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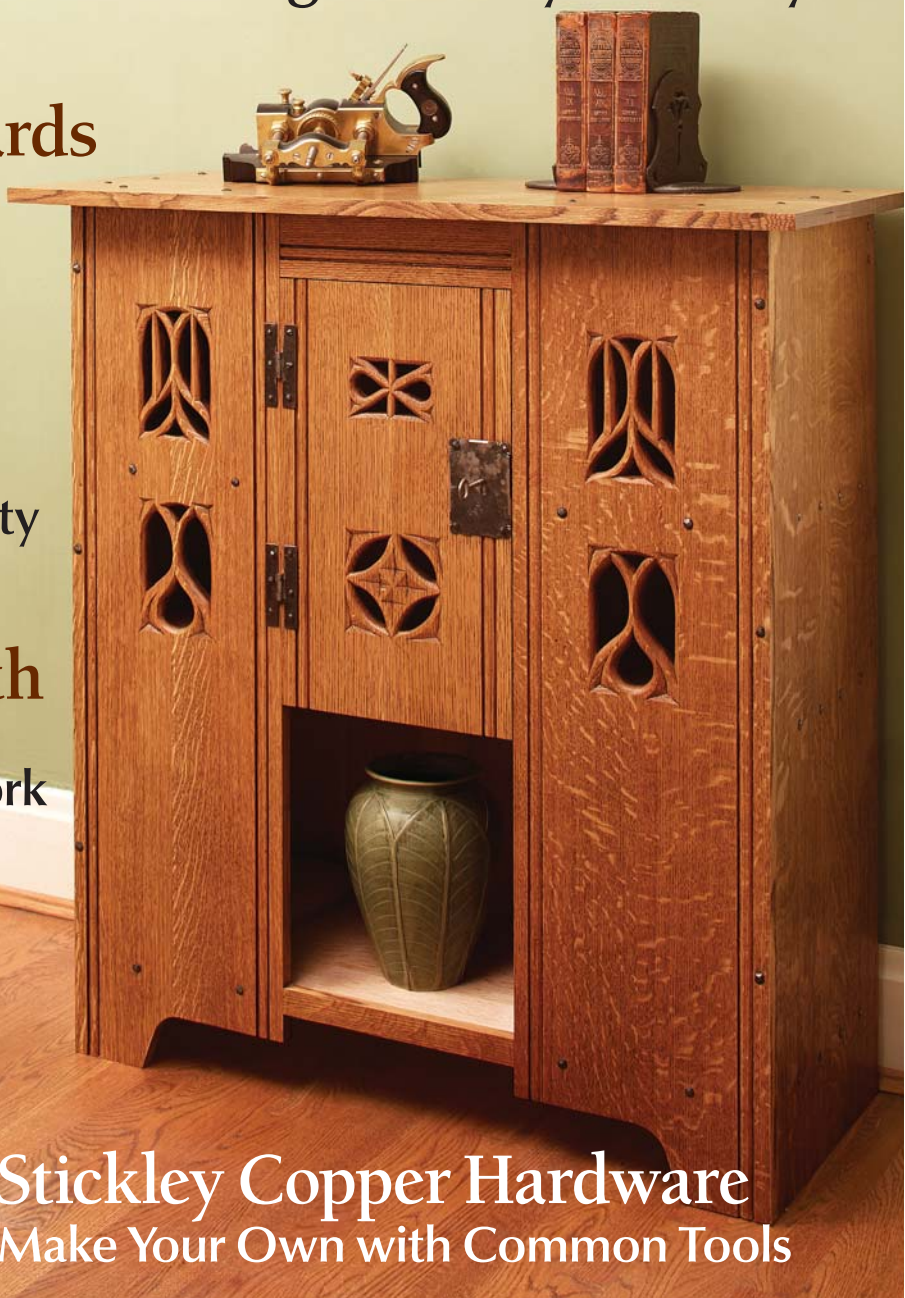
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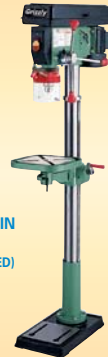
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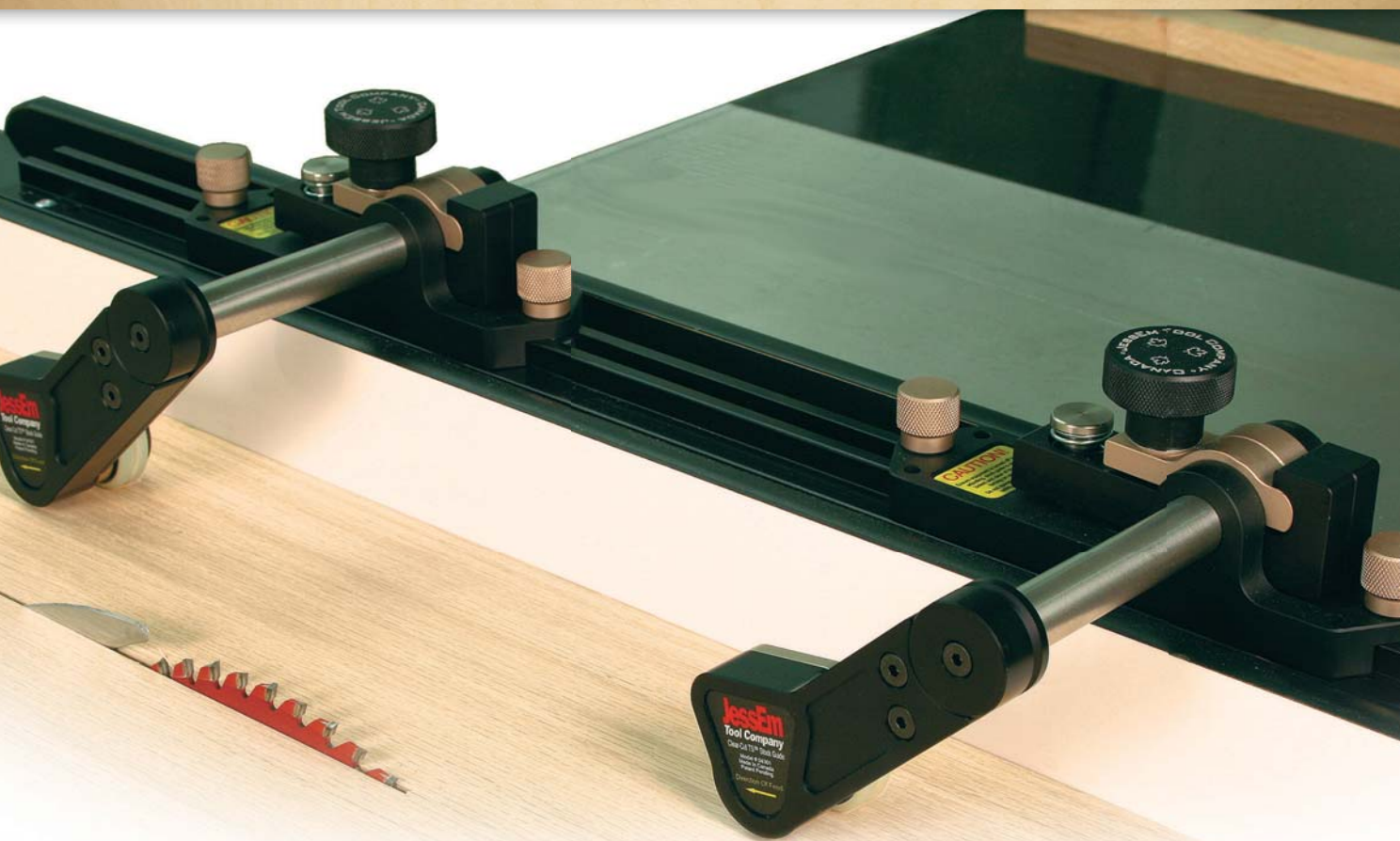
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Personal Predilections

I'm going to come right out and admit it: I don't fancy every project we publish in this magazine. I admire the techniques, tools and know-how that goes into each, and I learn something useful or interesting (or both) from every article...but that doesn't mean I would like to have all of the project pieces in my house.

While I aspire to proficiency in carving a ball-and-claw foot (and have recently been working on my carving skills), I doubt I'll ever build a piece of furniture that includes one (unless it's something irreverent and hilarious, like Jake Cress' "Oops" chair—look him up online if you're not already familiar with his work).

I'm just not terribly fond of a lot of the late 17th- and 18th-century English and American stuff you often see in museums (and in this and other woodworking magazines). Yeah, Goddard and Townsend did some mind-blowing work...but I find it overly fussy and blocky, and most of the hardware is too ornate by half for my tastes (and it's typically brass; I prefer my metals in black and silver).

And don't get me started on the surfeit of gilding, boullework and marquetry on French furniture à la Louis XIV—it's technically astounding, but...shudder.

Federal furniture? The "good" stuff takes some serious facility with veneer and inlay—both are admirable and they are skills well worth having...for use on other styles. Paterae, bellflowers and lots of contrasting veneers? I am at best aestheticallywhelmed.

The (I think) complicated carving and nonsensical curves of most Victorian furniture? Dust-collection points of no practical purpose.

I'm a simple girl. My aesthetics tend toward pieces that are in effect stripped down to a form. Maybe it has something to do with my poor eyesight—with too much going on, I just don't know where to look. So I'm simultaneously impressed and visually stunned. But I am not covetous.

By all rights, then, I ought to like mid-century modern. I don't. The style takes the "plain" too far; the square pieces are too much so. Plus there's an overabundance of plywood, and olive, brown and orange upholstery. (Also, I've an almost visceral dislike of the

round tapered legs that are ubiquitous on everything from couches to tables to bookcases.)

I do, however, admire the aesthetics of Scandinavian modern—probably

because there's more solid wood employed and the gentle curves and angles add a subtle elegance.

The same is true of many Shaker and Arts & Crafts pieces—the form and function is the focus; simple mouldings at the top (and sometimes at the bottom) serve to quietly frame the work.

I hope it's obvious that I'm writing with a soupçon of hyperbole; there are plenty of examples within all styles that I do like quite a bit (except Louis XIV). And in those I profess to like, there are plenty of examples of ugly.

But my point (I do have one) is that all of these—like them or not—employ techniques that are worth knowing, no matter what you build now or aspire to make someday. In all things, we can learn from what we dislike (but have no need to put it in our houses.) **PWM**

"Furniture with feet worried him; it looked as though it might beat him to the door if he made a break for it."

—Martha Grimes (1931-) from *"The Way of All Fish"*

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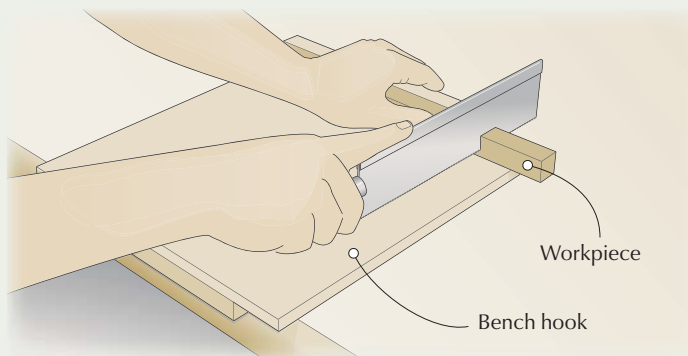
I purchased “The Workbench Design Book” (Popular Woodworking) and it was an excellent investment. In Chapter 2, Principle No. 9 (“All benches should be able to grip the wood so you can easily work on the faces, the ends and the edges”) is excellent, but troubling.

The single-most common hand-tool operation in my shop is cutting a board to length. I scribe it with a very sharp knife, then cut to the right of the line. Because I am right-handed, that puts the end being trimmed on my right. Therein lies the problem with almost every bench. The leg vise is on the left (for ease of planing), but for this operation that is the “wrong” end. Ditto with the wagon vise.

So how would you solve this problem?

Robert Williams
Killeen, Texas

Robert,
While it seems that the face vise is on the wrong end of the workbench, the traditional woodworker wouldn't consider that the case. The face vise is on the left area of

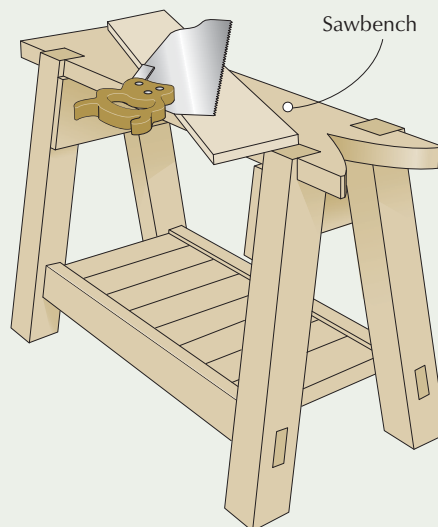


the bench (for right-handers) so that you are always planing into the vise screws. This makes it a lot less likely that the force of planing will pull your work free.

As to sawing, the face vise is positioned ideally for sawing tenons. You can stand comfortably in front of the bench and saw cheeks.

For crosscutting, a hand sawyer does one of two things: For small work, you use a bench hook on top of the workbench. For long or wide boards, you saw those on sawbenches, which are optimized for your height and handsaws.

Christopher Schwarz,
contributing editor



William & Mary Chest: Board Footage & Design

I'd like to try making the five-drawer William & Mary Chest on the cover of the April 2014 issue (#210).

Could you provide me with the total amount of wood in board feet used in making this chest?

Does this chest have dust boards between the drawers? And finally, would it look OK if I used bun feet in back instead of legs?

Tony Jungovich
Palm Bay, Florida

Tony,
I don't regularly figure out board footage (bf) for my projects because I do a fair amount of grain matching. When you do

that, the waste percentage can go from 20 percent or 30 percent to 150 percent or more. I tend to take my cutting list to the lumber pile and plot out the parts so I know I have enough, then add an extra board or two just in case.

That said, I would guess, depending on the type of wood and how you lay it out for figure, a good ballpark for primary wood would be 50 to 75 bf. Secondary wood will be at least that much again.

The chest I made did not have dust dividers, though many period examples do. You could certainly add them, but it will add dramatically to the weight of the piece, as well as to the amount and cost of secondary material.

The back posts could certainly be made

the same length as the front and bun feet put in their place. There are plenty of historical examples with four bun feet.

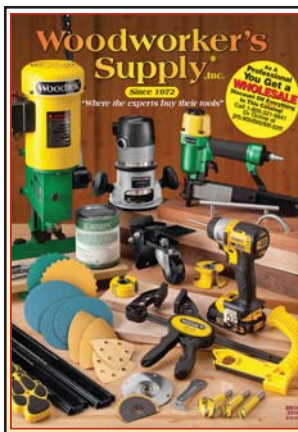
But one of the skills that I've found tends to scare budding furniture makers is turning. For that reason, I tried to keep the lathe work to a minimum by choosing to use bun feet only on the front of the chest.

Chuck Bender, contributor

Strong Joints for Windsors

Not to argue with an expert or a teacher of woodworking, but the wedge joint shown on page 39 of the November 2014 issue (#214) makes me wonder if, because the angle is really end grain and not really suitable for good gluing,

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a step or lap joint would be stronger by providing more glue area.

I realize the “wedge” joint expands in the hole...but?

Ed Huck

Franklinville, New Jersey

Ed,

Your question is understandable. Windsor construction is often 180° opposite to furniture making, and it often confuses those who set their hand to it. That is the case here.

In other chairs, the stretchers hold the legs together and are in tension.

The stretchers in a Windsor push the legs apart, and as a result, the joints are in compression. While I glue these angled tenons, it is really overkill because they cannot pull apart (barring the stretcher or a leg breaking).

Also, a lap joint would result in the tenon shoulder (where it meets the leg) being cut halfway through, weakening its resistance against shear.

Because people rest their feet on stretchers and children stand on them, shear is a real concern. The angled tenon is stronger in that it leaves the tenon at full thickness where it would be inclined to break.

Michael Dunbar, contributor

Best Durable Finish

What would be the best finish for a table in daily use? System Three Mirror Coat, catalyzed lacquer or another finish?

Charles Stuhre,
via e-mail

Charles,

For a table in daily use, you (as you know) want something durable and scratch-resistant. For that, Bob Flexner recommends (in his book “Flexner on

Finishing,” Popular Woodworking) either a two-part (catalyzed) finish or an oil-based polyurethane.

I have an oil-based poly on my dining room table, and it’s held up pretty well for nine years (other than a gouge from an ill-behaved child; nothing would have protected against that).

In my living room, I’ve a coffee table with two coats of pre-cat lacquer over shellac. It looks great, but I had a cat launch off the top, and that left some scratches.

Megan Fitzpatrick, editor

Woodworking Inspiration

I have always watched the woodworking shows on PBS, but never had anyone to teach me the trade. After following Popular Woodworking and reading through the “I Can Do That” manual, I was inspired to transition to woodworking as my main hobby.

I have loved every second of it, and built all kinds of fun projects for the family. I started with planter boxes, and worked my way up to a 6’ bar!

I ended up reading “Handplane Essentials” (Popular Woodworking) and purchased my first smoothing and block plane. I was hooked!

There is nothing like the joy of working with properly honed hand tools, and crafting furniture from a pile of wood. **PWM**

Josh Shaffer
Cleveland, Ohio

ONLINE EXTRAS

Letters & Comments

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Cutlist Correction

The cutlist for the “Contemporary Cabinet” in the November 2014 issue (#214) incorrectly denotes the width of the bottom at 9³/₈”; it should be 10¹/₈”.

Megan Fitzpatrick, editor



Highly Recommended

I know you know that to keep your tools clean and rust-free, you should wipe them down with oil after every use (I like jojoba). So like me, you probably have an oil-impregnated rag (a “woobie”) hanging somewhere near your workbench.

But not just any old T-shirt will do; what you really want is a “Super Woobie” – a microfiber cloth. Use one of these for a few weeks and you’ll find it holds oil like nothing else. When it starts to stink, simply throw it in the washing machine, then recharge. — Megan Fitzpatrick

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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.

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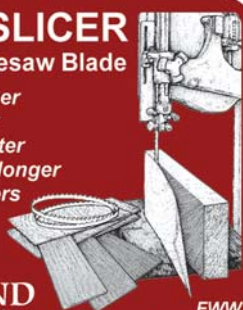


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THE WINNER:

Cut Flat Dados On a Round Surface

I needed to cut stopped grooves on a round surface – and while I could have cut them on the stock while it was square, then proceed to turn it on the lathe, I didn't want to worry about catching my turning gouge on a groove and causing tearing out (or worse).

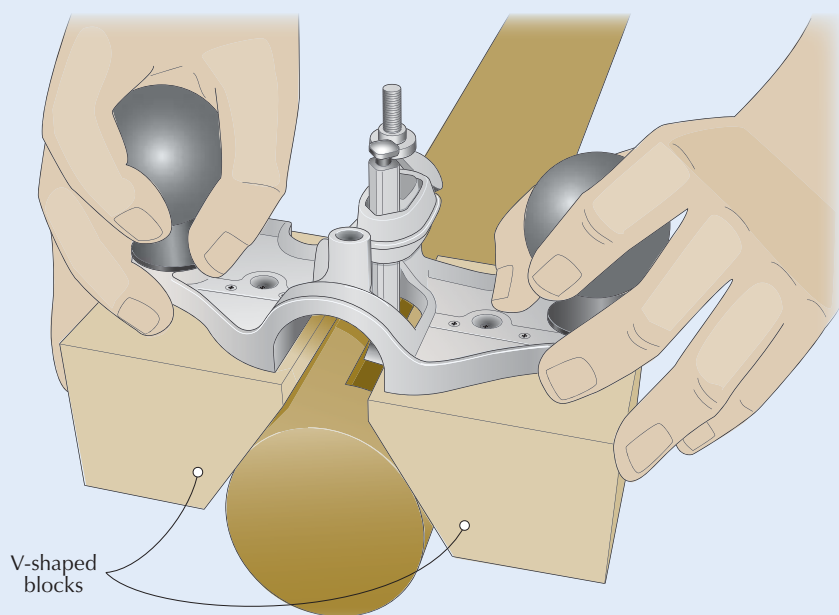
So, after considering (then rejecting) some kind of router jig, I figured out a way to use my router plane. I

often use “joiners saddles” (V-shaped blocks) to hold round work at the bench. So, I cut one of my saddles in half at the apex of the “V,” then screwed each piece to my router plane on either side of the blade.

A little trial and error got me to the correct angles for the fences for my particular workpiece.

Derek Olson

La Crosse, Wisconsin



Beeswax Helps Keep Bit Flutes from Clogging

While building a six-board chest, I was drilling pilot holes for cut nails using an eggbeater and a very small diameter twist bit.

With the slow-speed eggbeater, the flutes of the bit always load up with wood dust and are a pain to clean, especially if the bit is hot.

At first I resorted to a dental pick to clean the flutes.

Then I decided to try beeswax, and I found that wiping the warm, loaded drill bit with a piece of beeswax would free the wood in the flutes. The warm bit melts the wax, which is absorbed by the detritus in the flutes and it then easily falls out. Having the wax on the bit also helps to keep the dust flowing up the flutes on the next hole so it does not pack in so hard.

Jonathan Snyder

Anchorage, Alaska

Have a Hide Glue Repair? Daub it with Spittle

When small bits of inlay, marquetry or parquetry come loose, I reactivate the hide glue using some warm spittle. Simply daub the glue with spit until it gets a little tacky, then quickly press the piece back in place.

The reason it works so well is that:

1) The enzymes in our mouths do the first work of digestion in breaking down the foods we eat, including oils, fats and proteins (including those in hide glue).

2) The contact time is so short that the protein molecules do not become completely depolymerized.

Don Williams,

Monterey, Virginia

Trippy Glue Detection

Ultraviolet (UV) light is routinely used by conservators as an aid in the examination of objects because it causes the materials of the object to fluoresce differently.

Glue squeeze-out turns bright green or white, fresh shellac is neon orange, deteriorated natural resin varnishes are green, while waxes, oils and raw wood don't fluoresce at all. (Think trippy blacklight posters.)

