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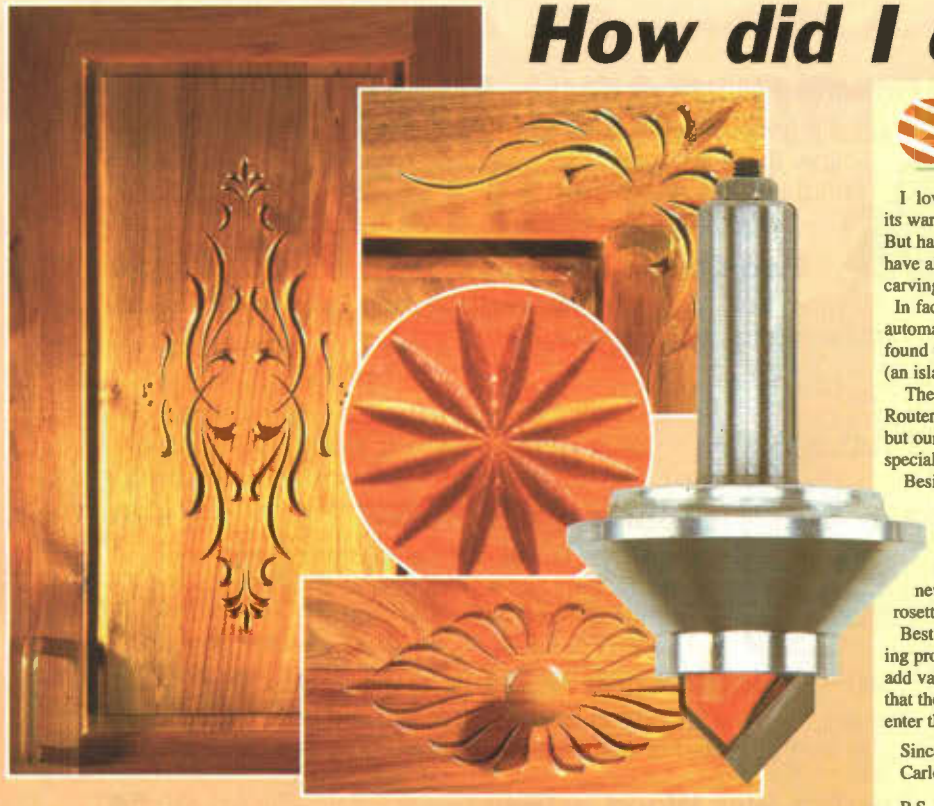
How did I carve these?



I love the look of hand carved wood, with its warmth, beauty and unique personality. But hand carved cabinets, doors and furniture have always been beyond my budget and quite frankly, intricate carving has always been beyond my skills.

In fact, architectural carving is almost a lost art in this age of automation and mass-production woodworking. So when we found this three dimensional router carving system in Tasmania (an island off the southern coast of Australia) we had to have it.

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Besides the expense and time required, traditional hand-carving has another limitation: it's very difficult to exactly duplicate a carving. The 3D Carving system allows you to produce any design once, twice or a hundred times! With the 3D System, cabinet shops and door makers can add a new dimension to their work. Furniture makers can add rosettes, corner designs and "hand carving" to their pieces.

Best of all, the 3D Carving System is very affordable, providing professional woodworkers with an excellent opportunity to add value and distinctive touches to their work. I'm convinced that the 3D Carver will prove to be the most revolutionary tool to enter the woodworking market in decades.

Sincerely,
Carlo Venditto, C.E.O.

P.S. If your router carvings look "too perfect", just add a few chisel marks for a more primitive look.

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2) Template Holding Frames: Clamped or tacked to your workpiece, these frames hold the 3D Templates securely in place.

3) Carver Templates: A total of 46 templates (with more in the works) produce a host of designs for cabinet doors, panel doors, door rails and corners, drawer fronts and many other applications.

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The 3D Carver System™ & Templates are protected by U.S. patent #5,146,965 & international patents.
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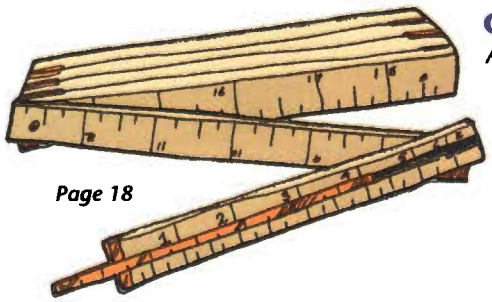
SAFETY NOTE

SAFETY IS YOUR RESPONSIBILITY. Manufacturers place safety devices on their equipment for a reason. In most photos you see in *Popular Woodworking,* 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. Think ahead. **SAFETY FIRST!**

COLUMNS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FOR THOSE WHO AREN'T WILLING TO SETTLE FOR "ALMOST."

"Almost Delta." That's like saying your next project will turn out almost right. Or that you'll be satisfied with "not too bad for the money."

Now before you tear into your next piece of walnut or oak with something less than Delta, remember this: A professional would tell you to buy the best band saw or table saw or jointer you can afford. Probably even tell you to buy the Delta, same as he did. Because you can't afford not to.

But here's what we'd suggest: Go out and shop any of the tools you see here. Run some stock across our Deluxe 6" Jointer. Compare our Contractor Saw or 14" Band Saw straight up with the competition. Look, really look at the details. Then ask yourself how you'd like to invest your money.

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It's Not Over 'Til It's Finished!

Poor woodworkers. We take up a craft that requires years of practice, reading and experimenting to develop a level of proficiency. For all the problems, though, we enjoy the work, and the satisfaction of a job well done. But as we near the end of every project, we face that inevitable chore which remains a mystery and places our hard work at risk to the unpredictable finishing boogie man.

My problem is once I've put so much effort into my project, after I've taken time to build it right, I want the Fat Lady to sing the praises of my work. I've learned she commands a good price for performing, but not nearly so much as she wanted for my efforts to learn woodworking in the first place. It used to be that whenever I'd invite her over to look at my latest creation, she'd leave without singing a note.

"Honey, I love those joints, the wood looks great and it's a handsome piece. But let's face it, the finish is so-so," she'd say while walking out the door.

"But I'm a woodworker, not a finisher! What do you expect?" I'd shout back.

Secretly, I also was disappointed in the finish. I wasn't really happy with the stain color, but what was I to do? It was the color I wanted when I looked at the store sample. What I should've done was spend another hour making a sample using the stain on *my* wood with *my* sanding and top coat. It would've saved me lots of disappointment. I ran my hand over the project and longed for a smoother finish. Okay, another hour applying three coats of a thinner finish with a light sanding between would be much better than two thick coats with no sanding.

On my next project I spent more time finishing, and while it wasn't perfect, it was a big improvement. The Fat Lady came by, was pleased and sang a little tune. The family and neighbors who saw the piece said things like, "Oh, that *feels* nice," and "that really *looks* professional." I felt better. Not so much for their praise, but because *I* liked the result.

Looking back on my finishing experience, I now know it wasn't much different from learning woodworking. At first, I would take short cuts and rush to complete the project, only to feel dissatisfied with the results. With finishing, I considered the process an unhappy chore that I wished could be avoided all together. When I finally understood that finishing was every bit as much a part of the process as selecting, cutting and gluing wood, my attitude improved and so did the quality of my work. I now actually believe that the hours spent practicing and properly applying finishes give back greater dividends for the time invested than does almost any other part of the process, save perhaps wood selection.

If the Fat Lady isn't singing the praises of your projects, is it because you haven't yet discovered that with woodworking, it's not over 'til it's finished?

Steve Shanesy

NEW IN THIS ISSUE

To help you exorcise the finishing boogie man from your shop, we're kicking off the first of an occasional series called *The Fear of Finishing* by Bob Flexner, a nationally recognized finishing authority. Bob's passion for the subject runs as deep as his knowledge. In this first installment, he tackles everyone's staining nightmare — blotching.

We're also happy to present step-by-step finishing recipes to create two often attempted, but rarely duplicated, old-time finishes, aged maple and Mission oak. Another finishing expert, Jeff Jewitt, walks you through them. If these two processes sound a bit daunting, try them anyway (first on scrap, remember). Truth be known, our featured cover projects were my first attempts working with shellac and mixing water stains. I'll admit I'm not a novice finisher, but the point is I wanted to try it out, and I'm glad I did. The results are spectacular, and now I have some curly maple put up and can't wait to try Jeff's old maple finish.

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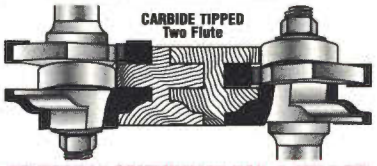

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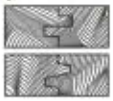

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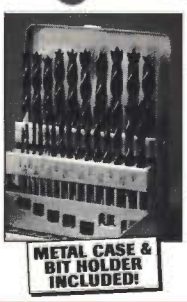

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INFEED/OUTFEED

We welcome your comments and questions, pro or con, about articles we publish or anything wood-related that's on your mind. We also want to see color pictures of what you're building. Send your input to: Infeed/Outfeed, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207. You also can e-mail us at Wudworker@AOL.COM or on CompuServe at Bruce Woods, 75463,3377. Letters may be edited for publication.

Wanted: Tips on Drying Lumber

Recently a friend and I cut down some large cedar trees. He has a small sawmill, and so one Saturday we took the time to saw up a few logs.

The lumber looks very good, but I am concerned about the moisture content of this wood, and how long to allow it to dry before using it.

Would you please give me some helpful tips on the best way to dry this lumber and how long this lumber must air out before it will be dry enough to use for fumiture, such as a cedar chest?

G.A. Purves Jr.
Exeter, MO

Drying Fresh-Cut Cherry

I'm looking for some guidance in properly drying some freshly cut cherry wood. I recently needed to cut down an old cherry tree and have some really big limbs (12" to 14" in diameter, 6' in length) I would like to dry and use for both turning and making boards. Of course I want to minimize loss of the wood to splitting and cupping, etc. Any suggestions would be appreciated, thanks.

Howard X
Howard851@AOL.COM

ED. — Lumber drying is a pretty broad topic, but we'll try and answer both of the questions. The sawn lumber must be stacked properly using 1" square stickers to separate the boards and allow adequate air flow through the stacked lumber. Hav-ing some type of roof over it to protect against rain, 4/4 softwoods (like cedar) should air dry to about 20 percent moisture content in about three months. Hardwoods can take up to eight months to reach the same moisture content. The slower and steadier the drying rate, the less chance of splitting and cupping. Be sure to paint the ends of the boards to seal them. This slows drying at the ends and helps prevent checking. Moisture content should be about 13 percent to assure best stability, however, and moving the lumber into an enclosure, or a more controlled environment, will assist that process. Dehumidifier units can also help speed up drying.

