguese Folding Table.

The table has four arms, not two (as was stated in the article cut list). In addition, correct dimensions are called out in the illustration below.

I apologize for any confusion these errors may have caused.

Ajax Alexandre,
online community editor



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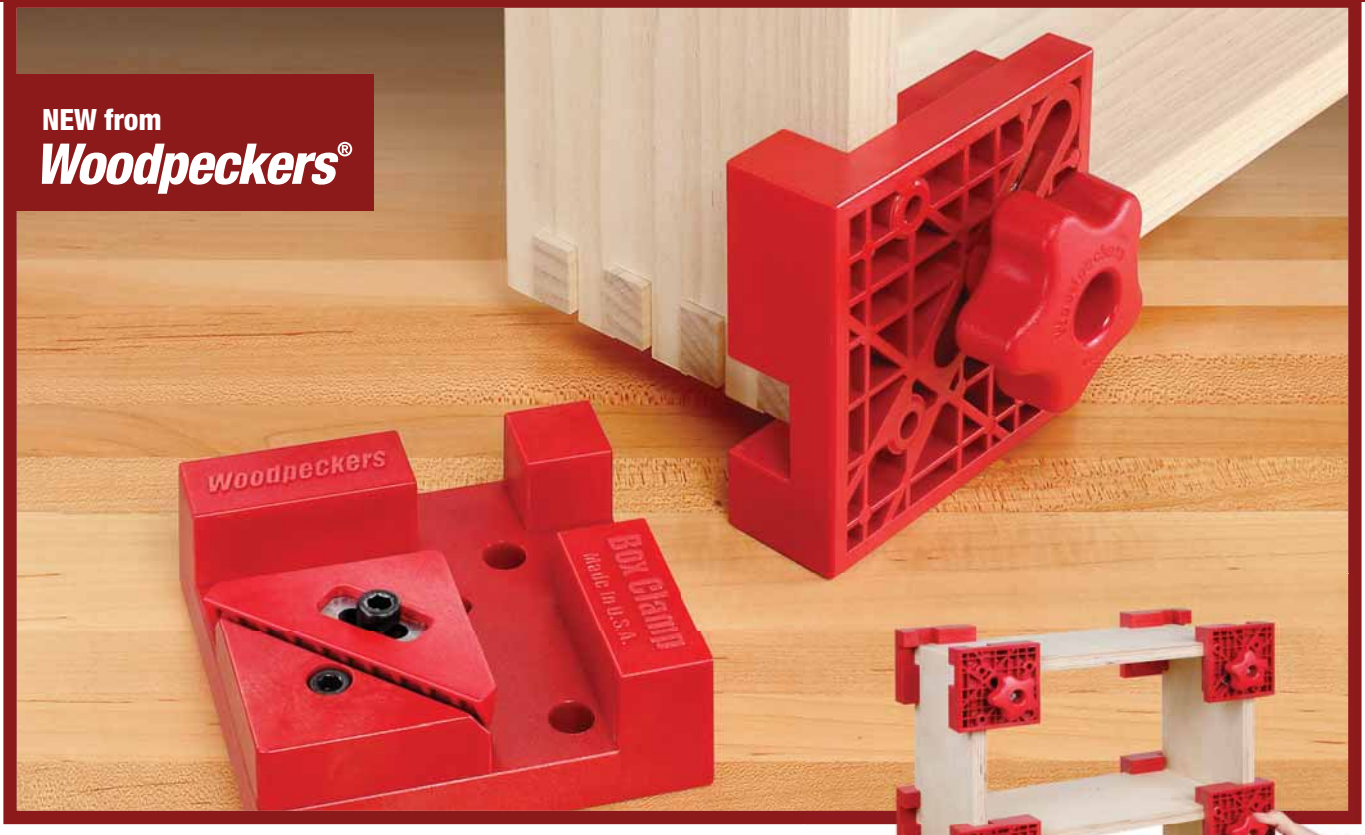

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EDITED BY KARI HULTMAN

THE WINNER:

Adjustable Thin-strip Jig

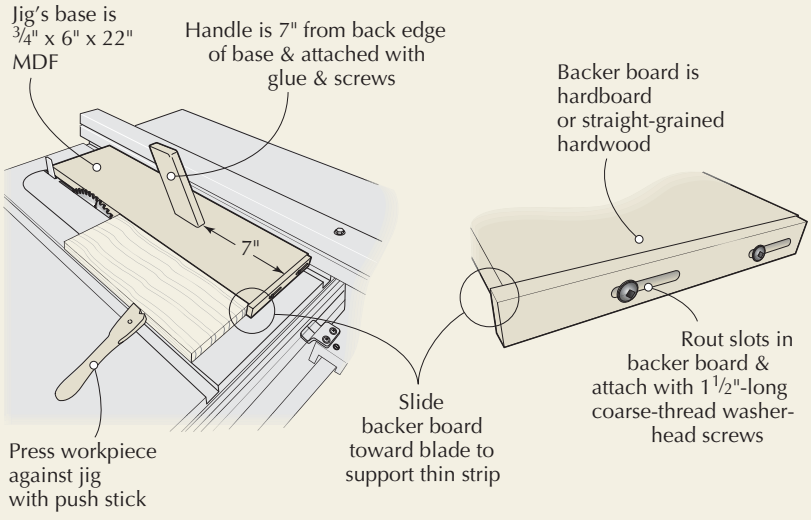
Here is my adjustable jig for ripping thin strips on a table saw. Used with a push stick and zero-clearance insert, it keeps my hands a safe distance away from the sawblade.

The base is MDF that's 3/4" thick x 6" wide x 22" long. The width of the jig keeps my hand away from the sawblade, and the length of the base accommodates longer stock. The handle, which is shaped for comfort and angled forward, helps the jig stay firmly pressed against the table saw's fence. Secure the handle 7" from the back edge of the base with glue and screws.

The adjustable backer block is made from 5/16"-thick hardboard (or straight-grained hardwood) and can be adjusted to support the entire width of the thin strips. I milled the slots on my router table and used 1 1/2"- long coarse-thread washer-head screws to secure the backer block to the jig's base.

I use a push stick to keep the workpiece tight against the jig until it reaches the sawblade.

Serge Duclos
Delson, Québec



Wedge Your Twisted Boards

I handplane all of the wood I use, including rough stock, and I have yet to meet a rough board that is truly flat.

Planing one true face on a bowed or twisted board can be difficult. When I run a plane over thin boards, they flatten under the pressure, so I'm not able to remove the high spots. Thicker, twisted boards tend to wobble as I plane them.

To keep things steady, I wedge door stops under the warped areas that are not in contact with the workbench. The wood no longer flexes or wobbles, so I'm able to handplane one true face. If you don't have door wedges, you can cut them from scrap wood.

Bob Jones
Hernando, Mississippi

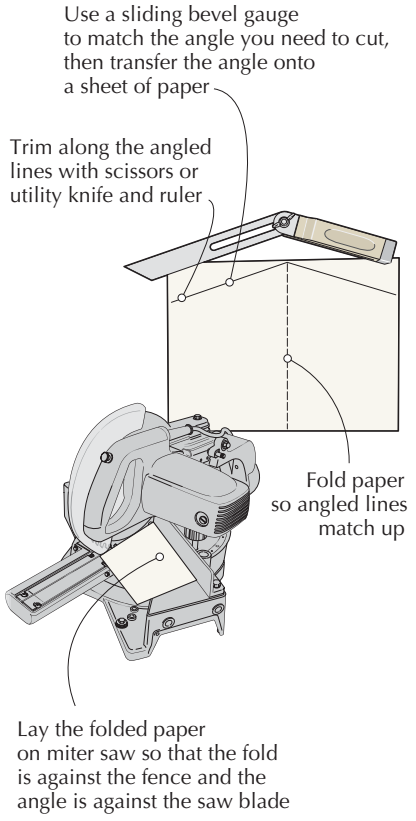
Precise Angles for Floor Trim

In the last few months we have been renovating our kitchen, including the floor. Our kitchen has bump-out windows with various angles of floor trim – each one slightly different than the other. I came up with an easy solution to find the correct angles for the small trim pieces.

Use a sliding bevel gauge to match the shape of the angle, then transfer the shape with a pencil onto a sheet of paper. Use scissors or a utility knife and ruler to cut along the two lines that create the angle. Carefully fold the paper so that the angled lines match up.

Place the folded paper on your miter saw with the fold against the fence and the angled side against the blade. Adjust the miter saw until the blade just touches the paper. This will give you the exact half of the angle for that particular trim piece. Easy!

Stan A. Grenda
Mill Bay, British Columbia



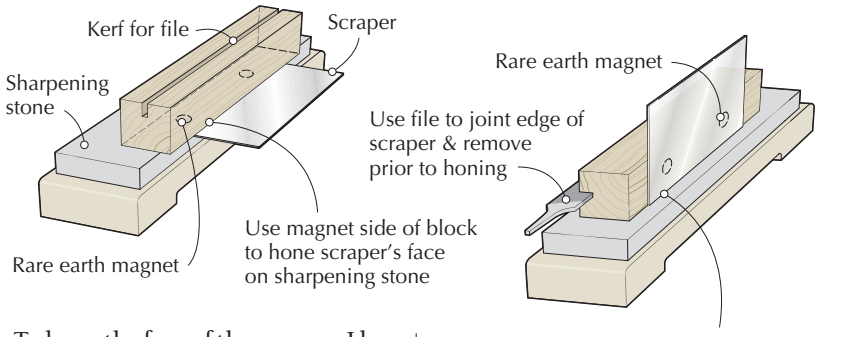
ILLUSTRATIONS BY MARY JANE FAVORITE

Scraper Sharpening Jig

A few months ago, I took a class with Christopher Schwarz at the Marc Adams School of Woodworking. He explained his technique for sharpening scrapers and I offered an idea that would help the process: a shop-made block with three distinct functions.

The block works as a holder for a mill bastard file, a 90° guide for honing the edge of the scraper, and a magnetic pressure block for honing the face of the scraper. I use a sharpening stone for honing.

To build it, I cut a perfectly square block of 2" x 2" x 6" scrap wood. Next, I cut a lengthwise kerf in the block to hold the file so I can joint the edge of the scraper. On the opposite side I drilled a couple 3/8" holes in which to embed rare earth magnets flush with the block's surface.



To hone the face of the scraper, I lay the block magnet-side down on top of the scraper. The rare earth magnets grip the scraper, even with lots of slurry on the stone. The block also acts as a 90° reference while honing the edge of the scraper on the sharpening stone. I eased the corners of the block to make it easier on the hands.

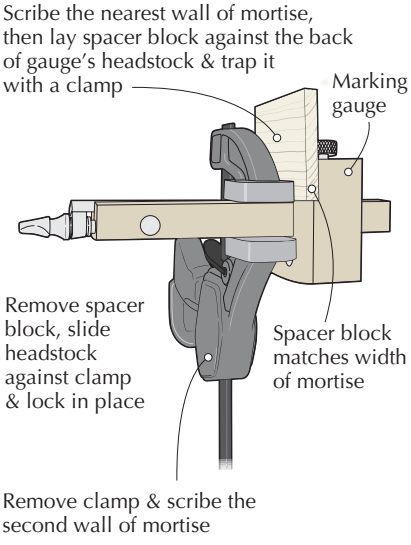
Shawn Nichols
Cleveland, Ohio

Accurate Setting for Mortises

With this trick I can quickly scribe mortises with my marking gauge.

First, use the gauge to mark the wall of the mortise that is nearest the reference face of the workpiece. Then, put a spacer block behind the gauge's headstock that matches the width of the mortise. Use a small clamp to trap the spacer block between the clamp and the headstock. Remove the spacer block and slide the headstock against the clamp. Lock the headstock in place and scribe the second line of the mortise. This technique also works when marking tenons.

Alejandro Balbis
Longueuil, Quebec

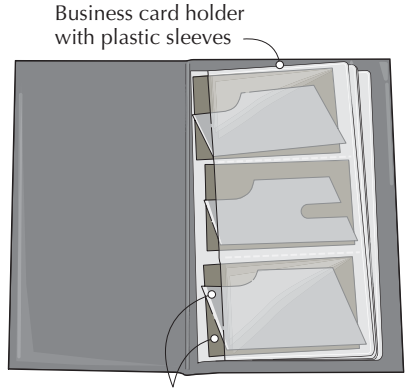


Storage for Combination Plane Cutters

I had a brainstorm for storing the cutters for my Stanley combination plane. I slip refrigerator magnets into the plastic sleeves of a business card holder then slide the blades in on top of the magnets. The magnets keep the cutters in place so their sharp corners don't dig into the plastic.

You can use this idea to house other pieces of metal such as spokeshave and utility knife blades, and scratch-stock profiles. PWM

Jeremy Kriewaldt
Lindfield, New South Wales



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BY THE EDITORS

Veritas Bevel-up Smoothing Plane

A jewel of a tool.

Perfectly sized. *Small smoothing planes will get you to the finish line faster than big ones. The new Veritas bevel-up tool is both easy to set up and use.*

I have never understood the modern fascination with enormous smoothing planes. We prefer big smoothers with lots of mass, long soles and wide blades. Our ancestors preferred small smoothing planes that were shorter (as small as 7") and narrower.

Why? The little tools worked faster and were less tiring than bigger planes.

Now Veritas has introduced a new small-scale smoothing plane that pushes almost all of my buttons. Its sole is less than 9" long x 2 1/4" wide, enabling it to get into hollows in big panels that big smoothers struggle with. And at 2 lbs., 12 oz., it is half the weight of a modern No. 4 1/2 smoothing plane.

But this is a full-featured plane with lots to love. It has an adjustable mouth that borrows its mechanism from the Veritas premium block planes. It has a redesigned lever cap. And the iron works well in standard honing guides. The nearly indestructible ductile body has a pleasing shape. Like all the Veritas bench planes, it comes with set screws to laterally position the blade. Some people love them; others ignore them. And Veritas has switched to using a matte finish on its wooden handles, which feels less like plastic.

The tool is available with either an A2 or O1 blade, and many users will wonder which to get. While I think A2 is a perfectly good steel, I prefer O1 for my smoothing planes because it is an easy steel to sharpen and takes a keen edge quickly with any sharpening system, from oilstones to sandpaper.

In use, the plane is decidedly unfussy. The iron is easy to set properly in the mouth, and you can quickly close up the mouth to take the finest shaving that your edge can manage.

The adjustable mouth of the tool deserves special mention. It is captured inside the casting of the tool, which prevents the mouth from closing up if you knock the tool into something. It also looks nicer. And like all of the Veritas bevel-up planes, the tool has a stop – operated with a straight screwdriver – so you can prevent the mouth plate from slamming into your sharp iron.

Open and shut. *The adjustable mouth on the Veritas smoothing plane is captured inside the base's casting. This is both tidier and prevents the mouth from inadvertently closing if you knock the toe of the tool.*

My only quibble with this tool is about the rear tote. While I like the shape and feel of the tool's front knob, the tote is too straight for my taste (though it feels better to the hand than it looks). I can fix that problem with a rasp. I'd better get started rasping. This smaller-scale tool has become one of the favorites of my 10-year-old daughter, Katy.

In all, this is my favorite of all the Veritas bevel-up planes – and at $179, I think it's the one to get.

— Christopher Schwarz

CONTINUED ON PAGE 18

Veritas Small Bevel-up Smooth Plane

Lee Valley Tools ▪ leevalley.com or 800-871-8158

Street price ▪ $179

BLOG: *Read a review of the Veritas premium block plane at popularwoodworking.com/dec11.*

Price correct at time of publication.

PHOTOS BY AL PARRISH

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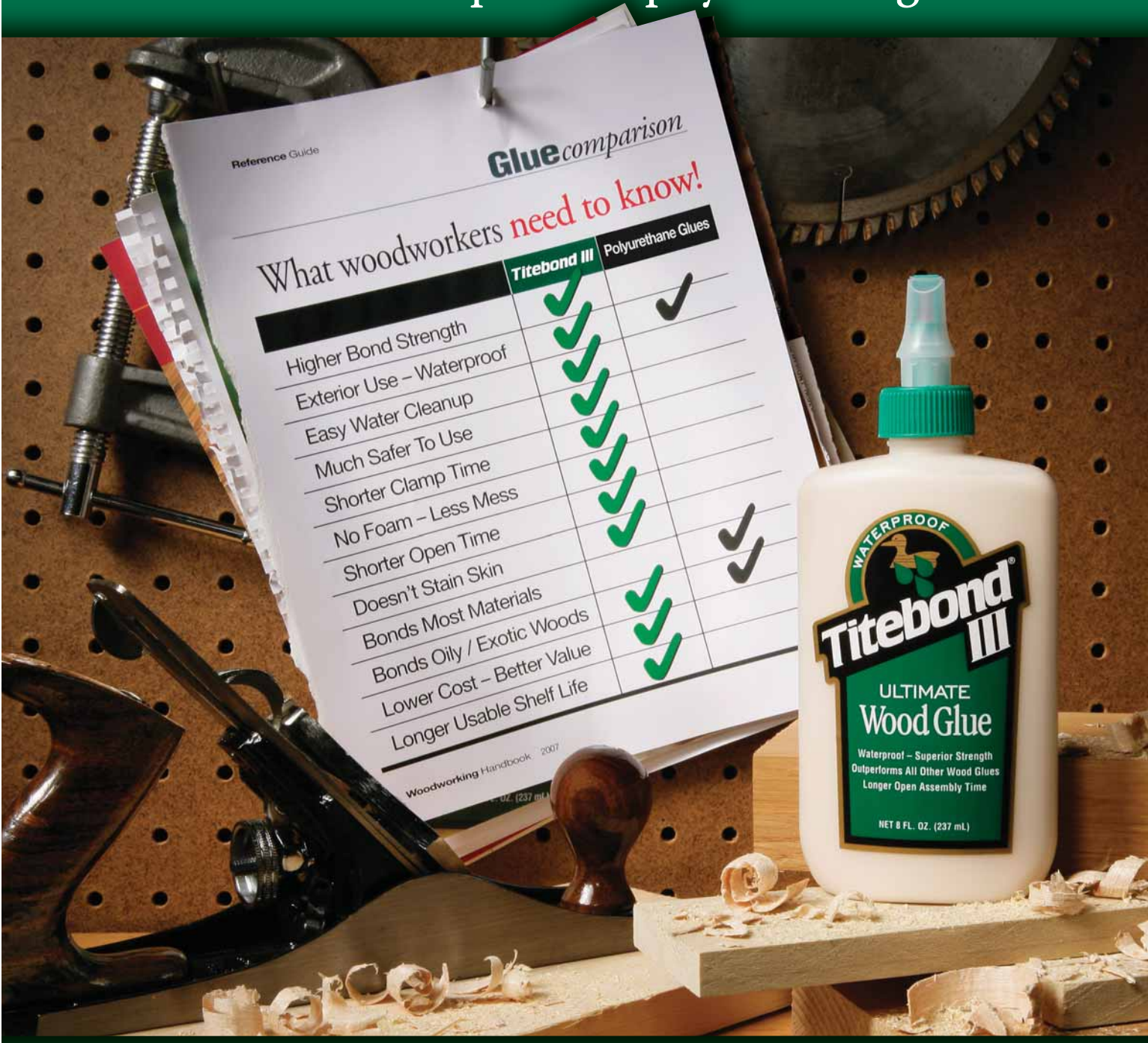

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CONTINUED FROM PAGE 16

Leigh R9Plus Through-dovetail & Box-joint Jig

Leigh has been known over the years for innovative and well-made joint-making jigs. Its newest, the R9Plus, offers some new features, not the least of which is an entry-level price point.