This can be helpful for quickly finding previous repairs or to facilitate surface cleaning before finishing.

Once you can see what is glue, what is finish and what is wood, you can safely proceed with mechanical scraping without fear of tearing up the wood beneath.

There are high-powered conservation UV lights available for a few hundred dollars, but I have always used a blacklight bulb from a Halloween store (there are online sources, too).

With the shop's windows covered and the lights off, you can see well enough to get the job done.

For just \$10, you can't go wrong.

Joshua Klein

Sedgwick, Maine

360° Disc Protractor

A recent project required laying out many angles. After struggling with a small drafting protractor, I made this novel tool that has proved useful.

It occurred to me that with a 360mm measuring tape wrapped around a disc of the correct diameter, each millimeter mark would represent 1° of an arc. The

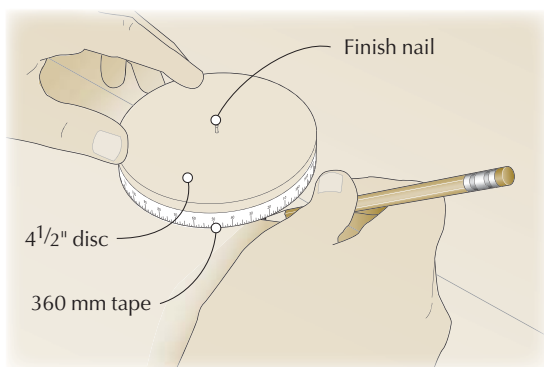
diameter of the disc would have to be equal to $360\text{mm}/\pi$: 114.6mm, or 4.51".

I cut a piece of $3/4"$ poplar and turned it on the lathe to the required size of $4\frac{1}{2}"$ diameter, drilled a $1/16"$ hole at the center, then applied a Kreg 3.5-meter, self-adhesive measuring tape (KMS7729) around the periphery. Each millimeter mark on the tape represents exactly 1°.

To use the protractor, tap a finishing nail into the workpiece at the point on a line from which you want to lay out an angular line, and put the hole in the protractor over the nail. Align the 0° point with the line, and mark the angle at the desired point.

Bill Wells

Olympia, Washington



Your Widest Chisel Might Be a Handplane Blade

In "The Essential Woodworker" (Lost Art Press) the author Robert Wearing describes how to make a first-class saw cut, directing the sawyer to "chisel a shallow groove" to act as a guide for the saw blade. He calls for a wide chisel to accomplish this task (for the sake of efficiency and accuracy) but my widest chisel just didn't seem up to the task on my last project.

Being a minimalist when it comes

to shop tools, I decided to employ my widest plane iron, a 2"-wide smoothing plane blade. One light tap to deepen the knife line, followed by light paring cuts to define the groove, does the trick.

The blade is perfectly suited to this task, and seems none the worse for wear after completing a few dozen tenon shoulders. I have broadened my chisel arsenal without spending a dime.

Phil Gaudio

West Simsbury, Connecticut

Frank Klausz's Router Table

During a recent video shoot for Frank Klausz's "Joinery Master Class" in his New Jersey shop, Frank showed me a clever feature of his shop-made mobile router table.

The router table is purpose-built at the same height as the outfeed table on his table saw. Frank has two dowels on the back of the router table that align with two holes on the outfeed table.

When they're mated, the weight of

the outfeed table is enough to prevent the non-locking wheels on the router table's base from moving around. And should Frank remove the router table fence to use the starting pin, the outfeed table provides plenty of additional work surface.

It's a clever setup that could easily be adapted for a number of mobile machines. **PWM**

David Thiel,

online product developer

Multiple Gauges? No Need

When I use a marking gauge to establish a line for joinery – the width of a rabbet, for example – I also strike a line on a scrap piece of wood and label it to leave a record of that gauge setting. I can then go back to that line on the scrap and reset the gauge to mark for an identical rabbet.

For a typical project, I'll have a half-dozen labeled lines on the scrap for various joinery features. This seems less confusing (and much cheaper) than keeping settings on multiple gauges.

Robert White

Sandia Park, New Mexico

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Veritas Bevel-down Bench Planes

Blade carrier helps to preserve cap-iron settings with ease.

When Veritas redesigned its bevel-down bench planes, the Canadian company started from scratch. Released in the fall of 2014, these tools share almost no DNA with the company's previous generation.

And, in the Veritas tradition, the company's engineers also chucked tradition when designing these planes. As a result, there are a lot of new things to talk about here. Let's start with the geometry.

For the first time in the history of the craft, you can buy these bench planes with a frog milled at every working angle between 40° and 65° in half-degree increments. There are three standard-size frogs (40°, 45° and 55°, but oddly, no 50°). Ordering a custom angle adds \$10 and a little time to the process.

So expert plane users can get exactly what they want. Beginners will probably stick with a 45° frog, though I would recommend spending the extra \$10 and get a 50° frog for your smoothing plane if you like curly wood.

You can also customize the knob and tote that come with your plane. There are two kinds of totes (standard and traditional) that are each available in three sizes (small, medium and large). I ordered a traditional tote in medium based on the company's recommendations. After trying other handles during a woodworking show, I prefer the small



New technology. The "blade carrier" allows you to use the plane with or without a cap iron, and makes setting the cap iron a snap.



traditional tote. So you might consider stepping down a size when you order.

The front knob is available in three shapes—standard, mushroom and tall—that reflect the three common types on many metallic bench planes.

And if that's not enough, you can also decide if you want O1 tool steel or the proprietary PM-V11 (spring for the PM-V11; it's nice). And, of course, you get to decide what length the sole is, from a No. 4 (9½") up to a No. 7 (22").

I purchased a No. 4 from the company, and I've spent about a month with it. There are some things I like and others that are odd. Let's get the odd out of the way. The rear tote is farther back on these tools than on a traditional Bailey-style plane—it was a full 1" back compared to my Stanley No. 4. So my index finger has to stretch to reach the blade on the Veritas. That feels weird, but I'll get used to it.

Second oddity: The traditional tote is more shapely than previous Veritas totes, but it could go further. The flats on the tote don't need to be there. I will remedy that myself with a rasp.

Those complaints aside, the heart of the plane—the frog, blade, cap iron and mouth—are quite incredible, both well-made and well thought-out. You can use the plane with or without a cap iron; that's because Veritas rede-

signed the way the cap iron and iron are fastened together with what it calls a "blade carrier."

The other amazing thing about the blade carrier is it allows you to preserve a particular cap-iron setting while sharpening. So if you use a closely set cap iron, the tool's blade carrier will allow you to drop it into that same favored position with incredible ease.

(One nit to pick: The plane's instructions are a little backward in my opinion when it comes to setting the cap iron. See my online video for details.)

If you are waging a personal war on tear-out, you'll also appreciate the way the mouth is opened and closed—it's just like on the company's bevel-up planes and block planes. The design allows you to quickly adjust the mouth with a twist of the front knob.

Price-wise, these planes are a bargain for what you get, from \$269 for a basic No. 4 to \$389 for a custom No. 7. They are Canadian-made and backed by Veritas's excellent customer service. My small complaints aside, these planes are winners, both for beginners and demanding users.

—Christopher Schwarz

CONTINUED ON PAGE 16

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■ VIDEO See how Christopher Schwarz prefers to adjust the cap iron on this plane.

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Tormek T-4 Water-cooled Sharpening System

I'm not usually a wet grinder kind of woman, because a dry grinder does the same work faster, then I move to waterstones to polish and hone.

I might be a convert, however, when it comes to tools that are difficult to grind on a dry grinder, including carving gouges and turning tools (and my kitchen knives). That's where the Swedish-made Tormek system excels.

Precisely because it works slowly and the grind is automatically water-cooled, you simply cannot overheat an edge and ruin it. Plus, it works on my Japanese chisels (laminated edge

tools don't fare well on a dry grinder).

The grinding wheel is #220 grit for coarse work, but if you hold the fine side of the included SP-650 stone grader to it for a few moments a fine grit (about #1,000) is deposited on the wheel; then sharpen at the same setting as the grind. (Hold the coarse side to the stone to re-grade it to #220.) Polishing is at the leather honing wheel, for which 3-micron paste is included.

But note the gap in grits. Moving from #1,000 to 3 microns means there will still be some deeper scratches in the steel, which translates to a less durable edge. So for straight tools, I'd move from the wheel to a #4,000-grit stone before polishing.

But if you have a lot of woodworking tools with curved edges, and also need to sharpen knives, axes and other odd-shaped tools—or you're simply not comfortable with high-speed grinding—the Tormek is a solid choice.



The T-4 is, according to the maker, 300 percent more stable and precise than its predecessor, the T-3 (and on par with the professional T-7 model). Also of note: it comes without sharpening jigs and attachments—so you buy only those you need.

—Megan Fitzpatrick

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■ **BLOG** For all things sharpening, visit Ron Hock's blog at hocktools.wordpress.com

Prices correct at time of publication.

Shellac Tiger Flakes from Tools for Working Wood

Because shellac is my favorite finish, I have tried nearly every brand of flakes on the market. By far, my favorite brand is the premium dewaxed flakes—Tiger Flakes—sold by Tools for Working Wood in Brooklyn, N.Y.

Because there are no lac bugs in Brooklyn, this stuff is obviously sourced from a third party. But what makes it special is the care and attention lavished on the flakes in transit to you. Tiger Flakes are primo—they have fewer bug parts than any other brand I've tried (and I've filtered out a lot of legs and other buggy bits in my day).



And they are fresh. Tools for Working Wood ships them in heavy, double-sealed plastic with a desiccant pack. The result is that the flakes dissolve quickly in alcohol. I typically mix up shellac in Mason jars—and flakes that I mix in the evening are ready to go the next morning.

Side note: Many shellac snobs get haired over about methanol vs. ethanol when mixing the shellac. With the Tiger Flakes, I can use any old denatured alcohol off the shelf at the home center

and it works beautifully.

Because the shellac is fresh, it dries hard, fast and clear. Tiger Flakes have won over many of my students who had tried shellac once and didn't like it because it was gummy and didn't dry well.

Tiger Flakes come in the colors super blond, blond, amber and garnet—each color deeper in orange than the last. Yes, it's expensive (\$32 to \$42 for a half-pound), but it will never let you down. **PWM**

—CS

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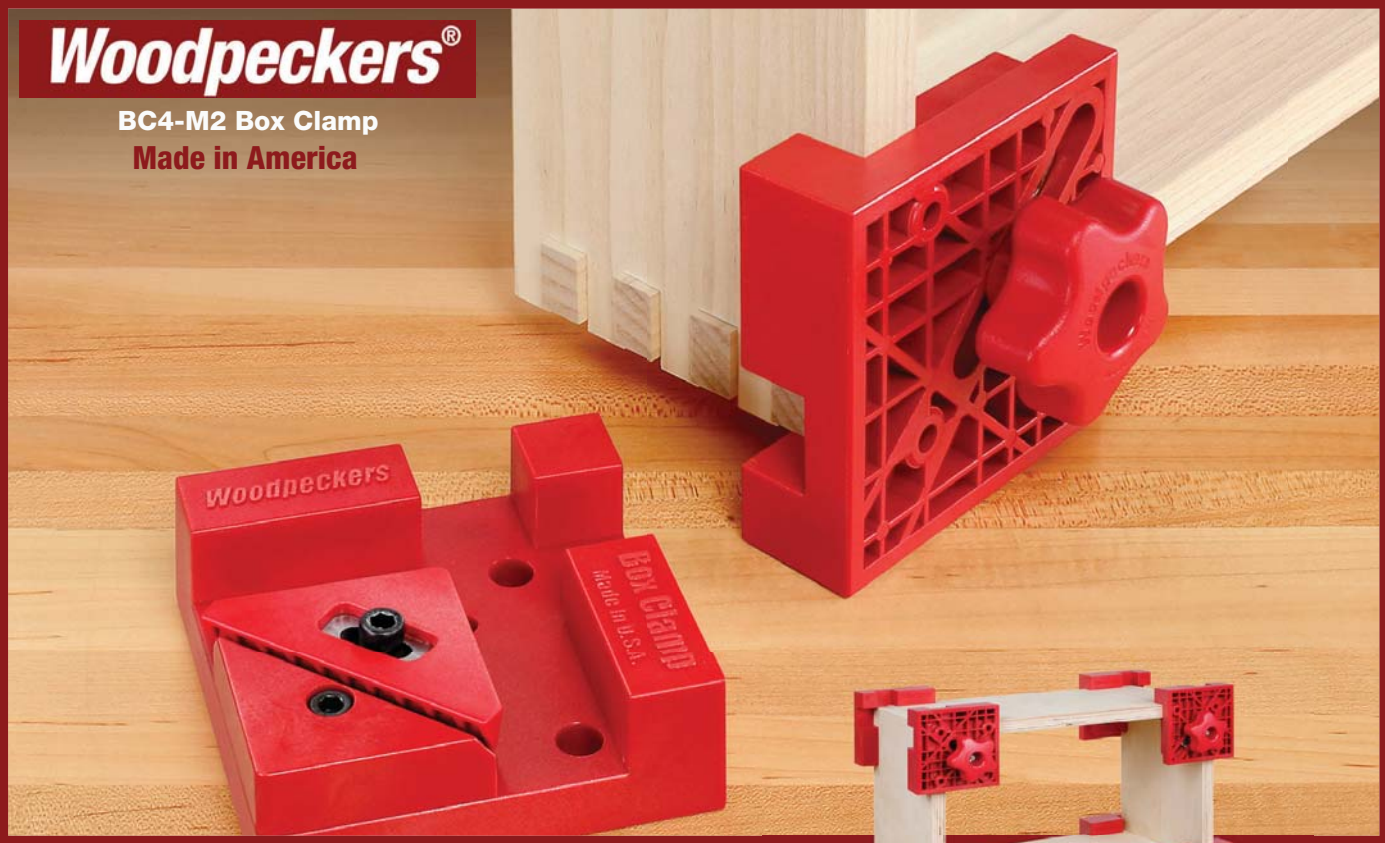
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Depth Adds Life to Design

Use moulding, carving and other details to add visual layers.

Have you ever gazed at a great painting and, for a brief moment, found yourself pulled into it? Almost like magic, a few well-crafted brush strokes can trigger memories like the haunting cries of a seagull or the briny smell of salt air.

It flips a switch in our imagination that allows us to experience the image as though looking through a window or imagining ourselves actually inside the scene. “Qualia” is a term to describe this, or simply “raw feel.” That raw feel in a painting might be the sum of many parts, but almost always there is a sense of depth.

Both furniture and paintings share some things in common when it comes to design. They both employ simple shapes arranged in a composition and they both rely on a sense of depth to engage the eye.

We use proportions to bring those shapes in relation to one another and to the viewer. Yet the one thing that brings a sense of life to a design is depth.

As humans, we key into depth with all of our senses, but especially with our sight. Our ancestors scanned the contours of distant hills searching for that green valley where they found food



Go bold. Mouldings do much more than hide joinery; they add a bold sense of depth to a design.

and shelter. They listened to the far-off howl of wolves and judged by the depth of sound whether their flocks were in danger. We are wired to understand our surroundings through our perception of depth, so it's no surprise it plays a role in design.

Depth & Our Sense of Space

A painter creates this visual magic in a flat canvas by using color values (lights and darks) to give a sense of layers.

Bright, deep colors pull objects in the foreground forward. The colors in the middle ground fade gradually, while objects in the distance are muted further, sometimes

fading into a distant horizon.

An artist can use layers of light to craft an image many miles deep in a flat canvas. In a similar way, layers of light and shadow can bestow a cabinet with a presence that's noticeably more engaging than if it were a just a plain wooden box.

Without thinking, we automatically search for visual markers to give us a sense of depth. Our eyes are tuned to pick up any breaks or disturbances in a monotonous surface. We enter a room and immediately size up the space and its depth by locating the floor in relation to the ceiling. That's one of the reasons a wall with a pronounced baseboard and crown moulding makes a strong visual statement. Taken the other way, a room with bare and similar colored walls, floor and ceiling can be downright disturbing. It offers no visual keys to comprehend the space.

Tricks to Add Depth

Regardless of your taste in furniture, it can help to take a closer look at how



Miles to go. The horizon line on this scene is miles away. Lights and darks achieve this effect on a flat canvas.

CONTINUED ON PAGE 20

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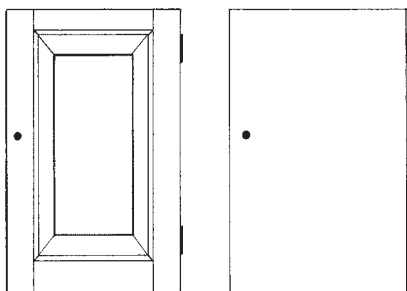
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More than the sum. A traditional raised-panel door is more than just a strong, lightweight solution. The shadow lines create a sense of depth not found in a flat panel.

traditional artisans tackled the problem of depth.

Many of the elements of the traditional lexicon helped create layers in a design. Mouldings, carvings, decorative inlay and figured woods were employed skillfully to create patterns of light and shadow. Mouldings and carvings especially were used to reflect light in a way that accentuated depth.

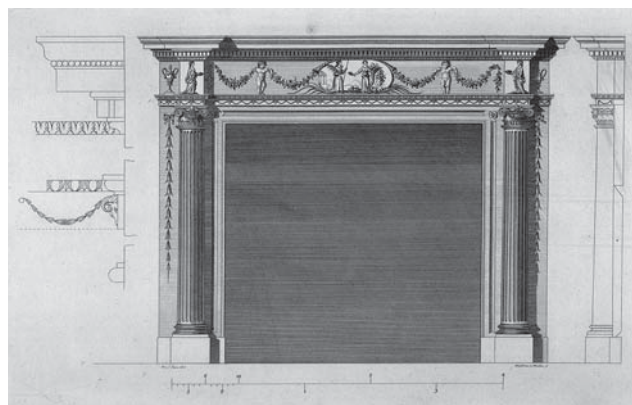
In fact, the most amazing thing about well-executed carving and crisp mouldings is how deep they can appear in a relatively shallow surface.

A series of mouldings forming a border creates a band of strong reflection and shadow to give a captivating sense of depth. Even a shadow line formed by a small bead or fillet can give a bland surface a pop. A curve worked into the vertical profile of a design imparts a fluid sense of motion or strength, but a curve incorporated horizontally across the front of a façade breaks up the reflection of light on a flat surface and creates a sense of depth.

Modern design often avoids many such traditional elements as mouldings or carving. Yet there still are methods to achieve depth aside from these.

Breaking up a flat surface by bringing elements forward creates a sense of depth. Note that it doesn't require much of a recess or a projection. Often a section of a cabinet pulled an inch forward is enough to add some visual depth.

Adding curvature is a sure way to create depth by altering the reflective qualities of a surface. A turned leg will



Thinking deep. A fireplace is just a hole in the wall. Yet, with the addition of mouldings to create depth, it becomes a focal point in a room.

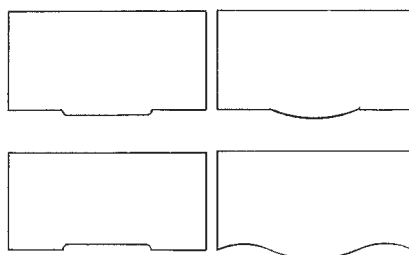
always look deeper than a flat leg, even if the design uses the same profile. Introducing a panel with texture will break up a surface much like ripples disturb the surface of water.

Application

At the drawing board, much of the initial work involves roughing in a basic form. Once the form is established, the design is brought to life by looking for ways to add layers.

Mouldings are one way to accomplish this, and mouldings tell us something else about depth. Mouldings usually highlight where one part transitions into another.

Those transitions or borders are often opportunities to add depth. Can the drawer faces be pulled forward or recessed? Can we break up a flat surface and introduce a curved surface? Can we add a textured panel in a door frame to help it leap forward from the surrounding surface? (Always keep in mind that it's possible to go too far, creating something too busy or jumbled.)



Break it up. These top views of a cabinet show some simple ways to change up a façade to create depth.

Conclusion

Gaining an understanding of the role that depth plays in a design can open up new avenues to explore. Take note of the mouldings and carvings on traditional work to train your eye and tune in to how period craftsmen achieved depth. Revisit your earlier work and ask yourself honestly if it might be more inviting if some of these lessons were applied.

One parting thought: All these options to add layers do not make a design easier to execute. In fact, they often make a build much more challenging. But hey, if we want easy furniture, there's plenty of that at the big-box store. **PWM**

George is the author of two design DVDs (Lie-Nielsen Toolworks), co-author (with Jim Tolpin) of "By Hand and Eye" (Lost Art Press) and writer of the Design Matters blog.

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Simplicity Itself

Free up your hands with this useful Chinese wood carrier.

My wife, Maureen, came through the work area and asked, “What are you making?” When I told her, she said, “No, really, what are you making?”

“A Chinese wood carrier. Really.”

It’s for carrying any kind of wood, though; it doesn’t have to be Chinese. I had a demo to pack for; the project was spoon carving. The last time I had to trundle around with many spoon blanks, I had sore arms and dropped pieces repeatedly. Then I remembered these carriers Daniel O’Hagan had shown me back in 1986. His note says “...as to the wood rack, it is simplicity itself.”

Daniel was a woodworker in eastern Pennsylvania who was a great inspiration when I was new to woodworking. (If it weren’t for him, I might still have a table saw!) He saw this lightweight wooden frame in a book called “China at Work,” by Rudolf Hummel (MIT Press, reprint, 1969). The text says laborers used two of these hanging from a pole across their shoulders to bring fuel to porcelain kilns. Daniel used his to bring stove wood into the house.

It’s a green woodworking project in that the stock is riven from a log, and much of the work can be done with a drawknife. My favorite woods for this sort of project are hickory or white oak, sometimes in combination.

Split & Shave

For the carrier shown here, I used two long, thin sections of hickory for the uprights; the frame and handle are oak. The bottom frame uses mortise-and-tenon joinery. I have made carriers with both round tenons in bored holes, and with rectangular tenons in mortises chopped with a chisel.