Commercial mills use large kilns to dry lumber steadily, but more rapidly than air drying. Note the stickers seperating the stacks of lumber.

For thicker lumber, drying times increase. Boards obviously dry better (more rapidly) than limbs. So ripping the lumber green will improve drying time.

Good luck to both of you!

Change of Address

In the January '96 issue's "Book Reviews," the address for the publisher of *Crafting New Mexican Furniture,* Red Crane Books, was incorrect due to a change of address. The new address is: Red Crane Books, 2008 Rosina St., Suite B, Santa Fe, NM 87505; (800) 922-3392.

A Bow to Don Kinnaman & R.J. DeCristoforo

Don Kinnaman, a retired shop teacher and contributing editor for *Popular Woodworking,* asked me if I'd like to have his collection of shop tips and techniques since I was still an active woodworking teacher. Of course I did! Within days a heavy package arrived from Phoenix. What a terrific collection it was. Hundreds upon hundreds of tips and techniques were neatly pasted and organized in book form. I spent many enjoyable hours looking at a collection that spanned Don's 40-year teaching career. I was amazed because it was started in about 1950 while I was making pig shaped cutting boards in junior high school.

Don's name appeared regularly under many fine tips. But another woodworker's name surfaced hundreds of times, page after page, decade after decade. Yes, it was R.J. DeCristoforo — what an exceptional woodworker, writer, innovator and inventor. He is still active, still dedicated, still tireless, and also a contributing editor for *Popular Woodworking.* Thanks Don Kinnaman and R.J. DeCristoforo for all your contributions to woodworking.

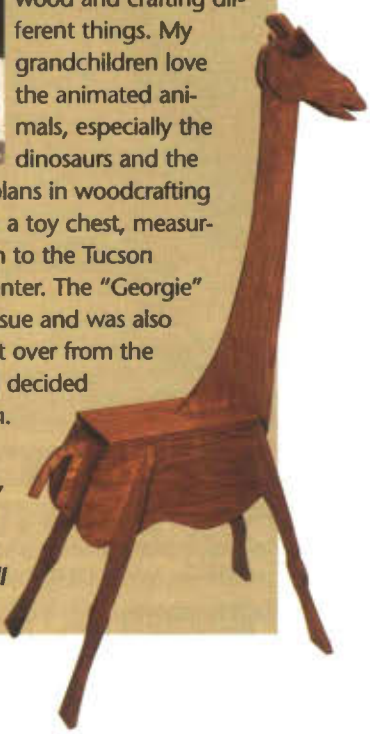
Dick Dorn
Oelwein, Iowa

Passing Joy Through Generations

I enjoy working with wood and crafting different things. My grandchildren love the animated animals, especially the dinosaurs and the alligator. Most of the ideas come from plans in woodcrafting books that I subscribe to. I've also made a toy chest, measuring 30" x 30" x 36", that was a donation to the Tucson University Hospital Children's Cancer Center. The "Georgie" Giraffe was in your March 1994 *(#77)* issue and was also made from the "scrap" oak paneling left over from the toy chest. The wood grain was so nice, I decided to finish it with the same natural oil stain.

Hopefully you can publish these to show your readers that septuagenarians, and older folks, enjoy using their hands to create wood craft for the youngsters.

George Small
Tucson, AZ



Correction: In the "Consumer's Choice Awards" *(PW* #89), the photos of the Craftsman and Skilsaw models were switched in the tie for the Best Circular Saw. We apologize to our readers, Craftsman and S-B Power Tools for the error.

ATTENTION TRICKSTERS!

Tricks of the Trade shares readers' ideas for making woodworking tasks easier and safer. Send your original, unpublished ideas to Tricks of the Trade, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207.

The VersaPak System, introduced recently by Black & Decker, uses interchangeable batteries, which are sold separately to reduce tool prices.

If needed, please illustrate with a color photo or diagram. We'll pay $35 for each trick we decide to publish, and the best submission will win a Black & Decker VersaPak™ System, including a cordless 7.2-volt drill, a cordless detail sander and a cordless multi-purpose saw.

This Month's Winner!

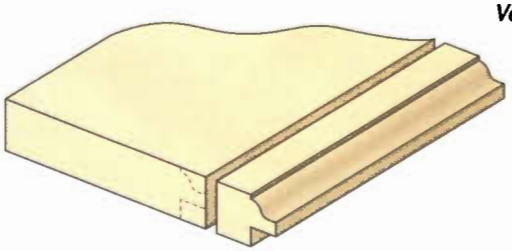
Wascally Rabbets!

Rabbets and moulded edges like those used for picture frames are difficult to cut safely and accurately on small frames for pictures or photographs when using a router.

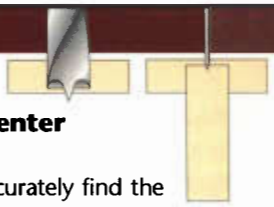
I make moulded frame sides without trouble if I do the router work on the edge of a wide board, then cut that piece off on the table saw. Then I repeat my router cut on the new edge and so on until I have enough pieces for my frames.

The wide board gives me a good bearing surface for the base of the router so I can cut the rabbet from one side and my moulding from the other without fear of the router wobbling and spoiling the wood.

John Clarke
Venice, Florida



Advanced Center for Dowels



I needed to accurately find the centers of the ends of a number of pieces of dowel rods to be used as rollers in some toys I was making. I have since used the following method for other applications.

I used a drill the same size as the dowel and bored a piece of scrap wood to the stage where just the point showed through. By then placing that scrap piece over the end of the dowel, I was able to push a nail through the drill's exit hole to mark the center of the dowel.

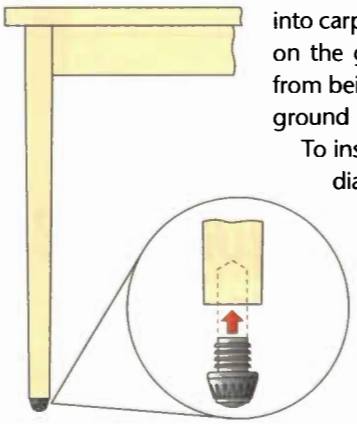
Robert Schofield
Dallas, Texas

Bottoms Up!

I've found that the plastic stoppers supplied with some bottles of wine make excellent feet for chair and table legs. Not only are they free, but very durable as well.

They appear to be made from polyethylene and get their strength from their thick cross section. Another advantage is that they are also taller than store-bought feet.

When used indoors on table legs, the extra height keeps the ends of the legs from sinking into carpeting. When used outdoors on the ground, they keep the legs from being damaged by wicking up ground moisture.



To install, simply bore the proper diameter hole in the leg end and tap the stopper into place using a mallet.

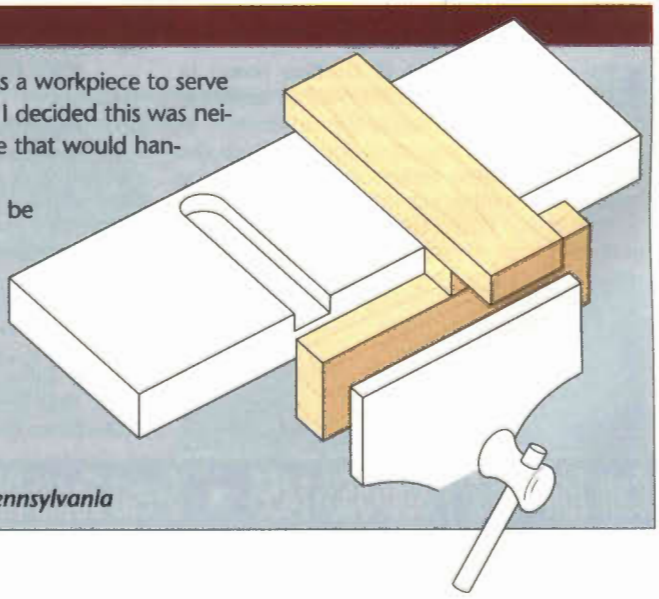
Walt Morrison
Northport, New York

In The Groove

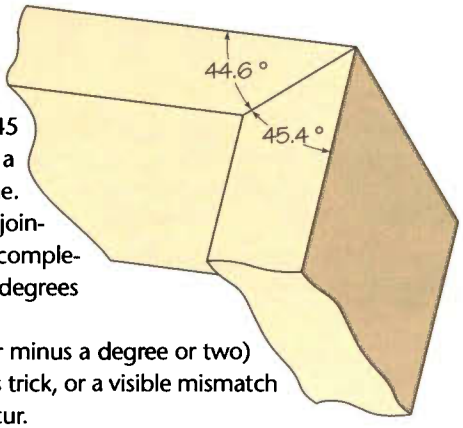
Like most readers, I have clamped a piece of scrap wood across a workpiece to serve as a guide when using a router to cut grooves for dado joints. I decided this was neither convenient nor craftsmanlike, and made a special T-square that would handle most jobs.

The T-square can be clamped to the workpiece, or both can be held in a vise. There's a block to rest against the workpiece that's also deep enough to grip in a vise. The guide piece is square to the block and includes a spacer thicker than the depths of the grooves I expect to cut. The guide piece extends a short distance behind the spacer to guide the router at the start of a cut. I joined my parts with glue and dowels, but they could be screwed together.

William Pearce
Philadelphia, Pennsylvania



To A Certain Degree

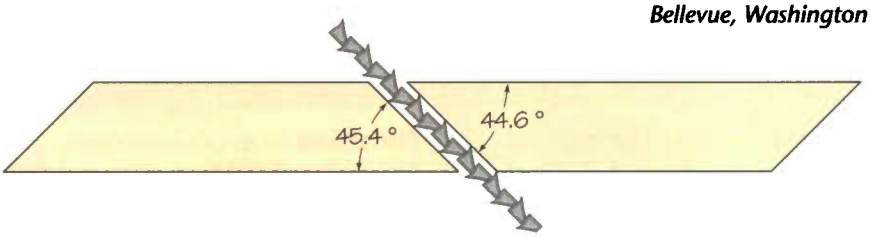


If you can't trust your miter saw or miter gauge to give you an accurate 45 degree cut to form a miter joint, here's a way to make an accurate joint every time.