But make no mistake, the R9Plus is not an entry-level jig. It can cut through-dovetails and box joints on stock of any width (more on that later), and can be precisely and easily adjusted for perfectly fit joints. It's made of the quality materials you've come to expect from Leigh. Except for a beam you make to which to attach the jig, it comes complete with router bits, two F-style clamps, a side-stop adjuster, and a patent-pending eccentric-shaped guide bushing that is a precision adjustment feature.

The jig can be used on a router table or by clamping the beam to a bench and routing with a handheld tool.

So what makes this jig different? The R9Plus aluminum template is not permanently affixed to your wood beam. Instead, it clamps securely to "pin plates" that are screwed to that. To make joints on stock wider than the template, you release the template and shift it over to a second set of pin plates, clamp it down and continue routing. It comes with three pin plates to accommodate stock up to 18" wide, and additional pin plates are available separately.

Another new feature is the "e10" adjustable router-base guide bushing. Its eccentric shape allows precision adjustment to ensure your router bit is properly centered to produce piston-fit joints.

So how did the R9Plus perform? After setup, my first set of dovetails were perfect. — *Steve Shanesy*

R9Plus Joinery System

Leigh ▪ leighjigs.com or 800-663-8932

Street price ▪ $169

BLOG: *For more on the R9Plus go to popularwoodworking.com/dec11.*

Price correct at time of publication.

Gramercy Tools Improves Veneer Saw Design

The traditional English-style veneer saw with its cranked handle is probably more familiar to U.S. woodworkers than is the traditional French-style saw with its handle directly atop the blade. The latter was unfamiliar to me until I picked up this new saw by Gramercy Tools. I then learned the Brooklyn-based toolmaker added a significant new feature: a solid steel 3/16"-thick backer plate to which the blade is secured.

Both the blade and the plate are wide at 2 1/2", which allows the use of a tall straightedge to guide the saw cut. That large reference surface helps keep the saw cutting 90° to the veneer.

I developed an immediate affinity for the French-style saw. With your hand positioned over the blade the saw is easier to steer than other saws I've used. The weight and rigidity of the backer plate provides improved feedback from the cutting action and it stiffens the blade. I suspect it also dampens vibration. And it just feels good in your hand – speaking of which, it can be used without modification in either hand.

Gramercy offers four blade options, and blades are easily removed for sharpening or to switch to a different tooth configuration. One is what might be termed an "all-purpose" blade with a traditional English/American tooth pattern; there's a modified version that's less aggressive or grabby; a French pattern with teeth that cut on either a pull or push stroke; and the fourth, called King Kong, developed for sawing thick veneer. All blades are sharp and ready to go out of the box. You can learn more about the various blades at the company's web site. PWM

— *SS*

Gramercy Tools Veneer Saw

Gramercy Tools ▪ toolsforworkingwood.com or 800-426-4613

Street price ▪ $89.95

BLOG: *Read more about veneer work at popularwoodworking.com/dec11.*

Price correct at time of publication.

BY GEORGE R. WALKER

Why Design?

Developing your skills is a journey of discovery.

Inviting design. *Design skills are a natural extension of our journey in the craft, as this nicely designed tool tote will attest.*

My brother and I gazed at a sunset from a rocky perch high atop Boulder Pass in Glacier National Park. A ball of orange slipped behind the jagged peaks way out there somewhere toward Japan. We sat there dazzled, not uttering a word as the clouds turned into purple islands in a sea of molten lava.

We were doing something we felt passionate about. It took effort to haul our packs up the steep trail, yet we soaked in every moment like a gift. That sunset wasn't an in-your-face adrenalin rush, but something in the moment, quiet and deep.

Admittedly, backpacking in the northern Rockies isn't for everyone. The vast majority are content to view the scenery from the safety and comfort of a car or on a television screen. It's the difference between knowledge and experience, or the difference between looking at a postcard of a mountain, and standing on the summit feeling a bit of sunburn on your face.

Wait, what's that have to do with design? Well, a lot of things that are hard to put into words. My guess is the majority of woodworkers enjoy the craft as a creative outlet. Using your hands to shape wood and unlock its endless beauty, and focusing your efforts to acquire new skills is its own reward. Hopefully, you'll never grow tired of that simple pleasure.

But there's more. Invite design into the picture, paired up with skilled hands at the workbench, and it completes a circle. Design skills transform your woodworking to another level, into an experience to savor.

Yet the majority of woodworkers are content to leave design to others and enjoy the scenery through a car window, if you will. Perhaps you feel ill-equipped for the task. I can relate to that. I always marveled at folks with a designer's eye, able to trust their guts.

For many years my confidence in making design judgments went no further than a vague sense of what I liked and didn't like. That alone didn't produce enough confidence to strike out on my own. The world already has plenty of poor design; why risk adding to it? Yet, there's a long list of reasons why design is worth your time and effort to learn more about.

Moments of awe. *Learning design is a series of small discoveries punctuated by the occasional moment of awe.*

A Beginning

This is how it starts for many, me included. Necessity forces us on a detour beyond what someone else laid down on those nice blueprints. The instructions call for a moulding shape that doesn't match your router bits, or maybe your wall space is too narrow to fit that cherry bookcase for which you

CONTINUED ON PAGE 22

LEAD PHOTO BY JIM TOLPIN; SUNSET PHOTO BY DICK WALKER; REMAINDER OF PHOTOS & ILLUSTRATION BY THE AUTHOR

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CONTINUED FROM PAGE 20

bought the plans. Perhaps you need to replace a broken turning or missing part on a cherished heirloom, with no picture to go by. Build furniture long enough and you smack into the need to alter, make do or improvise. In spite of your doubts, you step off that paved road and give it a go. Somehow it works, even feels good – and amazingly the earth doesn't spin off its axis.

Good Reason: Discovery

But there's more to this than just improvising when the bridge is washed out.

There are good reasons to break away from the guided tour bus and explore new design territory. The learning process as you awaken your design skills is filled with discovery. Students of design experience the fun of seeing the world around them in a new way as they begin to discern underlying forms, or the bones of a design. Familiar downtown streets take on a new meaning as the architecture unveils its story before newly opened eyes. Suddenly, a whole world of models and inspiration come to life; little gems seem to crop up that you might otherwise walk right by.

As your design skills mature you gain the ability to unpack a design, to discern why it works. It's one thing to admire a design, and a whole other world to know why a design is worthy of admiration.

Better Reason: Vision

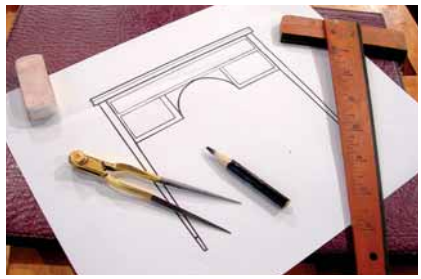
Developing a designer's eye means seeing with a new clarity and gaining the ability to visualize in your mind. I used to marvel at my wife, Barb, who is always fiddling and experimenting with her gardens. She looks out the window in the dead of winter at her garden encased in snow, yet can somehow clearly visualize heaping mounds of foliage in 20 shades of green. All I saw was frozen tundra and broken twigs.

This ability to visualize is a powerful mental tool, a sixth sense, a sense of form. This sense emerges naturally as design skills mature. Gradually, you find you can clearly visualize the curve in a sculpted armrest while it's still locked inside a chunk of mahogany.

All these are true and good reasons to take up design. Sometimes they are enough to make someone dip his or her toe in the water.

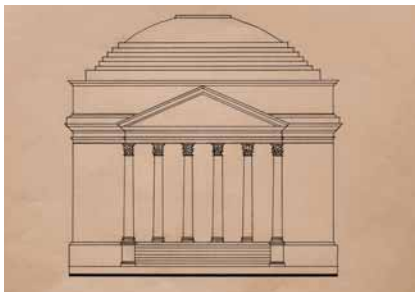
But here's a great reason: Design has always been what distinguishes an artisan. To expand on that, design is the link in the chain that makes a complete artisan. It unites imagination and skill into something greater, and it takes you places skill alone that would never find, and skill spurs imagination to scale heights beyond your present reach.

I hesitated sharing that sunset moment on Boulder Pass because words don't come close, but also because most of the pleasures found outdoors aren't eureka moments. Rather, the experience is a continuous string – small nuggets to savor. Design is like that. Yes, there is the occasional "shazam" discovery to celebrate, but mostly it's the moment-by-moment excitement of taking your craft journey to the next level. PWM



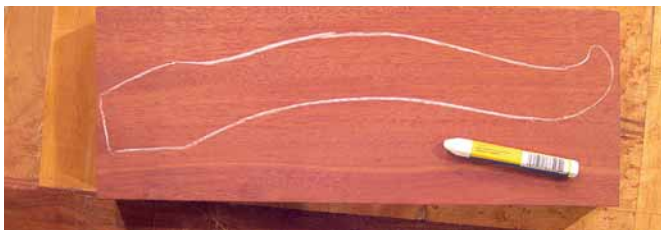
Artisan. *Design has always been the true measure of an artisan.*

George is the author of two design DVDs from Lie-Nielsen Toolworks (lie-nielsen.com).



Foundation. *Can you see the simple shape (a sphere) that governs the form in this building?*

Notice. *Details shout out for attention when your designer's eye is awake.*



Visualize. *Your ability to visualize complex shapes increases as design skills mature.*

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About This Column

If you have a thirst to hone your creative skills, Design Matters dives into the basics of proportions, forms, contrast and composition to give you the skill to tackle furniture design challenges with confidence.

BY ADAM CHERUBINI

Chisels Through the Ancient Eye

Today's tool choices pale in comparison.

Choice. *Eighteenth-century craftsmen typically had different styles of chisels than we do, and in greater numbers. Maybe it's time to reconsider our views on the most basic woodworking tool.*

We've talked and written volumes about planes and plane irons, and how to sharpen and use them. But when one thinks about making things by hand, there are a whole host of tools required to complete a project. Some tools get more attention than others. I guess I feel as though chisels have been overlooked.

Two hundred years ago there was a wide range of chisels on the market. It's fair to suggest that folks who didn't have electric routers and hollow-chisel mortisers therefore relied on chisels for tasks now done with other tools. So perhaps it's right that we now have a limited choice in chisels. Our choice of chamber pots and blood-letting tools is also limited.

But are we sure we've consciously chosen the right chisels for us out of the myriad that were once available – or are we merely the unwitting recipients of what carpenters had in 1920? No need to mince words; I think the latter is true. If you aren't so sure, read on. We'll examine what was available, and I'll try to place the various tools in context to the best of my ability.

The single-best resource for learning about period chisels is a volume entitled "Explanation or Key to the Various Manufactories of Sheffield," published by The Early American Industries Association and generally referred to as "Smith's Key." The "Key" contains detailed images of tools and hardware. The images were married to a price list. There are a few gaps, but for us, the point is still loud and clear.

Firming Chisels

The price list offered six types of the basic bench chisel (called a firming chisel or simply a firmer), including what we can assume were two different material choices. The standard 18th- and 19th-century English firming chisel was tanged and "square-sided." In reality, these chisels are ingeniously complicated. The sides weren't actually square to the back, but beveled a few degrees. I've found that the blades often taper in width, as shown below. These two features conspire to make a chisel that is easy to maneuver in tight spots and chops like a dream. The corners are strong and crisp. These chisels were also radically thinner than our chisels – far more similar to carving tools than the punches we call chisels today.

They were offered in "Cast Steel" (see "An Explanation of Period Steel" on the facing page) in the standard design or pattern, and in a heavier-duty version called "strong." They were also offered in four weights (short, long, strong and extra strong) in the common steel of the day. My guess is this would have been some form of refined blister steel. All were available in sizes ranging from $\frac{1}{8}$" to $1\frac{3}{4}$" in $\frac{1}{8}$" increments and by quarters beyond that to $2\frac{1}{2}$".

Firming chisel. *The blades on these basic bench chisels often tapered in width, and the sides were beveled a few degrees.*

Socket chisel. *These chisels, like the firmers, were available in "standard" and "strong" styles, and in a choice of steel.*

LEAD PHOTO BY THE AUTHOR

Socket Chisels

Socket chisels were available to early craftsmen but appear not to have been interchangeable with tanged chisels, as they weren't available in the smaller sizes. The smallest in the price list was 1/2". They were available in 1/8" increments to 1", and in 1/4" increment beyond, which suggests intended use for heavier-duty work. Like the firmers, socket chisels were available in standard and strong styles, in cast steel and the unspecified but likely blister steel.

Mortise Chisels

Mortise chisels were available in a range of styles, including strong, the unspecified standard and "best," in sizes ranging from 1/8" to 5/8" by 1/16" increments. Socket versions were available but only from 1/4", which suggests that they were better suited for larger, rougher work.

Prodigious Quantities of Chisels

Period accounts tell us 18th-century cabinetmakers had prodigious quantities of chisels. In 1708, Charles Plumley had "33 formers and broad Chisells, 5 Mortise chissells, 4 old chissells, and 3 Old Paring chissells." These may have been shared among three craftsmen. But even at that, each craftsman had 11 firmers, a couple mortisers and a paring chisel, at least. At the time of his death in 1765, Salem, Mass., joiner Joseph Gavet had five "pairing," seven "Mortis" and 16 firmer "Chizels."

As the century drew to a close, Benjamin Seaton had large, comprehensive sets of both firming chisels (18 in number) and what he called "cast steel chisels" (16). Though I'm not entirely sure what the distinction was, more knowledgeable people than I have summarized that the firmers were kept as paring or lighter-duty tools. In addition to the firmers, Seaton had four socket mortise chisels and a set of eight tanged mortise chisels, bringing the grand total to a whopping 46 chisels. And of course this doesn't include gouges or carving tools.

Mortise chisels. *These workshop workhorses were available in a range of sizes and styles.*

Conclusion

Period accounts indicate craftsmen had large sets of chisels. My guess is they had a wide range of sizes, likely every 1/8" to 1" and every 1/4" to 2" at least. This may suggest they selected chisels for more than simply a convenient size. Larger sets would have allowed craftsmen to use chisels as gauges to measure or define features (walking off dovetails for example) or creating dados of various and accurate sizes.

The difference in sizes available between firmers and socket chisels suggests the choice of style was more than a matter of personal preference.

Square-sided tanged chisels, no longer available to us, appear to have been the preferred style of 18th- and early 19th-century cabinetmakers. Bevel-edged chisels were known in the 17th century and were in use in other European countries in the period, but British craftsmen don't seem to have used them. We see no archaeological evidence of them and they don't appear in texts such as "Smith's Key" or in period images.

I have used chisels of ancient design for many years and have found them to have many excellent qualities over my bevel-edged Hirsch chisels. The same is true of my ancient forge-welded mortise chisels. Though the metallurgy is crude when compared with modern tools, the designs are transcendent. My sense is that it's time for us to look back at the earlier tools, try to understand them, and move beyond their ability to hold an edge as our sole measure of the quality and use of a chisel. **PWM**

Visit Adam's blog at artsandmysteries.com for more discussion of traditional tools and techniques.

An Explanation of Period Steel

"Cast steel" is a term used to describe the manufacture of the raw material, not the tools. British foundries produced clean homogenous steel by heating iron or blister steel along with alloying elements and flux in clay crucibles and pouring the molten metal into ingots, which were forged into high-quality steel items such as tools and knives. The advantage of cast steel over other steels available at the time was its homogeneity. The alternative was blister steel.

"Blister steel" was wrought iron packed in carbon and baked in a kiln. The iron absorbed some of the carbon in the heat. The resulting material had a blistered surface, thus its name. While the exterior surface was carbon rich, the interior sometimes remained almost pure wrought iron. The logical way to improve this material was to flatten it and fold it over on itself – a process not unlike that of Japanese sword smiths. This was called shear steel or double-shear steel, based on the number of laminations. The idea was to make the finished product more homogeneous. Folding and laminating steel back onto itself required a practiced hand and a lot of work. Part of the trick was avoiding decarburization.

Decarburization takes place when steel is heated in a carbon-rich environment. The carbon in the fire bonds with (and removes) carbon in the steel. This was the strategy behind the production of what was called German steel in the 18th century. Blister steel or carbon-rich cast iron (cast iron = lots of carbon, wrought iron = no carbon) was heated in a furnace until the right amount of carbon was removed. The molten steel was sometimes then poured into molds to directly form tools or other objects.

While dirty and not particularly wear-resistant, period steels did have many fine qualities. The hand forging process naturally reduced the grain size of tool steel, resulting in tools that could take amazingly keen edges. The high carbon content of period steels enabled them to achieve high hardness and yet still be easy to sharpen. — AC

12 Rules for Tool Chests

BY CHRISTOPHER SCHWARZ

Don't reinvent the wheel when storing your tools. A proper chest is still the best.

A box chock-full of tradition. *This tool chest, which was designed from time-tested examples, holds every hand tool you need, protects those tools from dust, and keeps everything just one hand motion away.* ***Click on the picture to play the video and see for yourself.***

When I tell people that I've worked out of a traditional tool chest for 15 years, they look at me as if I'm someone who has not yet discovered the joys of indoor plumbing.

They say, "Haven't you tried a wall cabinet? Or built storage below your workbench? Why not a series of open shelves next to your bench?"

The truth is that I've tried all those methods yet I still return to my tool chest. It holds every hand tool a woodworker could want. It protects the tools from dust (which contains salt and encourages rust). And I can get to every tool in the chest with only one hand motion.

In other words, it's tidy, protective and efficient. What more could you want?

The objections that most woodworkers have to tool chests are generated by people who have never worked out of a chest or who have worked out of a modern chest.

You see, most new chests that I've encountered are all wrong. They are usually too small to be useful. Most of these mini-chests were built in woodworking classes and needed to be transported home easily – hence their squat stature.

And the interiors of these modern chests are poorly divided. Either the woodworker has French-fitted every tool into a space, which is inflexible, or he or she has almost no way of dividing up the chest, so the tools are piled at the bottom.

For the last couple years I have studied many ancient chests. And what I found was surprising. Old chests are quite similar in size and in the way their interiors are divided. The other thing that is surprising is how plain most old chests are – inside and out.

Most of the tool chests we see in books are the fancy ones, on which some enterprising soul spent months adding veneer and inlay to the interior. These kinds of chests are rare in the wild. Old chests usually have three compartments in the bottom for planes and saws and three sliding trays above for the remaining tools. No inlay. No banding.

As I studied these old chests, I started developing 12 rules that describe their size and construction. While not all old chests follow all these rules, the best chests obey the majority of them.

"One thing I strongly object to – this is the use of inlaying and such extravagances on tool chests; they should be made well, strong, and convenient, so as to last a lifetime, being for use, not for show."