I split and shave the uprights; they



Elegant ease. A Chinese wood carrier is easy to make and perfectly suited to its task. What more could you ask for?

don’t need to be completely straight, but they do need to be split from straight-grained clear stock – no knots, twists or other flaws. I shave them between $\frac{3}{8}$ " and $\frac{1}{2}$ " thick, and they are about 36" long.

Long, whippy stock like this is best shaved with an extension on your shaving horse to support it. I make the uprights square-sectioned first, then shave the corners off to make an octagonal cross-section. You can leave it as an octagonal shape, or take a few



Space out. After limbering the wood for bending (either boiled water or a steambox will do), I tie the ends together and put a spacer in the middle, then let the parts dry.

CONTINUED ON PAGE 24

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shavings with a spokeshave to easily bring it to a cylindrical shape.

I give them a bit of a bow, or bend, by binding the ends with a spacer block between them. Either boiling water ladled over them or a stint in a steambox limbers them up for bending. Let them dry for a week or two—more if the wood was totally green. (Daniel's had more bow to them than mine.)

Bottom Frame

While the uprights are drying, you can make the bottom frame. I use leftover bits of oak from joinery work, so it's often about $\frac{3}{4}$ " thick; the finished frame is $8\frac{1}{2}$ " x $10\frac{1}{2}$ " or so.

You can shave or plane these; it really doesn't matter. When I was principally a chairmaker, I shaved the parts and used round mortises bored with a brace and bit. Now my work is more inclined toward benchwork and planes; so these days, I tend to plane the stock and use drawbored mortises and tenons to make a frame like this.

The tenoned rails are set in from the ends of the mortised stiles, but there is no real reason why you couldn't bring them out to the ends.



Hole-y. Bore a through-hole centered on the length of the stile; use a bevel gauge to help maintain your chosen angle.

Attach the Uprights

Once the frame is done, bore the holes for the uprights. The holes are centered in the stiles' length.

I eyeball the placement from the outside edge. You can set an adjustable bevel to help sight the angle and experiment with different angles. A more extreme angle kicks your uprights out farther; a steeper angle gives you less space between uprights. Bore all the way through the stiles.

I then bore a hole with the same bit through a piece of scrap to use as a guide when shaving the ends of the uprights. This is spokeshave work. Make it tight enough so the test-hole is squeaky when applied to the uprights.

The handle is another piece of oak, shaved about $\frac{7}{8}$ " thick x $1\frac{1}{2}$ " wide x $7\frac{1}{2}$ " long. I heavily chamfer the undersides of the handle, and just break the corners of the top surface.

I fit the bottom ends of the uprights into the frame and hold the handle in place behind the uprights, then gently pull the top ends together to figure out the angle and placement of the holes in the handle. I scribe on the edge of the handle where I want the holes to go, then take it down and bore these.

Leave the uprights long above the handle and trim them flush at the bottom of the frame. I split the uprights with a chisel, then drive a wedge into them, across the grain of the handle and frame. Add glue if you want.



Test hole. A scrap of wood with the same size hole as the base helps me to shave to the right size the four ends of the uprights for a tight fit.



Almost there. Fit the uprights to the base and handle. All that remains is to cut the uprights to length, then split and wedge them in place.

Stack some split wood in the carrier, hook your elbow under the handle, and you have one hand free for an umbrella, and another to open the door. Simplicity itself. **PWM**

Peter has been involved in traditional craft since 1980. Read more from him on spoon carving, period tools and more at pfollansbee.wordpress.com.

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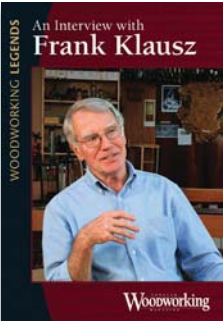
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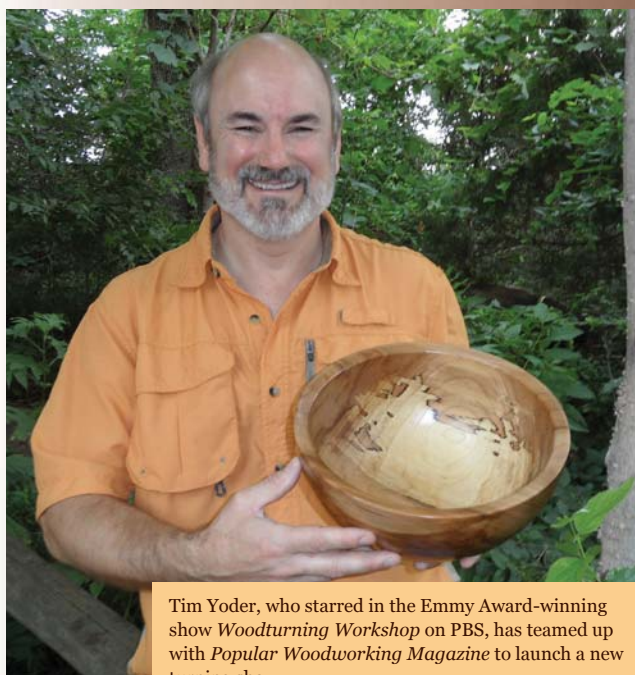
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American Gothic

BY CHRISTOPHER SCHWARZ

This early form – an aumbry – spawned many different types of furniture.

It is easy to forget that many of our favorite pieces of furniture are recent innovations. Forms such as coffee tables, bookcases and desks are – archaeologically speaking – new objects brought on by incredible modern wealth.

When you cast your eye back on the furniture record, the forms become simpler, fewer in number and (in some cases) quite unfamiliar. One of my favorite types of early furniture is the “aum-

bry” – sometimes called a dole or livery cupboard. It is the honored ancestor of the bookcase, hutch, cupboard, armoire and common kitchen cabinet.

Today the word “aumbry” is used to refer only to a liturgical piece of furniture or place in a church that holds the sacrament. But the word, and the piece of furniture, were both common and secular in the 1400s and 1500s. This enclosed cabinet held things that were precious – food, books, china and

anything else that had to be locked up.

One of the defining features of aumbries is that the front of the cabinet is pierced by Gothic tracery. These piercings are not just decorative. They allow air to circulate inside the carcass, like a modern pie safe. To stop insects from getting inside the cabinet, the piercings were covered with cloth fastened to the inside of the case.

Aside from the pierced tracery, these cabinets are straightforward to build



First wall. Clamp a batten on your layout line and saw the first wall of the dado. Press the sawplate against the batten to create a vertical cut.



Don't measure. Use the mating shelf to strike the second wall of the dado. Use a pencil or knife to mark this wall.

using simple tools and construction methods. Most aumbries are knocked together using basic joints—rabbets, dados and nails made from wood or iron.

This particular aumbry is based on a circa-1490 piece that was part of the Clive Sherwood collection sold at a Sotheby's auction in 2002. To make the piece more approachable, I simplified some of the tracery and removed some of the chip carving and knifework that festoons the front of the original. Despite these simplifications, this aumbry would look at home in any Medieval English or French homestead.

Start with the Oak

Most aumbries were made of oak. And because wide English oak is nearly impossible to get, I chose quartersawn American white oak for this aumbry. The original was made with planks that were 12" to 14" wide—a tall order these days. So I glued up the sides, top, stiles, shelves and door from two narrow pieces, taking care to match grain and color.

Because I built this aumbry almost entirely by hand, I took care to also make sure the grain direction in the panels was consistent. This detail makes life a lot easier for those who prepare wood for finishing with a handplane.

The case itself is as simple as it gets. The shelves are nailed into dados in the sides. The face frame, backboards and top are nailed to the carcass. The only complex bits are the mortise-and-tenon joints that hold the face frame's rails and stiles together.

And then there are the Gothic piercings. These are simple to make with a drill bit, a chisel and a couple of rasps.

Don't be intimidated by them—they are easier than they look. To get started on your aumbry, glue up the panels for the entire case, then cut the two sides to their final size and get ready to cut the carcass joinery.

Handmade Dados

The 1/4"-deep dados in the sides that hold the shelves are simple to make with a handsaw, chisel and a router plane. Begin by laying out one wall of each dado on the side pieces. Then clamp a scrap right on the layout line and use it as a fence for your saw. Saw down 1/4" into the side to create the first wall of the dado. Do not remove the batten.

Place the mating shelf against the batten and use it to lay out the second wall of the dado. Reposition the scrap so it covers the pencil line, clamp it in place and saw the second wall of the dado on the waste side of the line.

Remove the majority of the waste with a chisel, then flatten the bottom of the dado with a router plane. Check the fit of the shelf. If the dado is too tight, rabbet the end of the shelf. If it's too loose, make some wedges to knock into the gap at assembly time.

Cut all the dados, fit all the shelves then prepare all these boards for finishing, inside and out. Assemble the case using hide glue and 6d rosehead cut nails. Cut nails were invented a few hundred years after the original aumbry was built, so they aren't authentic to the core. However, because blacksmith-made nails are expensive (about \$1.50 to \$2 apiece) and the roseheads look (fairly) authentic, I decided to use them.

A second option would be to fasten

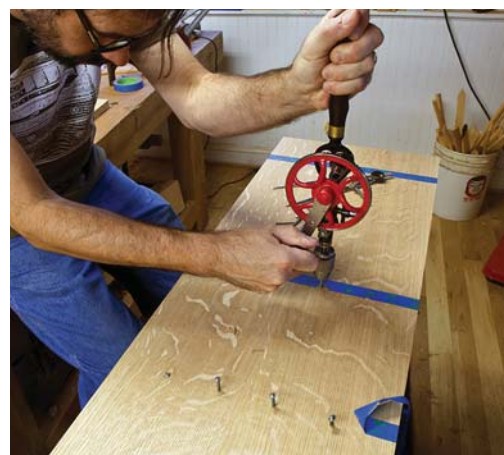


Second wall. Because of the set of the saw's teeth, clamp the batten so it covers your layout line for the second wall. This will ensure your dado isn't too loose.

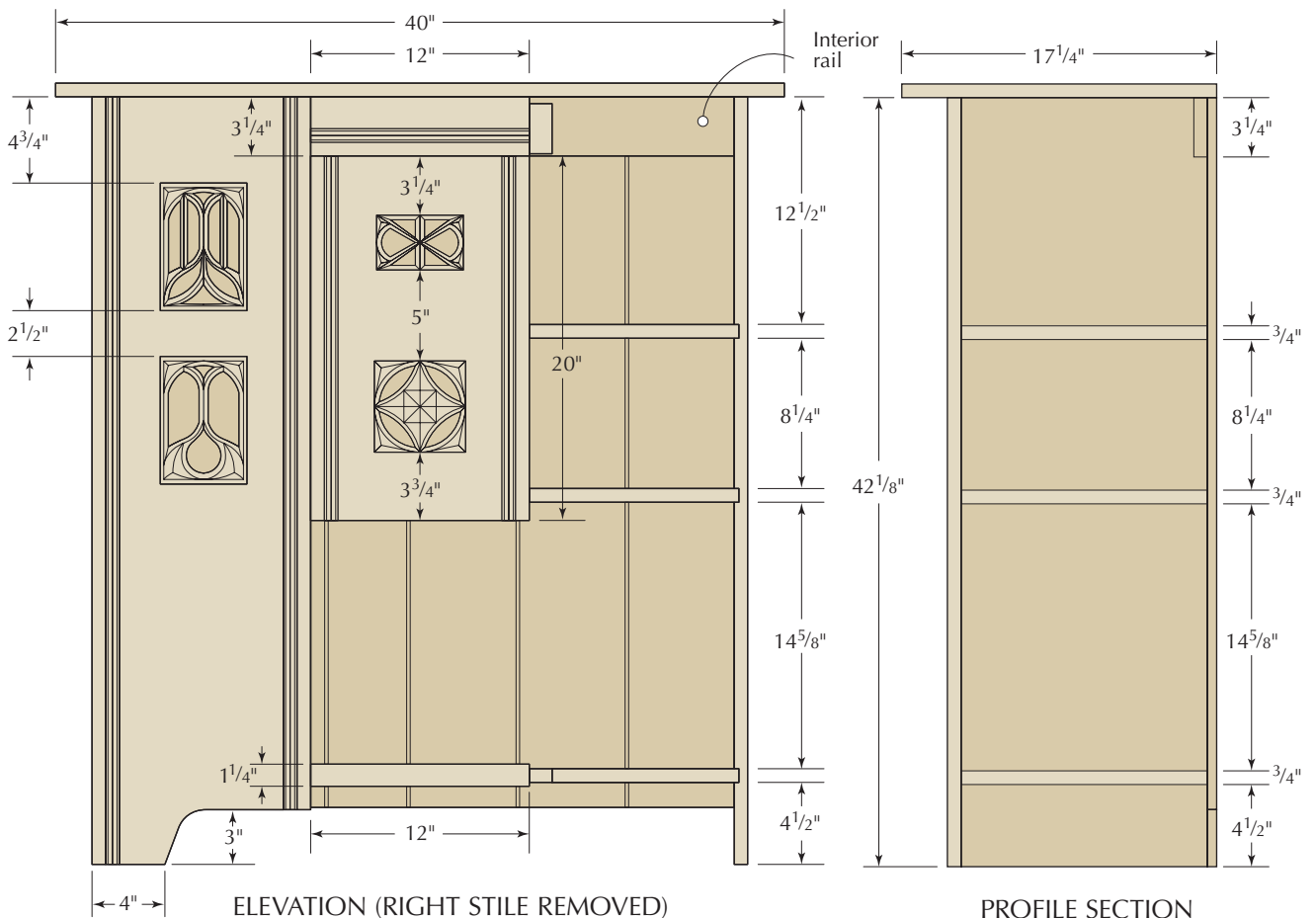
the sides to the shelves using glue and "trenails" or "trunnels," essentially tapered oaken nails.

A Rail for the Backboards

To make the carcass a bit sturdier, add an interior rail to the inside of the case. This rail, located at the back of the carcass, helps hold the backboards in



Square nails. Use wrought nails or rosehead cut nails to fasten the sides to the shelves. Use tape to remind yourself where the nails go—the tape is easier to remove than a pencil line.



place. To hold the interior rail in place, cut $\frac{1}{4}$ "-deep stopped grooves for its ends. Make these stopped grooves just like you did your dados: Saw the walls, chop the waste and clean the floor with a router plane.

Add the Back

The back of this piece is assembled using several narrow boards. On many originals, the backboards were merely butted against one another and nailed on, as shown in the drawings. This works, but you will have ugly gaps there when the boards shrink.

To avoid that, cut shiplap joints or tongue-and-groove joints on the long edges of the backboards. I used shiplaps.

When attaching the backboards with nails, first use clamps to pull the carcass square. Then nail the backboards to the shelves and interior rail using 4d rosehead nails. The nailed-on backboards will hold the carcass square, making it easier to fit the face frame and the door.



Chop & stop. The stopped groove for the interior rail is made the same way you made the dados for the shelves.



Knock & nail. Drive the interior rail in place. Then fasten it from the outside of the case with two 6d rosehead nails at each end.



Rack with the back. Here I'm pulling the case square with two clamps. I then nail the backboards in place. When I release the clamps, the carcass will remain square.

American Gothic Aumbry

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL	COMMENTS
		T	W	L		
1	Top	3/4	17 1/4	40	Oak	
2	Sides	3/4	14	42 1/8	Oak	
2	Stiles	3/4	12	42 1/8	Oak	
1	Door	3/4	12	20	Oak	
1	Top rail	3/4	3 1/4	14 1/2	Oak	1 1/4" TBE*
1	Bottom rail	3/4	1 1/4	14 1/2	Oak	1 1/4" TBE*
1	Interior rail	3/4	3 1/4	35	Oak	
3	Shelves	3/4	13 1/2	35	Oak	
1	Back	1/2	34 1/2	39	Oak	Shiplapped

*TBE = Tenon both ends

Build the Face Frame

The pieces that adorn the front of the aumbry are much like a modern face frame. The wide stiles join the narrow rails with mortise-and-tenon joints. I chopped the 1/4"-wide x 1 1/4"-deep mortises first, then sawed the tenons to match.

With the joints fit, you can cut the "crease moulding" that runs parallel to the long edges of the stiles and top rail. This is easy to make with simple tools. The crease moulding begins 3/4" from the long edge of the board and is 3/4" wide.

To begin, plow 1/8"-wide x 3/16"-deep grooves on either side of where the moulding is located. Then shape the material between the grooves with a rabbet plane and – if you have one – a small hollow plane, such as a No. 6.

The last bit of work on the face frame before the piercings is to saw out the



Pattern & piercings. Apply the pattern with spray adhesive and drill out the waste with a 1/2" Forstner bit.

feet. Cut them with a frame saw and clean up the cuts with rasps.

Gothic Tracery

The geometric pierced shapes in the stiles are easy to make, even if you've never carved before. You don't even need carving tools to do the job. Here are the tools I used:

- A 1/2" Forstner bit to poke holes in the waste.
- An electric jigsaw to remove most of the waste.
- A coarse cabinet rasp to shape the openings.
- 1/4" and 1/2" chisels to bevel the edges and make the triangular chip carvings.
- A fine rasp to clean up the details.

You can create patterns for the piercings using a compass and straightedge or you can download the full-size patterns for free from the *Popular Woodworking Magazine* web site (details at the end of the article). Apply the pattern directly to the work using spray



Saw out the windows. Use a jigsaw set with minimal orbit to remove waste as close to the line as possible. I used a standard jigsaw blade for this. I tried using a narrow blade intended for scrollwork, but it deflected too much.

adhesive, then bore out most of the waste with a drill.

After sawing out the waste, clean up the openings with a cabinet rasp. I used a 10" rasp with hand-stitched teeth that were fairly coarse – a 9 grain. The goal is to make the walls square and the lines fluid.

With the openings shaped, bevel their interior edges with a 1/2" chisel,

"To know and not to do is not to know."

— Wang Yangming (1472-1529),
Neo-Confucian philosopher



Simple moulding. After plowing two grooves in the stiles, shape the interior bit into a curve with a rabbet plane. Then finish up with a small hollow plane.



Rasping right. It's easier to rasp vertically if you hold the handle with one hand and the tip of the rasp with the other. Check your work with a square until you get a feel for the operation.

working bevel-down for the most part. The bevel should be only about $\frac{1}{4}$ " deep to create the three-dimensional effect. If you are using oak, you should sharpen the chisel frequently for the best results.

Then, clean up the cuts with a fine rasp, shaping the bars of the Gothic windows. I used a 7" modeler's rasp with 13-grain teeth. Follow up with sandpaper if you like.

Many of the corners of the tracery have triangular chip-carved details. These are easily made with bench chisels. Chop straight down on the three facets of the detail. Then pare out the waste toward the chops. Repeat these two operations until the detail is as deep as you want it—mine are $\frac{3}{16}$ " deep.

With the piercings complete, glue the face frame together and attach it to the front of the carcass with 6d wrought nails. Because the wide stiles will expand and contract significantly, I would not glue the stiles to the sides of the carcass. The wood movement might crack the carcass.

If you do want to use glue, apply it to the shelves near the door opening only.

The Door

Most aumbries have a single door. There is evidence that this aumbry had two, and the lower one is missing. I like the



Quick chips. The triangular depressions at the corners of the piercings are easy to make with a chisel and mallet.



Nail job. The pilot holes for the nails should be about two-thirds the length of the nail. That will give the nail the holding power it needs to keep the face frame on.

open space below, so I made only one door that enclosed the top two shelves.

The door is just a slab of oak with two geometric piercings. Make the crease mouldings and piercings using the same techniques as on the face frame stiles. I used a blacksmith-made lock and H-hinges, which were installed with wrought nails.

Installing hardware with nails is a bit stressful at first because there are no do-overs. Once you clinch the nails, prying them out can damage the door or stile. So you need your door to fit right the first time and clench the nails with confidence—loose nails are no good.

The finish is simply boiled linseed oil. Apply thin coats and allow each coat to dry thoroughly before adding another—about two hours is typical. After five or six coats, add a coat of beeswax and buff it out. That's one traditional finish for early pieces such as this.

If you want more protection, con-

SUPPLIES

Peter Ross

peterrossblacksmith.com

or 919-663-3309

■ Blacksmith-made hinges, locks and nails

Tremont Nail

tremontnail.com

or 800-835-0121

■ Rosehead and other cut nails

Horton Brasses

horton-brasses.com or 800-754-9127

1 ■ pair iron H-hinges, 4"

#HF-7

Call for prices.

sider adding a little varnish and mineral spirits to the oil to make a wipe-on oil/varnish blend. It's not traditional, but it will offer more protection and look the part.

And speaking of looking the part, if you want to go 100-percent authentic, cover the interior piercings with some undyed linen that is secured with iron tacks. **PWM**

Christopher is the editor at Lost Art Press and author of the book "Campaign Furniture."

ONLINE EXTRAS

For links to all online extras, go to:

■ popularwoodworking.com/feb15

WEB: Download full-size patterns of the Gothic tracery.

BLOG: Read more about aumbries.