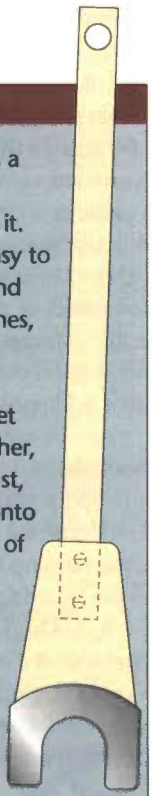
By alternating the location of the adjoining complementary cuts, you'll form a complementary angle always adding up to 90 degrees (see *diagram*).

The cuts will need to be close (plus or minus a degree or two) to an accurate 45 degrees even with this trick, or a visible mismatch on the inside corner of the joint will occur.

Gregg Kerber
Bellevue, Washington



Shop Helper



Every woodshop needs a large magnet with a broom-type handle on it. The handle makes it easy to push the magnet around the floor, under machines, benches, etc., without stooping.

If you drop a small set screw, nut, bolt or washer, even in a pile of sawdust, the magnet will grab onto it (but only if it's made of ferrous metals, of course).

Another use for a large magnet is to magnetize a screwdriver so that it will hold a screw for difficult fastenings.

Magnets are available from places such as Radio Shack, or Edmond Scientific by mail, or you could get one out of a junked microwave oven or the speaker of an unrepairable television set, like I did.

Devore O. Burch
Fort Worth, Texas

Non-Binding Solution

I taped a nail with a diameter slightly larger than the blade of my hand saw to the saw's handle. It comes in handy when I need to saw through a thin sheet of plywood. Unless I place something in the kerf created when sawing through the sheet, the saw will bind as the sundered pieces press back against it. That's where the nail comes in. I just drop the nail into the kerf; its head keeps it from falling through.

Lane Olinghouse
Everett, Washington

Divine Turning Tool

Sharp finishing nails in the end of the legs of this gauge mark the length of repeated turnings. The distance between the points is the desired finished length. The legs are slipped over the turning to check your progress.

Robert Tupper
Canton, South Dakota

by Ken Textor

Redwood

Few woods can match its suitability for a wide range of indoor and outdoor projects.

From a tree of near-mythical status comes lumber that's both versatile and highly desirable. For exterior and interior uses, redwood has few rivals.

General Description

Some confusion over redwood *(Sequoia sempervirens)* stems from common names that are loosely tied to it. It's often called sequoia, confusing it with the famous giant sequoias *(Sequoiadendron giganteum)* of California's Sierra Nevada. Conversely, giant sequoias are frequently called giant redwoods, creating even more confusion.

The redwood sold at lumber yards is mostly harvested on private lands. These trees grow along the coastal areas of northern California and southwest Oregon because of the large amounts of moisture needed to sustain them. Ocean fogs provide them with a nearly continuous source of water. This climate produces some of the tallest trees in the world. Redwoods grow to 350 feet, 100 feet taller than the Statue of Liberty.

Although sensitive to changes in climate, redwoods are remarkably prolific and fast-growing trees. Unlike other softwoods, the redwood can reproduce itself from either seeds or coppice shoots from roots. After a redwood tree is cut, several start to grow at the stump to take its place, ready for harvest in just 50 years. If left undisturbed, the tree can continue to grow for at least 1,000 years. Some redwoods are 2,000 years old.

Redwood lumber is moderately light in weight, yet relatively strong, and stiff for a softwood. It's often compared with western red cedar (see *PW* #88).

Redwood is a little darker red than cedar. Ordinarily, though, it's a brick red color that turns dark gray when exposed to light.

Like western red cedar, redwood lumber is very straight-grained. Older first-growth trees tend to be more fine-grained and impact resistant. Redwood lumber moves very little during humidity changes, and the heartwood's ability to resist rot, especially in older trees, is legendary.

Redwood is used in many phases of home construction. An exception is heavy timber frame construction; it's considered too brittle. It's prized for sash, siding, doors, moulding and all sorts of finish stock. It's also used in caskets, water tanks, tight cooperage, fence posts, outdoor decks, planters of all types, outdoor furniture and, of course, hot tubs.

Working Properties

Like western red cedar, redwood is a pleasure to work. Whether power or hand planing, the results are usually excellent. When sanding, there's less danger of sanding dips with redwood due to its improved hardness when compared with western red cedar.

Most cutting and shaping operations are trouble-free. Redwood's performance on the lathe is much better than western red cedar. Chips come off fairly smooth, and a glued-up turning block is easier to work than a large solid piece.

Fastening redwood is virtually problem-free. If fastening near the end of a board, however, you will want to use pilot holes. The brittle nature of redwood makes it prone to splitting. Where pilot holes are drilled, use a bit that's a size smaller for best results. (Use a #10 pilot bit for a #12 screw and so on.)

Finishing

Redwood takes and holds paints and stains as well as any exterior wood, and better than some. Stains are the preferred finish, although many woodworkers are also leaving exterior redwood projects unfinished. If you're using stain, do so before the sun starts to darken the surface.

Because of the variability of redwood's heartwood colors, use full-bodied stains to achieve a uniform result, particularly on house siding.

Clear finishes will be less successful than paints or stains. Redwood's modest hardness makes most shellacs, varnishes and lacquers eventually fail or require frequent additional coats.

Availability

Redwood is widely available throughout North America. Prices remain relatively stable, ranging between two and six dollars per board foot. Most redwood is sold in 4/4, 5/4 and 6/4 thicknesses.

Because of its useful characteristics, redwood is a species woodworkers should try at least once, particularly for those upcoming outdoor projects. After all, the redwood lawn chair you build today should be around for your grandchildren to use when they start relaxing with *their* grandchildren at the season's first backyard barbecue. PW

***Ken Textor** is a contributing editor to* Popular Woodworking. *His workshop is located in Arrowsic, Maine.*

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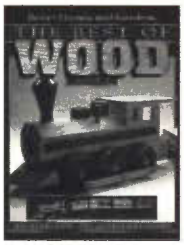

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WOOD® Magazine test, Sept. '93, pg. 45

The Proof Is In the Cutting

Both Woodworker II blades performed very well, whether cutting through butter-soft ¾"-thick pine or iron-hard 1¾"-thick ash. The 20° positive hook angle and 15° alternate top bevels give the blades an aggressive attack; we maintained a brisk, uniform feed rate while ripping a variety of woods on the powerful Unisaw and experienced no discernible resistance or slowing. On the smaller saws, switching to the thin-kerf blade allowed very similiar feed rates, again with barely noticeable resistance.

Although we've used blades that cut faster, their cut quality couldn't touch what we got with the Forrest blades. On solid stock, ripped edges came off our saws jointer-finished, smooth and slick with no visible teeth marks—good enough to edge-glue without additional machining. Crosscuts came out crisp and clean with no fuzzing or tiny splintering.

The Bottom Line

Performance of the Woodworker II is impressive enough that you could bolt this versatile, general-purpose blade on your saw and use it for virtually all of your cutting operations.

SHOP TEST, Woodworker's Journal Nov./Dec. '95 pg.78

CHOPMASTER FOR SLIDING COMPOUNDS & MITER SAWS

New specs, 5° Neg. Pts. & flat, runs out less than .002 for perfect, tight, smooth, splinter-free miter joints. TAKE EXTRA 10% – 20% OFF COMBO SALE!

NEW SIZES AVAILABLE	LIST	SALE
Delta Sidekick 6-1/2"x40Tx5/8"	$149	$ 89
Sears 8-1/4" & Delta 8-1/4"x60Tx5/8"	$170	$ 99
Hitachi 8-1/2"x60Tx5/8"	$179	$109
DeWalt 8-1/2" & Ryobi 8-1/2"x60Tx5/8"	$179	$109
Delta 9"x80Tx5/8"	$204	$119
Ryobi–Makita & all 10"x80Tx5/8"	$207	$129
DeWalt, Makita, B&D, Hitachi 12"x80Tx1"	$229	$139
Ryobi–Makita 14"x100Tx1"	$266	$179
Hitachi 15"x100Tx1"	$277	$189

For good general purpose cuts use Woodworker II 30T & 40T or Woodworker I. Use small stiffener where possible.

WOODWORKER I – CROSSCUT For TABLE and RADIAL SAW

	LIST	SALE
12"x60Tx1" or 5/8" 1/8"K	$198	$139
10"x60Tx5/8" 3/32"K	$162	$129
8"x60Tx5/8" 3/32"K	$150	$109

OTHER SIZES AVAILABLE

NEW DELUXE DADO-KING!

AS LOW AS $184 NET AFTER USING SHARPENING COUPONS

C-4 Carbide Tips — 4 on each chipper with special negative face hooks.

	LIST	SALE	10%	15%
6" D. 5/8" Bore NEW	$299	$269	$242	$229
8" D. 5/8" Bore	$321	$289	$260	$245
10" D. 5/8" & 1" Bore	$389	$349	$314	$297
12" D. 1" Bore	$499	$449	$404	$382

(Bore up to 1-1/4" Add $25 — Plus $5.50 S&H)

DURALINE HI-A/T FOR TABLE & RADIAL SAWS ALL FLAT FACE

5/8" HOLES. Boring up to 1-1/4" $7.50 extra. Larger holes–time basis. Shipping $4.50.

Faster feed rates & absolute splinter control. Stops splintering on OAK/ BIRCH PLY VENEERS & MELAMINE.

Other sizes available

SIZES AVAILABLE	LIST	SALE
7-1/4"x60Tx3/32" K	$149	$129
8"x80Tx1/8" & 3/32" K	$202	$169
9"x80Tx1/8" & 3/32" K	$207	$179
10"x80Tx1/8" & 3/32" K	$207	$159
12"x80Tx1-1/8"K	$212	$181

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Standard C-2 Carbide (below, left) and FORREST **still sharp** Oxidation and Corrosion Resistant Sub-Micron C-4 Carbide (below, right). Each shown after cutting 3,500 feet of MDF. Similar results obtained cutting particle board, melamine, and plywood.

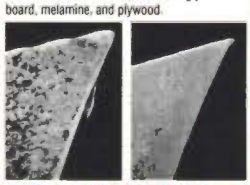

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PHOTO BY RICHARD HOWARD

Woodworker and TV host Norm Abram.

Minwax Hails April as National Woodworking Month

Since spring is the perfect season for woodworkers to tackle those projects they've put off during the finger-numbing days of winter, Minwax® has dubbed April as **Minwax National Woodworking Month™.**

Throughout the month, callers to Minwax's Wood Beautiful® hotline will receive a free copy of the 36-page *Wood Beautiful* magazine, and some practical advice from woodworking experts, including Norm Abram and Bruce Johnson.

Abram is a master carpenter and host of the popular public television series "The New Yankee Workshop."