– A Practical Joiner
The Woodworker Magazine, Feb. 1902

Rule No. 1: As Long as Your Tool Plus Some

The sizes of woodworking tool chests are fairly standard – between 35" and

LEAD PHOTO BY NARAYAN NAYAR; STEP PHOTOS & ILLUSTRATIONS BY THE AUTHOR

43". This range allows the chest to hold full-size handsaws, which have a 26"-long blade, plus another 5" of wooden tote. Ripsaws can have an even longer blade, up to 30". Plus you need to get your hand in there to grab the tote of your longest saw. In addition to long saws, the chest needs to hold a jointer plane. While metal planes top out at about 24" long, wooden-bodied planes can be as much as 30" long.

Bigger isn't always better, however. A chest that is longer than 43" will make it hard to transport in a carriage or mini-van.

So when you are sketching the length of your chest, measure your longest saw, add 5" so you can get your hand in there easily, and add a couple inches for the thickness of the material. That will easily get you to 37" to 40" if you use full-size saws.

Rule No. 2: Tall Enough to Make a Human Tripod

Short tool chests are difficult to use. They are about 14" to 16" high, and when you put them on the floor, it is painful to bend over to fetch a tool. So you put them on top of your workbench or table saw. Now the toolbox is taking up valuable space.

Traditional toolboxes are usually about 22" to 27" high. Those heights are ideal for the human form. The rim of the tool chest is below the pivot point of your waist. So you bend over and place your off-hand on the rim of the chest to stabilize yourself as you use your dominant hand to shift trays around. Your off-hand becomes the third leg of a human tripod.

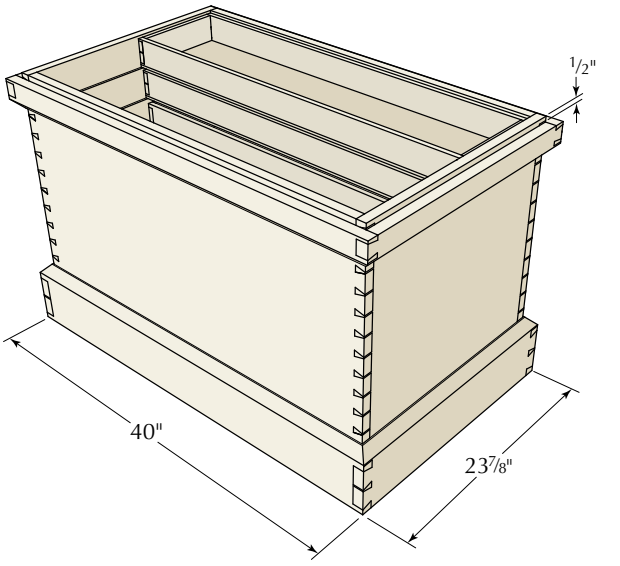
Naturally, the extra height gives you more room for tool trays, saw tills or chisel racks. It also makes the chest a nice height for sitting while working at the bench.

Rule No. 3: A Depth to Match Your Reach

The depth of the chest is usually about the same dimension as its height. This

The long of it. *My 24"-long jointer plane is the biggest plane I own. So I made sure that it would fit in the bottom of my chest and could be easily removed.*

Put your right hand in. *Secure your body against the rim of the chest with your off-hand. Root around for the tool you need with your dominant hand. No deep-knee bends are necessary.*



Not too deep. *A chest that is too deep from front to back is difficult to use. I've only seen a couple in my travels. So most woodworkers get this concept. This chest is as deep as it is tall.*

makes sense for a lot of reasons. For one, it looks nice. A square profile is a pleasing form. But it also makes practical sense. A shallow tool chest wouldn't be as stable, especially with its lid open. A deeper chest would be a pain to use. Imagine a 36"-deep chest. Your arms would have a heck of a time fetching tools in the back.

So now we have sketched out a shell that's about 38" long, 24" high and 24" deep, maybe a little smaller or a little bigger depending on the material on hand. Speaking of material, what wood should we use for the chest? The natural inclination is to use something strong, such as oak or maple. But tool chests in these materials aren't common.

Rule No. 4: Reduce the Weight; Increase the Joinery

One of the guiding principles of chest construction is to make the chest both lightweight, to make it easier to move, and strong, because the chest might take a beating on a voyage.

Lightweight woods aren't typically as strong as heavy woods. So here's what you do: Use a lightweight wood such as pine. But join the corners using a bombproof joint: through-dovetails. Use this lightweight wood with dovetails for every component of the chest, except for the parts that endure friction. Soft and lightweight woods are easily worn away if they rub constantly against other parts.

So the best strategy is to use oak in certain areas of the chest. That means oak drawer runners and oak drawer bottoms – if your drawer bottoms rest on your runners. If instead your drawer bottoms are captured inside your tool trays, then make the side pieces out of oak. Use pine for the rest of the parts and dovetail every corner.

Rule No. 5: Make a Thick Shell

Let's talk about the four walls of the chest. That's where material selection and construction begins. Old woodworking books are specific about the material for the shell: the clearest pine possible, free of knots and sapwood.

This might seem odd considering that the chest will be painted, but it's good advice. One of the antique chests I owned had several knots on the back. When I bought it, a couple of the knots had fallen out, and after moving the chest to the Midwest, a couple more fell out. Those I glued back in with epoxy. Why be so fussy about knots? They expose your tools to dust, which carries salts, which will corrode your tools.

Most tool chests have shells made from pine that is between 7/8" and 1" thick. Early furniture was more likely to have thicker structural components, so a 3/4"-thick shell would be unusual.

So why not make the shell out of 1 1/2" material? You could, but dovetailing those corners would be a major pain because your material is so thick – you'd probably have to use a tenon saw to cut the dovetails. And I don't think the extra-thick material would add meaningful strength. Chests made from 7/8" material stand up just fine for a couple hundred years.

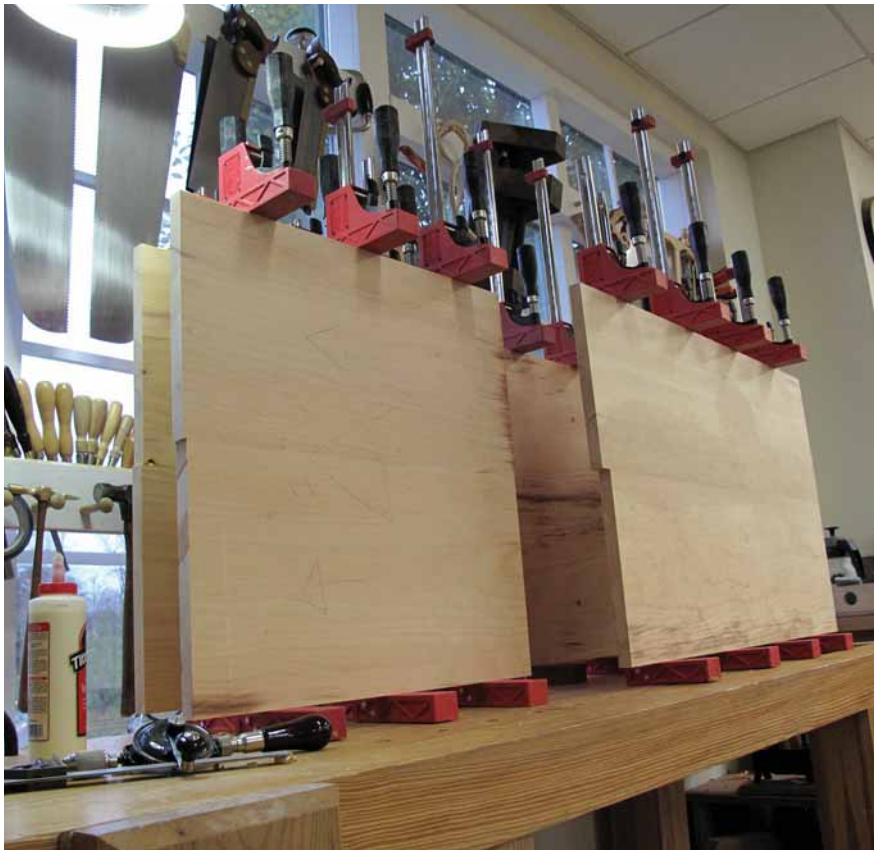
Rule No. 6: The Bottom Should Be Nailed. But Why?

So after all this talk about dovetails, it might seem odd that I recommend tonguing and grooving the chest's bottom boards and nailing them on. Why not put in a solid bottom that's captured in a groove?

A single solid-panel bottom will move a lot compared to five or six individual bottom boards, which will share the seasonal expansion and contraction. So if you use a solid-panel bottom you must leave a sizable gap for the panel to swell and shrink in the groove in the shell, which isn't ideal. You want everything to be as tight as possible.

There are other good reasons to use individual boards secured by nails. If the bottom gets damaged, replacing one cracked board is easier than replacing an entire panel, no matter how the bottom is attached. And replacing one nailed-on board is easier than replacing a board secured in a groove.

The bottom of the chest is the most susceptible to damage, but not the kind



Light but strong. *If you use pine for your shell (and you should), then you should beef up the thickness a bit. I like 7/8" – some people go for the full inch.*

of damage that some extra thickness will fix. The bottom boards are prone to rot, especially in a leaky basement shop.

Rule No. 7: Skirts, Dust Seals & Miters

The chest's skirt and dust seal are nearly as prone to damage as the chest's bottom. They are the first line of defense when the chest is slid onto a truck or rammed by machinery.

The skirt and dust seal (the skirt near the top rim of the shell) should be bulletproof. Simple miters will not do.

Dovetail the corners of your skirt and dust seal. Yes, it's a pain to fit everything around the shell. But a dovetailed skirt and seal will last forever. Their corners will never open. So the exterior of your chest will look as sturdy in 100 years as the day you built it.

Rule No. 8: Don't Blow it on the Lid

There are several ways to make a lid. Some work great. Some are temporary.

Some chests feature a single flat panel of wood trimmed on three edges with narrow stock that interlocks with the dust seal attached to the shell. These lids shrink, crack and break loose from their trim. Time is unkind to these chests.

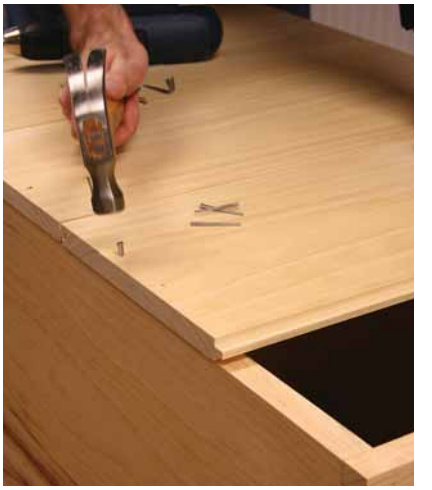
Duncan Phyfe (1768-1854), one of the most celebrated 19th-century cabinetmakers, used a flat panel with breadboard ends for the lid of his chest. This lid has survived fairly well, though there is still going to be movement that can interfere with your lock hardware.

The best solution is to build the lid as a frame-and-panel assembly. This confines almost all of the wood movement to the panel, which floats harmlessly in the middle of the rails and stiles.

So you could build the lid like a raised-panel door – except for the panel part. You want the panel to be stout because it will take a beating. So the joint between the panel and the door frame is critical. You don't really want to thin down the edges of the panel like you would when making a door panel. Thin edges will weaken the panel.

The old-school solution here is to plow a groove in the four edges of the panel so the panel will interlock with the rails and stiles. This keeps the joint between the panel and frame as stout as possible and the panel will be raised above the frame of the lid.

There is no downside to this approach. There are no weak spots on the lid. There is no significant wood movement along the edges or ends of the lid. So the trim around it will stay put. It is a permanent lid.



Fixable. *By securing the bottom with nails instead of a fancier joint, you are making the chest easier to repair in the future. Bottom boards can rot.*

Not mitered. *Dovetail your skirt and dust seal to the shell to ensure they stick around. Literally.*

Better lid. *A frame-and-panel lid with a raised panel is about as robust as you can get without adding lots of weight.*

Rule No. 9: Divide the Bottom Layer

With the exterior shell designed, we can now move to divvying up the inside of the chest. I am struck by how consistently early chests are laid out. And after trying out several arrangements, I've concluded that the old ways are good.

American tool chests tend to have two things on the bottom layer of the tool chest: planes (bench, moulding and joinery planes) and saws. Some English chests put the saws in a till affixed to the underside of the chest's lid, some did not. Some American chests would put a saw or two on the lid at times, but mostly the saws went in a rack near the front of the chest.

The back of the chest is a good place for moulding planes and rabbet planes. Set them on their toes with the wedges facing the inside of the chest. A dividing wall under the wedges will hold the planes upright. The good thing is that most moulding planes are the same length and width. (Older planes are a little different, but those are fairly rare.) Storing the planes upright in your chest

is ideal. This allows you to see their profiles and sizes.

This part of the chest will take up only a small part of the bottom area – about 3½" of space plus the thickness of the wall. So there is lots of space left.

If you put the moulding planes at the back, I recommend you put the saw till up at the front of the chest. The size of the saw till depends on how many large saws you own. Because I have only four long saws, my rack is only 4⅝" wide, plus the width of the wall separating the rack from the rest of the chest.

The till is simple – a couple boards with kerfs sliced in them to hold the sawblades. Planning the tills is more difficult than making them. You want to consider the thickness of the totes and the size of the sawblades, both the length and the depth. And you want the till to hold your saws in a place where you can reach them without stooping too far over.

The rest of the space on the floor of the tool chest is reserved for bench planes and joinery planes. In my chest, I ended up with a space that measured more than 10" x 37". That is a lot of acreage. You should be able to fit all of the standard planes in there, plus have room for a few other things. Some woodworkers would fold their shop apron and use it to cover the bench planes.

Having the bench planes, saws and moulding planes at the bottom of the chest works well. For one thing, these tools have more mass than the smaller tools above, so this puts a lot of the weight at the bottom of the chest, lowering the center of gravity.

Also, when you work, the first task of the day is to remove the bench planes and put them under or on your bench. Then you remove the saws and hang them on the wall in front of you. So now there is a large part of the chest that you don't have to access. The moulding planes can go on the bench – some woodworkers store them in a rack on their bench. But for most woodworkers, making mouldings makes up but a small part of the time on a project. So those planes stay safely down at the bottom of the chest until needed.

Rule No. 10: Trays

The simplest and best way to divide the upper section is to build trays that slide forward and back. Two or three trays are typical. Chests that have trays that slide left and right are out there, though they are rare. Why? Probably because it makes it difficult to fetch the long tools below.

The trays slide forward and back on runners that are nailed and glued to the sides of the chest. These runners are like shallow steps up the side of the chest so that each tray can be pulled out of the chest should you need to repair it.

The joinery for your trays should be permanent. You want to minimize their weight and maximize their durability. I recommend using ½"-thick pine and dovetailing the corners. The bottoms should be thin slips of white oak that are nailed to the underside of the dovetailed

'More Valuable Than a Shipload of Gold'

Without a proper tool chest, the novel "The Life and Strange Surprizing Adventures of Robinson Crusoe" by Daniel Defoe would have been a whole lot shorter.

After Crusoe was shipwrecked off the coast of the Americas in the 1719 novel, he returned to the wrecked vessel to pillage it for supplies. Food, of course, was important to Crusoe. Second on the list: tools.

"And it was after long searching that I found out the carpenter's chest, which was, indeed, a very useful prize to me, and much more valuable than a shipload of gold would have been at that time. I got it down to my raft, whole as it was, without losing time to look into it, for I knew in general what it contained."

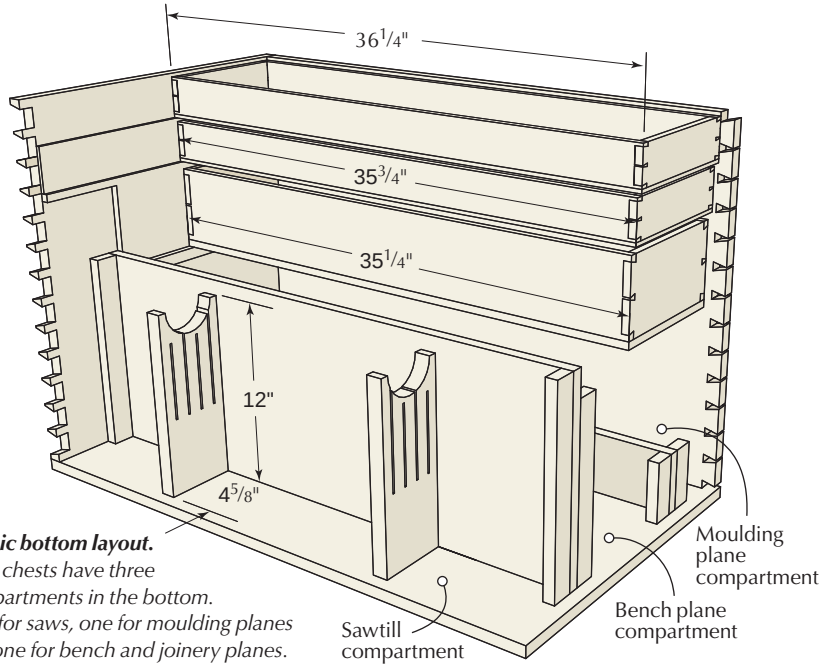
With the tools in the chest, Crusoe is able to build a whole life for himself, including a house and many niceties. Of course, first he has to learn to become a woodworker. And first he has to learn to sharpen.

On his second trip back to ship: "… I found two or three bags full of nails and spikes, a great screw-jack, a dozen or two of hatchets, and, above all, that most useful thing called a grindstone."

Crusoe's first project? Learning to process rough stock into boards so he could build a table and chair. His own words should be encouraging to beginning woodworkers who are teaching themselves the craft.

"And here I must needs observe, that as reason is the substance and origin of the mathematics, so by stating and squaring everything by reason, and by making the most rational judgment of things, every man may be, in time, master of every mechanic art. I had never handled a tool in my life; and yet, in time, by labour, application, and contrivance, I found at last that I wanted nothing but I could have made it, especially if I had had tools."

— CS



Classic bottom layout. *Most chests have three compartments in the bottom. One for saws, one for moulding planes and one for bench and joinery planes.*

Three trays. *Here you can see my three sliding trays arrayed so I can see everything in them. I'm only one hand motion away from accessing any of the three bins in the bottom of the chest.*

It's clear. *A painted finish is the clear choice for a tool chest. The paint protects the chest from the harsh indignities of workshop life.*

trays. This makes the part that wears, the bottom, quite durable. By nailing the bottoms to the trays I save a little space compared to grooving the bottoms in, and I make it easier to repair the bottoms if they are ever wrecked.

I had room for three trays in my latest chest: one that is 4¾" deep and two that are 2½" deep. You need only one deep tray. Shallow trays are better in almost all cases.

What goes in these trays, specifically? There are lots of ways to go. The point is to keep your arrangement flexible. Sometimes you will be doing a lot of boring. Other times a lot of hammering. The fewer dividers you add the more flexibility you'll have in the long run.