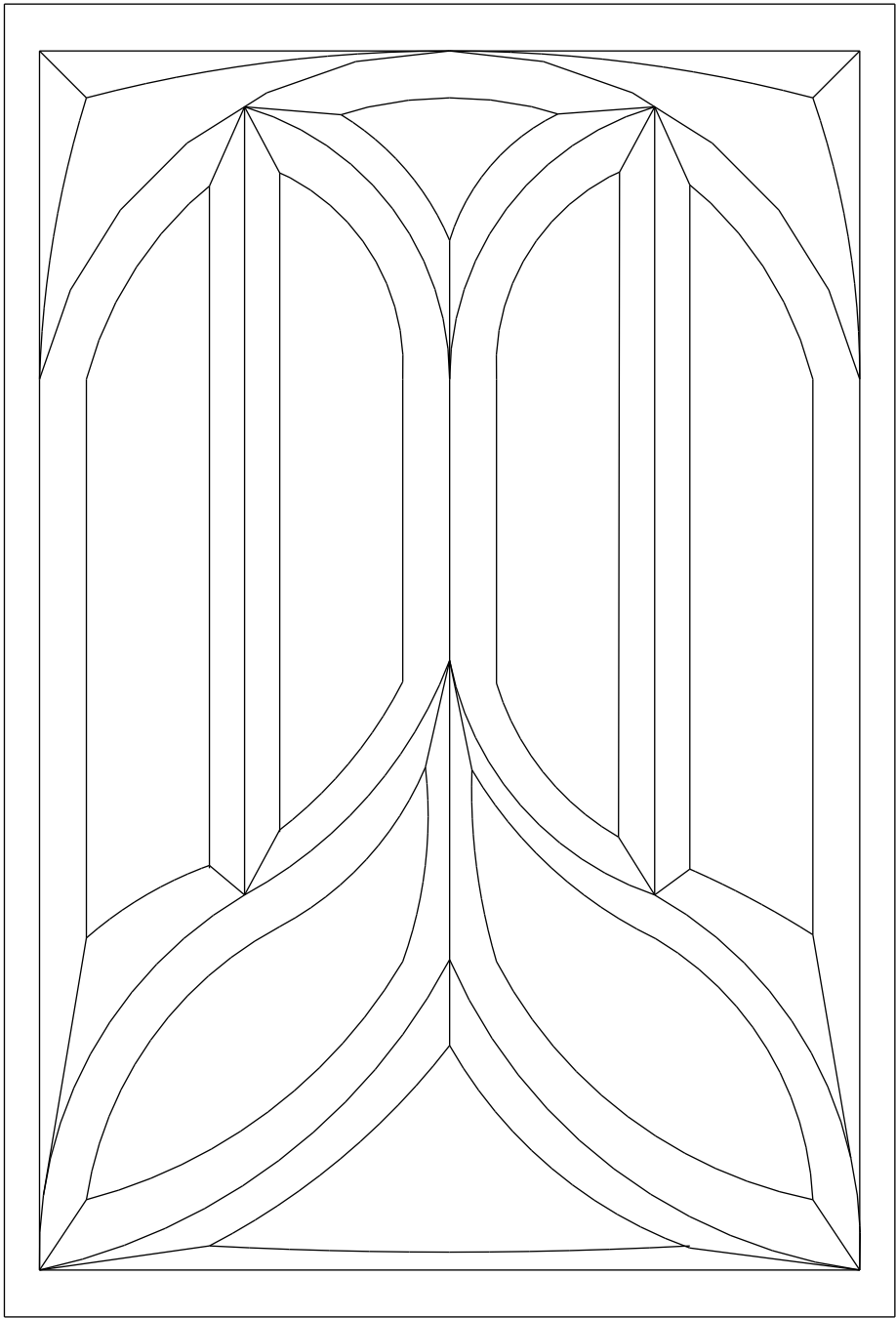
BLOG: Try making the tracery with a router.

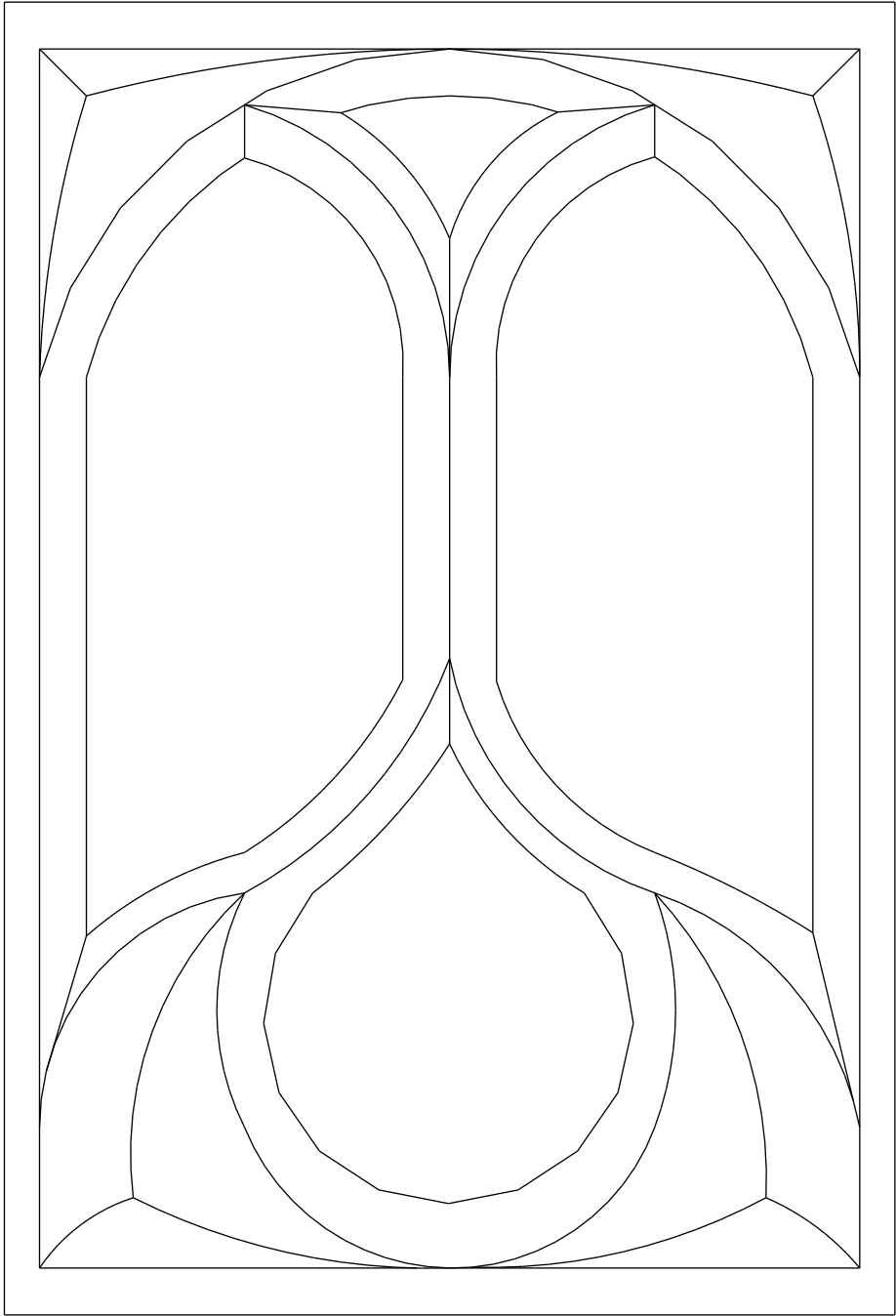
TO BUY: "Oak Furniture: The English Tradition," by Victor Chinnery.

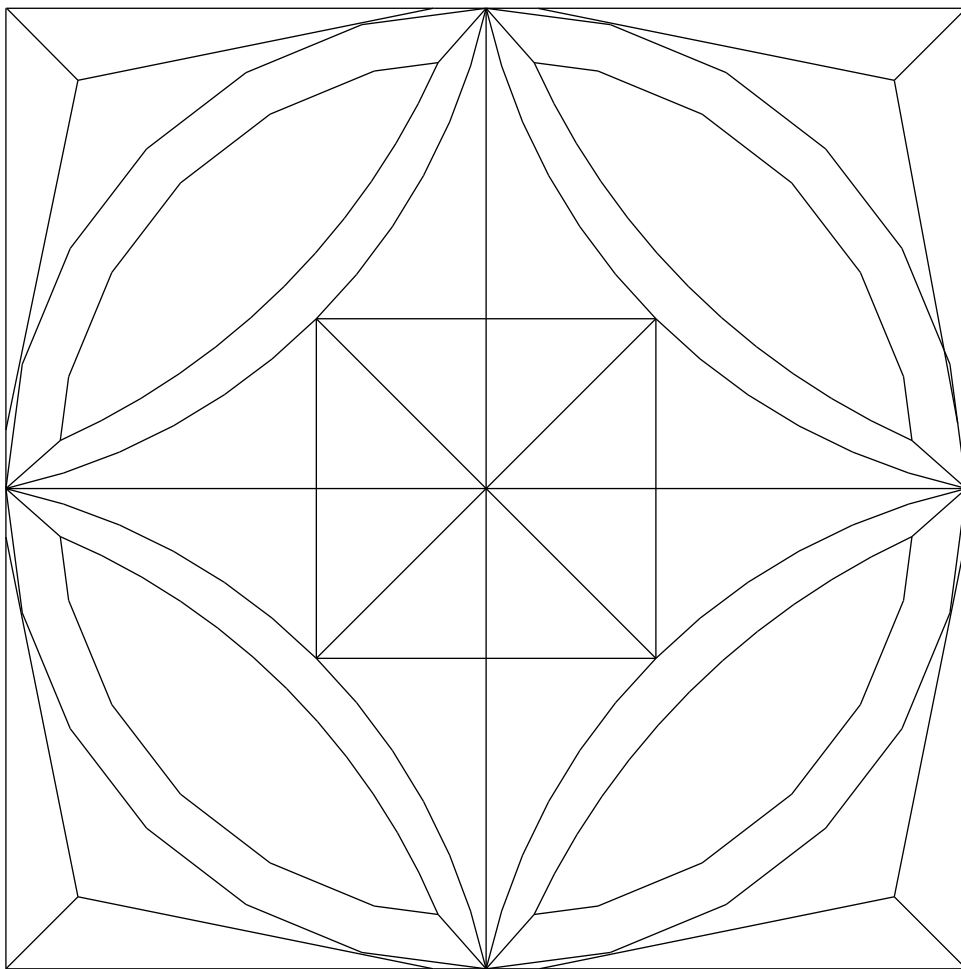
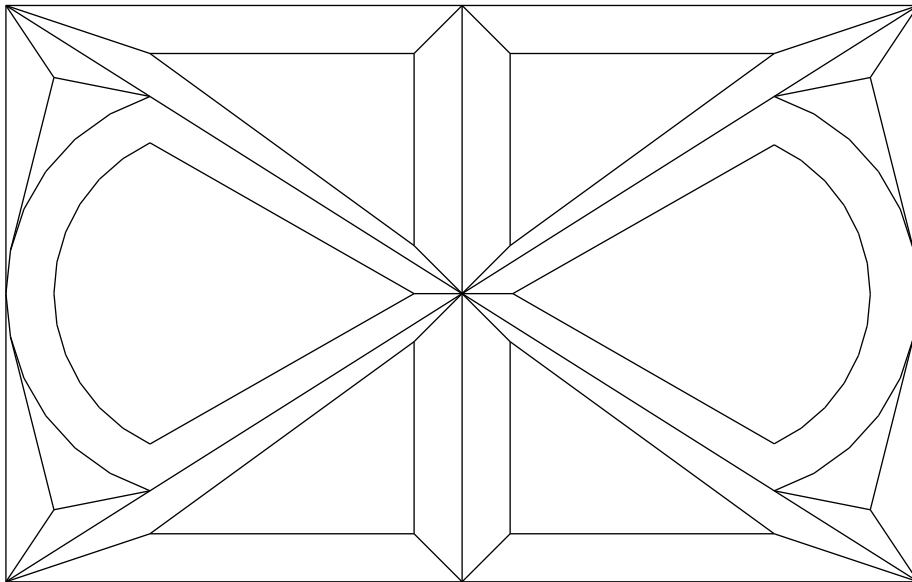
IN OUR STORE: "Forging a Custom Hinge" with Peter Ross.

Our products are available online at:

■ ShopWoodworking.com









COPPER HARDWARE

BY TOM CALISTO

It's surprisingly simple to make your own Stickley-style pulls.

The simple lines and honest joinery of the Arts & Crafts period have always appealed to me. The fumed quarter-sawn white oak and the warm patina of the copper hardware add a wonderful effect to the overall design.

But I have never been satisfied with the reproduction hardware that I have seen, so I prefer to make the hardware by hand. Copper is an easy metal to work, so making custom hardware is not as difficult as it might seem – and by making it yourself you have total control over the size, shape and design.

The pulls here are similar to those found on Gustav Stickley's pieces from about the turn of the 20th century. Most modest shops will have all the equipment needed to make them.

What You'll Need

The basic toolkit consists of a hardwood block, propane torch, hacksaw, files, a bench vise, some form of an anvil and a ball-peen hammer.

The anvil can be as simple as a block of metal. The ball-peen hammer shapes and textures the components of the pulls. Its striking ends need to be polished because any roughness on the faces of the hammer will transfer to the pulls. I use a smaller hammer in the 8- to 12-ounce range because only light blows are needed.

In addition to polishing the hammer's faces, it is helpful to grind a slight bevel (maybe 10°) along the lower half of the flat face. The bevel enables a more comfortable grip when planishing the perimeter of the back plate. Be sure to

radius any sharp edges after grinding the bevel.

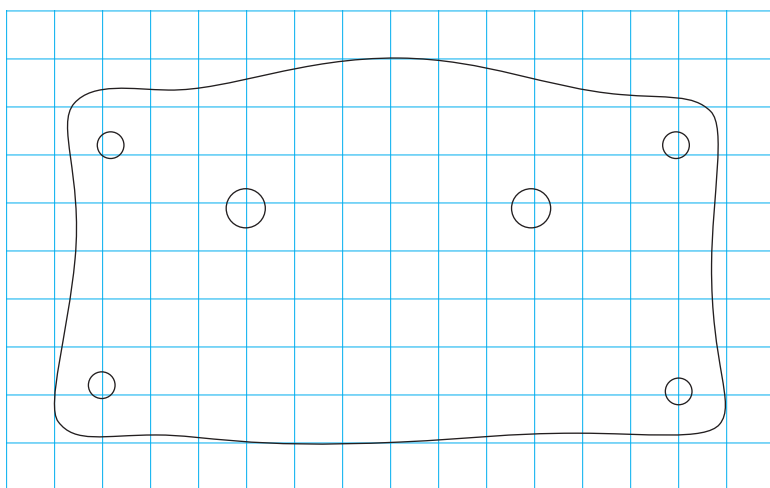
You'll also need 1/16"-thick copper sheeting (110 alloy) for the back plates; 5/16"-diameter copper rod for the bails and 1/2"-square bar for the posts. Sources include McMaster-Carr (mcmaster.com) and Online Metals (onlinemetals.com). I use 8-gauge grounding wire from a big-box store to make the rivets.

Back Plates

Trace the plate pattern onto the copper, being sure to include the hole locations.

You can cut out the shape using a hacksaw, jeweler's saw, scrollsaw or even a band saw equipped with a fine-toothed blade.

Once you've cut them from the copper sheet, smooth the sawn edges of the



COPPER PULL
Shown full-size
One square = 1/4"



Trace the pattern. The back plates can be cut from the sheet copper using a variety of saws, from a band saw to a jeweler's saw



Smooth operator. After you've sawn the plates from the copper sheet, smooth the edges with a file.

plates with a file.

Drill 1/8" holes for the two posts and 3/16" holes for the four hardware mounting holes. Because copper is such a soft metal, a twist bit tends to grab and lift your workpiece; be sure to clamp the back plate to prevent injury.

Add Texture

Texturing the back plates is done with many light taps from the ball-peen



Drill safely. Secure the back plate when you drill the holes. Here I use angled screws to hold down the workpiece.

hammer; the goal is to leave no flat spots anywhere on the plate.

As you hammer, the plate tends to curl up. Flatten it out by placing the textured surface face-down on a hardwood block, then strike the back with the flat face of the hammer.

Texturing will slightly distort the holes you drilled, but this is easy to clean up later.

After the front is uniformly dimpled,



Tap dance. Many light taps with the ball end of a ball-peen hammer give the back plate its dimpled texture.



Border patrol. Use the flat face of the hammer to smooth the perimeter of the back plate, just a few 16ths in from the edge.



Room to grow.

Chamfering the holes in the back plate (shown here from the back) gives the rivet heads room to expand and be flush to the surface.

I like to smooth the edges roughly 3/16" around the perimeter. This forms a frame of sorts for the textured area.

To do this, hold the back plate close to the edge of the anvil and work around the plate with the flat face of the hammer. Try to keep the planished edge uniformly wide.

Now run your 3/16" drill bit back through the mounting holes to clean them up.



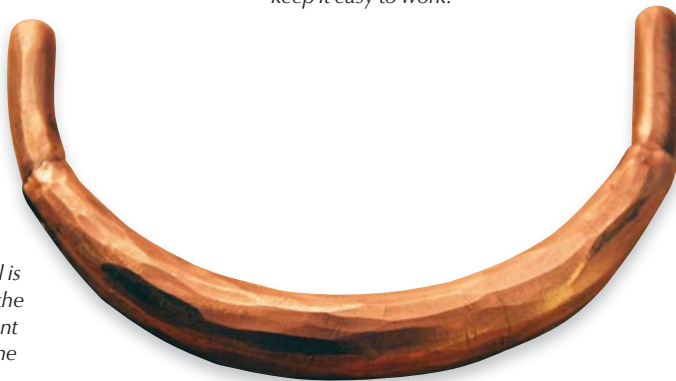
Birthing the bails. Each bail starts as $\frac{5}{16}$ " copper rod. I use a drill press and file to cut "tenons" on each end, then use the flat face of a ball-peen hammer to shape and draw out the bail.



Hard work. Hammer blows will harden copper, so stop and anneal the bail frequently to keep it easy to work.



Shop-made form. I use a bending form made from a pipe coupling to help forge the bail into a "C" shape. Re-anneal the copper if it becomes difficult to work.



No mortise. This bail is almost finished, but the "tenons" must be bent inside to insert into the back posts.

Flip the piece over to the non-textured side and use a countersink to chamfer the holes for mounting the posts. This chamfer gives the rivet heads a place to go while keeping the back plate flat. The chamfer should go almost through the back plate.

Bails

The bails are formed from $\frac{5}{16}$ "-diameter copper rod. For this design the blanks start off at 4" long.

To make it easier to size the bail to the posts, I turn each end of the blank to a little less than $\frac{3}{16}$ " in diameter. Use a drill press and file for this work.

The $\frac{3}{16}$ " "tenons" need to be about $\frac{5}{8}$ " long and terminate in the bail stock with a chamfer.

The copper will quickly fill the teeth of the file, so have a file card handy to clear the swarf.

Start drawing out the bail blank by tapering the ends and blending the diameter down to the $\frac{3}{16}$ " tenons. Use the flat face of the hammer to shape the bail and texture the surface.

Copper will harden after repeated hammer blows and become difficult

to work. It will need to be annealed frequently to keep it easy to shape and prevent cracking.

Use proper safety equipment and be sure that the work area is clean and free of flammable material before beginning the annealing process.

To anneal copper, heat the blank with a propane or MAPP torch to between a dark grey or dull-red heat (between 800°F and 1,200°F) and quench it in water.

Copper is an excellent conductor

of heat, so use pliers or tongs to hold the work.

Continue to draw out the bail until it is about 4 $\frac{1}{2}$ " long. The final product should be a little less than $\frac{5}{16}$ " in diameter in the center and taper to the $\frac{3}{16}$ " tenons.

Straighten the blank and finish texturing the surface. Anneal the blank and prepare to bend it.

I shape it around a form made from a 1 $\frac{1}{4}$ " NPT pipe coupling. Clamp one end of the bail to the coupling.

A small brass V-block protects the bail and distributes the clamping pressure. The V-block also helps to keep the parts oriented as you wrap the bail around the form.

After forming a C-shape, anneal the bail once again. Using pliers, turn the tenons inward to make a D-shape. Sight down the tenons and adjust them until they are in a straight line.



Bar tending. I form the back posts from $\frac{1}{2}$ "-square copper bar. Round over two sides with a coarse file to begin making a D-shaped cross-section.



Closer to fine. After roughing out the cross-section, move to a finer file and eventually to sandpaper to finish fairing the curve.



Mark & make. Mark the cuts to separate each back post. Each post should be about $\frac{1}{4}$ " long after your cuts are cleaned up.



Cut, but stop. Cut the back posts most of the way through, but leave them connected together until you solder in the rivets.



Center it up. Mark the hole for the rivet on the flat face of each back post.

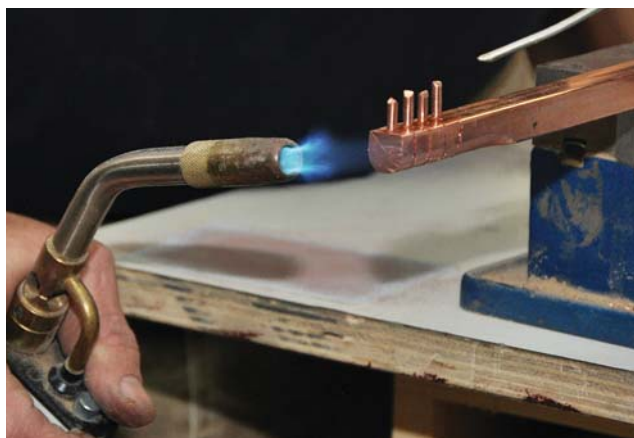
Back & side. Each back post will have two holes – one for the rivet in the flat face, and a through-hole in the side for the $\frac{3}{16}$ " tenon on each end of the bail.



Back Posts

The back posts (the D-shapes into which the pulls are inserted) start off as $\frac{1}{2}$ "-square copper bar. It is best to work the end of the bar into the D-shape while it is still long. This allows you to grip it in the vise and file the end without the vise interfering.

Torch it. Take care when soldering and annealing in your shop – flames and wood shavings don't mix.



Draw centerlines down three faces to help guide the file cuts. The lines show the termination of the radius, so avoid cutting into them.

With a coarse file, begin rounding over two adjacent edges to form a $\frac{1}{4}$ " radius along the edges.

Refine the surface with a finer-cut

"In this world a man must either be anvil or hammer."

—Henry Wadsworth Longfellow
(1807-1882),
Poet, Educator

file, then work up to #320-grit sandpaper. Mark the bar for the saw cuts that will separate the individual posts. Each post should finish at $\frac{1}{4}$ " after the saw cuts have been cleaned up.

With a fresh 18-teeth-per-inch hacksaw blade, begin cutting the posts from the bar. Cut about 85 percent of the way through the bar and bring the cut down so it just cuts into the bottom face.

The posts need a $\frac{1}{8}$ "-diameter x $\frac{1}{8}$ "-deep hole drilled in the center of the bottom. The rivet for attaching the posts to the back plate will be soldered into this hole.