Johnson, a craftsman, author and editor of *Country Living,* will give advice on wood finishing.

To reach the hotline, dial (800) 44-STAIN during April.

Milwaukee Electric Tool Assumes Sales, Marketing and Service for Two Tool Brands

Milwaukee Electric Tool Corp., a leading manufacturer of heavy-duty electric tools in North America, has acquired responsibility for selling, marketing and servicing electric tools previously offered by Chicago Pneumatic Electric Tool, including AEG brand electric tools, in the United States and Canada.

During the transition, Milwaukee will sell products using Chicago Pneumatic Electric Tools' brand name. By the end of 1996, most of the products are expected to be consolidated into the Milwaukee tool line.

Milwaukee also will provide parts, repair and warranty service for Chicago Pneumatic Electric Tool products and AEG brand electric tools.

Woodworker's Book Club Expands and Offers Free Membership

The Woodworker's Book Club, well known for its wide variety of books and the only book club exclusively for woodworkers, has greatly expanded its offering of titles to include all major woodworking book publishers.

Some recent main selections have included Jim Tolpin's *The Toolbox Book,* published by Taunton Books, and Bob Flexner's *Understanding Wood Finishing,* published by Rodale Press.

Club members get the first shot at many main selections before

they hit the market. Plus, all titles in the book club's free, full-color bulletin are discounted from 15 to 50 percent off.

Joining the Woodworker's Book Club is free, and there's no obligation to purchase anything. For more information, write to: Member Services, Woodworker's Book Club, P.O. Box 1271, Cincinnati, OH 45212-0171.

American Association of Woodturners Celebrates 10th Symposium

More than 500 woodturners, collectors and teachers are expected to attend **"Turning Ten,"** The American Association of Woodturners' (AAW) 10th annual national symposium from June 22 to 24 in the Koury Convention Center, Greensboro, NC.

At least 100 demonstrations, lectures, slide presentations and panel discussions by international and national leaders of the woodturning community will be featured during the event. The symposium also will include a gallery showcase of attendees' work, a Mentor's Invitational Show and an auction, which are all open to the public.

The AAW is the largest woodturning organization in the world. More than 5,700 members belong to 78 local chapters throughout the United States.

For more information, contact the AAW at 3200 Lexington Ave., Shoreview, MN 55126; (612) 484-9094; or fax (612) 484-1724.

Int'l Woodcarving Competition Accepting Entries for 30th Show

The International Woodcarver's Congress, an annual world class woodcarving competition and show, is looking for entrants to help celebrate its 30th anniversary. The Affiliated Wood Carvers, Ltd. (AWC) will sponsor the event at the Putnam Museum in Davenport, Iowa from June 20 to 23.

Participation in the carving competition or the seminars is limited to AWC members, but you can join by sending $10 in annual dues. Last year, more than $16,000 in cash and prizes were awarded to contest winners. For more information, write to Larry Yudis, Affiliated Wood Carvers, Ltd., P.O. Box 10408, Bettendorf, IA 52722-8408; or call (319) 359-9684.

This carving of a younger Abe Lincoln, created by Rick Harney of Normal, Illinois, won last year's "Henry Taylor Best of Show Cash Award" of $1,500.

NEW PRODUCT RELEASES

Shake, Sand and Roll

American Machine and Tool (AMT) is now producing a drill press which serves double duty.

The Model 5740 Permatrak Full Function Drill Press serves as an 8", five-speed drill press. With a five second belt change, it will also serve as an oscillating sander, grinder and milling machine.

Operating with a ⅓ hp, 1725 rpm motor, the 5740 offers a ½" oscillating travel and a spindle travel of 2". The chuck will accept drilling, sanding or grinding accessories up to a ½" shank.

The Permatrak Full Function Drill Press retails for $129.50. A catalog is available by calling (800) 435-8665 *or circle #162 on the Resource Directory Coupon.*

Pen-ultimate Scratch Repair

Minwax® is offering a handy solution to visible signs of wear and tear on your prized wood furniture. Minwax Wood Finish™ Stain Markers offer oil-based wood finish stain in handy pen-type markers.

The stain markers are useful for fast, permanent touch-ups of most interior wood surfaces, including furniture, cabinets, doors, moulding and floors. The markers are available in Red Mahogany, Provincial, Dark Walnut, Golden Oak, Red Oak, Early American, Pickled Oak and Cherry. They are also useful in stenciling and faux marquetry.

Each ⅛ fluid ounce of oil-based stain retails for $3.50. For more information, write to Minwax Co., 10 Mountainview Rd., Suite A, Upper Saddle River, NJ 07458-1934 *or circle #160 on the Resource Directory Coupon.*

Oil & Water? Both, Thank You

Binks Manufacturing Co. has developed a pressure cup designed for use when spray finishing with waterborne and solvent base materials.

The Steadi-Grip SG-2 Pressure Cup offers spray application efficiency, investment savings in time and materials, as well as functionality in conventional and HVLP finishing.

The Steadi-Grip includes a double-capacity 2-quart pressure cup, portability with efficient adjustment of fluid and air controls at the gun, and plastic liners for quick color changes and clean-up.

Steadi-Grip outfits are available for Binks Model 95, 2001 and MACH 1 spray guns in two models, one with an automatic air agitator (80-351), and one without (80-350). List price for the 80-351 is $380 and for the 80-320 is $260.

For more information, call (708) 671-3000, or write Binks Manufacturing Co., 9201 Belmont Ave., Franklin Park, IL 60131-2887 *or circle #161 on the Resource Directory Coupon.*

Sand-tastic!

Bosch is offering two new random orbit sanders, the B7255 5" and the B7300 6", both offering 3 amp motors with a variable speed range of 4,500 to 13,000 orbits per minute.

Both units also feature an integral pad dampening system which helps prevent start/stop damage on the work surface. They use a hook and loop pad system and through-the-pad dust extraction with either a dust bag provided or an optional vacuum system.

The B7255 retails for about $100 and the B7300 for about $115. For more information, contact S-B Power Tool Co., 4300 W. Peterson Ave., Chicago, IL 60646, (312) 794-7495, *or circle #163 on the Resource Directory Coupon.*

A Real Tool Horse

TracRac, Inc. has designed what's intended to be "the ultimate work station system." The TracMaster, an 8' triple-track beam mounted on retractable legs, is a sliding tool mounting system offering a universal tool mount, an adjustable work support and a sliding end stop as standard accessories.

TracMaster is constructed of a strong, yet lightweight, anodized aluminum. This gives it a weight of only 35 pounds, but a support capacity of 300 pounds.

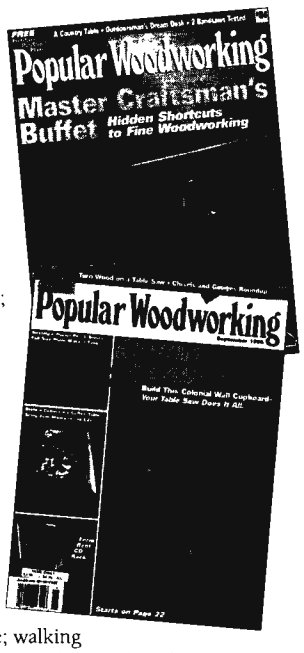
The universal tool mount allows attachment of chop saws, jointers, vises, grinders, etc.

The complete system is retailing for about $300 at many home center stores. A sliding extension stop offers a 9' cut, as well as additional tool mount surfaces. Work supports are available for $39 each.

For more information, call TracRac, Inc. at (800) 501-1587 *or circle #164 on the Resource Directory Coupon.*

Popular Woodworking Back Issues

Back Issues only $4.50 and $3.50 postpaid.



All 1994 and 1995 issues just $4.50

September '95 Country wall cupboard; collector's coffee table; turning on the table saw; porch swing; review on chisels and gouges.

July '95 Mission style coffee table; mortising jigs for your router; french provincial corner cupboard; kids' chairs and table set; fundamentals of spindle turning; kit furniture review.

May '95 Router bit basics; walnut buffet; sportsman's desk; carving luxury cars; finishing with wax; country farm table; authentic wooden drum.

March '95 Preparing stock; traveling lawn chair; flap-top table; T. Rex whirligig; cedar-lined hope chest; pier table.

January '95 Handkerchief table; toy chest; legless coffee table; corner computer desk; how to co-op your shop.

November '94 Carve a loon; library steps; a chest for silver flatware; carving sailor sam; using the tormek grinder.

September '94 Hope chest; deck furniture; jewelry box; cantilevered rocking horse; bit storage cabinet; revolving bookcase; dual biscuit joinery.

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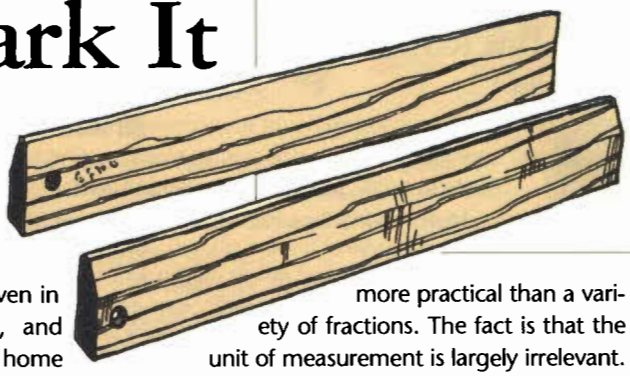
Measure It & Mark It

Good woodworkers go to great lengths over small units of measure.

Diagram 2: Winding Sticks



Most woodworking can be reduced to a series of essentially simple operations that, when combined, appear to be complicated and sophisticated procedures. But no matter how you reduce the various elements of design, structure and assembly, if you don't begin with accuracy, you won't be able to produce a perfect piece.

Many power tools have their own built-in measuring systems: you can set the router to cut at a specific depth, the table saw to cut a specific distance from its fence, etc.; but precise layout of individual pieces is still vital, and all too often depends on a loose use of the metal tape measure.

Pre-power woodworkers used a variety of measuring and marking devices to make their life easy, and most of them may still be used to ensure the accuracy of your own work — even in a powered workshop, and especially in a small home shop where space is at a premium and large stationary power tools are still a gleam in the eye.