Rule No. 11: Sticking Stuff to the Lid & Walls

Don't forget that the front wall and the lid are good places to store flat stuff. On the lid, some people put a framing square or a few squares. I've seen a few handsaws and backsaws hanging on the lid, too. On the front wall of the tool chest you can hang try squares and joinery saws – this is the traditional approach. I simply rest my dovetail and carcase saws against the wall. Other chests have a rack on the front wall of the chest for chisels, augers and other long and narrow tools – gimlets, awls, striking knives, gouges and the like.

Rule No. 12: Paint the Outside

This is the easy part. The outside of a tool chest should be painted. The modern choice is to use milk paint, which is durable and looks better as it ages. We don't have lead-based paints available, which were the paints of choice in the pre-Industrial world.

Paint will keep your chest looking good for a long time. Anytime it gets beat up, you can renew the look with another coat of paint. A stain or clear finish cannot be renewed as easily. Plus, paint is the most weather-, UV- and abuse-resistant finish available.

On the inside of the chest, I recommend skipping a finish. If you must finish the inside, use shellac, which will cure quickly and won't leave a nasty oily smell like linseed oil will.

Don't Be a Modern Failure

Many modern efforts to improve our workshops have been unsuccessful. We tried to re-engineer our workbenches so they were portable, and they became too lightweight and spindly. We redesigned the sawbench into plastic sawhorses that are the wrong height and are flimsy. We invented iron quick-release vises, which won't hold much of anything relating to woodworking.

And we have done the same thing with tool chests.

Our woodworking ancestors may have been uneducated and illiterate, but they certainly weren't stupid. They had to make a living out of their tool chests, so the design and function of their tool storage was well-considered.

I also have found that a traditional tool chest has other lessons to teach – if you pay attention – including the fact that it holds just the right number of tools to build any piece of furniture – and no more tools than you actually need. **PWM**

Christopher is contributing editor to this magazine and a partner at Lost Art Press. His latest book is "The Anarchist's Tool Chest."

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Complementary Curves

BY JEFF MILLER

Most of the challenge in making this graceful table is in the prep.

Simpler than it seems. *This graceful arched table might appear to be a complicated build, but looks can be deceiving. The secret is in simplifying the joinery and providing flat areas where the curved pieces connect.*

Many interesting pieces of furniture are deceptively simple. Deceptive, because although they appear simple, they are actually very difficult to make. Although this is occasionally true in my own work, that's not the case with the Arch Table, a piece that looks more complicated to make than it actually is. I'm not saying it's easy; there's a lot of preparatory work, and it is quite demanding in terms of shop resources. But the stuff that looks hard to do is actually not all that bad.

This piece is a great introduction to bent lamination, which opens up an entire world of curved shapes and lightweight, incredibly strong components. There are a lot of ways to approach lamination; for this project I make use of table-sawn strips, and rely on forms and cauls for gluing up the curved components. The complex-looking joinery is mostly screwed and glued together. In early versions of this table, I used mortises and tenons for the branching joints, but because of short-grain considerations, I found the screws to be a much stronger solution.

Forms & Cauls

The major prep work is in making the forms for the laminations. For the table's "wings," you'll need to make both a form and a caul (or a pair of each, if you want to speed up the process) for gluing together the layers. For the main arch, it depends on how many clamps you have available. I just glue up around a form with six layers of 1/4" Masonite acting as a caul, distributing pressure and preventing dents from the clamps. But I use 26 bar clamps in the process; without that large a collection, you'll definitely need to make up the cauls for a successful glue-up.

Layout for the forms involves drawing sections of some large ellipses. I made up a fairly simple ellipse-drawing jig. You could also draw an ellipse on the computer and print it out full-size then tape the tiled pages together. It's also possible to draw this ellipse with a loop of string and two nails. However you create the shape, it's best to draw directly on a piece of 3/4" plywood. Then cut it out as accurately as possible, and smooth to your line. You can also cut out the center section of the form at this time. Accuracy there is not nearly as important.

Use this first layer of the form to mark out the next two layers (note: you can piece together one of the layers if necessary), and cut them slightly oversized. Then glue and screw these layers to either side of the original, and flush them off using a router and flush-trim bit. Finally, go over the edges with sandpaper to even out any irregularities, then wax the edges plus a little bit of the sides of the form.

"The details are not the details. They make the design."

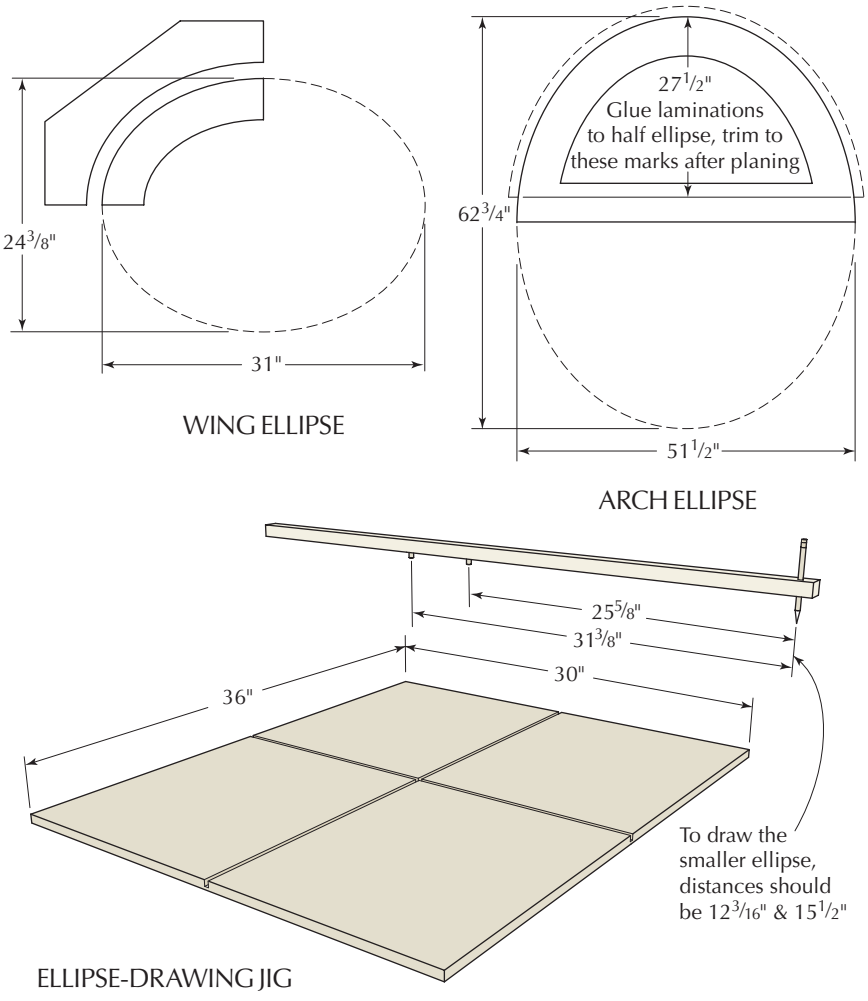
— Charles Eames (1907 - 1978)
American industrial and graphic designer

PHOTOS BY THE AUTHOR, ILLUSTRATIONS BY ROBERT W. LANG FROM THE AUTHOR'S DRAWINGS

To make up cauls, you need to know the overall thickness of your lamination. You should wait until you've actually ripped the strips for that, then clamp together all but one of your strips into a bundle to get an exact thickness (the last strip gets glued on after attaching the wings). With this information, you can make a scribing disk. This disk is used to draw the exact curve needed to apply even clamping pressure to the outside of the bundle of strips all the way around the curve.

I make these disks on the drill press using a fly cutter – one of those rather terrifying circle cutters with an adjustable cross beam and cutter. You want the distance from the edge of the center hole (not the center of this hole) to the outside of the disk to be the same as your lamination thickness.

Set your form down on a piece of 3/4" plywood, and roll the disk around your form with a sharp pencil pressed against the edge of the center hole to mark out the caul. Cut, then smooth carefully to your line, and add two more layers of plywood and flush trim those just as you did for the form itself. If you're doing this for the big arch, you'll ultimately want to break up the caul into three sections to keep it manageable. You'll also want to make registration marks, or even add some wooden registration strips, so the form and cauls will line back up exactly right when the time comes to glue your lamination.



Rip Strips for the Laminations

You will need roughly 16 3/32"-thick strips, ripped from stock that is 1 7/8" to 2" thick, to make up the final thickness of 1 1/2". Mark a layout triangle on the face of your board before you do anything else. I rip the strips on the table saw, and always set up so that I cut the strips to the outside of the blade. This means re-setting the fence after each rip (moving it over 3/32" plus the thickness of the blade). Setting the rip fence at 3/32" and trying to rip the strips is a major safety problem and can lead to some nasty kickback and shattered strips. Because this constant adjustment of the fence is a pain, it makes sense to cut down your wood into two or three equal widths (try for two pieces at least 3 3/4" wide). That way you can rip more than one board at the same setting. Be aware that it's unsafe to rip strips out of a board that's less than 1/2" wide. Don't even try.

Use a featherboard to press the wood against the fence, but only in front of the blade. You'll also need a push stick handy for when the board gets narrow. Pile up the strips in order as they come off the blade, or in multiple piles if you're cutting from more than one board. If things go awry, you can always put the strips back in order by referring to the layout triangle.

You'll need one less strip for each of the wing bundles than you'll need for the arches; the outer layer will come from the outer layer of the arch, which gets glued on after you join the wings to the arch.

Glue Up the Laminations

Most wood glues have a small amount of flexibility to allow for joint expansion

Safety first. *The saw is set to rip strips to a precise width at the outside of the cut, which is safer than cutting thin pieces between the blade and the fence.*

and contraction. When you're gluing together a lamination, however, that flexibility can lead to the layers slipping a bit in relation to their neighbors. This glue-line "creep" can cause the laminated shape to lose some of its bend (springback), and can create little ridges between layers. The best bet is to use either Weldwood Plastic Resin Glue (a powder and water mix), or Unibond 800 (a powder and liquid mix). Both have rigid gluelines, long open times and work especially well for this type of work. These glues also require caution when working with them; be sure to wear a good dust mask and gloves while mixing, and keep the gloves on throughout the preparation and application.

Before you do anything else, set aside the outermost strip from each of your two main arch bundles. Label these strips so you'll be able to glue them on later in their proper places.

There's a little more preparation needed before you can actually glue up your laminations. First, you'll want to figure out where you can do the glue-up. I work on the floor mostly because I've been doing it that way for 25 years, but my shop floor is completely covered with glue spots; this may not go over so well in your shop. It's also easier to work at a more comfortable height. My knees have been lobbying for this change of late.

Setting up a piece of melamine board (which can be scraped clean when you're done), or plywood on solid sawhorses or benches is probably preferable. Or just cover your floor with cardboard, plastic or paper. You'll also want to protect the floor or set up a second worksurface where you can roll out the glue on all of the remaining strips.

It pays to go through a dry run to be sure you have everything ready to go and to familiarize yourself with the process. Set your form on top of a few wood blocks sized to make it easier to get the first clamps into place under the form. If you haven't already, prepare the six 1/4" x 2" Masonite strips or a set of cauls.

You may want to position a handful of clamps under the form, ready to receive the lamination. In any event, all the clamps should be at hand. Center the bundle of strips on the form, then bend the strips into place for your dry run. Start clamping at the top of the arch and work down the sides, alternating clamps above and below the form as you go.

The actual glue-up starts with laying out all of your strips in order, then separating the top strip from the rest, so you don't accidentally get glue on it. Mix up your glue – about a cup and a half should be enough for the main arch – according to the directions. Then roll the glue onto your strips with a foam paint roller. I don't bother with a paint tray; I just pour a little glue on the strips and spread it around. Make sure you cover the strips completely, and go over any spots that look a little dry. Stack up the bundle in order (including the top strip), and clamp it to your form as you did during the dry run. Try to keep the edges of the strips reasonably well aligned; it will make smoothing the

On a roll. *A paint roller makes quick work of spreading the glue evenly on all of the laminations.*

Practice first. *Before you add glue, do a dry run to ensure you've enough clamps – and that when then glue is on, you know where to place them.*

edges much easier. Let the glue set for at least 12 hours – longer if it's colder than 70° Fahrenheit in your shop. Finally, before you remove the clamps, transfer the marks for the bottoms of the arch from the form onto your laminations

The process is the same for gluing up the wings.

Caul of the wild. *A form for the outside of the curve helps to spread clamp pressure, reducing the number of clamps needed.*

Smooth the Laminations

When you take the laminations off the forms, they will look like a mess. Before you clean up the edges, move the arch bottom location marks to the inner faces, where you won't cut them away.

Set up infeed and outfeed supports next to your jointer, and joint one of the edges of the lamination. Unfortunately, this is pretty hard on the jointer knives, but I haven't found much else that will do the job as easily and quickly. A few passes and you should have a clean edge. Then you get to pass the lamination through the planer. I know it looks odd, but it does work. Apologies to the planer knives as well.

Joinery

Once the laminations have been machined smooth, it's time to move on to sizing and joinery. The ends of the arches can be cut off at the marks using whatever method works best for you (you can always go back to the forms and re-mark if you forgot that step earlier). An outfeed support will be necessary if you're using the table saw or band saw. Hold off on cutting the wings to length for now.

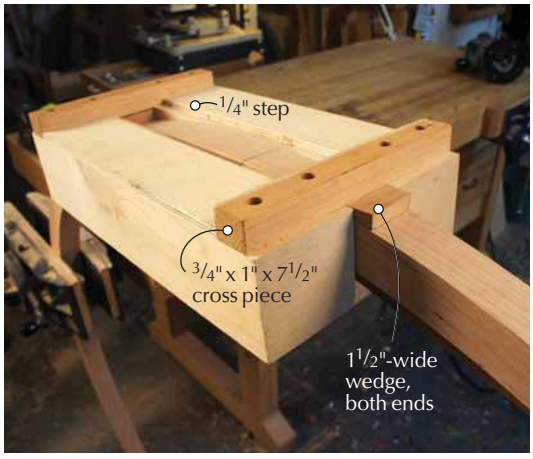
The joint between the arches and the wings has a routed flat on the arch where the bottom of each wing attaches. The flat begins $16\frac{9}{16}$" up from the bottom of the arch (along the outer curve, or $15\frac{11}{16}$" measured straight up from the floor) with a $\frac{3}{32}$" step down to the flat. The flat is roughly $4\frac{1}{4}$" long, and simply feathers out at the top; there is no step there. Start by marking the step-down locations on each side of the two arches. Then at one of those locations, measure down $\frac{3}{32}$" and draw a line from there to $20\frac{13}{16}$" up on the lamination as a reference for where the flat should end.

Make up a jig for routing the flats as shown in the photo on the next page. Two shims added between the jig and the lamination will set the jig up for the right cut. Put the jig (without shims) in place on top of the lamination, then shim it up so the top of the inner edges is flush with the layout lines for your flat. Glue or tack the shims into place, and you won't have to repeat this process at the other locations. Clamp the jig in place on the lamination.

Set up your router so that a $\frac{1}{2}$" straight (or spiral-upcut) bit just touches the top of the inner surface of

Ahead of the curve. *The jointer levels the surface of the lamination. Infeed and outfeed supports help keep the material flat on the machine bed.*

Around the bend. *The opposite side of the glued lamination is surfaced with the planer.*



On the level. *This jig supports a router, used to create a flat surface for the wing to connect with the large arch.*

Full-size layout. *A piece of plywood locates the corners of the large arch and the wings. Mark the wings from the flats on the arches.*

Let it ride. *Align the straight cut on the wing with the edge of the jig base.*

Safe & secure. *The jig holds the curved part securely to make the cut, creating a flat surface to attach the wing to the arch.*

the jig. Start the router in an upper corner, safely away from contact with the lamination. Then rout around the edges clockwise (in a gentle climb cut) to give you a clean edge. Go slowly across the step at the bottom so you don't blow out the wood as you exit the cut. Then rout away the remainder of the flat. Finish the other three flats the same way.

Layout for the wings requires a little more work. Do this on a large surface of at least 31" x 55", with a square edge (I used a piece of plywood a little bigger than that). The base of the table actually fits into a rectangle roughly 54" wide by 30 3/4" tall (your base may vary slightly in from this size).

The ends of the wings are directly above the bottom of the arch (on the outside face). You'll use this to lay out where the flats need to be cut on the wings. Measure 30 3/4" up from the bottom of the plywood along the square edge and mark a line. Set up the arch on three or four 1 1/2"-thick scraps (I used the lamination offcuts) with the bottom aligned with the bottom edge of the plywood and one side at the square edge. Now take one of the wings and place it on the plywood with the more curved end toward the arch.

The goal is to find a location for the wing that allows the curve to flow well into the bottom of the arch while the top part of the wing touches the edge of the plywood at the 30 3/4" mark. Once you're satisfied with the location, trace the flat and the step onto the wing. You can also make a mark 1/2" above the 30 3/4" line, where you'll be able to trim the top of the wing roughly to size.

Now you need a way to cut the flats on all four of the wings. The easiest way to do this is to create a positioning jig. Start by tracing the inside curve of a wing onto a piece of 3/4" plywood, particleboard or MDF, and cut out the shape. Place this curved piece on a larger rectangle of plywood. Move the wing and the curved piece so that the line you marked from the flat of the arch is located over the edge of the rectangular plywood. Confirm the location, then screw the curved piece down. Now, if you set up to cut flush with the edge of the plywood, you can cut each of the wings held in place on this positioning jig just where they need to be cut.

You still have to crosscut the pointy end you just created on each wing so it will match up with the step on the arch. This is an easy crosscut on the table saw using the miter guide with a sacrificial fence. Mark out the cut location, and place the wing's flat down on the saw table. Clamp to the miter guide so nothing slips, and make the cut.

The main arches need two small mortises each for the stretchers. The basic approach to cutting these joints is to create a simple positioning jig you

can clamp into place that will allow you to rout (or use a hollow-chisel mortiser, or drill) as if the part were a rectangle.

Plunge routing requires a wide, stable platform for the router to rest on, so I used a 4"-wide board of the same thickness as my lamination to make the jig. Start by measuring 8 3/8" up from the bottom along the outside of the lamination. Mark a line there for the center of the 3/8"-wide x 7/8"-long mortise. The centerline of the mortise will be 19/32" from the outside edge of the arch. This is slightly off center, but there's still another lamination layer to add to the outside of the arch.

The goal now is to mark a cutout in the positioning jig so the outer edge of the jig lines up parallel with where the mortise needs to be (basically tangent to the curve at the centerline of the mortise). Cut out the arch shape, then transfer the mortise location to the jig, and square it around to the other side as well.