Mark the centers for the holes and use a drill press to bore the openings. (Use a drill press vise or clamp to hold the bar while drilling.)

Rivet

Soldering the rivets to the posts is easy, but all the parts need to be clean and free of oxidation for the solder to flow. (And take the same safety precautions as with annealing.)

The surface should be bright and shiny. Avoid touching it with your bare hands after cleaning (the oil in your skin may contaminate the surface).

Cut the grounding wire into $\frac{1}{2}$ " lengths. Apply flux to the holes and the ends of the rivets, then place each rivet into a hole.

Begin soldering by applying heat with the torch, and keep the flame moving. When the parts are hot enough, the solder should flow freely.

Apply enough solder so that it just begins to flow out of the hole. Adding too much creates a bead around the rivet and will prevent the posts from flushing up with the back plate when it's time to rivet them together. (If this happens, sweep away the excess solder with an acid brush dipped in water while the solder is still molten.)

I have used both silver solder and regular solder alloyed for copper pipes.



Consistent decoration. After soldering in the rivet, dimple each back post with the ball-peen hammer.

Silver solder is much stronger, but not worth the extra difficulty.

After everything cools down, cut the posts from the bar, then clean the sawn face with files and abrasives. The posts need an additional hole to receive the bails. Mark the center of the post and drill a $\frac{3}{16}$ " through-hole while holding it in a vise. Chamfer the hole and lightly texture the post's surface, then knock off the edges with a file.

Assembly

Assemble the components and make sure the bail rotates freely in the posts.



Pull it together. The elements that make up the drawer pull are ready to be assembled.

If necessary, adjust things by either bending the bails or filing their ends to fit the post holes. Once satisfied with the fit, rivet the posts to the back plate.

Flip the pull over and clip the post rivets off about $\frac{1}{8}$ " proud of the back plate. Using a hardwood block to back up the hammer blows, begin lightly tapping the end of the rivet. Work on each side to evenly fill the chamfer with the now-formed rivet head.

Flush up the rivets to the back face of the pull with a file to ensure it will lie flat on the drawer or door.

Original Arts & Crafts pieces typically used pyramid-head nails or screws to mount the hardware to the furniture.



Chamfer music. To attach the back post to the plate, you'll tap the rivet head to make it expand and fill in the chamfer on the back side of the plate.



Ready to go. The finished pull is ready to be mounted using your fasteners of choice. I prefer $\frac{3}{16}$ " round-head copper rivets.

I prefer using $\frac{3}{16}$ " round-head copper rivets. These rivets can be purchased from most industrial supply houses.

To mount the hardware, locate it on the piece and drill one $\frac{3}{16}$ " mounting hole to start. Insert a rivet, then drill a second hole. Insert the second rivet and drill the remaining holes. If you drill all four at once, I can assure you that at least two holes will be off.

Riveting the pulls to the piece is the same as riveting the posts. The one exception is that a washer is needed on the inside of the door or drawer. (The wood is not hard enough to back up the rivet head as it is formed.)

While I have described here making only one style of pull, the same techniques can be easily applied to many different designs, as shown in the opening photo.

Cut, shape, assemble and attach – it really is that simple. **PWM**

Tom has been building custom furniture and hand-crafted tools for more than 25 years. He is an instructor at The Woodwright's School in Pittsboro, N.C.

ONLINE EXTRAS

For links to all online extras, go to:

■ popularwoodworking.com/feb15

WEB SITE: Learn more about Tom Calisto and his work at Windward Woodworks.

ARTICLE: Build a Stickley sideboard with this free article from Woodworking Magazine.

TO BUY: "Building Classic Arts & Crafts Furniture: Shop Drawings for 33 Traditional Charles Limbert Projects" by Michael Crow.

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Teak Oil: The Oil That Doesn't Exist

BY BOB FLEXNER

'Teak oil' is whatever a manufacturer chooses to put in the container.

No wood finish illustrates better than "teak oil" why finishing is so confusing. Brands vary from mineral oil, to linseed oil, to tung oil, to oil/varnish blend, to wiping varnish, to simply wax and turpentine.

Many brands claim or imply ultraviolet resistance. But my tests, and the experiences of many in the wooden-boat community, contradict this. From a technical standpoint, these finishes are applied too thin to be effective, even if manufacturers have actually added UV absorbers.

Some brands claim to be formulated specifically for teak and other oily woods, but they don't dry better, which is what you would want for an oily wood that retards the drying of oils and varnishes. Others claim to "feed" the wood or replace natural oils, which is silly. No wood needs feeding, and teak's natural oily resin can't be replaced.

Commercially available teak oils are all over the map with their claims. One truth that can be said about them all is

that none has anything to do with teak wood or teak trees. Teak trees aren't drained of their oily resin to make teak oil.

Here's some background about "oil" finishes. Twenty-five years ago, I wrote an article in *Woodwork Magazine* attempting to make sense of the many wipe-on finishes sold as oil. These included raw and boiled linseed oil, tung oil, oil/varnish blend and thinned varnish (not oil at all) that I called "wiping varnish."

Due primarily to manufacturer mislabeling, there was tremendous confusion in woodworking circles.

I spent most days for three months testing products and even had some examined by a chemist trying to figure out what they were. It turned out to be pretty simple, of course, and you probably have a good understanding now because, even though few manufacturers have mended their mislabeling ways, most writers and teachers have adopted the vocabulary and definitions I suggested.

Defining Terms

Linseed oil and tung oil cure soft and wrinkled unless all the excess is wiped off after each coat. These finishes are sold as "raw linseed oil," (which dries too slowly to be useful as a wood finish), "boiled linseed oil," "100% tung oil" and "teak oil."

Mixtures of linseed oil and/or tung oil and varnish (including polyurethane varnish) also cure soft and wrinkled (though harder than linseed oil and tung oil) unless all the excess is wiped off. I named these finishes "oil/varnish blend." They are sold under a wide variety of names, including Antique Oil, Maloof Oil, Danish oil, tung oil and teak oil.

All these finishes could be grouped under the broad term "oil" because they are applied and dry the same, and all the excess has to be wiped off to be functional. Otherwise, the surface will be sticky for a long time.

Wiping varnish is the outlier among the wipe-on finishes marketed as oil

Teak grays. As with all woods, teak turns silvery gray after a few month's exposure to UV light and rain. Unlike most other woods, however, teak resists insects and fungal decay naturally. This bench is about 12 years old and is still in excellent condition.





Identification test. To determine if an unknown finish that thins with mineral spirits or turpentine is oil or varnish, put a puddle on a non-porous surface such as glass or the top of the can and see how it dries. If it dries soft and wrinkled (left), it is a drying oil such as linseed oil or tung oil, or a mixture of one of these oils and varnish. If it dries hard and smooth, (right), it is varnish. If it doesn't dry, it is some type of mineral oil.

because wiping varnish cures hard after a number of hours. Therefore, it can be left wet to dry so that several coats create a build. The greater the build, the better the protection for the wood against all types of moisture. This finish is also sold under a wide variety of names, including Wipe-On Poly, Seal-a-Cell, ProFin, salad bowl finish, tung oil and teak oil.

Notice that all of these finishes (except linseed oil) are sold as tung oil and teak oil, which accounts for a lot of the confusion. Real tung oil does exist, but teak oil doesn't.

Teak

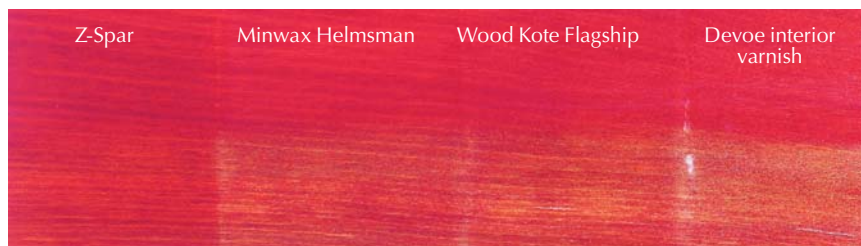
Teak is native to the South Asian countries of Myanmar, Thailand, India, Cambodia and Laos, but plantations now exist elsewhere. The wood is prized for its resistance to fungal decay and insects such as termites and marine borers.

Teak also resists decay from sun, rain and saltwater extremely well. As a result, teak has been used for centuries in marine environments, especially on boats. It has also become popular for general outdoor situations, including decks and furniture.

The natural color of teak is tan to medium brown and the grain resembles that of walnut. Upon exposure to UV sunlight and rain or saltwater, unfinished teak, like all woods, turns silvery gray. The cause is the degrading of the color-providing lignin and extractives at the surface, leaving only the cellulose.



UV-resistance test. To determine if teak oils are effective at preventing penetration of UV rays I applied two coats of all 14 "UV resistant" teak oils in alphabetical order, separated by masking tape, to two panels stained with a red dye. I used red dye because it fades quickly in UV light and speeds the test. I covered the top half of the two panels and placed them in direct sunlight for just 30 hours. Teak oils, which have to be wiped off to be functional, are just too thin to be effective, even if they actually do contain UV absorbers.



Film build. Ultraviolet absorbers alone can't prevent penetration of UV rays; film thickness is also needed. To demonstrate this, and also compare varnish claims, I finished a red-dyed panel with five brushed coats of four different varnishes and exposed it to sunlight for six months. From the left: Z-Spar, a boat varnish sold at marinas; Minwax Helmsman and Wood Kote Flagship, both marketed as UV-resistant and sold in home centers; and Devoe interior varnish. Z-Spar clearly contains UV absorbers. You have to question the claims of Minwax and Wood Kote because their products performed almost as poorly as interior Devoe varnish on the right.

lose. It's this loss of color that people hope to prevent by applying a teak-oil finish. They may also think they are extending the life of the teak.

There are three distinct and very different markets for products labeled "teak oil:" exterior wood, primarily boats, decks and outdoor furniture; interior wood, including boat interiors and hardwoods other than teak; and as a furniture polish on already finished interior teak furniture, mostly from Scandinavia.

UV Resistance

Fourteen of the 16 teak oils I collected and tested are marketed for boats or outdoor furniture. These products either state specifically "UV resistant" or imply it in the name ("Boat," "SeaFin," "Marine" etc.), with a picture or draw-

ing of a boat or garden furniture on the label, or with a marketing claim such as "fights weathering and fading."

Resistance to UV light in a wood coating is achieved in one of two ways: the inclusion of pigment or the inclusion of a UV absorber (I use the term broadly to include all types). The best example of a UV-resistant pigmented coating is paint. The next best, also in effectiveness, is deck stain.

There are several products sold in stores or online alongside teak oils that resemble a deck stain in that they contain pigment but are too thin, or dry too soft, to be built up like paint. These protect better than teak oils because of the pigment, but they also color the wood, which many people don't like.

Ultraviolet absorbers work by turning light energy into heat energy, which

WHAT'S REALLY IN THERE?

	Brands Labeled Teak Oil	Manufacturer's Claims	Contents: From manufacture, or my best guess
	Amazon's Golden	Interior/exterior/ Marine use	Mineral oil and dehydrated castor oil
	Behlen	For teak and other exotic woods. No exterior claim	Linseed oil
	Boat Armor	Restores natural oil balance in wood with "mineral seal oil"	Mineral oil
	BoatLIFE Teak Brite	Adds original oil to protect wood	Oil/varnish blend
	Briwax	Interior/exterior. Feeds wood	Wiping varnish
	Dalys SeaFin	Interior/exterior. Won't chip, crack or peel	Oil/varnish blend
	First Mate Marine	Interior/exterior. Feeds wood. For teak and all fine woods	Wax and turpentine
	Flag Wood Care	Interior/exterior. From England. Replaces natural oils	Probably linseed oil
	Interlux Premium	Traditional Scandinavian blend of oils	Linseed oil
	MaryKate NuTeak	Extremely long resistance	Tung oil
	Meguiars Gold	Interior/exterior	Linseed oil
	Minwax	Interior/exterior. For teak, mahogany and rosewood	Oil/varnish blend
	Scan Care	From Denmark. Implied it feeds wood. No exterior claim	Probably linseed oil
	Star Brite Premium Golden	Interior/exterior. For teak and other fine woods	Tung oil
	Watco	Interior/exterior. Protects from inside wood	Oil/varnish blend
	West Marine Premium Gold	Interior/exterior. Biodegradable	Probably linseed oil

dissipates. But these absorbers wear out under UV exposure, resulting in the surface first dulling, then cracking if there's a build. Eventually, the coating degrades to the point that UV rays reach the wood and degrade it, and the coating peels.

To prevent this from happening for the maximum time, boat owners and finishers who want the wood to keep its color typically apply as many as eight brushed or sprayed coats of a UV-resistant, clear film-building finish such as varnish or water-based finish. After six months to two years (depending on latitude and exposure), they sand off the dulled surface finish and apply several more coats.

By following this procedure, the time when the entire finish has to be stripped and replaced can be postponed.

But this is a lot of work. So just as manufacturers of oil finishes have found a market among woodworkers wanting an easy wipe-on, wipe-off finish, manufacturers have also found a market among boat owners and people with outdoor furniture for easy-to-apply oil finishes.

Twelve of the finishes labeled "teak oil" and sold as UV resistant are oil—that is, mineral oil, linseed oil, tung oil or oil/varnish blend. One, First Mate Marine, is wax. One, Briwax, is wiping varnish.



Pigmented finishes. Alongside the teak oils sold in stores and online are pigmented wipe-on/wipe-off finishes marketed for teak. They don't call themselves oil, and they market themselves as more UV-resistant than oil, which they are because they contain pigment. The Semco product pictured is the clear version, but pigmented versions also exist, and the company encourages you to buy them. I didn't find the clear any better than teak oils.



Danish teak furniture. The finish used on teak furniture imported from Denmark and other Scandinavian countries is a very durable catalyzed (“conversion”) varnish. It’s applied thin with a flat sheen to resemble an oil finish, and it’s often marketed as oil, but it’s far more protective and durable. This dining table, used for all meals, is 30 years old and is still in good condition.



Oil-finished teak. Linseed oil, tung oil and oil/varnish-blend finishes darken considerably as they age. Contrast the color of this 20-year-old handmade teak coffee table, finished with Watco Danish Oil, with the still-natural teak color of the dining table at left.

The problem with oil and wax finishes is that they can’t be built up thick enough to be effective. The wood can be re-oiled periodically whenever it begins to fade to put some color back in for a while, but long-lasting results can’t be expected if the wood is exposed to sunlight.

Briwax could be built up, of course, but the directions don’t say to do this, and I saw no evidence of better UV resistance in wiped-off coats.

Interior Teak Oils

Ten of the teak oils marketed for exterior teak are also marketed for interior teak, including other hardwoods in some cases. Two, Behlen and Scan Care, don’t mention exterior uses.

The quality you would want in an oil marketed for interior teak would be better drying. This could be achieved, for example, by the addition of more driers to counteract the oily resins in teak, which slow the drying.

But the one characteristic that stood

out with all the teak oils (not including Briwax, which is varnish), was how slowly they dried on any surface, including glass. Though there’s nothing wrong with using any oil or varnish marketed for exterior use on interior wood whether or not a manufacturer says so, I didn’t notice improved drying.

Furniture Care

In the mid-20th century, teak was made popular as an indoor furniture wood by Danish designers and factories. Though the finish on this furniture is commonly marketed as “oil,” it is actually a very durable catalyzed (“conversion”) varnish. The finish typically has a flat sheen and is applied thin so it resembles non-film-building oil to an untrained eye. I have some knowledge of this because I worked in Denmark in the mid-1970s spraying catalyzed varnish on teak.

The Danes may be less-than-honest marketers, but they aren’t fools. They know they can’t hope to create a market for furniture with a soft finish of no measurable thickness that doesn’t prevent liquid penetration. Tabletops finished with oil can look terrible within six months to a year. But the Danes also reason (correctly) that they can take advantage of the mystique of teak as a naturally oily wood and promote the finish as oil.

They can then add to the mystique by selling special “teak oils” to be used as furniture polishes that people believe replace the natural oils in their teak furniture. Note that this would have to occur through the catalyzed varnish that is so good at preventing liquids from penetrating – even if the natural oil could be or needed to be replaced.

Conclusion

The label “Teak Oil” means nothing. The finish inside could be anything, though all the brands I gathered were limited to oils, varnishes or waxes that thin with petroleum-distillate solvents or turpentine.

Teak oils could legitimately be re-labeled “snake oil” for all they have to do with teak wood. **PWM**

Bob is author of “Flexner on Finishing,” “Wood Finishing 101” and “Understanding Wood Finishing.”

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“Everyone who receives a liberal education today counts chemistry among the most essential parts of his studies.”

— Antoine-François Fourcroy
(1755-1806),
French chemist



Shooting Boards

BY GRAHAM BLACKBURN

These appliances add accuracy and consistency to your handplane work.

There was a time, before the introduction of power tools, when the handplane was the very icon of woodworking. Nowadays of course, woodworking is often represented by the table saw and the electric router (among many other power tools). But as more and more woodworkers rediscover the pleasure – not to mention the economies, increased possibilities and safety – of incorporating various hand tools and techniques into their woodworking practices, there is a renewed interest in traditional woodworking.

Today's amateur woodworker is presented with a growing array of ever-better designed hand tools that often rival the products of such legendary firms as Norris, Preston and even early Stanley products. There is also an increasing amount of information about how to restore, fettle and sharpen these tools.

But whether you buy a brand-new handplane, an expensive model from the beginning of the 20th century, an

antique wooden tool or even a lesser-quality modern item, learning how to condition and prepare the tool itself is only half the equation. The other half is the technique of using the tool. The best-conditioned and most expensive plane in the world may well produce nothing but frustration if you remain ignorant of how best to use it.

The Missing Half

It used to be commonly understood that the term “hand-tool use” is rarely synonymous with the term “freehand use.” Except perhaps for carvers, most traditional woodworkers would no more consider using a handplane freehand than would today's woodworkers consider using a table saw or other power tool without some form of fence or guide. Indeed, these things are invariably built into the power tool itself.

But the vast majority of handplanes – and there is an enormous range of handplanes – need some external form of guidance if consistency and accuracy are to be achieved.

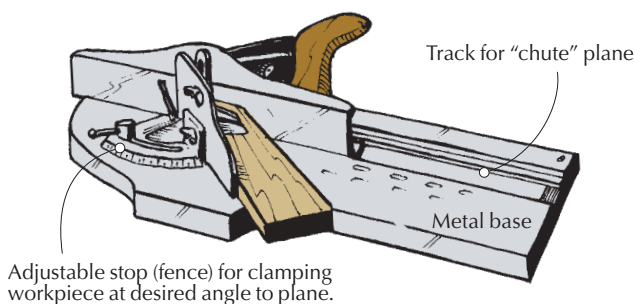
While some planes, including fillisters and moulding planes, are equipped with a fence and even a depth stop, there is seldom little else that is built in to guarantee accuracy.

This is especially the case with the most common tools: the so-called bench planes. These are the planes used for dimensioning, flattening, squaring and even final finishing of the workpiece. They include jack planes, fore planes and jointer planes, in all their varieties.

Accurate Edges

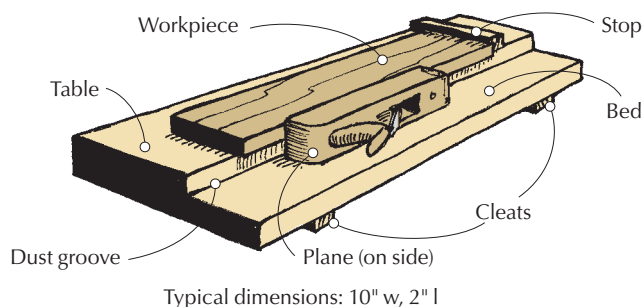
When it comes to preparing edges, the essential adjunct to all these planes is some form of shooting board. That this device is often unfamiliar to many woodworkers is because, apart from a few relatively rare (and now very expensive collector's items such as the Stanley Chute Board), these items were invariably user-made rather than manufactured and store-bought.

The good news is that making your own shooting board and learning how



Adjustable stop (fence) for clamping workpiece at desired angle to plane.

Stanley shooting board. The No. 52 (which included the plane and cast iron shooting board) was offered from 1909-1943. If you can find a set today in good shape, it is likely to cost upward of \$1,000. However, the setup does an excellent job of squaring edges.



Typical dimensions: 10" w, 2" l

Basic shooting board. This simplest of appliances allows you to plane perfect 90° edges every time.

to use it is far from difficult.

If you secure a workpiece in the vise with the edge to be planed uppermost, you can easily run a plane along this edge. But, depending on the thickness of the edge, you may find it difficult to maintain the plane at a perfect 90° angle to the face of the board. On the other hand, if you place the board flat on its face and use the plane on its side – assuming the side of the plane is perfectly square to its sole and the surface of the bench is perfectly flat – the edge can theoretically be planed perfectly square to the face of the board.

There are, however, two problems with the latter method. First, the board needs to be secured by stops or clamps; and second, most bench planes have irons that do not extend to the outside corners of the sole. Using the plane on its side directly against the edge to be planed means that it is impossible to plane the entire width of the edge.

The shooting board solves both these problems, for it is really nothing more than a jig for holding any given

workpiece both securely enough and high enough so that the tool can be used on its side to plane the edge at a consistently accurate angle.

Basic Shooting Board

The simplest form of shooting board consists of three pieces: a base on which the plane runs on its side; a table where the workpiece rests to raise it so the plane's iron engages the workpiece's entire edge; and a stop fixed to the table against which the workpiece is held.

Unless the shooting board is made from some form of stable plywood or particleboard, it is usual to fix transverse cleats to the bottom of the base to keep it perfectly flat.

These cleats, if carefully positioned, can also be used to secure the board on the bench, either by being hooked over the front of the bench (and possibly also over the edge of a tool well), or by being held between bench dogs.