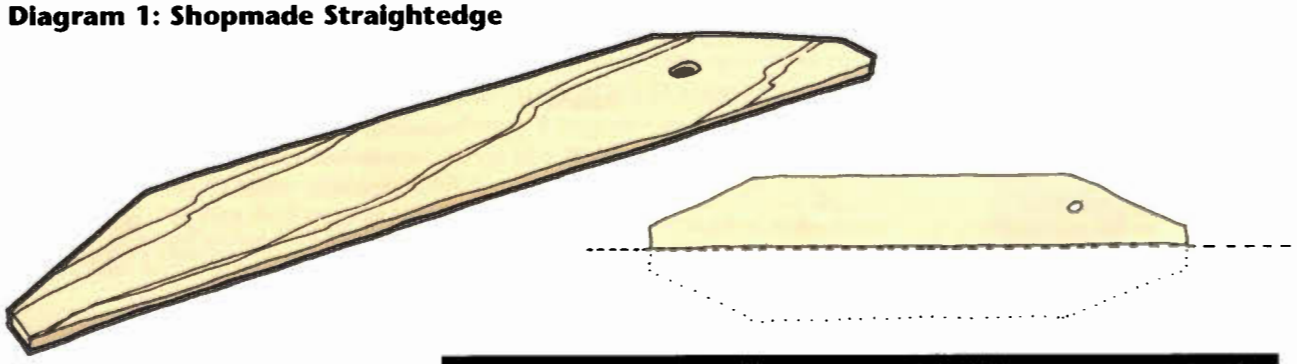
Units of Measurement

Although the imperial inch-foot-yard, etc., system was developed from a series of logical parameters (such as average hands, feet and strides), and despite that its base of 12 (inches to the foot) makes it readily divisible in a variety of ways, advocates of the decimal-based metric system are quick to point out that it frequently becomes cumbersome.

Every carpenter is familiar with real-life measurements such as "six feet, three inches and a hair" or "a scosh under so-and-so many inches"— these being more practical than a variety of fractions. The fact is that the unit of measurement is largely irrelevant. Almost any standard will work if used consistently, and many are in use around the world.

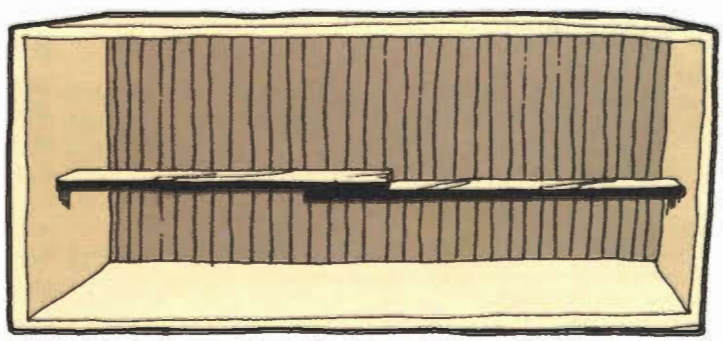
Of course, it helps considerably if your tools are made in the same units as the measurement system you use — so that a ¼" mortise can be conveniently excavated with a ¼" chisel, for example — but it is relative proportion that is more important in good design (and this invariably underlies sound construction) than actual units of measurement. Nevertheless, if your straightedges, try squares, bevels, and other measuring, guiding and layout tools are graduated with some form of consistent calibration, this will constitute a very real advantage in your work.

Diagram 1: Shopmade Straightedge



To test the truth of the straightedge, draw a (dotted) line using the straightedge, then flip it (into dotted position) and compare the edge with the line.

Diagram 1a: Pinch Rods *Obtaining an interior dimension.*



by Graham Blackburn

The higher edge of the rear stick indicates the board is higher or warped at this point compared to the front stick.

Straightedges and Rules

A simple length of straight wood may serve as a convenient straightedge for testing and marking. It may be made in almost any size or length convenient for the job at hand, but remember that it should be straight in two ways: along the flat and along the edge. ***Diagram 1*** illustrates a good shape for a shop-made straightedge and a method for proving its accuracy. Remember, under different conditions, some woods are more dimensionally stable than others. If you make a shop-made straightedge with the intention of using it for a long time, it will pay to make it out of a relatively straight- and close-grained wood such as mahogany or maple.

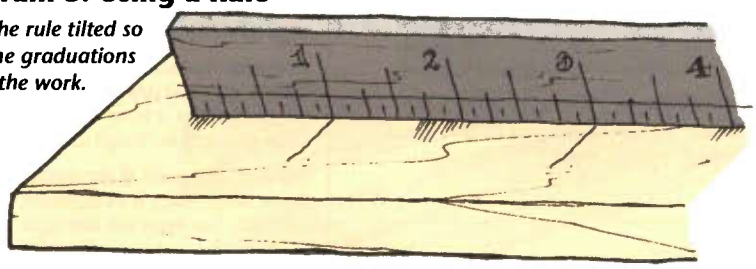
A single wooden straightedge graduated in inches may be used to mark off various lengths, but two, ungraduated straightedges may also be used for measuring distances not otherwise conveniently measurable. Two such straightedges used as a pair are known as "pinch rods" ***(diagram 1a)***. By holding them together and extending them until they fill an interior space (such as the diagonal between two opposing corners of a cabinet), this measurement can be compared (with the opposite diagonal, to guarantee squareness of the case) or transferred as necessary.

A shorter pair of wooden strips may also be made to serve as winding sticks ***(diagram 2)***. These are invaluable in gauging the flatness of a board being planed, checking the flatness of your bench, or measuring the planes of any surface not able to be held to any other standard. The sticks are laid parallel to each other on the surface to be tested and sighted across. If the surface is truly flat, the top edges of both sticks will coincide. If one edge is tilted relative to the other, this indicates a departure from planeness.

A sufficiently thin strip of straight-grained wood may also be used to fair, or generate, various shaped curves for which no other template may be available. A little experimenting will soon demonstrate how different shaped curves can be obtained depending on the points at which such a thin strip is held and bent: the further apart you hold it, the broader the curve, etc.

Diagram 3: Using a Rule

Keep the rule tilted so that the graduations touch the work.



For greatest accuracy, nothing's better — in the woodshop — than a machinist's straightedge. Typically uncalibrated, a 48"-long machinist's straightedge is a precision instrument and should be treated with care. Always lay it down flat, protect it from extreme temperatures, and keep it in a case when not in use. It will provide you with a standard of straightness and flatness greater than is actually possible with a material essentially as alive and ever-changing as wood, which reacts constantly to ambient moisture.

A graduated wooden straightedge can be extremely useful for measuring. Look at it carefully and see how it's marked. There are different systems of graduation: it may be marked in centimeters or inches, which may be divided in various ways — tenths, twelfths, or eighths. Also note that the subdivisions may be marked with lines of different lengths, making it easy to read off fractions of the basic unit.

It may seem obvious that to measure a certain distance between two points with a rule you should place the end of the rule even with one point and read the graduation line nearest the other point. But if, as often is the case, the end of the rule is worn or missing, you should start at the 1" mark and subtract 1" from your reading. This is a good technique to practice when using retractable tape measures. This is especially true for those with sliding tips at the end designed to compensate for inside or outside measurements, since error is liable to creep in as the tip becomes worn with use and isn't always fully compressed or extended.

To measure accurately with a graduated wooden rule, hold it on its edge so the graduations touch the work being

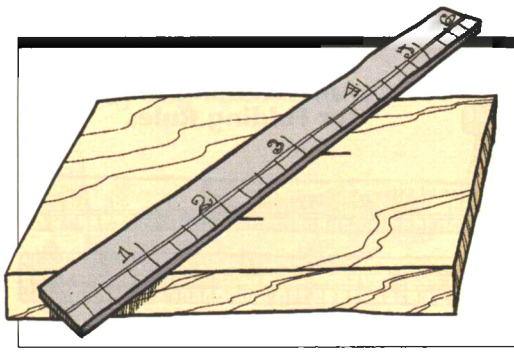


Diagram 4: Dividing a Board Using the Rule

By angling the rule until the 1" mark and the 4" mark are at the edges of the board, the 2" mark and 3" mark can be used to divide the board into three equal widths.

measured ***(diagram 3)***. Depending on the rule's thickness, this could reduce inaccuracies by as much as ⅛".

To find the center of a board, hold the rule across the board so that two even inch marks (remember that zero, the end, counts as an even mark) touch the edges, slanting the rule as necessary, and read off the dividing mark. An extension of this idea is the method of dividing the width of any given board into equal parts, as in ***diagram 4***. The rule is slanted across the width of the board so that its graduations may be evenly used to represent the required divisions. For example, if you wish to divide a 2½" wide board into three equal parts, hold the rule so that the 1" mark and the 4" mark touch the edges and mark the board at the 2" mark and the 3" mark.

By holding the rule so that a given graduation is kept even with the edge of a board, and keeping the rule perpendicular to the edge, you can run the rule down a board using it as a marking gauge with a pencil held at its end. For this purpose, it helps to file a small notch just big enough for a pencil tip or a marking awl in the center of the end of the rule.

Long Measurements

The metal tape measure wasn't always the ubiquitous measuring device it is now. To start with, tapes were made of actual tape, and had to be wound back into a leather case by hand after use. Such tapes may still be found, especially in the longer lengths, and as such are somewhat easier to use when measuring long distances since they're more forgiving of obstructions than hard metal. But take care not to stretch them excessively. If the end has been worn or frayed so that it no longer begins at zero, simply push a safety pin through the first convenient whole number and remember to subtract the appropriate distance from the final measurement.

A long tape is ideal for measuring long lengths, but to mark a long line itself you need a chalk line. These are sold in cases into which the line may be wound and powdered chalk is kept, automatically recoating the line each time it's used. Such a chalk line is a relatively modern

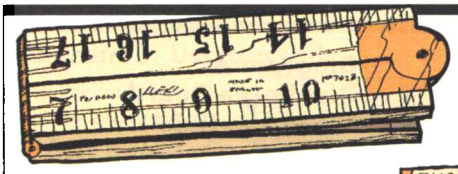
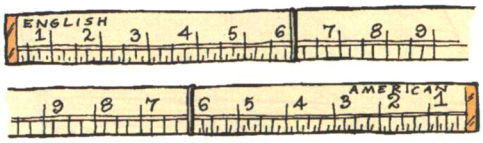


Diagram 5a: Four-Fold Rule

Diagram 5b: English & American Marking Systems for Folding Rules



invention, but lacking one you are not necessarily unable to mark a long line. You simply need to do as previous generations did: rub a length of suitable string or twine against a lump of chalk (or soft red brick) as you stretch it out and snap it as you would a modern chalk line. (The Japanese continue to use lines that are wound around small wheels held in a container of charcoal.)

The accuracy of a snapped chalk line depends on holding the stretched line as perpendicular as possible over the place it is to be snapped. If held to the side, the line won't be perfectly straight.