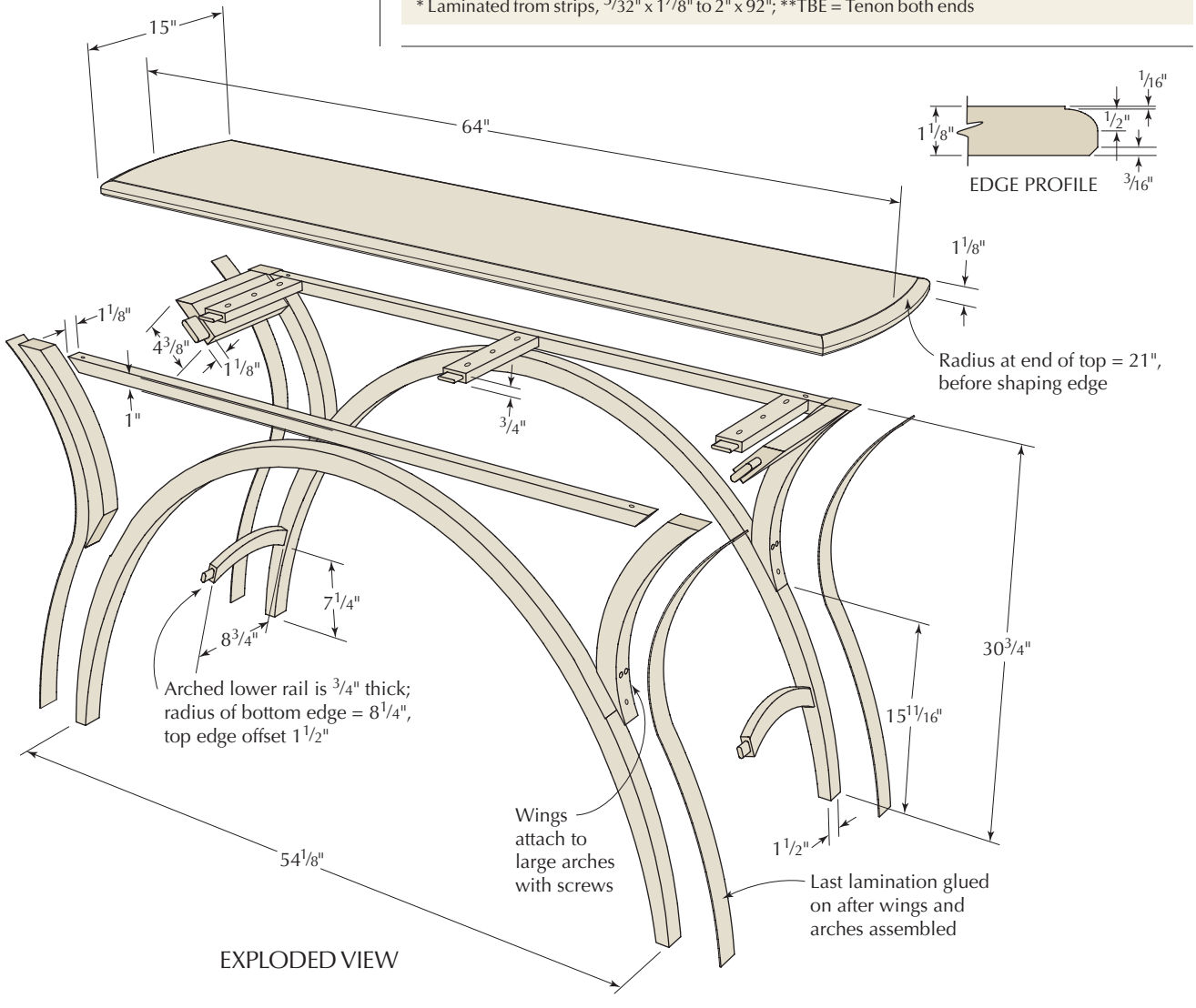
Clamp the positioning jig in place, and set up a plunge router with a fence. Set the fence so the 3/8" x 7/8" mortise will be centered 19/32" from the outside edge of the arch. You can either transfer marks to the arch and rout by eye, or set up some stops to limit the travel of the router. Rout the mortise roughly 1" deep. I find that a series of very shallow passes gives a more accurate result, with less chatter of the router bit. You can simply flip the jig over to rout the opposite side of the arch.

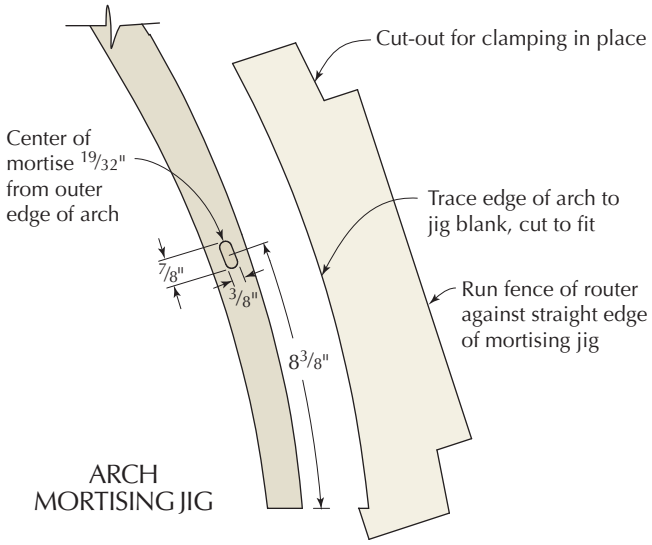
Drill and countersink three holes in each wing, perpendicular to the flat face. Now screw the wings into place temporarily (no glue!) so you can lay out the tops of the wings and the front and back aprons. The aprons are 1" high,

Arch Table

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑	2	Large arches	1 1/2	1 1/2	*	Lamination	
❑	4	Wings	1 1/2	1 1/2	*	Lamination	
❑	2	Arched lower rails	3/4	2 3/4	10 3/4	Solid	1" TBE**
❑	2	Angled upper rails	1 1/8	4 3/8	11 1/4	Solid	1 1/4" TBE**
❑	3	Top rails	3/4	2	11 5/8	Solid	1" TBE**
❑	2	Angled aprons	1	1 1/8	52	Solid	Cut to fit
❑	1	Top	1 1/4	15	64	Solid	

* Laminated from strips, 3/32" x 1 7/8" to 2" x 92"; **TBE = Tenon both ends





Create a line. *This jig provides a flat reference for the router fence and holds the wing securely to make the mortise.*

1 1/8" wide, and roughly 60" long. Save a couple scraps from milling them so you can prop up the arch for an easier layout. The layout process takes place on the plywood you used to set up the wing alignment. Here, prop up the arch on the scraps at the bottom and the stretcher at the top. Align the bottom of the arch with the bottom of the plywood and clamp it in place.

The apron should be set so the line that is 30 3/4" up from the bottom of the plywood is at its top. Now you can mark the curvature of the wings onto the apron, and the tops of the wings from the top edge of the apron (use a short pencil stub to mark from underneath). Label each location so you can put everything back together the way you marked it. Carefully saw to your lines. You'll have a chance to rout the tops of the wings flush later, but you should try to smooth the ends of the aprons carefully to fit the wings. You can undercut the center portion of the apron's ends a little bit if you like.

Mortising the upper part of the wings for the side aprons is very similar to mortising the arch for the lower stretchers. Make a similar positioning jig with a straight edge parallel to the mortise you need, then locate the mortise by referencing off that edge. These mortises should be 1/2" x 2" x 1 1/4" deep.

Shaping & Smoothing

Lay out a curved taper on the inside of the arches, starting opposite the wing joint and tapering down to 1" wide at the bottom of the arch. You can use the outside of the other arch to draw this curved taper. Band saw the waste off, then smooth the curve. This can be a little tricky, because the glue lines are harder to cut than the wood, but a sharp spokeshave followed by a scraper usually does the trick. Sandpaper on an appropriately curved sanding block will work, too. While you're at it, smooth out the rest of the arch and the convex parts of the wings and chamfer the very bottoms of the arches' "feet."

Assembly

It's finally time to attach the wings to the arch. Glue and screw them into position and plug the holes. Then refine the transition (and flush off the plugs) with a spokeshave, rasp, scraper and/or sanding block so you'll be able to glue and clamp the final layer to the outside of the arch and wing. Be careful not to round over this surface from side to side or you'll never be able to glue the final layer on effectively. Check to be sure that the outside strip will actually conform to the refined curve and adjust as necessary. Then cut the outer strips so that they are a few inches longer than needed. They should remain wider than the laminations to leave some room for misalignment.

It takes a lot of smaller clamps to glue on the final layers. I only do one of the four glue-ups at a time. I use 1/4" Masonite strips or extra sliced layers

Cover your tracks. *The final strip covers the joint, leaving uninterrupted grain on the outside of the assembly.*

Fair curve. *Clean up the transition between the wing and the arch to provide a smooth bed for the last laminate.*

as cauls and to protect the inside of the arch from the clamps. I also screw some shaped blocks to the masonite to help position some of the clamps appropriately. A dry run will help you figure out what you need to do to stay in control when the glue is finally applied.

When the glue is dry, cut the excess length, plane off the excess width and finish smoothing out all of the edges as well. There are probably little bits of the routed flat sections above where the wings attach to the arches. A bit of sandpaper backed up by a thin scraper makes it easy to get in there to ease that transition. Round over all of the edges with a 1/4" roundover bit set to about two-thirds of its normal depth, then follow this up by carving, filing and sanding the inside corners of the arch-to-wing intersections.

Mill the side apron and lower stretcher blanks. Cut and fit the tenons. Then band saw and smooth the lower stretchers to shape. Make sure to ease the bottom corners of the stretchers a little to avoid the short-grain weakness there. Then round over the edges to match the arches. Bevel the tops of the aprons to roughly the angle of the wings, but leave them a little long for now.

Drill countersunk pilot holes – essentially pocket holes – in the ends of the front and back aprons so you can attach them to the wings. These

What chisels are for. *A router bit won't reach the inside corner to shape the edge. Carve into the corner from both directions.*

Plane truth. *This jig provides a flat surface for the router base, bringing the front-to-back rails and the tops of the wings flush with the aprons.*

should be roughly perpendicular to the angled ends of the stretchers. You also need to mortise the inside faces of these aprons for three crosspieces you'll use to attach the tabletop to the base. You can determine the length of these crosspieces by dry-fitting the arch assemblies and the aprons together, then setting the front and back aprons in place centered on the width of the wings. Measure the distance between aprons, then add the tenon lengths to get the overall lengths.

Cut and tenon the crosspieces, then drill them for the screws to attach the top. The center holes can be left as-is, but the holes to the front and back should be elongated to allow for expansion and contraction of the solid top. Smooth any components that still need attention.

Glue up the arches with the lower stretchers and side aprons. Separately, glue up the front and back aprons and the crosspieces. Once the arch is out of clamps, you can screw the upper apron assembly in place. I flush off the tops of the aprons and legs using a large piece of plywood that has a rectangular opening that fits over the ends of the legs and end apron. I clamp this in place on

Independent top. *After shaping and finishing the top, attach it to the base with screws through the front to back rails.*

the front and back aprons, then rout away anything that projects above the height of those aprons. Be sure to use a light climb cut to avoid blowing out the edges.

Making the top is nothing out of the ordinary. Shape the end curves on the band saw set up with adequate support to the side. Plane everything smooth, then rout and smooth the edge profile on top and bevel the underside. You can screw the top on now, but I usually wait until after finishing the table; it's much easier to finish the top and base separately. I finish with five or more coats of an oil/varnish blend followed by a coat of wax, but any finish you're comfortable with will work. PWM

Jeff is a Chicago-based furniture maker and woodworking teacher. He's currently working on a new book covering the essentials of craftsmanship, due out next fall from Popular Woodworking Books.

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Straight Talk on Sharpening

BY DENEB PUCHALSKI

While a cambered plane blade works fine, why start the hard way?

A sharp edge is an absolute necessity for hand-tool woodworking – but for many beginners, sharpening plane irons and chisels is an obstacle rather than a gateway to enjoying hand tools. Using dull tools not only requires more effort, it yields poor results. I believe sharpening is a skill that you must master in order to do good work. That doesn't mean it has to be hard to do.

When someone is just getting started on the plane path, they should focus on removing obstacles and reducing the variables in that path – and the shortest route is usually a straight line.

In the case of planes, that straight line is a straight edge on your blade. Using a honing guide with preset projection stops makes sharpening at any angle repeatable and fast. Working on just two grits of waterstones, #1,000 for honing and #8,000 for polishing, also speeds up the process without sacrificing results.

Until you really know what sharp is, the more variables you include in the process the more difficult it is to know what you are working with. There has been much written about the need to "camber" or create a curve on the cutting edge of your plane irons. This can be a helpful technique, but if you don't even know what a sharp edge is – let alone how to set up your plane to take a reasonable cut – you may struggle to get good results. First, concentrate on learning how to hone a sharp edge.

Simple sharpening. *If you're new to handplanes, it's important to experience "sharp" on a straight blade before worrying about camber. A simple sharpening setup with two stones and a honing guide can get you there quickly. Before honing, you can grind your blades straight using three grits of sandpaper (#80, #220 then #400) affixed to a granite plate.*

What is Sharp?

"Sharp" is the intersection of two evenly polished surfaces that come together to form an edge. The angle that they come together and the level of polish determine how keen that edge is. You can make that edge more keen by taking both sides to a high level of polish on an #8,000 grit waterstone or the equivalent.

By its nature, a straight edge is easier to sharpen than a cambered edge. It is

PHOTOS BY ROBIN MACGREGOR; ILLUSTRATIONS BY MARY JANE FAVORITE

not that sharpening a camber is hard to do – there are many methods described in many articles – but it does add complexity to a task that can already be intimidating for many people.

With as few as eight to 10 combined strokes on two stones, you can create a mirror edge with a straight blade.

Cambering a blade, however, requires first establishing the camber by grinding, then maintaining it, usually with multiple finger/pressure positions on the blade. Again, it's not difficult, but it means that you need to know what you are looking for. And you won't want the same amount of camber for each blade you'll be using, so that's additional complexity built into the sharpening process.

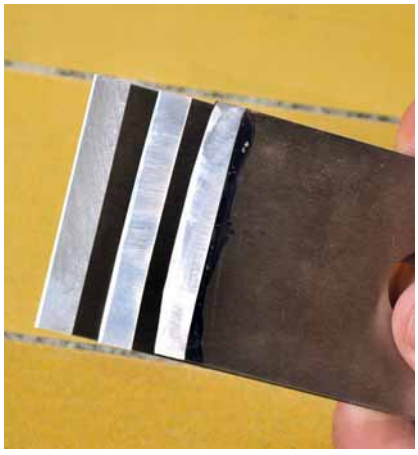
A straight edge, on the other hand, is always sharpened the same way; the only change is in how long the secondary bevel gets and when you'll need to regrind the primary bevel (issues you'll also encounter with cambered blades).

Blades & Cuts

Anyone learning to use hand tools needs to understand the relationship between the cut they are taking and the tool they are using. You'll be working your stock with a variety of cuts, from a heavy roughing cut to a thinner flattening cut, then finally a very thin finishing cut. By working through these in sequence, you will eliminate the track marks from the heavier work. As long as your final finish passes are less than .002" and the blade is set parallel to the sole of the plane, you will not leave plane tracks.

How heavy of a cut you are going to take is a direct relation to what you need to do and the material you are working with. The heavier the cut, the more resistance and the greater likelihood of tear-out. The more blade you have exposed, the heavier the track marks will be at the edge of a cut.

A cambered blade will reduce both the tracking and the resistance, because the corners of the blade are relieved into the body of the plane. However, if you don't already have some experience with this process and know what results you'll be getting, you will not know how much camber to apply to the blade for each step.



Camber. *Here, you can easily see the differences between a straight plane blade (bottom of the stack), a gentle camber and a pronounced camber. Start straight. After you gain experience, you can introduce cambers.*

For the most part this is a process of trial and error. By first getting familiar with a straight blade, you'll be able to gather the information you need to decide if and when a camber is appropriate, and how much to radius a blade for any given situation.

Tool Setup

Once you have achieved your edge, you need to set up the blade in the tool. While everyone has his or her own ideas about setting up a plane to take a cut, when I sight down the sole of a plane, I know that if I can see the blade edge easily, then it will be too heavy of a cut for anything other than a roughing cut.

"There is a great satisfaction in building good tools for other people to use."

— Freeman Dyson (1923 -)
theoretical physicist

A shaving of .003"-.004", which is about the thickness of a piece of paper, does not sound like much – until you push the plane and you feel how hard it is to move. You'll need to take shavings this heavy or more when roughing , but flattening and finishing cuts should be .003" or less.

Test Block

The trick here is to set up the tool for a known cut before you start working on your stock. If you know what the plane is going to do before you even take a pass on the board, it gives you a great deal of control over the whole process.

I take a shaving from the edge of a test block that's about ½" thick by 3" long and 1" to 2" wide. I like to use poplar for this because the lacy quality of very thin shavings makes it easy to see differences in thickness. If you get the same thickness of shaving from each side of the blade then you know that

Test. *In the plane on the left, you can readily see that the two test shavings are different thicknesses; this tells you the blade is not parallel in the plane's mouth. On the right, the two shavings are the same thickness, which indicates the blade is properly aligned.*

the blade is cutting parallel to the sole of the plane. You can then take a cut down the middle of the blade to see if the edge of the blade is straight, convex or concave. You don't want the edge to be concave, because this means that the corners of the blade will dig in no matter what you do.

I find it useful to take from a test block a series of test cuts ranging from .001" all the way up to .010" – but what does that mean? Well, if you have a dial caliper you can measure these thicknesses so you know what you're aiming for. I don't expect you to measure every shaving that you take in your work, but this way you can get a sense of what that range of shavings looks like.

Then when you are taking test cuts in the future, you'll have an idea of what type of cut you are taking: roughing, flattening or finishing. The test cuts tell you two things: if the blade is cutting parallel to the sole of the plane; and the exact depth of cut. If you want more or less depth, set the projection of the blade accordingly.

By knowing what the tool is going to do when you take a cut on a workpiece, you gain power over the process. If you don't get a good cut, for example, you know the board is simply not flat enough to allow that shaving to happen. Most people would increase the depth of cut at this point. If, however, you are trying to take a finishing cut, you should either take more passes at the thin setting until you get a full cut, or switch back to one of your larger planes to get the stock flatter. Or switch to a smaller smoothing plane with the same setting as your first plane; less bearing surface will allow the plane to get into smaller hollows.

Baseline measurements. *While it's folly to measure every plane shaving, knowing what is meant by .001" to .010" will help you set up your planes properly. So measure a few shavings of different thicknesses until you visually understand what you're aiming for.*

Planes & Cut Types

A roughing cut, a flattening cut and a finishing cut will each be of different thicknesses, and can be made with a single tool. There are, however, three bench planes that will make handplaning more efficient.

Roughing is suited to a fore plane (the jack plane falls into this category) and these are typically 14"-18" long (Nos. 62, 5, 5½ and 6 in the Stanley numbering system). Flattening is a job for a jointer or try plane, which is usually 22" long or more (Nos. 7½, 7 and 8 fit the bill here). The finishing cut is best handled by a smoothing plane (Nos. 164, 4½, 4, 3, 2 and 1). A smoother does not cut more smoothly; it is just smaller so it allows you to take thin finishing passes more readily because it touches less of the workpiece than the longer planes, and can get into any gentle dips.