An alternative method is to add to the underside of the base a longitudinal keel that can be held in the vise

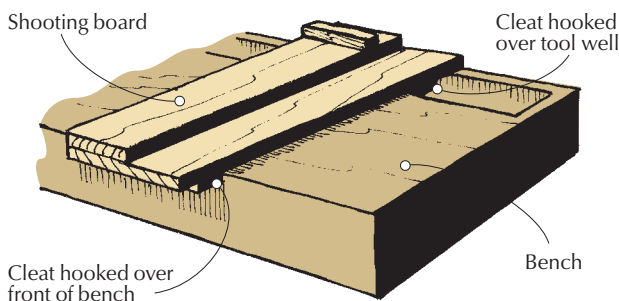
(although cleats may still be advisable to keep the board from warping).

The stop (the piece against which you hold the workpiece) can simply be nailed in place or wedged into a deep dado cut in the top of the shooting board base. (The latter method is, in my opinion, better because it allows you to move the stop over as its end becomes worn or damaged.)

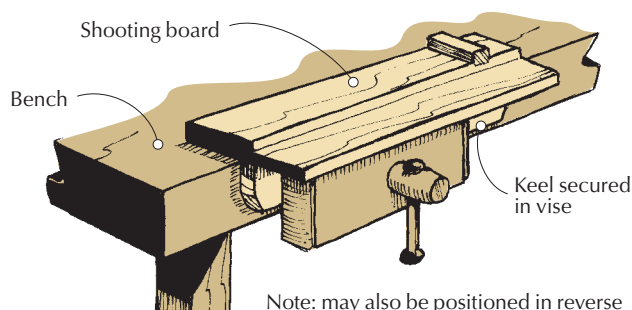
Either way, make sure the stop is fixed at 90° to the table so the workpiece registers against it accurately for trimming ends square.

It is important that when planing you hold the workpiece so its edge overhangs the table a little; the plane is never used so that it bears against the edge of the table. Rather, it is worked to a line marked on the workpiece. Nevertheless, it is good practice to plane a small dust groove on the bottom edge of the table where it contacts the bed to prevent any build-up from forcing the plane away from the work.

No matter how carefully you make the shooting board, it cannot do its

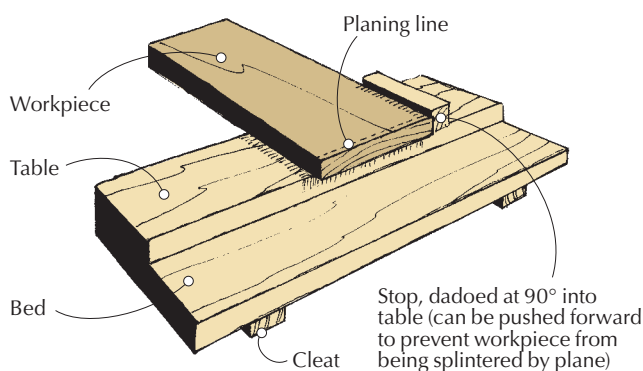


Cleats. A cleat at the near end acts as a bench hook; a second cleat, at the far end, drops into the tool well. (You could skip the far cleat if you build the shooting board from a stable materials, such as plywood.)



Note: may also be positioned in reverse

Keel. A keel attached on the underside of the shooting board can be secured in a vise.



Stop. To trim ends dead square, the stop must be affixed at 90° to the straight edge of the table.

job if your plane's sole is not perfectly perpendicular to the side on which it is run.

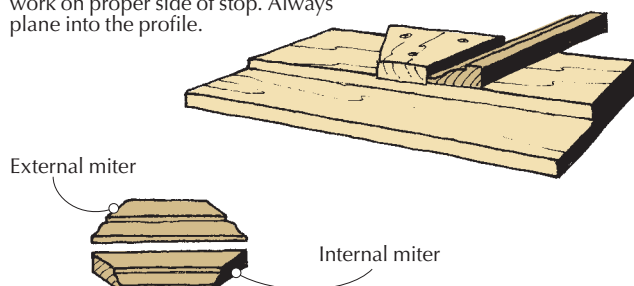
Most right-handed woodworkers prefer to use a plane on its right side, so the stop and table are fixed to the left side of the shooting board's bed. If you are left-handed, reverse the positions and run the plane on its left side.

In the days when plane bodies were all wood, care had to be taken when periodically shooting the sole of the plane so it remained perfectly square to the sides. (You cannot plane anything flatter than the flatness of a plane's sole.)

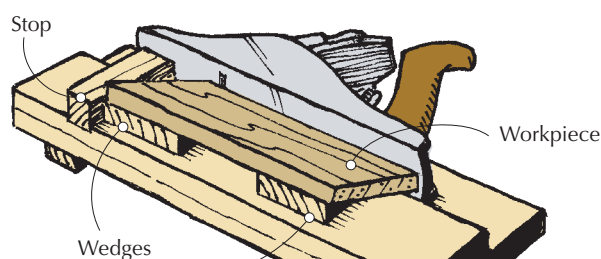
This is not hard to do with a wooden plane, but metal-bodied planes present a different problem. Better-made planes may well have square soles, but if it is necessary to flatten the sole, be sure to maintain perpendicularity with the sides – particularly for the side that will run on the board.

Once you understand the principles behind a simple shooting board used to achieve a perfectly square edge, consider the following varieties.

To trim ends of mouldings, place your work on proper side of stop. Always plane into the profile.



Miters. A stop with 45° angles on either side allows you to easily plane both inside and outside miters.



Off 90°. A basic shooting board can be used to plane edges at angles other than 90°; simply insert wedges of the needed angle under your workpiece.

Angled Edges

You may need to plane edges at angles other than 90°. You can do this easily with a basic shooting board simply by altering the angle of the table on which the workpiece rests. The simplest way to do this is to place appropriately angled wedges under the workpiece. Alternatively, temporarily tack a narrow strip to the back of the table.

A slightly more involved method, but one that will give you more choice and security in the long run, is to hinge the front edge of the table to its bed. Include some form of thumbscrew-fixed height-adjustment to the back edge to keep the angle from changing in use.

Angled Ends

While a perfectly square stop is useful for shooting the end of a workpiece at 90° to its length, other angles may sometimes be required. These can be easily achieved with the use of an auxiliary wedge-shaped piece inserted between the stop and the workpiece. Furthermore, if used in combination

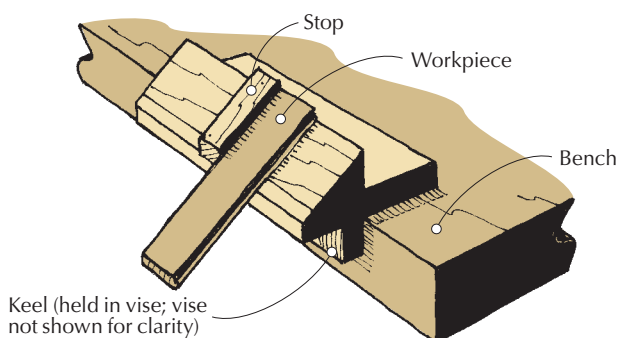
with any of the previous methods for shooting angled edges, the shooting board can be turned into a device for accurately planing the ends of mitered and splayed work.

Miters

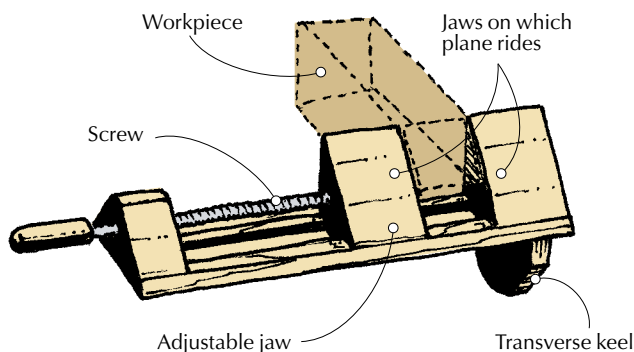
Trimming miters freehand is risky. If you have to trim relatively narrow mitered pieces such as moulding, make a shooting board that consists of a bed and a table as before, but fix a stop, cut at 45° on both sides, in the center of the table's length. That way, you will be able to plane into internal and external miters without risk of splintering the ends.

When you need to trim tall narrow miters, such as those at the ends of skirting, moulded baseboards, cornices or plinths, you need the quaintly named donkey's ear shooting board. It is essentially the same as a regular shooting board except that the table is at a fixed 45° angle and the stop is placed in the center of its length.

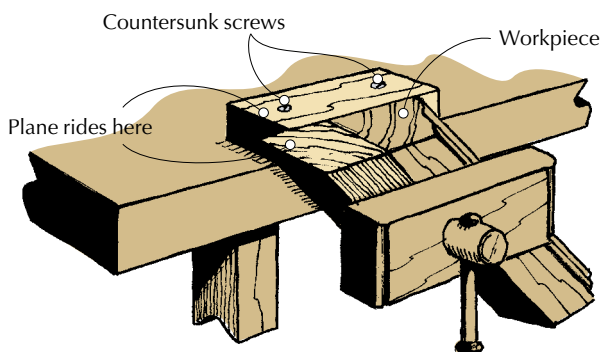
Because such pieces to be trimmed are frequently quite long, the shooting



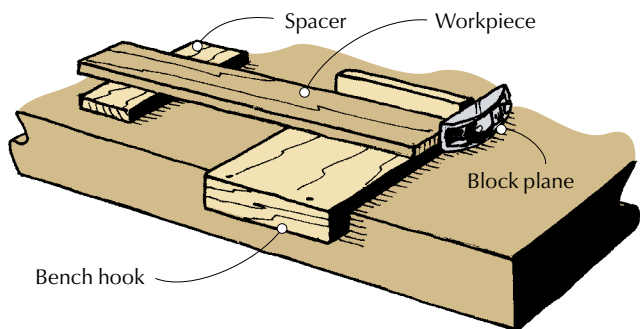
Donkey's ear. This specialty appliance for shooting tall, narrow miters has a bed fixed at 45°.



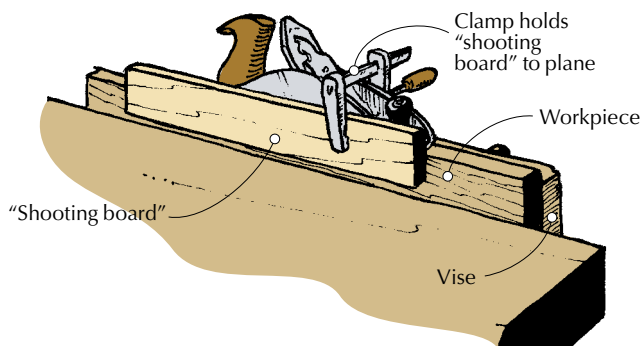
Miter block. A miter block (shown here in the left-handed orientation) was once a common commercially available appliance.



Shop-made. With little ingenuity (and less fuss), you can easily make a simple miter block in your shop.



Bench hook. As long as your workbench is flat, you can use a bench hook to hold a workpiece as you shoot the end square.



Fence. If you don't have a shooting board of sufficient size to hold the work, attach a fence to the plane to hold it at the desired angle.

board must be used close to the front edge of the bench. This typically means that it will be held by a longitudinal keel in the face vise.

Miter Shooting Block

Although by definition not strictly a shooting board, any discussion of the topic would be incomplete without mention of the miter shooting block.

This device is used for miters that are both long and wide. Its utility is derived from the broad area of support for the plane that is used to trim the workpiece (and those surfaces are commonly protected by a thin card glued to their surfaces in case the plane's iron should inadvertently travel over these parts). Once commonly manufactured in both left-and-right-handed varieties, a simpler version can easily be made.

Last Thoughts

Lacking any form of shooting board, you can use a simple bench hook for trimming end grain. It will provide the two essentials: a stop for the work and

an elevated edge for a plane used on its side directly on the bench.

Most bench hooks are relatively small, typically no more than 12" x 12", so the length of the workpiece that can be shot is short indeed. But using a pair of bench hooks, or even one bench hook and a spacer, is an easy way to trim the end of any board square and true.

And finally, what can you do when the workpiece is too long to be used with a shooting board? (There is, after all, a practical limit to the length you can make a shooting board.)

To paraphrase an old proverb, "if you can't take the work to a shooting board, take the shooting board to the work." Clamp a thick and rabbeted fence to the side of your plane and hold this fence tightly against the workpiece (secured in a vise). This produces the same ef-

fect of keeping the sole of the plane at a consistent angle to the edge being shot. And of course, this fence can also be angled to work on edges other than those at 90°. **PWM**

Graham has been making furniture for more than 40 years. He is the author of numerous books on the craft – most recently "Jigs & Fixtures for the Hand Tool Woodworker" (Popular Woodworking) Find out more about Graham at www.blackburnbooks.com.

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VIDEO: Watch Christopher Schwarz use the Lie-Nielsen No. 51 Shoot Board Plane, and get some resources for commercial shooting boards.

WEB: Read what Chuck Bender has to say about the Veritas shooting plane.

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"Handle your tools without mittens."

—Benjamin Franklin (1706-1790),
American writer & statesman

Recreating Rohlfs

BY PETER MARCUCCI

Most woodworkers are familiar with Arts & Crafts designers William Morris, Gustav Stickley and Charles and Henry Greene. But Charles Rohlfs' inspiring work is a bit less well-known.

Rohlfs, trained as a designer and draftsman, spent his early years designing iron stoves and dabbling in theater. After marrying, he and his wife, novelist Anna Katherine Green, established their home in Buffalo, N.Y.

Like many of us who begin woodworking, Rohlfs couldn't afford to buy quality furniture, so he began to design and build pieces for his home, and later turned it into a profession.

His work displays many common elements of Arts & Crafts furniture, but is set apart by unique design, shapes, artistic ornamentation and carving details. Writers have described Rohlfs' work as artistic, complex, eclectic and eccentric. His furniture is rare and Rohlfs' works are highly valued at auction.

Rohlfs' 1898 desk chair, on which the pierced carvings are said to have been inspired by the cellular structure of oak, is a stunning example of furniture as art. Only four of these are known to exist; one is on display at the Metropolitan Museum of Art in New York. "Antiques Roadshow" estimated in 2006 an original at \$80,000 to \$100,000.

I've been researching and recreating Rohlfs furniture for years, but as a woodworker, it's a challenge; the few books about Rohlfs have a biographical or art-history focus. I am more interested in how his furniture was made. So with gross dimensions in hand, I developed plans by scaling photographs. After building my first version of the desk chair, I visited the Met to study and photograph a known original. Upon returning home, I updated my plans to better match it.

This mahogany Arts & Crafts desk chair exemplifies furniture as art.



Patterns. Although it takes some time to make full-sized patterns and templates, when you make your second chair (and you will) the initial investment pays off.



Select & Prepare Material

Rohlf's works were typically made from oak or ash. He did, however, use mahogany for a number of his pieces, including the desk chair – which is nice, because mahogany is easier to carve than oak.

My first iteration was made from $\frac{7}{8}$ " stock, but it was far too heavy looking. When viewing the original, I could tell it was far more delicate, with wood less than $\frac{3}{4}$ " thick. I made my second version from $\frac{5}{8}$ "-thick stock – but it looked too thin. Since then, I've settled on $\frac{11}{16}$ ". To my eye, this thickness looks about right.

If you lay out the parts carefully, the chair can be made from one $\frac{3}{4}$ "-thick board that's 8" wide x 10' long (or about five board feet). If you choose this stock approach, the only glue-up needed is for the seat and foot. The back is just shy of 8" wide at the top and 3" at the bottom. The offcuts are used to make the legs, side stretchers and cross braces.

Begin with the Seat

This chair breaks down into four major components: seat, back assembly, front



Step down. Use a $\frac{3}{8}$ ", then a $\frac{3}{16}$ " rabbet bit to make the step profile. Stop the $\frac{3}{8}$ " rabbet 1" from the back edge and the $\frac{3}{16}$ " rabbet $\frac{1}{4}$ " from the back edge.

assembly and cross-brace assembly.

Start by constructing the seat. I had 4"-wide stock on hand, so I made a four-board seat.

I use centerlines (on the seat and back) as reference lines for building the chair. After marking the centerline on the seat, cut the front edge square with this line. Then cut the back edge just a bit larger than final width (I did this at the table saw).

When making a chair, you need to assemble and disassemble it a number of times to size and fit the pieces. I use dowels to aid in assembly and to help consistently locate the parts.

Before going further on the seat, drill a $\frac{3}{8}$ " hole (about $1\frac{1}{4}$ " deep) into the back edge at the centerline. This hole will match up with one drilled into the chair back.

Next, drill a $\frac{3}{8}$ " blind dowel hole to locate the bottom of the seat with the top rail. This hole, drilled on the underside of the seat along its centerline, is $1\frac{1}{2}$ " back from the front edge of the seat.

Now, set your table saw blade at 3° and cut the back of the seat to final width. The 3° angle matches the angle of the chair back.

Make a template of one-half of the seat, locate it along the centerline and trace the shape. Flip the template over and draw the other half. Cut the seat at the band saw, cutting close but leaving the line. Use a block plane and rasps bring the seat to final shape.

To finish up the seat, rout a stepped profile on the edge.

Back

Begin work on the back by making a full-size pattern. I printed a paper



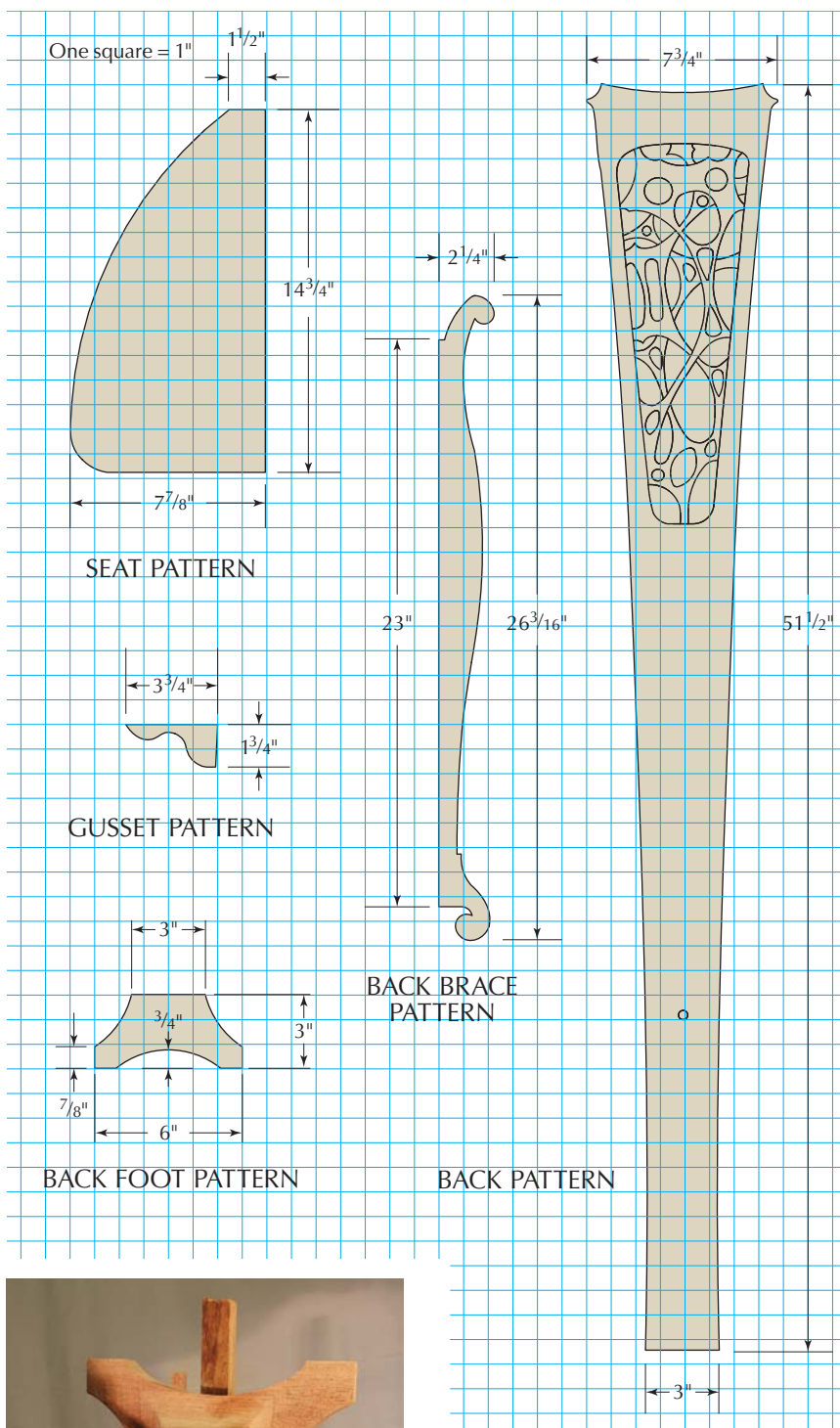
Musical influence. I tapered the inner two boards by 1". This creates a pleasing V pattern that complements the guitar pick shape of the seat.

template, glued it to a $\frac{3}{4}$ "-thick board and cut out the pattern at the band saw. You'll use the pattern to rout the final shape of the back, so spend some time smoothing the edges and fairing the curves. So I can always locate the centerline of the back, I cut two small notches into the top and bottom of my template.

The back is cut from a board 8" wide x 52" long. Mark a vertical centerline on the workpiece. While the edges are still parallel and square, lay out the point where the seat and back connect along the centerline of the seat, $13\frac{7}{16}$ " up from the bottom edge of the back. With a square, draw a line across the back board. Then drill a $\frac{3}{8}$ " hole at the centerline at a 3° angle to match the slope of the back. This hole will house a $\frac{3}{8}$ " dowel that will mate with the hole drilled into the back edge of the seat (the back brace, when installed, will cover it).



Shapely back. Attach the roughed-out back to the template (being careful to line up the centerlines). Rout the finished shape with a flush-trim bit.



Cover up. Attach the bottom diagonal stretchers with screws driven through the back of the foot. Once the screws are installed, the mortise will be plugged and covered by the back brace.

Using the template, trace the shape of the back and cut it at the band saw (leaving the line). Reattach the template and rout the final shape of the back with a flush-trim bit.

The carved medallion at the top of the back is recessed $\frac{3}{16}$ " from the front face (see the Back Medallion Pattern on page 51).



On the edge. With double-sided tape, attach the template to the front side of the back. Use a pattern-routing bit to cut the edges of the medallion to a depth of $\frac{3}{16}$ ".