Folding Rules

For many years woodworkers used folding rules *(diagram 5a)*. Many older woodworkers still maintain that these have advantages as yet unsurpassed by the now more common metal tape measure. Made in a variety of lengths from as short as 6" to as long as 4' (once-, twice-, and sometimes three- or four-folding), such rules may be conveniently folded and carried in an apron or back pocket.

Whatever the variety, the folding rule is usually a good deal more sophisticated than its cousin, the tape measure. The folding rule is exact, and can not only measure off a scribed line or a given distance, but, by virtue of the various scales marked on it, can also be used for directly measuring actual distances on a scale drawing. It's also useful for measuring or laying out angles since it can be used as a protractor, with the aid of a simple table giving the angles corresponding to the various openings of the unfolded arms.

Relatively cheaper and more simply marked folding rules were used for general work, but more expensive varieties with better constructed joints, brass edgings, ivory segments (even more stable than the very dense and stable boxwood usually used), and fitted with little spirit levels and even calipers were also offered by many manufacturers. The better rules were also marked with graduations in eighths, tenths, twelfths, and sixteenths of an inch, as well as various architect's scales and protractor markings around the knuckle joints. In short, these tools were made to last longer and do much more than today's virtually disposable tape measure.

The rule also has the advantage of being rigid, and won't unexpectedly rewind itself. It can be held with confidence at almost any angle to the work. To accommodate other personal preferences, different marking schemes are used. For example, for the near-sighted, rules known as "blind man's rules" with extra large numbers are still available. And depending on whether you're left-handed or right-handed, you have the choice of "English marking" or "American marking." Rules with English marking are graduated from left to right, like the words on a written page. American-marked rules are graduated from right to left *(diagram 5b)*. I grew up using the English system, which seems more logical than having the numbers run backwards; but the American system has the advantage that, when the rule is held in the left hand, the right hand is free to use the marking instrument without obscuring any numbers.

Skilled users become adept at flicking folding rules open and shut, but the beginner is often frustrated by a tool that always seems to be folded the wrong way. Furthermore, while it's true that the folding rule doesn't clip on your belt like a tape measure, neither does it unexpectedly fall off. It usually finds a secure home in your back pocket, shirt pocket, or apron. In practice, I now use both: the tape for hooking over the ends of boards

Diagram 6a:
Zig-Zag Folding Rule

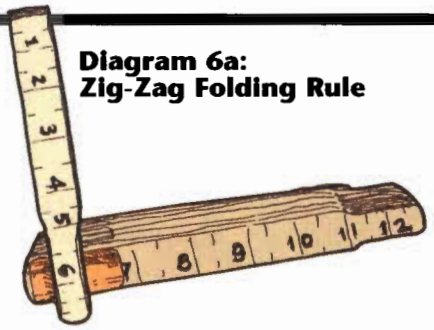
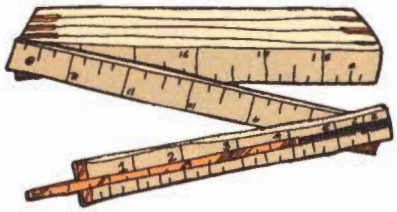


Diagram 6b:
Zig-Zag Rule with Extension



to be marked off and cross-cut, as well as for measuring longish distances to be filled, such as window or door openings where there's no wood yet to be measured and where I can get the tape to stand rather rigid; and the rule for precise layout and marking. The rule also comes in handy as a depth gauge for checking mortises too narrow to admit the hook at the end of a tape.

Four-fold one-foot rules were frequently given away as promotional and advertising pieces. These, together with the small 6" versions often fitted with sliding calipers (made left- and right-handed), are also extremely handy to carry around.

The other main type of wooden rule useful in the shop is the zig-zag rule *(diagram 6a)*. "Zig-zag" was the Stanley Rule and Level Company's patented name for this design, but it has now become a generic term for a folding rule that opens in a zig-zag fashion. These rules' chief advantages are their rigidity and length. It's hard to get a metal tape to stay straight when extended much more than 6', especially when held horizontally; but zig-zag rules can be found that unfold up to 12', and remain rigid when completely extended. A further feature of some zig-zag rules is a sliding extension *(diagram 6b)*. This allows inside measurements to be read directly without having to calculate, rather inaccurately, the width of the tape measure's case. Two drawbacks to this kind of rule are the time it takes to refold the rule compared to the virtually instant retractability of a spring-loaded tape measure, and its vulnerability to breaking precisely because you didn't have the patience to refold it in the first place.

Accurate layout and precise measurements are fundamental to sound woodworking procedures. Regardless of your measuring or marking tools, take the time to "do your homework" and put to practice that old adage — "measure twice, cut once." PW

***Graham Blackburn** is a contributing editor of* Popular Woodworking. *He enjoys making furniture and writing about woodworking.*

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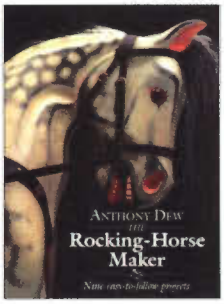

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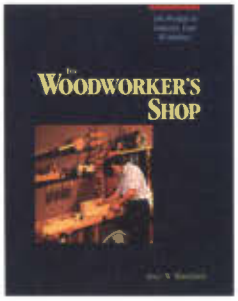

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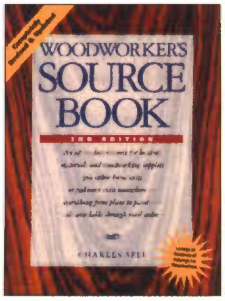

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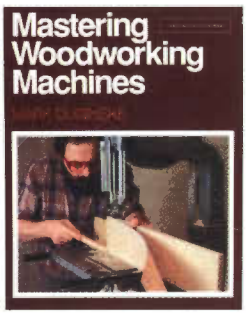

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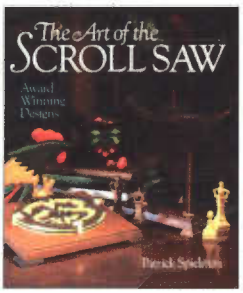

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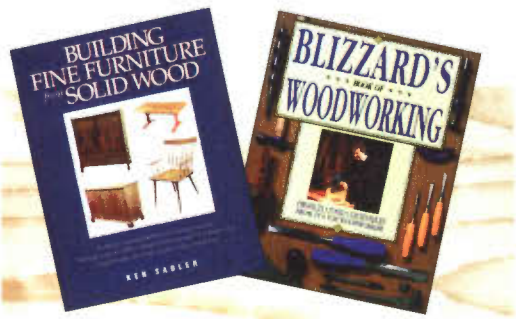

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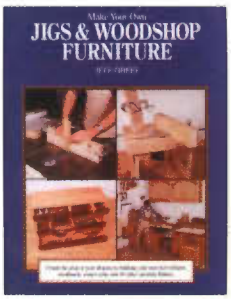

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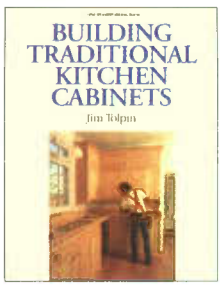

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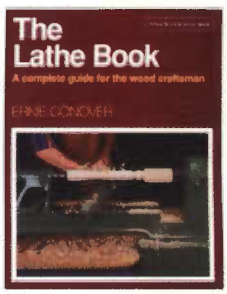

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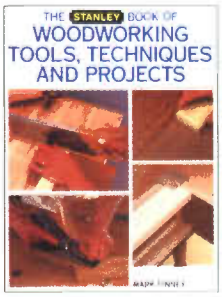

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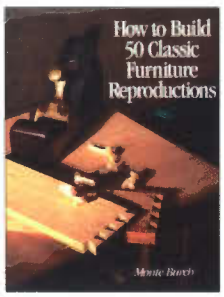

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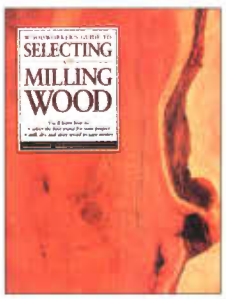

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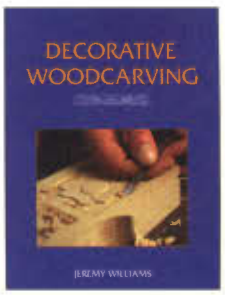

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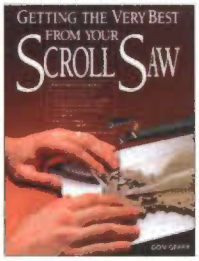

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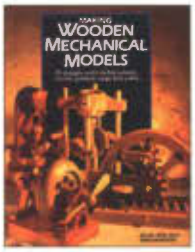

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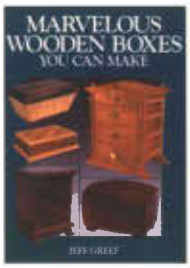

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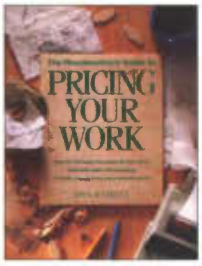

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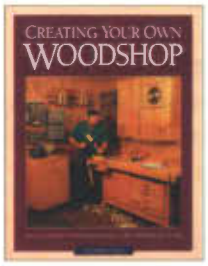

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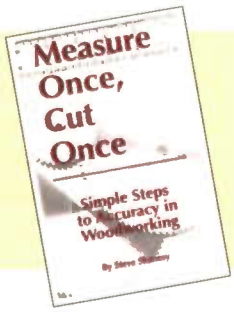

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WOMEN READERS!

Whether you design and create your own projects, or help your spouse in the shop, this is your forum! If you have a woodworking question or concern, would like to share your project ideas, or are seeking advice on anything from tools to finishing, I'd love to hear from you! Drop a letter to Dovetales, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207 or you can send e-mail to Wudworker@AOL.COM.

Wanted: Tools FOR Women

Have you ever picked up a power tool only to feel an ache a few minutes later because it was too big or heavy for your hand? Woodworking tools are designed with the average-sized man in mind, but, as you well know, the average-sized woman is significantly smaller.

So, from the start, most men have an instant advantage over most women woodworkers, who have to make adjustments to get the same performance out of their tools.

"Tools are fashioned for the fat guy at the hardware store," says woodworker Kristine Jensen. "You know, the one who bellies up to you as you're deciding whether to spend the extra money on the carbide tip instead of the high speed steel and says, 'Looking for something for your husband?'"