Roughing will be your thickest shaving, flattening will be about half that thickness and finishing will be half

Bench planes. *The three bench planes in order of use are (left to right) the jack or fore plane, the jointer or try plane, and the smoother. The difference in the thickness of the shavings from each plane is noticeable, from thick to thin.*

Leaving tracks. *Here you can see the progression of track marks from blades ground and sharpened straight across. With overlapped plane passes set to take a .0015"-thick (or thinner) shaving (right), the tracks disappear.*

that again. It's hard to put a number to those thicknesses because every type of wood is different, but roughing cuts will typically be .004" thick or more, flattening cuts will be .002"-.004" thick, and finishing cuts will be .001"-.002" thick. The thinner the cut, the cleaner the surface. If you're working in a soft, forgiving piece of wood you can bump that scale up a bit, but know that you're getting away with heavy cuts; you've not solved any mystery of the universe – and if the grain direction gets squirrelly, you'll probably get some tear-out.

When to Camber

Here is the major point of this article: If you're taking shavings greater than .002", you'll leave track marks from the corners of the blade, no matter what you do. This is where a cambered blade can be your friend. If you're at the beginning of your journey with handplanes, however, you might find it a bit like learning to swim – you don't want to jump into the deep end right away.

Getting the blade nice and sharp and taking thin cuts will solve the majority of your problems right off the bat. Your roughing stage will leave some noticeable track marks in the wood. When you then switch to the jointer plane to flatten the stock, you will knock those down and leave smaller track marks. The smoother then allows you to remove any remaining blemishes, leaving a mirror-smooth surface. But how?

As long as you set the blade in your smoother at .0015" or less, have it parallel to the plane's sole and overlap each pass on the board without exerting undue pressure on your tool, you'll get no track marks.

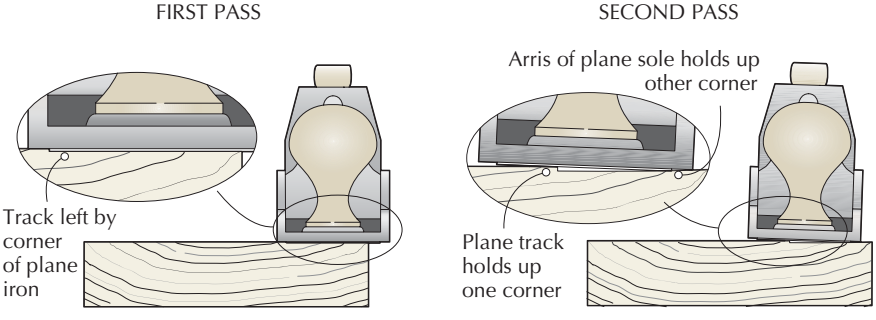
Your first smoother pass (with one edge of the plane off the board) leaves one almost-invisible track; when you overlap your first pass with your second, your first plane track actually tilts the body of the plane slightly. And the pivot point of this tilting is the corner of the plane's body – where the sole meets the sidewall. This slight tilt lifts the corner of the blade off the work. Subsequent passes keep the tool tilted and that corner from marking the work. The final pass should be with the edge of the tool off the workpiece – where there's no material on which to leave a track.

If you focus on learning how to get a consistently sharp edge and setting the plane up for known results, you can work in a sequence of cuts that doesn't leave heavy track marks to clean up with the smoother. If instead you decide to sharpen your blades with a camber, you will need to fully understand which type of cut you will be taking with each plane and therefore how much of the blade should project from its mouth.

I don't think that working with a cambered blade is a bad idea. I simply encourage you to make that choice with a clear purpose and understanding of what is appropriate for each planing situation.

A straight blade is quick to sharpen and easy to maintain. Start working with one and you may find that there are far fewer situations where you feel a cambered blade is needed than you have been led to believe. At the very least, you will have a much better idea of what you need to do if you decide to try a camber. **PWM**

Deneb is a senior sales representative and show coordinator with Lie-Nielsen Toolworks in Warren, Maine.



Erase your tracks. *With a blade parallel to the smoothing plane's sole and projected to take a .0015" cut or less, start your passes with the edge of the plane off the board. This will create one near-invisible track. On the second pass, the plane will ride with one edge on that tiny track; that will cant the plane's body just enough to remove the first track while creating another near-invisible track on the other side – which will then be removed in the subsequent pass, and so on.*

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Shop-built Disc Sander

BY ERNIE CONOVER

Keep your lathe from loafing between jobs with this easy-to-make, inexpensive disc sander.

Disc sanders are invaluable for anyone working with small parts, such as toymakers, instrument builders, model makers and turners doing segmented work. In fact, any shop will find the machine well worth having.

Your wood lathe provides an ideal platform for a shop-built disc sander that won't cost you more than $50 and a few hours of shop time. Your lathe's bed provides a rock-solid platform for the table, and the headstock and spindle powers the rotary action. An added benefit is variable speed, a feature that dedicated machines don't offer. You can adapt the sander size and capacity to the swing of your lathe. Even a mini-lathe will allow a 10"-diameter sanding disc.

Yes, you can buy small tabletop disc sanders for as little as $150, but they have only a 7"-diameter disc and are usually prone to vibration. A good, usable disc sander will cost you $400 or more, which makes our shop-built machine a real bargain. What is more, this machine should run as smooth as silk.

"Man is a tool using animal. ... Without tools he is nothing, with tools he is all."

— Thomas Carlyle (1795 - 1881)
Scottish essayist, historian

Your $50 disc sander. *Just about any lathe will provide the power and the platform for a shop-built disc sander. It also has some extra features including variable speed and little, if any, vibration.*

The best material for the platen, or sanding disc, is 3/4"- or 1"-thick MDF because it is very flat. You may want to use it for the table surface for the same reason. That said, I used solid wood for my table and base – scraps I found in the shop.

You'll want to use a good-quality face plate to mount the platen to the lathe spindle. If you have a four-jaw chuck, a less-expensive option is the screw that comes with it. Using it as a screw chuck is a great way to hold the disc and negates tying up a face plate. Simply drill a hole in the center and screw the platen to the chuck when needed. To preserve the threads in the MDF, add a few drops of superglue to harden them.

The table height for your shop-built disc sander may vary from the example offered here. The table height should be equal to your lathe's spindle height or the distance between the lathe bed and the center of the spindle. Adjust the length of the stanchions accordingly.

Any platen up to about 9" in diameter should run true. Larger diameters

PHOTO BY THE AUTHOR; ILLUSTRATIONS BY ROBERT W. LANG, FROM THE AUTHOR'S MODELS

may need some truing once attached to your lathe. I would not make the platen smaller than 9" in diameter unless you are limited by the swing of your lathe. If possible, make it 10" to 12". With a big lathe, you can make a disc of up to 20" without much problem. But be aware abrasives for 14" and up are harder to find. A 12" platen is very usable, and pressure-sensitive, adhesive-backed abrasives in that size can usually be found at a big box store.

Make the Platen; Get It Flat

Start by making the platen. Mark your circle with a compass on the material and cut close to the line using a band saw or jigsaw. Mount it to the face plate (or screw chuck) taking care to center it. Now mount it on the lathe, bring up the tool rest and true the outside diameter. Don't make the platen diameter smaller than the abrasive discs you plan to use.

If the face of your platen runs out wildly and wobbles at the edge, check the face plate first. A run-out of .003" on a 3" face plate will be .012" at the edge of a 12" circle – about halfway between 1/64" and 1/32". By putting a tool rest close to the outer edge you can judge run-out. You can true the face plate itself with a large, high-speed steel scraper. Hold it about level on the tool rest (with the tool rest positioned close). Carefully bring the scraper to the face plate surface and take very light cuts. With your circle of MDF mounted, it may run out a bit even with the best of faceplates. You may also get some run-out when using the screw chuck. The answer is to scrape the MDF flat. Your new disc sander table can aid greatly in achieving this end – so if you haven't made it yet, it's time to get started. Study the illustration to get familiar with this part of the project.

Build the Base

The first step is making the sectors and stanchions for the table base. On one of each component (there are two of each), center punch for the 1"-diameter trunnion hole 1 1/2" from the top and left corner. On the stanchions, use a compass set to 1 1/2" (which makes a 3"-diameter circle), and set the point in the center punch dimple. Draw the top of the stanchion radius then draw the rest of the curved shape freehand.

To mark the outside radius edge of the sector, set the compass to 7" and place the compass point at the top-left corner and draw a 7" arc. Now set the compass to 3 1/2" with the point in the center punch dimple and lay out an arc on the sector.

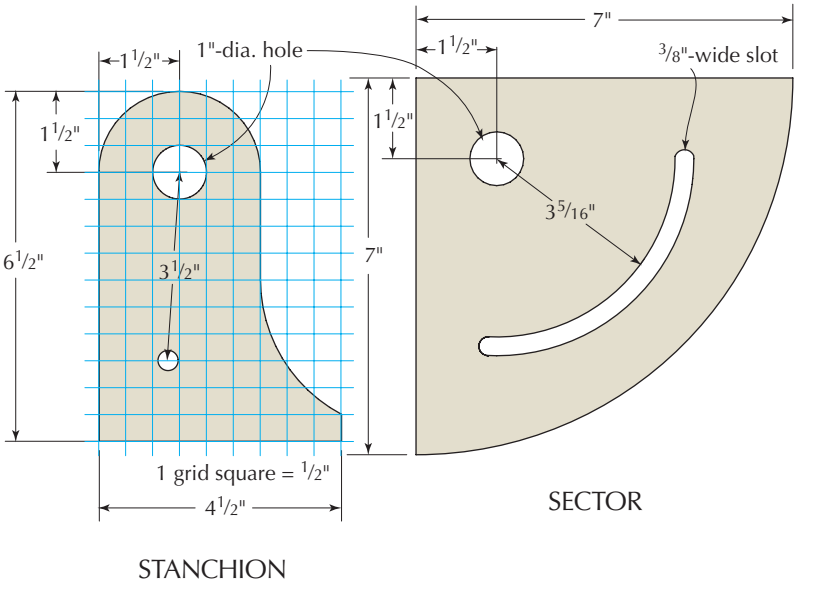
Use this same setting to lay out the location for the hole for the carriage bolt on the stanchion.

To make the arced slot for the carriage bolts on the sectors, lay out two more arcs, one 3/16" bigger and the other 3/16" smaller. Now drill a 3/8" hole at each end of the arcs then remove the waste with a scrollsaw. Make sure the lower hole center is slightly less than 1 1/2" from the edge to ensure the table can be pivoted square to the face of the sanding disc. The upper hole is less critical and in all likelihood, you won't have much need to set the table to a steep angle anyway.

Nail the like pieces together for band sawing the final outside shapes. Also drill the holes for the trunnion and the carriage bolt. Use a drill press if you

Affix your sanding disc. *You can mount your platen or sanding disc to your lathe spindle using a face plate or a four-jaw chuck with a screw, as I'm doing here.*

Stanchion & sector layout. *Determine any adjustments to the stanchion and sector particular to your lathe's capacity. Then locate your hole-drilling centers and arcs, and draw the curved shapes of the parts. I made the one for this article for a Powermatic with a 10 1/4" center height so I added 2 1/4" to the 6 1/2" dimension given in the plans.*



have one. Scrollsawing the arced openings should be done individually.

Assemble the Base & Table

Next join the two stanchions to the base. I elected to use a Festool Domino machine; however, a biscuit joiner, screws or even nails would work fine. Before joining the tabletop to the sectors, notch the table edge that will face the sanding disc. The length of the notch should be slightly longer than the diameter of the disc. Center the notch on the edge.

You may want to bevel the bottom edge of the notch. Doing so will allow the table to be positioned closer to the disc when the table is set at an angle. If you want to have a miter slot on your tabletop, machine it now. When done, join the two sectors to the tabletop.

The trunnion that the table pivots on is a length of 1" dowel. I turned mine because it is cheaper and I could turn the center part to a slightly smaller diameter to make assembly a breeze. If you decide to buy your dowel, check the diameter as these often are undersized; that would result in a sloppy fit. Applying paraffin wax makes assembly and operation easier. A wire nail through the top of one of the stanchions locks the dowel in place.

To mount the table to the lathe bed, cut a stepped block that locks between the lathe bed's ways so that it will not spin when you tighten the nut. The size and shape of the block will be particular to your lathe bed. Make it slightly narrower than the gap between the ways so it can drop through from the top. Drill a hole in the center of the block and the center of the table base so they can be bolted together.

Use Your Sander Effectively

Most of the time you'll use your sander with the table set at 90° to the platen. It's a good idea to check the setting with a square each time you install the sander on your lathe.

Normally, a fairly coarse abrasive is used on a disc sander. For most work I like #80 grit; for fine work, #120 grit. If your paper loads and burns quickly you're using too fine a grit. You also can

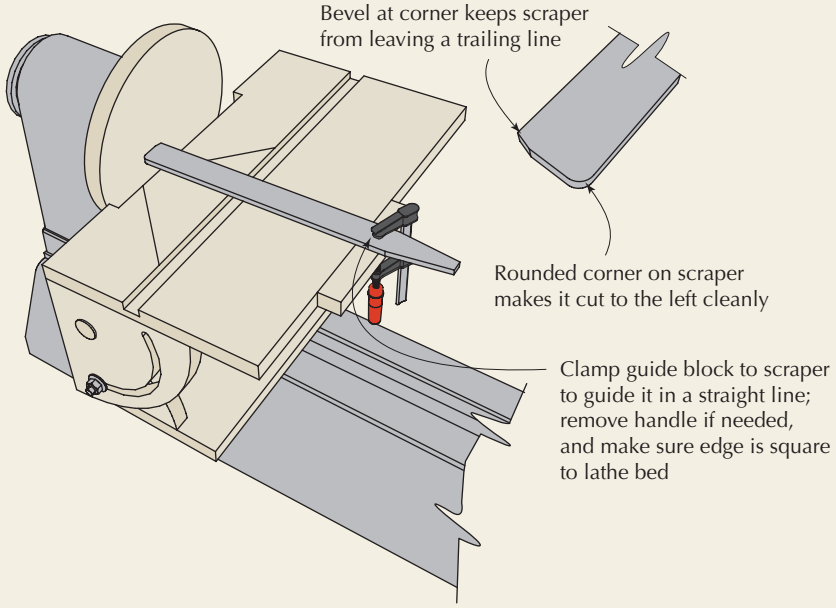
Glue up your parts. *Use whatever method you prefer to join the base to the stanchions and the table to the sectors. I used a Festool Domino machine.*

Make your table swing. *The trunnion is merely a 1"-diameter dowel and is used to pivot the table on the fixed base.*

Scrape the Platen Dead Flat

Scrape the platen flat with a square-end scraper. First, use a try square to position the table square to the lathe bed and lock it down. Next, tilt the table slightly so the scraper is facing downhill with the cutting edge on the centerline of the disc and the tool flat on the table. If you have a miter slot in the table, use a miter gauge to hold the scraper dead square and advance it slowly across the disc. If you omitted the miter slot, attach to the scraper a block of wood that rests on the front edge of the table as shown here. When finished, you want the platen to be dead flat. Once it's true, never remove the face plate (buy another one for general use). If using a screw chuck, you can remove it when not in use. Add a coat of shellac or other finish to seal the scraped face of the MDF.

— EC



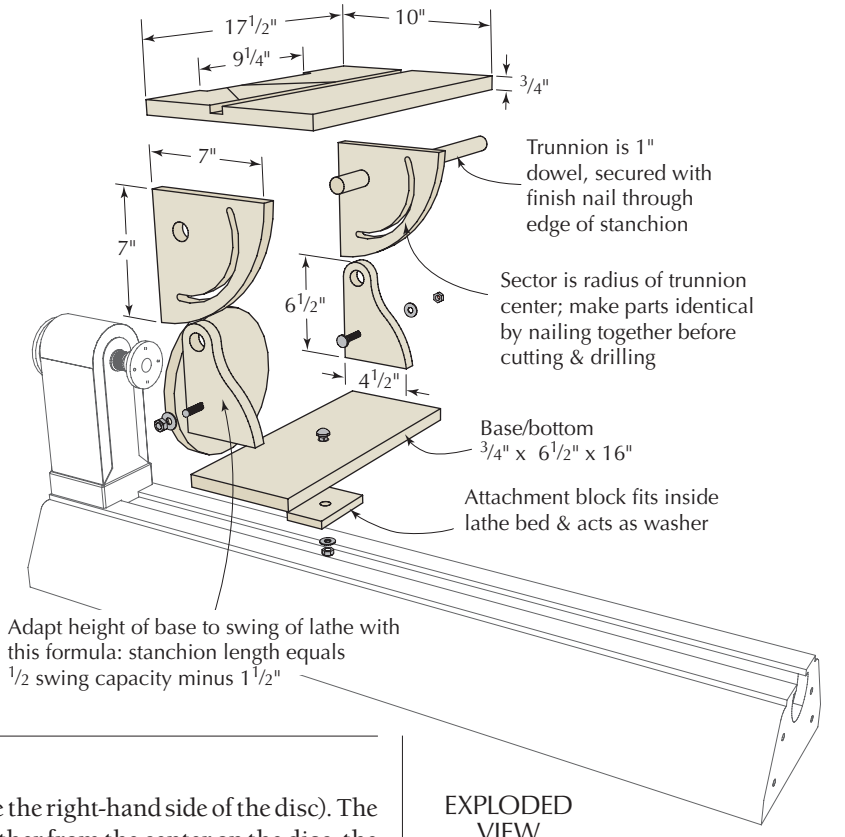
Mount the table & base. *Your sanding platform is secured to the bed of your lathe with a mounting block and bolt. The block is sized to fit your lathe.*

Square it up. *Most sanding jobs use the table set square to the sanding disc. Check it each time you set up your disc sander on the lathe.*

Shop-built Disc Sander

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑	1	Tabletop	3/4	10	17 1/2	MDF	Hardwood OK
❑	2	Sectors	3/4	7	7	Hardwood	Radius one edge
❑	2	Stanchions*	3/4	4 1/2	6 1/2	Hardwood	Shape two edges
❑	1	Base/bottom	3/4	6 1/2	16	Hardwood	
❑	1	Platen/disc**	3/4	9		MDF	
❑	1	Stepped block				Hardwood	Size varies

* Part size length can vary depending on the spindle-to-bed dimension of your lathe.
** Diameter can be up to 20" if lathe has sufficient swing.



EXPLODED VIEW

slow the lathe speed to avoid burning.

Removing expended abrasives can be challenging on dedicated machines. It's easier on this sander because the table is easily removed or slid out of the way. Warming the abrasive disc with a hair dryer or heat gun will make removal easier. Apply the new disc carefully and press it down with a J-roller, using considerable force to set the adhesive.

One advantage of using a lathe as the power source is that it can be slowed down, either by belts and pulleys or by a speed dial. This allows the platen to turn more slowly to give the operator more control over the sanding process.

The disc rotates counterclockwise and you only use the left-hand side of it, which puts downward pressure on the table to make things manageable (don't use the right-hand side of the disc). The farther from the center on the disc, the faster and more efficient the sanding. This means wider parts will sand faster on their left side. To compensate, exert more pressure on the right side closer to the center of the disc.