Pattern work. Place the webbing pattern into the medallion and draw the outline. Drill out most of the waste, then use a jigsaw or scroll saw to cut to the lines.

Now place the webbing pattern into the medallion and draw the outline. Drill a number of clearance holes and, using a scroll saw or jigsaw, cut the pattern, then smooth the edges.

Foot

To make the $\frac{13}{8}$ "-wide x 3"-wide x 6"-long wishbone-shaped foot, I glued together two pieces of $\frac{11}{16}$ " material.

The foot is attached to the back with a $\frac{3}{8}$ "-thick floating tenon. Cut a 2"-wide x $1\frac{1}{2}$ "-deep mortise before shaping the foot. I used a plunge router and a shop-made mortising jig, but you can use your preferred method for cutting mortises. Cut a matching mortise into the bottom edge of the back.

Shape the foot at the band saw and fair it with an oscillating spindle sander, then cut an $\frac{11}{16}$ "-deep dado into the back that will house the back brace. I roughed out the dado at the drill press using a Forstner bit and squared it up with a chisel. The final task on the foot is to bevel the bottom at 3°.

Front Assembly

The front-leg assembly consists of five pieces: two parallelogram-shaped legs, a top stretcher, a middle stretcher and the carved panel.

The 11/16" x 1" legs are cut at a 21° angle (the 11/16" faces are the front and back).

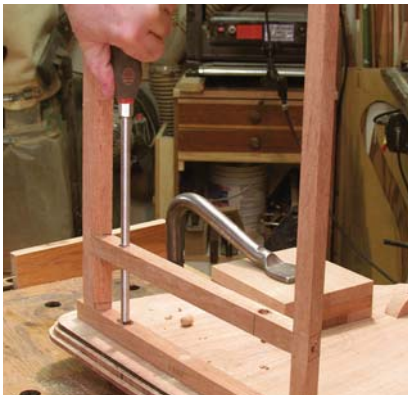
Cut the top stretcher to length and round over the two ends. At the midpoint on the stretcher, drill a 3/8" hole. This will house a 3/8" dowel that mates with the hole drilled into the seat.

The stretcher is screwed to the underside of the seat. To allow for wood movement, I rout two oval screw slots about 2 1/2" from each end.

The middle stretcher is 10 3/4" long, and each end is cut at a 21° angle. This stretcher is located 2 1/8" below the top of the leg. Mark its location on the front legs and drill pilot holes into the legs and stretchers. (I use spring clamps to hold everything together.)

The carved panel fits into the space created by the top and middle stretcher and front legs. It is glued in place after the front assembly is attached to the seat.

Cut each end of the panel at 21°, and make the panel blank slightly shorter than the middle stretcher to allow for recessing it slightly from the face of the front assembly. As you did on the back, trace the pattern on the front panel, drill clearance holes and cut



Easy access. Drill two 3/8" holes through the middle stretcher 1 5/8" from each end. When attaching the leg assembly to the seat, these holes will allow you to insert a screwdriver to access the screws.



Back it up. Use the locator dowel to position the back onto the seat. Once the back is positioned correctly, drill pilot holes through the back and into the seat. Secure the back with screws.

out the pattern.

To keep everything square and parallel, attach a temporary spacer between the bottom of the legs so the width at the bottom of the legs matches the width where the legs attach to the stretchers. Center the legs along the top rail, clamp them in place and drill pilot holes through the top rail into the legs. Attach the legs to the top stretcher with screws.

Drill countersunk holes to accommodate 3/8" plugs, then glue and screw the front-leg assembly together, making sure everything remains square and parallel. After the glue sets, use a block plane to flush the surfaces as needed.

Get Attached

Now you are ready to attach the back and the front-leg assembly to the seat.

The centerline of the back needs to be perpendicular to the face of the seat, otherwise the chair will look like the Leaning Tower of Pisa. I use a fixture clamped to the seat to help line up the back.

To strengthen the chair, install a gusset between the back and the bottom of the seat. It is screwed into the seat bottom and through the back.

Use a dowel to locate and position the front assembly to the seat. Attach it with two screws, making sure that it is parallel with the seat's front edge.

With the back and front assembly in position, fit-up the side stretchers and cross braces.

Stretchers & Cross Braces

The side stretcher and cross-base assembly adds tremendous strength and rigidity to the chair. To begin work on it, position the chair upside down on your workbench.

Given the slenderness of the parts, it is easy to pull the chair out of align-

"It does not follow that large means are important toward satisfying the taste for things fit or beautiful."
—Charles Rohlf (1853-1936), from The Rotarian, Vol. VI, No.1, 1915

Rohlf's Desk Chair					
NO.	ITEM	DIMENSIONS (INCHES)			COMMENTS
		T	W	L	
❑ 1	Back	11/16	7 3/4	51 1/2	Mahogany
❑ 1	Seat	11/16	15 3/4	14 3/4	Mahogany
❑ 1	Foot	1 3/8	3	6	Mahogany
❑ 1	Back brace	11/16	2 1/4	26 3/16	Mahogany
❑ 1	Gusset	11/16	1 3/4	3 3/4	Mahogany
❑ 1	Top stretcher	11/16	11/16	13 3/8	Mahogany
❑ 1	Middle stretcher	11/16	11/16	10 3/4	Mahogany
❑ 1	Carved panel	11/16	2 1/8	10 3/4	Mahogany Cut to fit
❑ 2	Front legs	11/16	1	15 5/8	Mahogany
❑ 4	Side stretchers	11/16	11/16	14	Mahogany Cut to fit*
❑ 4	Cross braces	11/16	11/16	17	Mahogany Cut to fit*
❑ 1	Interior stretcher	11/16	11/16	9 1/8	Mahogany Cut to fit*
❑ 16	Plugs	3/8 dia.		Mahogany	

*Make additional pieces for test fits.

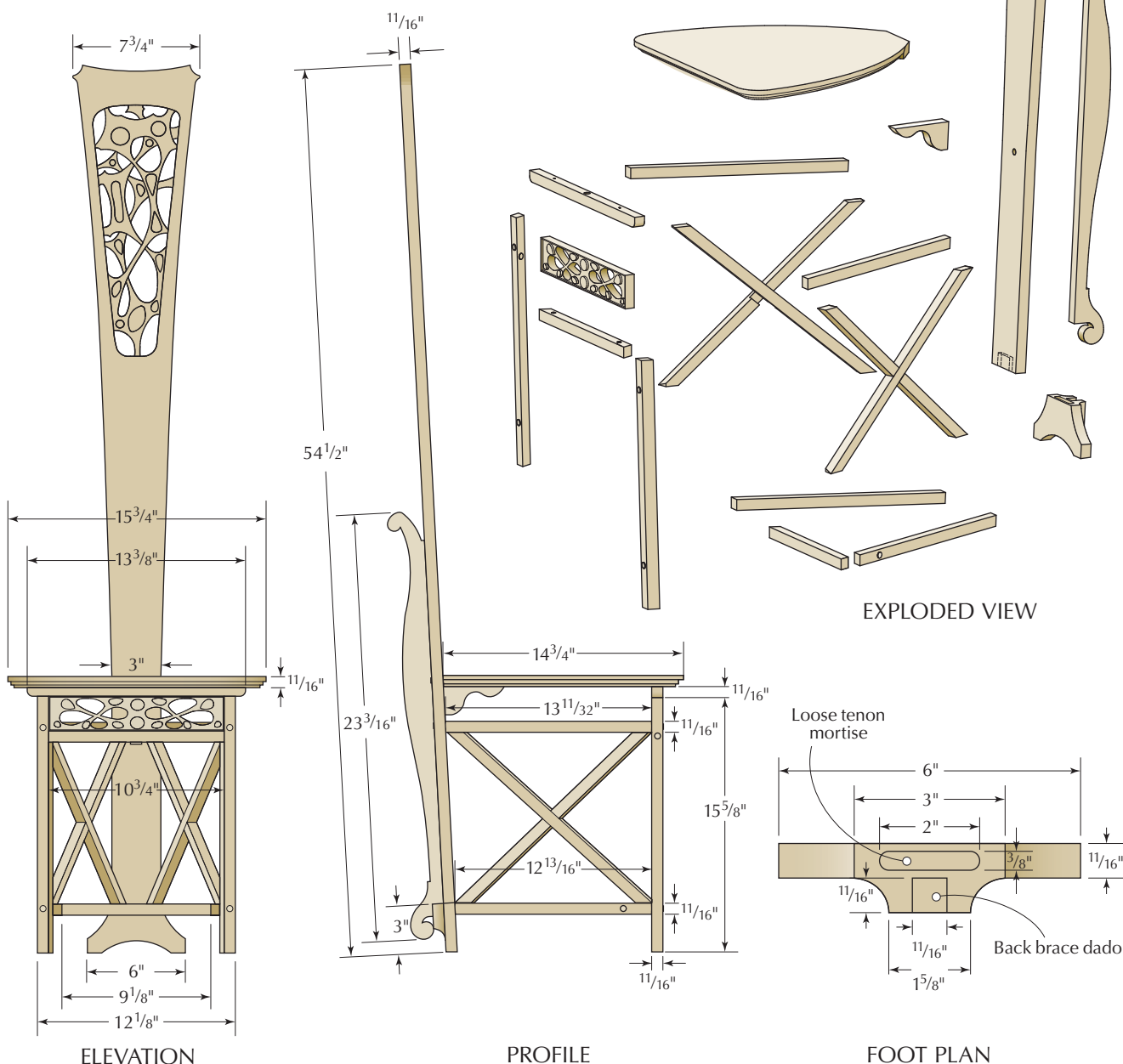
ment. The parts should fit snug but not too tight (or too loose); you don't want to distort the front assembly or change the angle of the back when it's screwed in place.

To keep the back aligned vertically and at 3° to the seat, make a fixture that clamps to the seat and back. I also clamp a $\frac{5}{8}$ " spacer along the inside of the back to set the distance between the side stretchers.

A $2\frac{1}{8}$ " spacer locates the top side stretchers the correct distance from the seat bottom, and holds them in place as you work. The same spacer is also used to keep the front leg assembly square



Assembly aids. Various fixtures and spacers hold the chair in alignment and help to locate parts during assembly.



with the bottom of the seat. Similarly, use spacers to locate and hold the bottom side stretchers in place.

It is best to make test pieces to fit the side stretchers and cross braces. The various angles can get confusing – it's hard to get accurate measurements with a tape measure and it is easy to make a mistake.

The front of each side stretcher is cut at 21°. The back edge is a compound angle, cut at 21° and 3°. To make this cut, I set my miter saw at 21° and place the side stretcher on a 3° sled to create the compound angle.

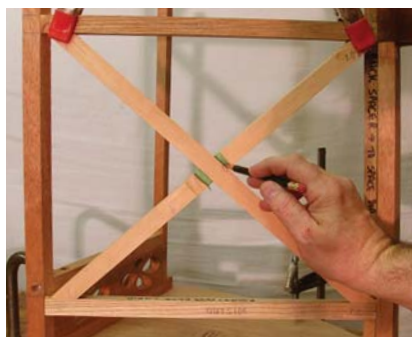
With the stretcher cut to length and fitting snugly, drill a pilot hole through the front leg and into the stretcher.

Mark the outline of the stretcher onto the back. Drill a pilot hole through the back, keeping your drill at the same angle as the stretcher. The pilot hole should come through the back about 1/2" from the centerline.

Spacers locate and hold the top of the lower side stretcher flush with the top of the foot. Because the back slopes, the lower side stretchers will be shorter than the top stretchers.



On the stick. The easiest way to measure the stretchers is to use an adjustable story stick.



For position only. Using trial pieces with a loosely cut half-lap joint, mark the joint location. Transfer the layout to your final pieces.

With the side stretchers in place, fit up the cross braces, which have a 42° angle at each end.

A half-lap joint connects them. Sneak up on the cut, testing the fit and position as you go.

The cross brace is glued at the half-lap joint and to the side stretchers. Use spring clamps hold everything in place.

Once the glue sets, remove the assembly and use dowels to securely attach the cross braces to the stretchers.

An interior stretcher, set 2 3/8" back from the front of the legs, connects the two lower side stretchers. Mark its length, cut each end at 21° and secure it with screws drilled through the side stretchers.

Back Brace

The back brace is installed last, and fits into the dado on the back of the foot. It stiffens the back and conceals a number of the screw holes used to assemble the chair (see Back Brace Pattern on page 48). Attach the brace to the back with four screws along the centerline, then plug the holes with faceted plugs.



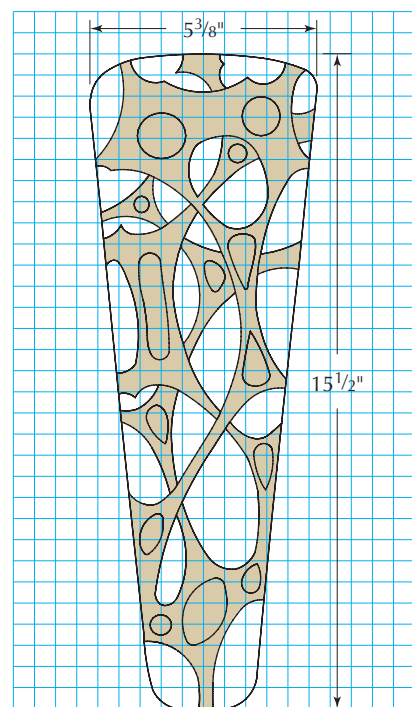
Drill. Mark the location of the stretchers onto the foot and drill pilot holes through the back of the foot and brace dado; this will help you locate screws to attach the side stretchers.



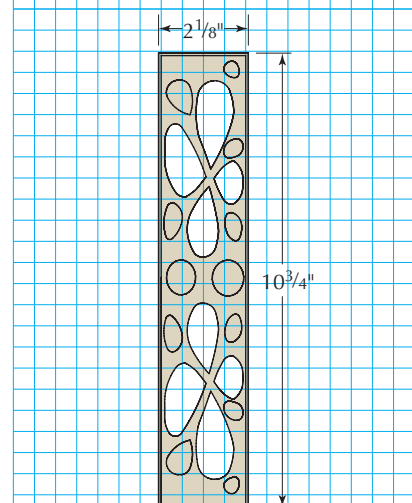
Stopped hole. The cross braces are securely attached to the side stretchers using 3/8" dowels. Take care not to drill all the way through the show face of the cross-brace pieces.



Faceted plugs. Shape the face of the wooden plugs with a carving knife.



BACK MEDALLION PATTERN



FRONT INSET PATTERN

One square = 1/2"

CARVING DETAILS



Practice. To warm up and flex my carving muscles, I first carved the patterns in basswood.



Shallow V. Use a small V-gouge to cut along your layout lines. When cutting along the thinner strands, watch the grain direction so as not to tear out.



Nodes. Now it's time to deepen and define each node. Use a gouge with a matching curve to define each by making stops cuts into the V-groove around each of them.



Add curves. Use a straight gouge to shape the curved surface of the each node. Be careful – the edge of the webbing is fragile and prone to chip.



Passover. Make stop cuts to define areas where one strand passes under the other. Then lower that portion to the stop cut.



Definition. Next, define and deepen the webbing using a detail knife. Make a stop cut along the center of the V-groove, then pare away along each side of the webbing to deepen it. (In more difficult areas, you might find it easier pare with a small straight or skew gouge.)



Pare down. Lower the background by paring away the wood to these stop-cuts.



Smooth. To strengthen and support the edge, slightly bevel the other side of the webbing. Use detail rifflers to remove any tool marks and smooth the surface.

Plugs & Screws

Rohlfs used faceted wooden plugs to conceal the screws. A carving knife makes quick work of shaping the three facets on each $\frac{3}{8}$ " plug to match the originals.

Most of the screws are driven into end grain, which is not the optimal situation for a screw joint. To increase the holding power, I inserted $\frac{3}{8}$ " dowel plugs along the path of each screw to provide some long grain for the screw to bite into. I used #8 screws during the initial assembly, and once the chair was assembled, I replaced each #8 screw with a 2"-long #10 screw. This is a pretty beefy screw in fairly slender stock. Take care to drill appropriate pilot holes and don't overtighten – otherwise, you risk splitting the wood.

Carving Inset

The carving process is the same for the front panel and the back. Begin by laying out the pattern defining the overlapping strands, the webbing and the perimeter of each node.

I started by carving a basswood prototype of the front panel and back medallion.

Finish

I darkened the wood a bit with some English chestnut stain, leaving more finish in the carved portions, then applied several coats of a tung oil finish.

Like a favorite picture, painting or sculpture, the 1898 desk chair needs to be prominently displayed. But get ready to make another one because the first visitor to your home will want one. **PWM**

Peter is a woodworker – primarily a chairmaker – who lives near Toronto, Canada.

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Meet the maker.
Paul Dumond,
alongside one of his
enviable slabs.



Art on the Living Edge

BY SPIKE CARLSEN

A nearly off-the-grid Montana shop creates a worldwide demand.

Walk into Paul Dumond's workshop in Montana and you'll see some unusual things: Slabs of wood the size of pool tables; massive 3-horsepower machines powered by solar panels and 700-pound chunks of salvaged I-beam. You might also find Dumond doing something unusual – like pacing across a 4' x 20' redwood tabletop using a floor sander to smooth the slab before finishing. When you're wrestling 2,000-pound slabs of wood in a one-man shop, you get creative fast.

Taking the Plunge

Dumond built the typical stuff typical kids built while growing up in Connecticut – shop-class bookshelves, chess boards and Radio Shack doo-dads. There were few indications he'd find his home in the world of woodworking.

After earning a degree in accounting at the University of Connecticut, Dumond moved to Montana to work for Champion International, a paper and wood products producer. He began dabbling with building furniture in his spare time, making tables and bookcases for his own place and for a few friends.

Showcase the slab. This 9'-long, 66"-wide walnut table with live edges shows Dumond's approach to the beauty of the wood.

"I realized I liked being creative," Dumond said. "But creative accounting can get you in trouble." So after 10 years of pushing paper, Dumond took the plunge into building furniture full time. With the exception of tips and techniques picked up through woodworking magazines and the Internet, Dumond is completely self-taught.

He became enamored with live-edge slabs after helping a friend move some massive walnut crotch slabs from Nebraska and winding up with a few of them.

"I stared at those beauties and just couldn't get myself to turn them into rectangles," Dumond explained. So he made his first live- or – natural-edge piece – a bed.

He was hooked. And, while Dumond still makes furniture from "square wood," his true love is live-edge slabs.

For the Love of Wood

Because most trees in his area are softwoods, he sources much of his wood from the East Coast. Dumond has connections with a tree surgeon



in Maryland and dozens of other small sawyers in Pennsylvania and the surrounding areas.

He prefers working with the little guys and they know what he likes. Most of his slabs come from deadfall or recycled woods. Dumond figures he has enough slabs stashed away to keep him busy for a decade or more. He also keeps a mental inventory of all his stock.

"Some simply tell you what they want to be," he explained. "Some are dining room tables, some are desks, some are bookcases. You need to listen."

One thing that makes Dumond's work stand out is the care he takes in creating the bases for his work. While many woodworkers fixate on the slab itself – treating the legs or bases as an afterthought – Dumond focuses on the entire piece.

Many of his bases are made from wood, but he also uses glass, acrylic,



Knowing the wood.

Here, Dumond shows off some of the slabs in his inventory.

little works of art unto themselves; Dumond loves the contrast of an ebony butterfly in a maple top.

ribbed steel, rebar and massive sections from steel I-beams. He incorporates doors, drawers and shelves that seem to be natural extensions of the top.

He loves to mix and match materials. "I have some elk antlers sitting in the shop right now," Dumond said. "I'm not exactly sure how I'm going to incorporate them, but they're going to become part of a table somehow."

He also incorporates butterflies judiciously, using them to stabilize splits in the slabs while adding to the aesthetics of the piece. The butterflies can be

Though Dumond uses the term "rustic" to define his furniture, much of it has a contemporary flair – more at home in an urban penthouse than in a Wyoming ranch.

Dumond recently finished a pair of executive desks (below left), cut from a single walnut crotch, accented with quartersawn sycamore butterflies, cantilevered from massive triangular cherry bases – all inspired by a petite jewelry box Dumond spotted in Homer, Alaska. Rustic, they are not.

He doesn't build scale models or use CAD programs, but works off sketches. "Sometimes I'll doodle to get the right look, but some of my best ideas come from lying in bed at night, designing things in my head."

After taking such care in preserving a live slab's natural beauty, Dumond makes sure to showcase the shape and grain when he puts the sanders away. He's tried natural finishes with tung and linseed oil, but found they don't bring the grain to life, go on unevenly and offer little protection against water rings and abuse. He's tried polyurethane but feels the finish is too thick and glossy. Dumond prefers a thinned varnish, applying four or five coats by brush to ensure thorough coverage,



Executive sweet. A pair of executive desks (above) crafted with crotch walnut tops, sycamore butterflies and triangular cherry bases, show Dumond's use of rustic and modern forms.



Butterfly aesthetics. Dumond uses contrasting woods as art elements in a coffee table with bookmatched burled maple slabs and ebony butterflies.



Stabilized with beauty. Ebony butterflies strengthen and add beauty to a maple top.



Suspension of disbelief. The top of this 10'-long buffet is suspended above the cabinet with $\frac{3}{4}$ " rebar. The curly maple base features dove-tailed corners.

then finishing up with a spray gun to eliminate brush marks.

The Business Side of Wood

"You don't get much drop-in traffic when you live at the end of a five-mile dirt road," Dumond joked. He credits the Internet for having allowed him to create a worldwide client base.

"I can finish a piece and post it on the web site one day and get a call from someone in Saudi Arabia interested in it the next," he said.

He's sold pieces across the United States as well as in Sweden, Italy and other parts of Europe—some for upward of \$30,000. The day of our interview, Dumond received a request from someone in Vietnam looking for a 3'-wide x 20'-long walnut table.

Though Corvallis, Mont., is a long way from the East Coast, Dumond has a sampling of his furniture and slabs in a designer's showroom in Manhattan.