The biggest obstacles in the search for the right tools are size and weight. Betty Bridges, who co-operates a small custom cabinet shop with her husband, says, "I am probably much stronger than the average woman, as I have always done a lot of physical work since childhood." Yet when she first started working with her husband, she couldn't do things exactly the way he did. "This was mainly from the difference in the size and strength in my hands. I could not handle his large nail gun. It was just too heavy," she says. "The weight of hand tools that require repetitive use makes them more difficult for a woman to use."

"I suppose the train of thought is we couldn't possibly put our tools through the workout men do. Guess again! I have remodeled most of my house myself, built my shop from scratch, and repair nearly all mechanical failures of my car."

Although some "women-sized" tools do exist, usually their durability is sacrificed with their size and weight. Woodworker Sharon Vance says, "I suppose the train of thought is that we couldn't possibly put our tools through the workout men do. Guess again! I have remodeled most of my house myself, built my shop from scratch, and repair nearly all mechanical failures of my car."

Many women also have a disadvantage in height when using stationary tools. To help them work as taller people do naturally, some have developed raised floor panels or box-type step stools to reach the proper height.

Sharon Vance believes that putting more women on manufacturers' design teams would lead to more fair representation of women's tool needs.

But until more quality tools are developed for the average-sized woman, Betty Bridges has offered these guidelines for buying the right, good quality, tools:

1. When you pick up the tool, don't just check for a comfortable weight — it isn't the only factor that contributes to fatigue. You should also check the balance. For example, a well balanced jigsaw will vibrate less, be more accurate, and easier to use than a lighter weight, poorly designed one.

2. Go to woodworking tool shows. You can meet with knowledgeable salespeople and try out the tools. Take advantage of being able to directly compare different brands.

3. If you're going to use your tools a lot, multiple use tools that require constant setup and changing are bad investments and waste time. But if you're only an occasional woodworker or rarely change settings, they can work well.

4. Many woodworking catalogs can be quite educational. They provide an overview of the tools, equipment and supplies that are available.

Anne McDonley, who hosts a chat session for women woodworkers on the online computer service America Online, adds, "I think it comes down to not only choosing the best rated tool, performance wise, but also what feels better for *your* body to use.

"We have found that like men, women come in all sizes and shapes and have to adapt their woodworking methods to accommodate their conditions," she says.

Of course, those women who have larger builds than the average female don't face these obstacles, while some smaller built men do. Such is the case for woodworker Linda Bloom, who doesn't encounter any difficulties, but her college instructor, woodworker Daniel Aulbert, has frequent problems because he has rather small hands for a man.

She relays, "He said that when they put the D-handles on the routers, that was the best help that has come along in quite a while. He thought maybe if manufacturers went to the D-handle's style on their power tools a person could then use both hands and have some more control."

Developing tools for users with smaller builds would not only benefit those woodworkers, but may also pay off for the manufacturers. The National Retail Hardware Association reports that about half of DIY store customers are women, so a viable market does exist — just do the math.

In next issue's "Dovetales," we'll conclude our search for the best tools for women. We'll also talk to some manufacturers to find out what they have done or are working on to accommodate tool users with smaller builds. Please also feel free to write in with your comments and suggestions.

More on Threaded Inserts. . .

Thanks to everyone (men and women) who gave more suggestions on last issue's letter about how to install threaded inserts straight. Here's one of the best responses:

I'd like to add to your suggestions concerning installing threaded inserts. Even after investing in a large straight screwdriver that fit the threaded insert, things still managed to go slightly awry when installing. I work a lot with volunteer amateurs in my woodworking business, so I have to do it right every time.

First buy a 4" or longer bolt to fit the threaded insert, along with two nuts. Then cut the head off the bolt. Thread on the nuts, and then the insert. Tighten the double nuts to the insert.

Now drill the properly sized holes for the inserts slightly larger than the insert's "barrel" (the insert's diameter minus the threads). Then chuck the bolt-nut-insert assembly in your drill press. Lower the quill until the insert is in the hole. Do *not* turn the drill press on! Now manually turn the quill, driving the insert into the hole.

After the insert is installed to its proper depth, use a pair or wrenches to loosen the nuts and manually back off the quill to unthread the bolt from the insert.

Hints: Be sure to leave a portion of the bolt thread above the nuts, so there's room to loosen the nuts. Also, it helps to clamp the workpiece to the drill press table.

The other plus is no accompanying gouge in the workpiece from the screwdriver slipping out of the insert. In fact, I was taught that the only use for the slot in the insert is to remove it. Insert manufacturers and suppliers offer insert tools, but the bolt and nut arrangement is both economical and effective.

No drill press? Use a drill guide. As an example, the one offered by Port-A Line also permits you to drill holes at an angle. Just don't turn it on!

Having said that, I am always interested in reading about my sisters in woodworking. I look forward to more of the same.

Carol J. Reed
Ramona, California

"Can This Joint Be Saved?"

Thank you for the invite to women woodworkers. I am a beginner at age 46, and with three kids in college. I salvage scrapwood all I can. . . even to the point of dumpster diving to get others' castoffs!

I recently built a tall TV table for my daughter's dorm room, specially dimensioned to put her huge boom-box on a lower shelf. My first mortise and tenons, and first dowel joinery, proved a case more in damage control than finesse, but I was proud of finally producing a stable, squared-up table. I beveled the edges of ¾" particle board shelves with a hand plane, and am now wondering, even though it worked so well, if I am going to damage a well-tuned plane blade on resinous composition board?

After this project, I feel I could write a book titled *Can This Joint Be Saved?* But I'd encourage anyone to jump in and try. I learned much more from having to correct errors than if everything had gone well.

Barb Siddiqui, Wenatchee, WA

The glues used to stick particle board and even layers of plywood together will dull plane irons or other non-carbide steel tooling in your shop quickly. I'd strongly recommend you avoid using these materials on your hand planes, jointer, power planer and most hand tools where you rely on a sharp edge for cutting. Carbide steel tooling, on the other hand, will continue to hold its edge when used with glue laden materials. While it dulls the edge faster than solid wood with no glue present, the "life" of the carbide edge remains good for quite some time.

You're right, learning from your mistakes is one of the best ways to learn the craft of woodworking. Be sure to keep us updated on your progress! — Cristine

ASK THE EXPERTS by Steve Erbach

We are constantly working to improve your knowledge (and frequently our own) by looking to experts for advice. This column asks the woodworking industry professionals who make up our editorial advisory board *your* questions on any woodworking-related topic. To "prime the pump," we've asked some of our board members to address the questions they're most frequently asked. We hope you will send our experts your questions about tools, materials, techniques, finishing or even questions which may not fit into the standard categories. Send them to Ask the Experts, *Popular Woodworking*, 1507 Dana Ave., Cincinnati, OH 45207 or e-mail us at Wudworker@AOL.COM.

The Truth About Asian Imports

A number of myths persevere about imported tools. As with most misconceptions and presumptions, they are often based on some degree of truth. But not all imported tool companies work the same way. Here are some facts to counter some of these myths.

Myth #1. Everyone sources woodworking tools from the same Taiwanese factories.

Yes *and* no. There are factories in Taiwan who will put a different label on a particular machine and sell it to anyone who has the money to spend, but even within these factories there are varying degrees of quality.

The factory can, for example, reduce the cost of an identical looking machine by downgrading the electrical package. There's a substantial cost difference to the importer for different quality motors and switches. They can also cut corners on the quality of bearings used.

Some imported tool companies manufacture much of their equipment and machinery in a separate factory, or have it manufactured to particular specifications and tolerances to ensure their level of quality. You cannot assume because the machine castings are similar in appearance that they are produced in the same factory and the only difference is the label.

Myth #2. Everything imported is a copy, and therefore inferior.

This myth implies that anything but the original must be second rate. There have been almost 20 years of changes and improvements in woodworking machinery from Taiwan. In fact, American-based manufacturers source products and parts overseas, often from the very factories that produce equipment for import.

Woodworking equipment and machinery is manufactured all over the world, be it Canada, Germany, Italy or Taiwan. All woodworking equipment companies realize that it's a world economy.

Myth #3. Parts for imported, mail order machinery are not available, and they can't be serviced because there are no local dealers.

Many mail order companies do not service what they sell, or have a limited (or non-existent) parts department. Again, it depends on the company's level of commitment to their products and to their customers. Don't *assume* that the parts are available or that every company will be able to service your needs.

Local dealers find it very difficult to stock the thousands of parts necessary to service all the equipment they represent. In certain cases, when customers need a part, dealers may have to order it for them anyway.

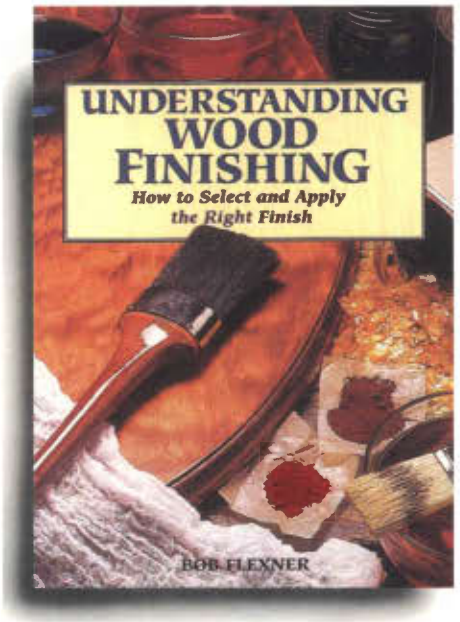
With today's shipping rates, mail order companies can compete effectively with local dealers to get a part, repair it, and have it on the customer's doorstep in no time at all.

Myth #4. Taiwanese motors are no good.

This answer is related to the first myth. It is strictly up to the manufacturer or importer to specify what electrical package is included. Not all companies specify alike.

Steve Erbach *is vice president of Grizzly Imports, Inc.*

GOOD READING — by Steve Shanesy



Understanding Wood Finishing, *by Bob Flexner. 310 pages, hardback, $27.95; ©1994, from Rodale Press, 33 East Minor Street, Emmaus, PA 18098.*

The problem with wood finishing is few woodworkers, even highly advanced ones who make their living at it, understand little more than the basics of this important aspect of their craft. Many pros and home hobbyists tend to treat the subject like alchemy, rather than science-based chemistry. The result is that while the interest in woodworking has grown enormously over the past decade, the finishing of all those projects hasn't kept pace with the advancing woodworking skills.

Enter Bob Flexner, a woodworker who's on a mission to help us improve the quality of our work by sorting out the facts from the many myths of finishing materials and techniques. Bob spent 20 years learning finishing the old fashioned way — by doing it — then spent six years studying the chemistry of finishing materials so you wouldn't have to!