A safety note: Touching the disc in any way leaves a nasty injury that takes a long time to heal. I place my thumbs on the front edge of the table so that my fingers cannot inadvertently slip forward. Learning to use the machine at low speeds is a good way to get acquainted with it and reduce the odds of accidents or unsatisfactory results. **PWM**

Ernie has been working wood, teaching and writing for decades, and has 10 books, four videos and numerous magazine articles to his credit.

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Krenov-style 'Memories Box'

BY TED BROWN

Wood is the starting point of inspiration for these boxes infused with the past.

Built with love. *The wild apple top was the starting point for this "memories box" I made for my wife. The rest of the box is of Swiss pear.*

In my mind, this article goes to the root of why we work wood. It is about the philosophy of creating things in wood and the approach more so than the technical application of skill. Back in 1993, I spent nine months studying a way of working under James Krenov at the College of the Redwoods in Fort Bragg, Calif. Yes, I learned technical things there, but more important is that Jim inspired us to think, to be sensitive in our choices and to do the very best we could in the execution.

If you have read Jim's books, you will immediately grasp the fact that his way of working was significantly different from the rest. Jim was excited by the wood itself, and how he could gently massage the material to create a piece with a natural look, with a feeling. I once heard him say something along the lines of, "When you look at a piece of fine furniture, you are not just looking at the piece, but a significant portion of the maker's life."

This article is about applying and enjoying the principles I learned from Jim. It is about the making of three small boxes: why they were made, for whom they were made, and what considerations went into the materials, shapes, weights and feel of each piece. Jim liked fine work, a good honest joint, thoughtful use of grain and little tool marks left by the maker in the wood.

"Simplicity needn't be crude; it can, and should, include the sensitive."

— James Krenov (1920 - 2009)
studio furniture maker, teacher and author

I made these boxes for people I love. The first, made of Swiss pear, was built for my parents. It is a "memories box" – not that different from a jewelry box, except that there are fewer little pockets inside. The idea is to store bits of your life in these boxes: photos, ticket stubs, documents, awards, trinkets – just about anything that sparks your memory of special people, and special times. The second box, also in Swiss pear, was made for my girlfriend, now my wife. In the same way that I selected a favorite feminine wood for my mother, I also selected Swiss pear for my dear wife. I am currently making a third box, in this case of curly maple and ziricote.

Free Yourself in Your Work

Jim taught us to focus on the visuals in the wood. In this case, when making a box, the most important visual is the top, or "face," of the piece. This becomes the starting point – finding a piece of wood with an interesting message for the top panel of the box. If the panel is interesting, then the piece becomes alive and inviting. If the carcase of the box is smooth and calling out for your touch, then you move to a second level of tactile enjoyment.

Surprise. *Inside the larger box is the surprise of a smaller one.*

In the case of the box made for my wife, the idea started with an interesting piece of wild apple wood. I knew that the graphics were strong, that the fine fruitwood would work well with my plane, and that the tight grain would take an exquisite finish. The panel looks like a country scene, with a horizon,

PHOTOS BY THE AUTHOR

and a setting sun in the west. Surrounding that image with a frame of Swiss pear made for an interesting beginning to a lovely box. When you open the box, you use an integrally carved handle, yet another Krenov influence, keeping a natural relationship to the piece.

Yet another influence was the creation of a little surprise inside. When you open the box, you find another delicate box. This box is made of curly maple, and it sports the rich hues of caramel and licorice in the Macassar ebony bottom. In the bottom of the larger box, light curly maple is used to effectively give a sense of light from within. The rails on which the inner box is perched are hard maple, waxed so that the little box can slide along with ease. It is all about the little things.

Jim taught us how to create an entire piece, without getting caught up in measuring or numbers. Along with that concept, he spoke to the idea of "visual weight." That is, how thick should a frame member be? How wide? How big should the box itself be? It is a very freeing way of working when you allow the process to be driven by discovery. The box should be about "this wide by this long," he would say, waving his hands about. That concept would then get more focused by the size of the pattern of the top panel.

Once the top panel is sized, we then place the frame material around it, and mark the visual weight of the frame width on each piece. The frame members will all be milled at the same time, so the thickness of each is exactly the same, and "about this thick," as Jim would say, as he looked at his thumb and forefinger. The point was this: The thickness of the frame had to be the right visual weight for the size of the box. Jim encouraged us to avoid round numbers such as 1/2" and 3/4", because those numbers handcuff you, and the resulting design looks that way. I actually run the parts (plus one extra) through the planer all at the same time, and stop milling when the thickness looks right.

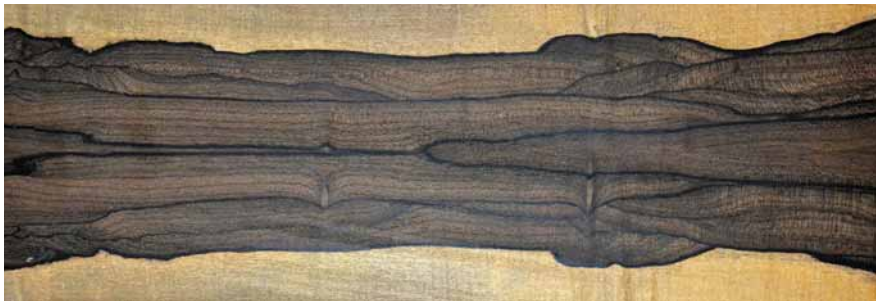
Keep Your Work Well-oriented

Cabinetmaker's marks serve several purposes. We use a system based on a triangle. The bottom of the triangle is placed on the bottom of the frame, the stiles or sides of the frame get the sides of the triangle, and the top frame member gets the tip of the triangle.

This marking scheme allows us to keep the frame members oriented, and – this is very important – with the correct side up, when cutting joinery and grooving the frame to accept the panel.

When laying out the mortise positions, I simply estimate two things: how far I want to stay away from the outside of the frame, and how far I must stay away from the inside of the frame so that the panel groove does not cut into the floating tenon. I take a piece of wood and create a "story stick" from which I transfer the location of each mortise. Those cabinetmaker's marks save me all the time from making errors: no numbers – simple and sensible!

When cutting the mortises, the first thing I look for are the cabinetmaker's

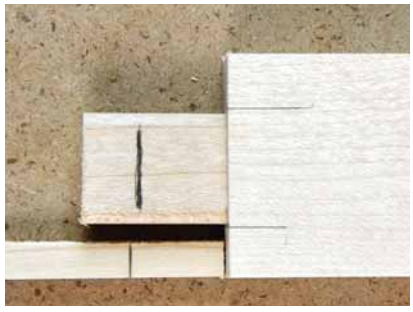


Scene. *For the top panel of your box, choose wood that creates an inviting visual scene.*

Does it look right? *Don't be beholden to measurements. If the visual weight of the frame looks right, then it is right.*

Stay oriented. *Cabinetmaker's marks help you instantly see which face is up, and keep your pieces oriented. Mark them on blue tape and you won't mar your planed workpieces.*

Floating tenons. *A horizontal boring machine cuts the mortises for my floating tenons.*



Story stick. *Used to probe the depth of the mortise, the story stick is then used to transfer that measurement to the tenon. Cut the tenon a little shorter than the mortise depth.*

marks. I want to know that I always have the right side up. In this way, it does not matter whether or not the mortise is placed in the center of the wood, so setting the mortising machine is just as easy as eyeballing the middle of the frame thickness.

With the mortises cut, I then proceed to install floating tenons into either end of the stiles. I glue the tenons in place, leaving too much material protruding, in terms of length. When I dry-fit the tenons into the rails, it is simply a matter of gauging the depth of the mortise with a small story stick. I mark the depth of the mortise on the story stick, then transfer that depth to the tenon and cut the tenon a little short so that it will not bottom out.

Raise the Panel

The panel is raised. I do this with a modified straight router cutter, which has had its tips rounded slightly to make a wee rounded rabbet in the wood. To cut the panel to a tight fit in the frame, I again use two thin story sticks – material thinner than the groove, cut so that it just fits into the groove for length and width. With the ends of the story sticks cut to a point, you can slowly nibble off the points of the sticks with a chisel, until the stick just fits into the groove with a snug fit.

Use the short stick to set the band saw fence to a setting for the panel width, and the longer stick to set up the table saw to cut the panel length. Raise the panel with the router table, then take a few plane strokes off of the width of either side of the panel to allow for seasonal movement. I usually eyeball my estimate for movement of the panel, mark that with a finger gauged pencil line, then plane to the line. Still no numbers.

The panel is left just slightly too thick during raising so that, as the panel is handplaned, the thickness is planed on the backside to a nice fit with the groove. While you have the handplane out, it is time to plane the insides of the box sides before dovetailing.

Distinctive Dovetails

Make your dovetail pattern interesting, and something that cannot be replicated by router cutting. Jim always cut his pins

Pare. *Tune your pins with a sharp chisel for the perfect shape before transferring the shape to your tail board.*

first, tuned them with a sharp chisel for shape, and fit the tails to that.

Dovetails are cut to scribelines made with a marking gauge, and set so that the pins and tails will protrude just a bit, just enough to be cleaned up to a perfect finish when the outside of the box is handplaned.

Then, yes, I sand a bit with #400 paper. Jim would say to soften the edges until they feel good, but not so much that they feel like a marshmallow. Rounding over the edges starts with a plane and a file, and is then refined with a little bit of fine sandpaper, in that order.

An Inviting Finish

This sort of box is all about creating a delicate piece that calls out to be handled. In that vein, Jim taught us to use shellac polish to finish the piece. Again, even in the dilution of the flakes in the alcohol, it was "put about that much in the bottom of the jar, and about three to four times that much alcohol, and swirl it."

The shellac is applied using a padding technique, where the "pillow" of clean white cotton is kept moist, but not wet. Lay down layers of shellac, allowing each to dry in between. Drying time increases as the finish builds. Feel the surface with the back of your hand to see if it is dry – a cool surface is still drying. Cut the finish back with #0000 steel wool between coats, and proceed until you have a sheen but not a shine.

Achieve a pleasing sheen by cutting back the final coat of shellac (about eight coats on the outside), to avoid a shiny look. A fine cabinetmaker's wax is the last part of the finish, which protects the shellac and improves the feel of the piece.

Distinct dovetails. *Lay out an interesting dovetail pattern – one that can't be cut with a router and jig – to instantly signal your box is handmade.*

Now, About Those Memories …

We work wood because we enjoy the opportunity to work with such a beautiful material, and, with a sensitive hand and eye, we create a wonderful piece. As furniture makers, we may now continue to enjoy the work, as we present it to our loved ones. **PWM**

Ted is a long-time furniture maker and designer who lives and works in Ottawa, Ontario.

Shellac. *Build up to eight coats of shellac, cutting back the finish between each coat with #0000 steel wool. The final step is to apply a fine cabinetmaker's wax such as Clapham's Wax, then cut back that finish with #0000 steel wool once again. The steel wool imparts a tiny scratch pattern in the finish to reduce shine. Buff the box with a soft cotton cloth – what we want is a beautiful soft sheen.*

A Box for My Parents

When I returned from California in 1994, I asked Mom what I could make for their home. She thought for a while, and finally said that she didn't know, that their house was full. She was right. At that stage in their lives my folks had all they needed. So I decided to build them a memories box. Now that my folks are gone, I keep their precious things in it to remember them by.

In this image you see a box with a map hanging over the edge. It is printed on silk, and was sewn into the uniform my father wore while he was in World War II, flying in Lancaster bombers as a wireless air gunner for the Royal Canadian Air Force.

There are many things in this box, from my parents' wedding invitation, to rings, to tickets my dad bought for a train in Montreal on the way home from Europe in 1945.

Make a memories box and give it to your loved ones. And Jim, I will carry your lessons with me forever.

— TB

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Chester County Style

BY CHARLES BENDER

This Pennsylvania area developed unique and recognizable furniture.

From its green rolling hills in the south and plains-like farmland in its middle to the nearly mountainous terrain in the north, the topography of Chester County, Penn., is as diverse as its people and, more important, its furniture. As woodworkers, nearly everyone who is interested in period furniture has heard of Chester County. But do many even know where Chester County is?

By the middle of the 18th century, Philadelphia had become not only the largest city in the Colonies, but the center of furniture design and production. The most astounding thing is that just 25 miles or so west of the city, in the rural countryside of Chester County, a revolution was taking place. It wasn't fought with musket and ball; it was a battle of taste. In order to understand what was taking place, we need to know the makeup of the residents of Chester County– one of William Penn's three original counties.

When you study period furniture, there's a lot of talk about regionalism. That is, different areas of the country had different preferences as to furniture proportion, ornamentation and overall design. What's amazing about Chester County is that within one small county in Pennsylvania, we find significant construction and design differences.

Those micro-regional differences were driven by the diverse groups of people populating the different parts of the county. Once you understand the cultural makeup of the county, it's easier to understand the furniture design variations. The one common thread, regardless of region within the county, was that the furniture had to be simple.

Flat top. *Highboys remained popular in the Colonies long after they had gone out of fashion in England. In Chester County, the simpler flat-top highboy with its trifid feet remained popular long after ball-and-claw foot and bonnet-top highboys reigned in Philadelphia.*

Throughout the 18th century, English and Welsh Quakers, Presbyterians and Church of England adherents settled in Chester County. Other European immigrants arrived as well but the majority were from England, Ireland, Scotland and Wales. The English Quakers settled in the eastern and southeastern parts of the county and in the Great Valley. Irish Quakers and Scots-Irish Presbyterians gravitated to the southern and western parts. The Pennsylvania Dutch settled in the north. These groups brought with them a wide variety of furniture design tastes and construction methods.

PHOTOS COURTESY OF H. L. CHALFANT ANTIQUES, IMAGES BY SCOTT CHALFANT

"Some very wonderful pieces were made in areas outside the big centers, with much expertise and quality."

— Albert Sack
from "The New Fine Points of Furniture"

One reason for this migration to Chester County was the opportunity to make a living. Three major highways that connected to large cities in (Philadelphia, Lancaster and Reading) passed through the county, so there was a steady flow of goods and services. In the Colonies, wherever there was commerce, there were cabinetmakers and other craftsmen plying their trades.

Understated Design

The English Quakers in Chester County brought simplicity to their furniture. While the likes of the Hollingsworth and Cadwalader families engaged elite Philadelphia cabinetmakers with commissions that rivaled their British cousins, Chester County families dealt with local craftsmen to create elegant pieces with far less ostentatious adornment. Trifid, pad and Spanish feet reigned when ball-and-claw and hairy paw feet were the rage in Philadelphia. The simple shell was preferred to the lush vegetation of rococo Philadelphia.

This is not to say that Chester County pieces were colloquial or unrefined. Chester County residents had regular dealings with their city counterparts, and they were educated and aware of the latest fashions in the city. The settlers tended to be more conservative and held on to forms and designs far longer than in many places.

Much like the Colonial affinity for the highboy (which had gone out of fashion in England long before the ripening of the Chippendale period, but remained popular in the Colonies until the Federal period) the residents of the county continued making spice boxes and other forms beyond the limits of fashion in the cities.

One of the primary regional differences between Chester County furniture and furniture from the city was wood selection. Mahogany was arriving

Spanish feet. *While trifid feet and the more rococo ball-and-claw foot were the height of fashion in Philadelphia, the comparatively simple Spanish foot on this spice box on frame typify the Chester County style. And by the time trifid feet were out of style in the city, they were popular in Chester County.*

Philadelphia excess. *This Philadelphia highboy, with ball-and-claw feet, is far more highly decorated than what came out of Chester County during the same period.*

Bandy legs. *While the squat bandy legs with block feet on this chest are examples of the plainer Chester County taste, the way in which they are attached to the carcase is specific to the Octorara creek area. The bandy legs are first attached to a cross member which is in turn attached to the case using wooden threaded screws.*

with regularity into the port of Philadelphia throughout the 18th century. For city-dwellers, it was the fashionable wood of choice. Mahogany from Santo Domingo, Honduras and Cuba was the dominant species for Philadelphia's wealthy because of its deep reddish-brown color and because of its workability. It carved well and finished even better.

For the plainer Chester County elite, mahogany never became more popular than the local walnut (though it was used in small amounts). Being more conservative led the county consumer to look for a wood that was similar in appearance and workability but readily available without heading to the docks of Philadelphia. Although walnut was predominant, other species, including mahogany, cherry and curly maple, were used as primary furniture woods.

Secondary woods in Chester County and the surrounding areas were local and included poplar, which was predominant, pine and chestnut. What is lacking is the regular use of yellow pine and white cedar that appear in pieces made in Philadelphia.

Wainscot chair. *This furniture form was popular throughout the early years of the Colonies, in Chester County as well as elsewhere. Much like the spice box, the wainscot chair remained "in style" long after it had gone out of fashion in Philadelphia.*

Joinery Methods

Looking at the joinery methods used in Chester County, we find similar methods employed as those used in Philadelphia. The mortise-and-tenon joint was used in joined pieces while the dovetail was the method of choice for case pieces. (Joined pieces essentially consist of four corner posts with rails mortised and tenoned into them. Case pieces are usually based on a box that is dovetailed together with a front and back or top and bottom.) The through-mortise-and-tenon joint was used on the rear legs of chairs in the county as it was in the city. Basic joinery is one area where little variation occurs. Still, there are some variations that occur that are unique to Chester County.

These can best be illustrated in a discussion of the regional variations within Chester County. In other areas of the Colonies, regional tastes covered broader regions of land. The Connecticut River Valley covers a far greater area than Chester County, yet we find similar methods of construction and ornamentation along the entire valley.

Line-and-berry inlay, for example, shows up in the southeastern areas of Chester County, but not in the western or northern areas. There are other examples of design and decorative elements that are specific to certain regions of the county as well.

Farther south we find design elements that not only don't occur in any other part of the county, but nowhere else in the region. Through this area of the county winds the Octorara Creek, alongside which craftsmen developed a unique flair within the popular styles Queen Anne and Chippendale styles of the day.

Line-and-berry inlay. *This spice box exhibits line-and-berry inlay, which is found more often on Chester County pieces than on pieces from any other area.*

Tall clock. *This Chester County tall clock would have been a status symbol for its owner. While the pieces of Chester County were plainer, they were by no means unsophisticated.*

Like the chests created in Philadelphia, the craftsmen along the Octorara employed cabriole legs and ogee feet, but with a twist.

In New England, bandy leg chests had short cabriole legs with square stock at the top of the leg as an attachment point to the case. In the Octorara area, however, the bandy legs had no square stock on top of the legs. The front and rear legs of a chest were attached to one another, front to back, via a cross member. This board joined the two legs together and was then attached to the case using threaded wooden screws. This made moving the chest easier because the feet were removable.

Another Octorara distinction comes in the form of ogee feet, and there are a number of examples of low chests, tall chests and desks with ogee feet from the area. In many ogee feet, a small spur is part of the design that is created by a semi-circular cutout that radiates out from the main body of the foot. This

Simpler in the country. *Located just outside Philadelphia, Chester County, Penn., had its own unique style of simple but elegant furniture, most often made of native walnut.*

semi-circular cutout then curves away from the main body of the foot in a convex arc leading to the part of the foot that terminates into the base moulding at the bottom of the case. On an Octorara foot, however, the cutout is a half-circle joining the point of the spur to the main body of the foot.