But being at the end of a five-mile road means something else—no power poles. So Dumond took advantage of the wide-open spaces and southern orientation to install a 24-panel photovol-



Big sky power. Dumond with his wife, Kathie Dewitt, and dogs Sadie and Sally near the solar panels that provide 80 percent of his shop's power.

Country rest. Hand-carved cherry seats and a live-edge walnut backrest show the living form of the wood.



"Trees are poems that earth writes upon the sky."

—Kahlil Gibran (1883-1931),
Lebanese artist, writer

taic electrical system. Sixteen massive batteries store the power. The system is beefy enough to run 3-horsepower equipment, one machine at a time. On cloudy days, or if he's gearing up for a long day of sawing and planing, he'll fire up a gas-powered generator. But Dumond estimates that 80 percent of his power comes from the sun.

"Our carbon footprint is pretty small," Dumond said.

Dumond's work is equally divided between commissions and speculative work—pieces made without a buyer lined up. "It's hard to show someone a piece you've only designed in your head," he said. "I prefer to just build it. I can get it out of my head and in front of the camera."

He's prolific. Dumond currently has 50 pieces he's gotten "out of his head, in front of the camera" in inventory in his Montana warehouse and into a Manhattan showroom.

After so many years of building, he can look at the shape and grain of a slab and just know how it should be used. He prefers not to force a slab into a shape it's not.

"Wood grows however it wants to

grow," Dumond said. And he honors that.

Dumond has earned the right to live life on his own terms. His shop overlooks the big sky of the Bitterroot Mountains. He schedules his projects so he's not under tight deadlines and can enjoy the process.

"Furniture making is a calling," Dumond said. "You're not going to get rich at it, you're not going to get any bonuses. But I love what I do."

"Before taking the plunge, I talked with some furniture makers in Boulder, Colo.," Dumond said. "And they explained that building furniture for fun is a lot different than building furniture for a living. Some people make the transition and woodworking just isn't fun any more."

Dumond has kept it fun. **PWM**

Spike is the author of "A Splintered History of Wood," "Woodworking FAQ" and the newly released "The Backyard Homestead Book of Building Projects." Find out more at spikecarlsen.com.

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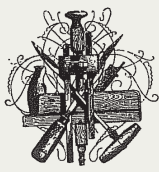
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Knew Concepts	11	60	knewconcepts.com
Lee Valley	19	28	leevalley.com
Legacy Woodworking Machinery	Cvr 3	98	legacyncwoodworking.com

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Lie-Nielsen Toolworks	11	29	lie-nielsen.com
Lignomat USA	11	124	lignomat.com
Mirka Abrasives	Cvr 4	31	mirkawoodworking.us
Old English Furniture & Cabinet Co.	56	34	www.oefcc.com
Oneida Air Systems	19	35	oneida-air.com
Osborne Wood Products	9, 25, 56	36	osbornewood.com
Philadelphia Furniture Workshop	56	-	philadelphiafurnitureworkshop.com
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Woodworker's Source	56	53	woodworkerssource.com
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Weekend Pot Rack

This simple piece keeps your favorite cooking implements close at hand.

I like having the pots, pans and cooking utensils I use most often within easy reach of my stove, and this simple pot rack fits the bill (with a shelf on top for lids or what have you).

My original design of this piece hangs over the counter in my kitchen. That one has three sections (to span the counter-sink-counter span of my cabinet run) and is in hard maple, with two $\frac{3}{4}$ "-diameter 304 stainless steel rods on either side of the sink.

The construction methods are basically the same as what I'm showing here, but to make this version more approachable, I used materials from a home center, including a $\frac{3}{4}$ "-diameter wooden dowel. But there's no reason you couldn't get creative and use a copper rod or black steel pipe capped with matching metal bits on either end.

The First Cut

This project is assembled using pocket screws, dimensional poplar and some maple Shaker pegs (because that's what the home center had available).

You'll need 4'-long pieces of 1x8 (the top) and 1x3 (the back), 2' of 1x6 (the sides) and a 4'-long dowel. (I considered using a smaller-diameter dowel, but had concerns about the weight of heavy cookware bowing it.)

One way I simplified this build from my original was to, as much as possible, use the actual widths of the dimensional lumber. But the 1x8 top simply has to be ripped – a $1\frac{3}{4}$ " overhang just looked bad.

So the first task is to rip that 1x8 to $6\frac{1}{2}$ ". For this, I used a circular saw with an edge guide (though you could also use a jigsaw), then cleaned off the saw marks with a block plane.

Next, cut the top and two side pieces to length at the miter saw. (It's best to



hold off on cutting the back to length until you have the sides screwed to the top; that way, you can measure the actual rather than the theoretical distance.)

Appealing Curves

Now set the top aside and work on the sides.

You have a couple options on laying out the curves. The easiest – if you have access to a printer with legal paper – is to download the SketchUp drawing

from our web site (see popularwoodworking.com/feb15), print out the side piece full-size, then cut it out and use spray adhesive to stick it on the workpiece. Then, you can simply cut to the pattern.

But while I have access to a suitable printer, I prefer the "bendystick" method. So, using a combination square, I measured 6" down from the top and made a mark on the front edge, then 1" in from the back and made another mark at the bottom edge. I tacked in a nail near each of those marks, then rooted through the trash for a thin offcut.

With the offcut registered against the nails, I can tweak the curve until I get something that looks right to my eye, then mark the curve with a pencil. Note that my curve might not exactly match the printout – and that's OK. What looks good to your eye is what matters.



Rip it. This jig's platform matches the width of the saw's shoe from the blade to the edge; the edge of the shoe rides against the fence. To use it, align the jig's bed with your cutline, then clamp it in place. Keep the saw tight against the fence as you cut.



Bendy stick. I often use two nails and a thin offcut to lay out curves. This approach allows me to tweak things to my liking rather than adhere to a strict pattern.

Once you have the curve marked on one piece, cut it out using a jigsaw. And the cleaner and more fluid your cuts are, the better – then there's less cleanup to make a fair curve.

If you've cut close to the line and have an almost-fair curve, go ahead and use the first piece to lay out the curve on the second, then cut it out, too. If you're not happy with the first cut, clean it up with a rasp until you're almost there, then mark and cut the second side.

Now clamp the two sides together (cut side up), and use a rasp and sandpaper to fair and smooth the curves on both at the same time; that way, they'll match. (But if they're a little off, don't fret. No one will notice when they're 36 1/2" apart on your wall.)

The last bit of work on the two side pieces is to drill the holes for your dowel (or pipe). On my original, I used stopped holes and captured the steel rod – but that makes the assembly a little trickier without a helper to

Weekend Pot Rack

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL	COMMENTS
		T	W	L		
1	Top	3/4	6 1/2	40	Poplar	
2	Ends	3/4	5 1/2	13	Poplar	
1	Back	3/4	2 1/2	36 1/2	Poplar	
1	Dowel	3/4 dia.		39	Poplar	Cut to fit

hold things in place. So here I drilled through-holes.

To keep from getting blow-out on the backside, it's a good idea to drill in from both faces of the workpiece. First lay out the hole on the inside face of each piece, then drill a tiny hole right at the center. Now chuck a 3/4"-diameter Forstner bit or spade bit in your drill and align the bit's point with the small hole. Drill halfway through, flip the piece, then repeat. (It's important that these holes be straight and at 90°, so grab a helper to spot you if necessary.)

In the Pocket

Using a pocket screw jig, bore two holes on the inside faces at the top of each side piece. (I measured in 1 1/4" from each long edge and struck a layout line... because I'm anal-retentive.)

Before getting started on the assembly, I recommend sanding the top and sides now. For painted work, I usually sand to #150 grit.

With the surfaces prepped, you're ready to attach the sides to the top. There's a 1" overhang on each end, so use your combination square to mark



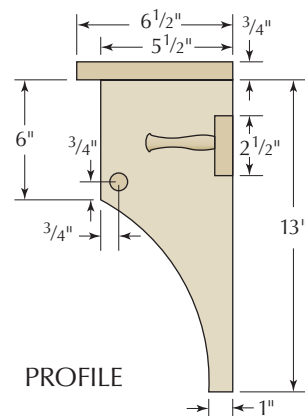
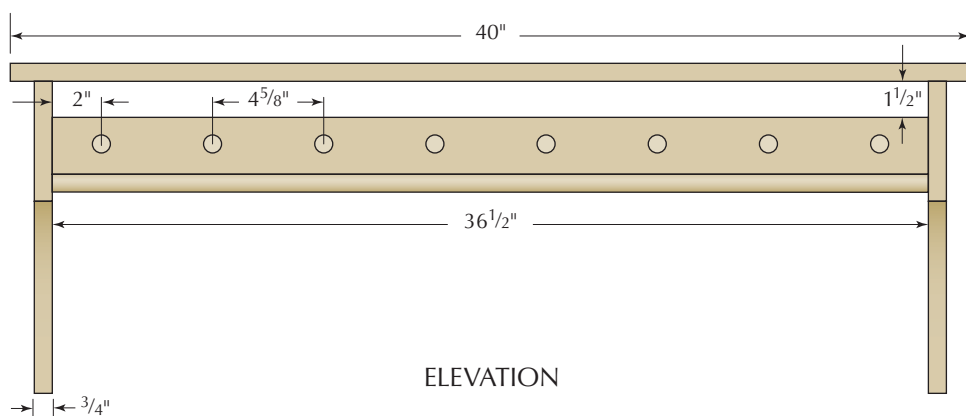
Assembly block. To help with assembly, I clamp an offcut at my layout line, then use that to support the side and keep it aligned as I drive the screws.

1" in from both ends on the underside of the top. Clamp a straight block of wood at that line, and use that both to align the workpiece and help hold it in place as you screw the side to the top, flush at the back edge.

Repeat the process on the other end.

Ready for Round Bits

Measure the distance between the two sides and transfer that length to the 1x3 (better yet, mark the length of the back



by holding it up to those two pieces). Cut the back piece to length, drill two pocket holes on the back at either end, then sand up to #150 (it's awfully hard to sand after the pegs are installed).

Lay out the eight peg locations. On mine, the pegs are 2" in from either end, and $4\frac{5}{8}$ " apart on center. You can, of course, adjust this for your aesthetics and needs. Match your drill bit to the diameter of the tenons ($\frac{1}{2}$ " on mine) and drill stopped holes a little deeper than the length of the tenon. You can drill through-holes, but then the glue will drip through.

Spread a little glue around the walls of each hole, then tap the pegs in place.

After the glue has sufficient time to set, screw the back to the sides.

Now insert the dowel rod through its holes, mark it to length, then cut it about $\frac{5}{8}$ " overlong. Cut a $\frac{3}{4}$ " deep kerf centered across each end, reinsert the dowel, then tap a wedge (with a little glue on it) into each kerf. This will



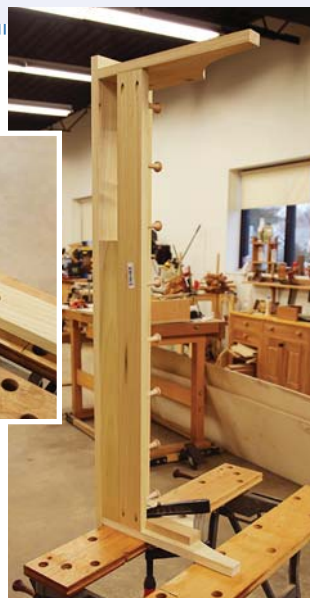
Pegs. A little glue and a light tap with a mallet to fully seat the pegs will keep things in place.

spread the dowel just enough to lock it in its hole and keep it from sliding out.

After the glue dries, use a flush-cut saw to flush the dowel to the sides, then clean up the cut with sandpaper.

Get Out Your Brush

Because of the pegs and the round dowel, I knew it would take me longer to paint this project than to build it, so I was sure to choose a good paint



Spacer block. Along with clamping an assembly block in place, for this operation, I also inserted a $1\frac{1}{2}$ "-wide spacer block between the top and the back.

that included primer – I didn't want to have to apply more than two coats. In hindsight, it might have been easier to paint before assembly, then touch up where needed when done.

Of course, if you like the look of your wood, an oil/varnish blend or other clear coat would work nicely, too.

Once your chosen finish is dry, attach D-rings at the back on each side piece, hang your pot rack on the wall, buy a pack of S-hooks (mine are from Ikea) then decide which of your pots and pans to keep close at hand. **PWM**

Megan is the editor of this magazine; she can be reached at megan.fitzpatrick@fwcommunity.com.

NEW ON VIDEO: 'I CAN DO THAT: PROJECTS FOR THE BEGINNING WOODWORKER'

We've just launched an online video version of the I Can Do That column, "I Can Do That: Projects for the Beginning Woodworker," with bi-monthly episodes. Each episode is presented free for one month at popularwoodworking.com/icandothat, then gets added to the hundreds of woodworking videos available at shopclass.popularwoodworking.com, our streaming video site.

Like this column, the video series teaches you the foundation techniques and knowledge you need to build nice pieces of furniture using dimensional lumber and a good but basic set of tools from the home center.

The host, Chad Stanton, is a custom furniture maker with almost two decades of experience in building and teaching. Chad got into woodworking after several years working as a certified auto mechanic – something he got tired of doing because of the lack of creativity involved. "I quit the job, and, with my last \$100, printed up a bunch of fliers for doing handyman repairs," he said. He distributed them around likely neighborhoods, and things panned out.

At first, Chad was doing a lot of trim carpentry, but prefers the custom furniture work in which he now specializes. "Right now, I'm working on a Queen Anne desk for a retired professor, and I've made a lots of conference tables, vanities and fireplace mantels," he said.

You can see of more of Chad's work and find out more about him at stantonfinefurniture.com – and, of course, by watching his videos. — MF

ONLINE EXTRAS

For links to all online extras, go to:

■ popularwoodworking.com/feb15

PLAN: Download a free SketchUp model for this pot rack.

BLOG: Read about the maple and stainless steel pot rack in the author's kitchen.

Our products are available online at:

■ ShopWoodworking.com



About This Column

Our I Can Do That column features projects that can be completed by any woodworker with a modest (but decent) kit of tools in less than two days of shop time, using materials from any home center. Our free PDF manual explains how to use all the tools in the kit. Visit PopularWoodworking.com/ICanDoThat to download the free manual.

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Combination Squares

Select a reliable tool with these simple tests.

I can't think of one project I've made that hasn't involved using one or more of my combination squares. I use these to lay out joints and cuts, and to check cuts to confirm that they're square (a test I perform on a scrap piece every time before I use our shop's table saw on actual workpieces).

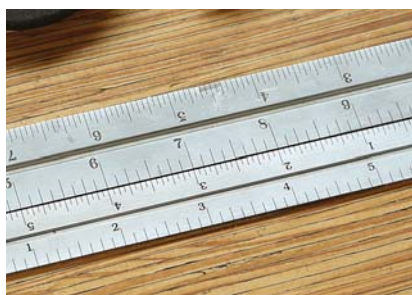
So when it comes to must-have measuring tools, a reliable 12" combination square is near the top of my list, and a 6" version is pretty close behind. And while their scales are unlikely to disagree, they might – so if possible, buy them at the same time. Or, when you get a new one of either, compare and confirm that they match. (It's also a good idea to show the scales on all your measuring devices to one another – ideally, they'll all be exactly the same.)

If you're buying these tools in person, take with you to the store a mechanical pencil and scrap of wood that's at least 6" wide x 6" long, with one jointed edge. If you're buying through a catalog or online, cast a critical eye over your new tool or tools as soon as you open the box.

And perhaps it should go without saying, but buy the best combination squares you can afford (and don't for even a second consider one with a plas-



Lifetime tools. Buy good combination squares and treat them well, and these workhorse tools will outlast you.



Matched scales. It's always a good idea to make sure the scales on your measuring tools match one another – and to use the same tools throughout a build.

tic head). These are tools that get used a lot; good ones will last and be well worth the cost.

First, Assess the Rule

It's of course paramount that a combination square is, well, square. If the rule and head don't meet at 90°, the tool is useless. (Yes, you can sometimes fix an out-of-square square, but you shouldn't have to – particularly on a new tool.) But you also need to be able to actually read the thing.

So before testing for square, make sure the rule itself is up to snuff. Are the numbers readable? (Engraved, rather than stamped, numbers and lines, are

usually better.) Are there denotations in 8ths, 16ths and 32nds? (If you're an engineer, you might work to 64ths; I do not.)

If the markings are satisfactory, make sure both long edges are straight.



Straight edge. To confirm that the rule is straight along its length, show it to the edge of a jointed board. If there is light showing through, the rule is not acceptable.



Square. Register the head firmly against the straight edge of your board and strike a line. Now flip the square and show the rule to the line. If the square is true, the line and rule will be parallel.



To do this, take the rule out of the head, then press one edge of the rule against the jointed edge of your board. If the rule is straight, you won't be able to see any light peeking out between the ruler and wood. Now check the other long edge.

Now Test for Square

Reassemble the square and register the head firmly against the straight edge of the board. Hold the tool tight to the board, then scribe a thin and consistent pencil line against the rule on the board's face.

Now flip the square over and "show the line to the square" – that is, with the head again registered on the jointed edge of the board, align the other side of the rule with your pencil line. If the rule and your line are parallel, the square is indeed square. If it's off, test again

to make sure there wasn't user error involved. Still off? Pass.

Once you're satisfied that the rule is good and it meets the head at 90°, loosen the nut below the ruler, remove the rule, then reinsert it. On most combination squares, the locking nut mechanism has a spring in it; pushing up on the bottom of the nut releases the tension of the mechanism and moves it into position to make rule re-insertion easier. The rule should be easy to remove and replace.

Tighten the nut and tug on the rule; it should not move.

Some squares include a bubble level and a removable metal point that is intended to function as a scribe or scratch awl. The scribe will likely get lost and the bubble level is fairly useless for furniture work. So I really wouldn't worry much about these.



Reinsert. First, look into the locking-nut mechanism through the top and make sure the catch is flat to the side of the tool. Next, match the furrowed side of the rule with the flat. Now push up on the nut and slide the rule in place.



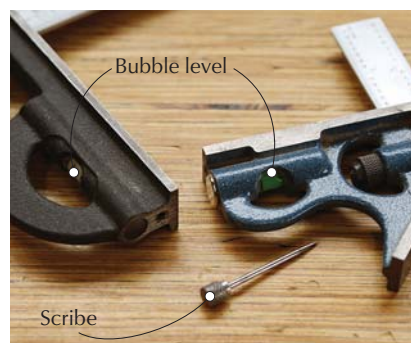
Lifetime Tool

If you buy good combination squares and treat them well, they'll last beyond your lifetime. (At home, I use a 6" Starrett that my grandfather acquired before my mother was born.)

Do your best to never drop a combination square – but if you do, test it immediately for square. (And if it's kaput, you can at least keep the rule.) Don't needlessly slide the rule back and forth in the head; it wears the surfaces where the rule and head meet.

And make it a rule to test your squares every once in a while. If you find they go out of square after a few months or a few years, save up for a better brand. **PWM**

Megan is the editor of this magazine; she has at least seven combination squares, including an 18" Lufkin (awfully useful for trim carpentry and framing).



Extras, but not necessary ones. Between my two squares at work, I have two bubble levels and one intact scribe; that's three features too many for my needs.

ONLINE EXTRAS

For links to all online extras, go to:

■ popularwoodworking.com/feb15

ARTICLE: In 2005, we tested 6" combination squares; the article is now free online.

IN OUR STORE: "Measure Twice, Cut Once," by Jim Tolpin (in PDF format).

About This Column

Woodworking ESSENTIALS

Woodworking Essentials takes a close look at the tools, materials and processes of woodworking.

Our products are available online at:

■ ShopWoodworking.com

Mom's Shop

Kite frames to cabinets: A 50-year journey back to woodworking.

Before mom's shop bustled with warmth, woodcraft and cheer, the location of her future endeavors hoarded what dad called, "Relics from the Golden Age of Aviation."

Mom would rebut, smiling, "Maybe just a collection of airplane bones."

But she couldn't have been happier for dad. He was newly retired and set to restore his "relics" in his own golden age. But nearing retirement herself and wanting to stay sharp, mom pined for ventures of her own as well as a place to pursue them. So when dad got the "New Hanger" next door, the family excavated and transported his fossils, providing mom with the "Old Hanger" to fill with her ambitions.

She began asking herself and others, "Before the family and career, what did I want to do?" She had always spoken fondly of childhood summers in her uncle's workshop making wooden cars, boats and kite frames.

"Back then and around here, women were discouraged from going after those skills," she once told me. "But that was something I wanted."

When she retired, before friends could ask what she was up to and inhibitions could take hold, she enrolled in woodworking classes, saying, "I'll be a novice, but at least I'll be a safe one."

To get mom started, dad did his thing and salvaged a table saw, drill press, scroll saw and jointer/planer. The 40-year-old equipment worked well enough, even though it had been through a fire and subsequently covered in melted tar.

Euphoric with the "new" machinery, mom made a miscellany of knick-knacks, from cookware to dustpans. When word of her exploits spread around town, a few ancient woodworkers, ready to hang up their tape mea-



sures and T-squares, thought peddling their tackle to a beginner would suit them "perdy good."

Their generosity provided mom with a band saw, dust collector, oscillating sander, router and lathe. So mom began making furniture, including suspended swings, stools and hall-trees.

Around the same time, the local hardware store called it quits. The old owner hawked mom his shelves, pegboards and the check-out counter for a workbench.

Now fully outfitted, she geared-up her skills by putting a dropped ceiling in the cabin and fashioning the sink, cabinets and countertops for the shop's bathroom.

Whenever I visit home, I always find mom in her sanctuary. She says she's living a long-lost dream. For me, as well as for the surrounding community, she's become more than a late-blooming woodworker. And though mom's too

humble to think of herself this way, she's an inspiration.

At 64, she's stirring things up in a small town that only 50 years ago would have derided her for becoming a woodworker. She's showing family, friends and neighbors it's just fine to be a beginner, to stay creative, gain new perspectives – that times change, and so can we. **PWM**

David, who lives in Athens, Ohio, says that whenever he visits, his mother always has a project on which she graciously allows him to help.

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