Inlay Abounds

Another difference between Chester County furniture and the surrounding areas is a tremendous amount of line-and-berry inlay. While you can find string inlay on furniture from other areas, nowhere is it seen as often as on Chester County pieces.

Spice chests with line-and-berry inlay were extremely popular in the county, where this inlay also is found on blanket chests, Bible or document boxes, low and tall chests, and even on drop-leaf tables; most of it comes from the southeastern region of the county.

Round 'Birdcages'

Many tilt-top stands and tables, made throughout the colonies, have a feature called a birdcage – a square wooden structure that allows the table to tilt as well as rotate. In the middle section of the county, in Downingtown, a number of tilt-top tables and stands were made with unique round birdcages.

Rural – but Sophisticated

Because it's a rural area, people might expect the furniture of Chester County to be unsophisticated; they'd be wrong. Tall case clocks, an 18th-century status symbol, were made by many craftsmen living in the county. Chests-on-frames, a kind of highboy with fewer (if any) drawers in the base, as well as full-sized highboys, were made there by dedicated craftsmen for discriminating clients, not by farmers for their own use.

In the early days of the county, wainscot chairs and ball-foot chests were popular. Early craftsmen also made William & Mary highboys for clients, which displays knowledge of this then-new furniture form. While the craftsmen of Chester County, and their patrons, were aware of the latest fashions, they tended to hold on to construction methods and design elements far longer. We see some chests, clearly from the Queen Anne or Chippendale periods, with elements held over from William & Mary, such as raised-panel case sides.

When you consider how close Chester County is to Philadelphia, it is surprising how different the furniture is. Although it has the overall feel of Pennsylvania furniture, the people who settled in Chester County made furniture of their own by changing the designs to suit their own aesthetic, and began a furniture revolution within their communities. They could have followed the fashion trends of Philadelphia, but they resisted.

Inspired by these rural craftsmen, contemporary cabinetmakers working within the county today continue to create furniture made to a high standard. And while we contemporary cabinetmakers of Chester County build pieces from a variety of regions in a variety of styles, many have made the simple, elegant furniture of our home the mainstay of our bodies of work. Craftsmen from all over the country also take inspiration from those early residents, ensuring that the stylistic revolution that began centuries ago continues to this day. **PWM**

Charles is a period furniture maker and the lead instructor at Acanthus Workshop.

Birdcage. *The mechanism that allows this candlestand to both tilt and rotate is called a "birdcage." In the Downington area of Chester County, these are often round instead of the typical square shape. This design feature is specific to Downingtown, Penn.*

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Advertiser's Index

BY MEGAN FITZPATRICK

Gent's Chest

A simple box for basic household tools.

Household tools. *This "Gentleman's Tool Chest" is an adaptation of a 19th-century example that would have been stocked with a small but fancy set of household tools.*

Common in the 19th-century, a "Gentleman's Tool Chest" typically contained a set of fancy household tools including the first "multi-tools" – a handsome handle into which a variety of tools including gimlets, drivers, chisels and the like could be fitted. The chest might also include a small brass-backed saw, a filigreed square, dividers, a brass hammer and more – "showcase tools" for the squire who simply liked to putter around the house.

This project is an adaptation of a 19th-century example, made simpler by the use of dimensional lumber, nailed butt joints and applied moulding – and it was built using a small set of tools (though a powered miter saw was certainly not found in the gentleman's tool set!).

A Basic Box

The basic box construction couldn't be simpler. Cut two 18"-long pieces of 1x8 (which is, of course, actually 7¼" wide) and two 7¾"-long pieces at the miter saw. Clamp them into a box shape with the front and back overlapping the ends. Drill three pilot holes through the long grain of the front and back and into the end grain at each corner, eyeballing the location at the top, middle and bottom of each corner. There's no need to be persnickety about a symmetric layout – the joint will be covered with moulding. Sink 4*d* finish nails in your pilot holes to secure the box parts together.

Glue cleats at the bottom edge of the front and back (nail them – or clamp them in place until the glue dries).

To fit the bottom to size, cut a 16½"-long piece of 1x10, then clamp a straightedge to guide your jigsaw's shoe, and cut it to 7¾" wide (or just a hair under), and use your block plane to trim it to the perfect width and length to drop snugly onto your cleats. Nail it in place.

The lid is an 18"-long piece of 1x10 (9¼" wide), attached with two butt hinges mortised into the back and lid.

Gussy it Up

With the basic box built, let's make it look better. That's going to involve a lot of 45° miter cuts of what my local home center calls "outside L" (a.k.a. "corner moulding"). You'll need at least 12' or so (but you might want to buy a little extra).

Mitered moulding gets wrapped around the entire bottom; on the lid, the two front corners are mitered while at the back of either side the cut is at 90°.

Start by setting your miter saw to cut a 45° angle and snip off one corner of the moulding with the L-shape tucked in against the saw's fence and base, so that the moulding is supported on two sides. Now slide your piece down about 20" and make a second cut and repeat two more times. (Overcut all your moulding pieces with the necessary angle on one corner.) Now do the same to cut four 11"-long pieces (two for the top, two for the bottom).

Slide one 20"-long piece of moulding over the front edge of the top, line up the cut at the corner, then use a pencil to mark at the back where your cut for the other corner begins. Do the same with all your pieces – and mark the correct cut direction for the second angle (just to keep things straight – er, angled).

Back at the miter saw, reset for 45° in the other direction, make the cuts for the other ends of your mitered pieces, then reset to 90° for the lid's two side pieces.

Miters galore. *The trickiest part of this build is getting all the miter joints to fit snugly. I find it's easiest to hold one 45° corner in place while I mark the moulding at the inside back corner for the second cut (no measuring). And I always mark an angled line on the top of the moulding in the direction my second cut needs to go.*

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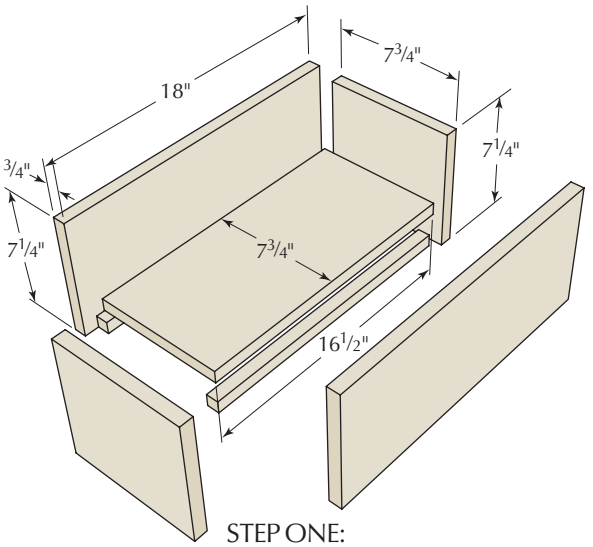
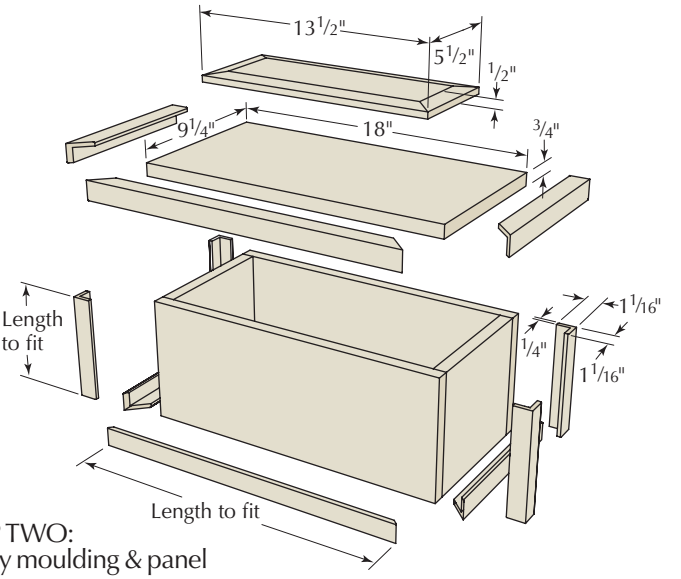


STEP ONE:
Assemble the basic box



STEP TWO:
Apply moulding & panel

With the pieces cut and fit, glue and nail the long piece to the front of the box lid. On the lid sides, apply glue at the front; use nails at the front and back (to accommodate seasonal movement and cross-grain construction). Attach the bottom pieces in the same way.

With your miter saw set for 90°, set a stop 6 1/8" to the left of the blade and cut the four pieces that wrap the corners, then nail them in place butted against the bottom moulding.

Back it up. *When cutting the hinge mortises on the top edge of your back, clamp an offcut on the backside; the narrow piece of stock that forms the back of the mortise is fragile.*

Top Panel

To dress up the top more, cut a 1/2" x 5 1/2" x 13 1/2" piece of poplar (or whatever 1/2"-thick stock is available at your home center). Set a combination square to 1" and mark a line in from each edge of the top face. Use a block plane to cut a bevel from the edge to your lines. Center the panel inside the moulding on the top, then glue and nail it in place.

Finishing Touches

The hinges are 2"-long brass butt hinges with 5/8"-wide leaves, mortised into the underside of the lid and the back. I used my combination square to mark the depth and width for each mortise, defined those extents with a chisel, then removed the waste with a series of chisel cuts.

The finish is mahogany gel stain on the inside, and two coats of dark green latex paint on the exterior.

This "gent's box" is now ready to be loaded with my (not-so-fancy) set of household tools. PWM

Megan is managing editor of this magazine. She can be reached at megan.fitzpatrick@fwmedia.com.

Gent's Chest

	NO.	ITEM	DIMENSIONS (INCHES) T	W	L	MATERIAL	COMMENTS
❑	2	Front/back	3/4	7 1/4	18	Pine	
❑	2	Ends	3/4	7 1/4	7 3/4	Pine	
❑	1	Bottom	3/4	7 3/4	16 1/2	Pine	Trim to fit
❑	1	Lid	3/4	9 1/4	18	Pine	
❑	2	Cleats	3/4	3/4	16 1/4	Pine	
❑	1	Top panel	1/2	5 1/2	13 1/2	Poplar	
❑		Outside L moulding	1/4	1 1/16	144*	Pine	

* Rough total length needed; it's a good idea to buy a little extra when working with miters.

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BY BOB FLEXNER

French Polishing Myths

Linen and more.

Three times in the last year, articles have appeared in major woodworking magazines instructing readers to use linen for the outer cloth in a French polishing pad. No explanation, just the instruction.

This brought back memories from 30 years ago of my running all over town searching unsuccessfully for linen because I had just read the same instruction: Linen is "best."

Recently, I was able to buy some linen in the Los Angeles fashion district to test whether it actually is superior to cotton (specifically tightly woven worn handkerchiefs, which are my favorite).

I'd long suspected the word "linen" was being used loosely: "linen closet," "change the bed linen," "Linens 'n Things." Indeed, a search through dozens of old books on French polishing, many from England, revealed both linen and cotton being recommended.

Still, linen is a specific fabric, and when the type of picky personality that is capable of pulling off a successful French-polish job is told to use linen, that's what he or she tries to use!

As you surely suspect, after extensive comparisons, I can't see or feel any difference between using a thin, tightly woven cotton cloth and a thin, tightly woven linen cloth. Both work great. The key for me is that they are thin and tightly woven.

Make a pad. *To make a pad for French polishing, wrap a folded cotton or wool cloth inside a non-stretching (not a T-shirt) cotton or linen cloth that is thin and tightly woven without sewn ridges. Here, I'm using a cotton cloth from a fabric store.*

French Polishing

Though French polishing takes practice to master, it's easy to describe.

Wrap a folded cotton or wool cloth the size of a golf ball or larger inside a thin, tightly woven, non-stretching cotton or linen cloth and twist the outer cloth tight to remove wrinkles. Pour some one-to-two-pound-cut shellac onto the pad's bottom, tap it hard against your other hand to disperse the shellac then rub the cloth in straight, circle or figure-eight strokes over the wood surface, to slowly build an evenly thin film.

At an early stage, sand with very fine (#600 or finer) sandpaper to remove roughness and other flaws, then continue building the film.

Add shellac. *The easy way to add shellac to the pad is to pour it from a squeeze bottle. I'm always amazed at those who go to the trouble of tying up the folds of the outer cloth with a string. The whole purpose of using an outer cloth to wrap a folded inner cloth is so you can remove wrinkles easily by giving the folds a twist. Why would you want to untie and retie the cloth every time?*

Tap to disperse. *Once you've added shellac, and maybe some alcohol, to the pad, disperse the liquid throughout by tapping the pad hard against your other hand. The advantage of not wearing gloves is that you can feel the wetness of the pad, and you'll learn to adjust to what feels right. Gloves prevent this, but many wear them anyway to avoid contact with the alcohol and the stickiness left by the shellac.*

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PHOTOS BY THE AUTHOR

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Add oil. *Until you become experienced, you'll find that adding a finger dab or two of oil to the pad each time you add shellac and alcohol gives you more control.*

There are three tricks for getting good results.

The first is to apply a couple finger dabs of mineral oil to the bottom of the pad every time you add more shellac. Then disperse again.

As the alcohol in the shellac evaporates through the oil, it leaves a vapor trail across the surface indicating you have a good amount of shellac and alcohol in the pad. If the pad is too wet, the vapor trail will be so long that you can't see it. If the pad is too dry, there won't be a vapor trail, just an oily smear.

As you rub, the vapor trail will shorten to only a few inches. This tells you it's time to replenish the pad.

The second trick is to wipe the oil off the surface now and then with naphtha to see where you are. The oil disguises flaws, making you think you're closer to the end than you actually are. For this reason, many experienced French polishers don't use oil at all, but they lose the lubrication and the visual clues provided by the vapor trail.

Naphtha is best because it evaporates much faster than mineral spirits. Neither causes any damage to the shellac.

The third trick is to reduce the amount of shellac and increase the amount of alcohol as you near the end of the job—that is, as the film starts looking good with the oil removed. The easy way to do this is to have one squeeze bottle of two-pound-cut shellac and another of alcohol.

For all of the building phase, pour some shellac followed by a little alcohol onto the pad and disperse. As you near the end, slowly reduce the shellac to nothing, finally adding only alcohol.

This is to eliminate rag tracks. Just as with brushing, cloths leave tracks, like tiny brush marks, when the finish is thick. Thinning is key to eliminating the rag tracks (and also brush marks).

Apply Shellac to Inner Cloth?

Another common instruction is to open up the outer cloth and apply shellac to the inner cloth whenever you need to replenish it. It's claimed the outer cloth then regulates the seepage.

This is nonsense. Once both cloths are wet with shellac, the outer cloth doesn't know it is separate from the inner cloth. Once you have dispersed the shellac, and so long as you don't have the pad soaking wet, the depositing will be even across the surface.

Removing the outer cloth every time you need to replenish gets really messy, and there's no need to do this as long as your outer cloth is thin enough to let the poured shellac penetrate.

Linseed Oil?

Sometimes you see instructions to use raw linseed oil instead of mineral oil. This is OK as long as you are especially vigilant to remove all of it after completing the project. Otherwise, the surface will become sticky.

You could use any type of oil, actually. It comes down to what you get used to, and many French polishers trained in England were taught to use raw linseed oil. Personally, I prefer mineral oil because there's no risk of stickiness.

Spiriting Off?

Traditional instructions say to remove the oil at the end by "spiriting off" with denatured alcohol. This is very difficult to do because the alcohol can easily damage the shellac film.

It's much safer to use naphtha, with the downside that it leaves the surface looking drier. You can regain the "wet" look with furniture polish or paste wax, which also reduces scratches.

Vapor trail. *Adding oil to the pad produces a vapor trail when you are rubbing the pad over the surface. The vapor trail is evidence that you have a good amount of shellac, alcohol and oil in the pad. As you rub the pad, the vapor trail will shorten, which tells you when it's time to add more shellac and alcohol to the pad.*

Hand-rubbed French Polish?

Twice in the last year I've seen the term "hand-rubbed French polish."

I guess this term could be used for marketing purposes. "Hand-rubbed" indicates quality to many people. But it is misleading because it is redundant. French polishing is rubbing by hand!

On the other hand, could the phrase refer to rubbing afterward with abrasives? Why then bother with French polishing? Just brush or spray the shellac (much faster), then rub it smooth and perfect to the sheen you want.

French polishing done well produces a perfect finish to begin with. PWM

Bob Flexner is author of the books "Flexner on Finishing" and "Wood Finishing 101."

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BY BRIAN BOGGS

The Myth Of Original Design

Consider yourself a midwife to creativity.

I have taught a number of classes on designing chairs and it's always interesting to watch students' creative processes. I like to keep my classes as fresh as I can for my own benefit if not for the students', so I plan each class a bit differently. Still, every design class seems to run into the same wall. This wall appears in the form of the question: "How do we come up with good design ideas?"

While there are guidelines for evaluating a design, the process for generating a new design idea seems more evasive. What is a new idea anyway? How do you make it appear?

As I watch students struggle to give birth to original forms for beautiful and comfortable chairs, I often see the struggle to create something original getting in the way of great ideas. While I don't design chairs without a lot of effort, there is a conflict between thinking hard to solve a problem and being genuinely creative. It is this creativity element that seems difficult to "put to work" when faced with a challenge of designing something new or "original."

Designing something light, strong and still comfortable will challenge even fairly advanced furniture makers. For me, answers to these challenges seem to emerge in the process of sketching, but not so much as a result of the lines I lay down on paper. Ideas seem to take form best when my thoughts allow them to – not because I "think of them."

I initially get a little activity or tingle that takes shape after thinking about what need I am wanting to meet with a new piece. As my vocabulary of joinery advances, my range of creativity expands as well because any incoming design has more forms it can take. Increasingly, I am getting ideas for designs constructed unlike any traditional furniture. My Guitar and Lily chairs are examples (the Lily chair is shown above).

While these designs did take their form on my bench, I see my role as more that of a midwife assisting a birth than as an architect "designing" a structure. The creative process flows best when my thoughts retreat to give it space and allow me to facilitate its arrival without deforming it with ego. Like in the birthing process, the baby is not the achievement of the midwife; it's just a baby arriving.

The more I learn about how to shape, join and finish wood, the greater my ability to facilitate these design arrivals without having to deform them to fit my limited repertoire of options. Good design development is an amazing process to experience when it is genuine, and the results are enjoyed by everyone who encounters them. My signature on the bottom just means I facilitated its arrival.

Still, the term "original" does have a place. For me, "original design" refers to a craftsperson tapping into the original source of creativity – not taking credit for being the source of the creativity.

What is important in this distinction is the recognition that good ideas and creativity come through us, not from us. We are not going to think up something brilliant. At best, we let it happen by being present and available to it. That's a much lighter experience than trying to force it, and it's a whole lot of fun. PWM

Brian made his first chair in 1983. Today he's considered one of the top chairmakers in the United States.

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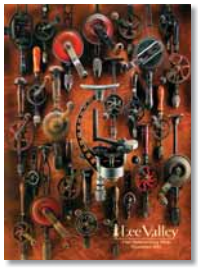

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