In his exceptionally well-done book, *Understanding Wood Finishing,* Bob shares his knowledge in words, photos and illustrations in a style that *we all can understand.* It would've been easy for him to write a book that aimed to impress people with his knowledge of the subject. But it's apparent on every page that the goal of the book is to shed light on a subject that has been kept in a deep, very dark, closet.

Happily, the book is written for all woodworkers regardless of their finishing skill levels and interests. Bob does not treat the ragged on oil finish as unworthy. Nor does he exalt sprayed lacquer or French polish as the ultimate finish. Rather, Bob tells us the benefits, shortcomings, application methods, myths and useful tricks relating to most any finish.

In the book's 18 chapters, the full range of finishing subjects are presented in a detailed, yet approachable, manner. He discusses the basic question, "Why finish wood, anyway?" and proceeds to walk you through each step, including preparing the wood, choosing tools for finish application, staining, filling wood grain, understanding all the types of finish materials in everyday use, finishing safely, and repairing and stripping finishes. He even tells us how to *finish* the finish. One chapter, "Finishing Different Woods," presents a photo gallery of numerous woods finished using different stains and topcoats to clearly illustrate the results of each material.

Where applicable, step-by-step instructions are provided to guide the reader toward a satisfying finishing experience. Illustrations and quality color and black and white photography support the book's information. Best of all, though, the book works well on two levels. First of all, it's a terrific reference book that the wood finisher will return to time and again for sound advice. On another level, it's also the kind of book you can just sit down and read or browse, picking up useful information every time.

When you understand that every project, be it a pull-toy or Connecticut high boy, has three components that contribute equally to its success — design, construction and finish — you'll want to have *Understanding Wood Finishing* on your shelf to guide you to a successful project conclusion.

— by Steve Shanesy

Continued on p. 68.

ARTS & CRAFTS LAMPS

Distinctive lighting is surprisingly simple — including the wiring.

By James J. Townsend

PHOTO BY RON FORTH PHOTOGRAPHY

Building a lamp stand doesn't have to be difficult. The wiring, hardware and construction may seem intimidating, but getting handsome results really doesn't take much effort or expertise. And there's no better style to practice lamp making than Arts & Crafts, sometimes referred to as Mission or Craftsman, style. Simple lines, visible joinery, and hand forged rather than flashy hardware will produce quality lighting that's frustration-free!

Offered here are two plans for table lamps. Quarter-sawn white oak is the traditional material for this project, but red oak, cherry, ash, or other hardwoods also produce pleasing results.

Build the Square Stand

This design repeats the square motif often found in Arts & Crafts decoration. A square base is topped with four slender square posts, topped by yet another square. This is a simple design which can be completed with little more than a table saw and a drill.

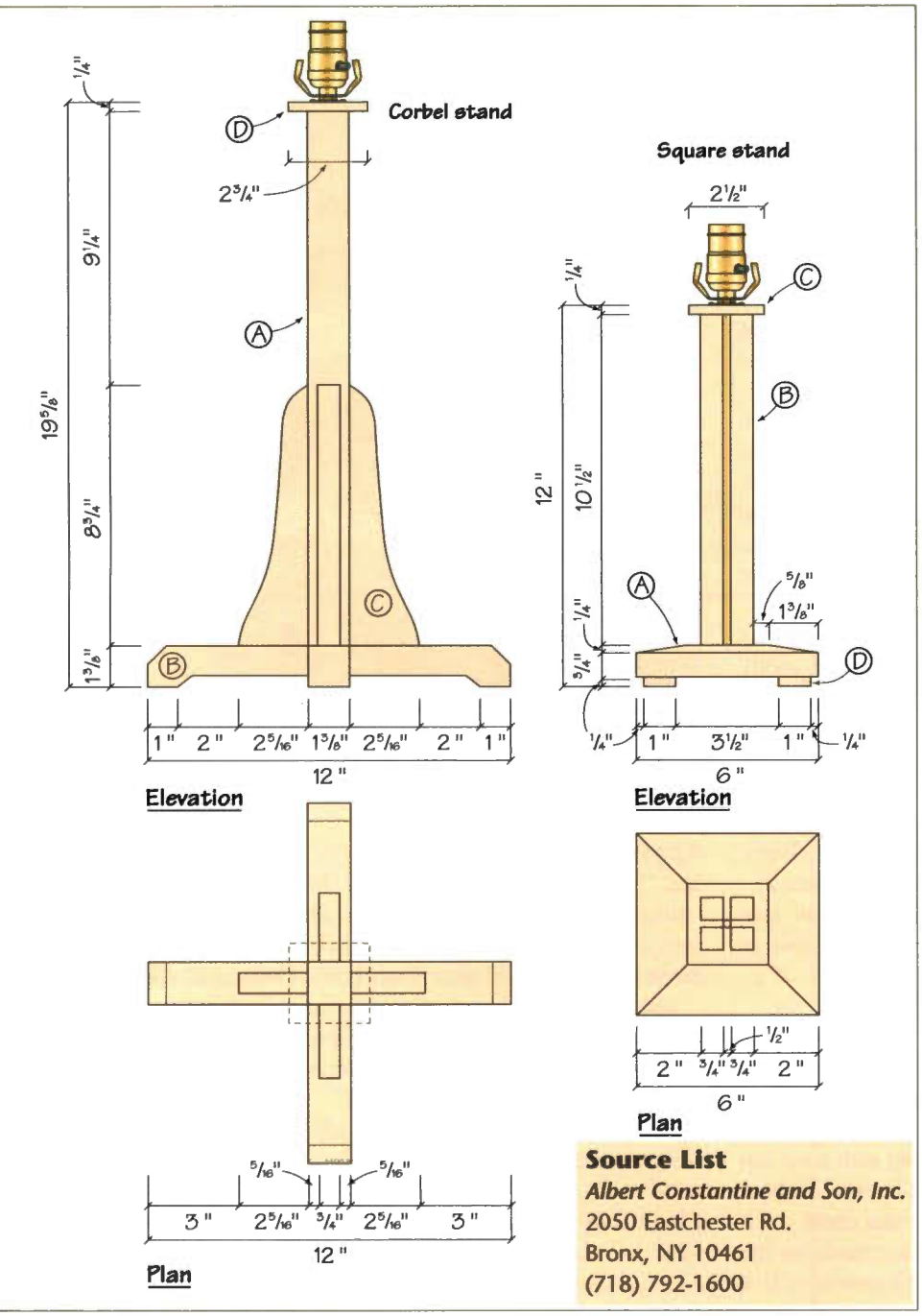
Start by making the base. Rip and crosscut a 6" square from 1" stock. Bevel the outer 2" of the top's four sides to a 10 degree angle with a plane, jointer, or table saw, as shown in the ***diagram at right***. Use special care if using a table saw for this operation, as you'll be making a cut through quite thick material and probably will have to remove the blade guard. It will be easier if you take several passes. Plane or sand to remove any saw marks.

Draw lines from corner to corner on the bottom of the base to establish the center. Measure 1" from the center on the four diagonal rays. Drill and countersink for the screws that hold the spindles to the base. I used flathead #8 screws 1¾" long, but other sizes will do the job. Drill a ⅜" hole through the base's center to receive the lamp conduit pipe or wire chase.

Next make four ¾" square spindles 10½" long. Drill pilot holes in the centers of both ends of the spindles for fastening screws. Cut a 2½" square of ¼" stock to cap the spindles. Again, measure 1" from the center on the diagonal lines. Drill clearance holes for the screws to hold the cap to the spindles. Then drill a ⅜" hole in the top's center to receive the conduit. Lightly chamfer the top's edges with a block plane.

Next attach the cap to the spindles with roundhead brass screws. Avoid square drive or Phillips screws, as they ruin the old look of the lamp. To speed up the aging process, you can dip the brass screws in brass antiquing fluid. Constantine's (see Source List) offers a fluid that can be brushed on brass items (smaller items are simply dipped in the fluid) to accelerate the aging process. The longer you leave the fluid on the piece, the darker the brass becomes. Before using this treatment, be sure to strip any lacquer off the hardware with nail polish remover. For an extra bit of finesse, line up the screw slots with the grain.

Glue ¼" thick, 1" squares to the corners of the bottom as feet, inset about ¼" from the edges. These not only add a nice design detail, but raise the base high enough to provide clearance for the electrical cord.



Source List
Albert Constantine and Son, Inc.
2050 Eastchester Rd.
Bronx, NY 10461
(718) 792-1600

***Photo 1** Lamp hardware is easily found in most hardware stores and home centers.*

Installing the Hardware and Wiring

Now install the lamp hardware and choose a lamp harp or metal support that's the right size for your shade. These days, lamp hardware is easier to find than it used to be. In fact, most hardware and home center stores carry everything you need, sometimes packaged all together *(photo 1)*. Most lamp hardware is accompanied with wiring instructions.

Here are the simple steps to safely wire the lamps:

1. Disassemble the lamp socket by squeezing its side. Look for a mark that says "press." The socket and the wiring posts are on one piece and the threaded base is on the other.
2. Strip the first ½" of insulation from both lamp wires.
3. Thread the lamp wire through the lamp conduit pipe from the bottom, then through the threaded base of the socket. If you're using a harp holder, nuts, washers or spacers between the lamp pipe and the socket, be sure to thread the wire through these in the correct order.
4. Tie a knot in the wire about 1" from the end to prevent the wire connections to the socket from being pulled loose.
5. Attach the wires to the wiring posts by loosening the screws, looping the wire around the screws, and securely tightening the screws.
6. Insert the lamp socket into the threaded socket base and push until it clicks into place.
7. Screw the socket on the end of the lamp conduit pipe.

Schedule of Materials

No.	Letter	Dimensions T W L	Item
Square Stand			
❑ 1	A	1" x 6" x 6"	Base
❑ 4	B	¾" x ¾" x 10½"	Spindles
❑ 1	C	¼" x 2½" x 2½"	Cap
❑ 4	D	¼" x 1" x 1"	Feet
Corbel Stand			
❑ 1	A	1⅜" x 1⅜" x 18	Post
– or –			
❑ 4	A	⅝" x 1⅜" x 18"	Posts
❑ 2	B	1⅜" x 1⅜" x 12"	Bases
❑ 4	C	¾" x 2⅝" x 8¾"	Corbels
❑ 1	D	¼" x 2¾" x 2¾"	Cap

Making the Corbel Stand

This lamp's curved support pieces, called corbels, are characteristic of Mission and Prairie styles. The design also lends itself to scaling up for a floor lamp. (I selected the size shown because I wanted to use some oak scraps I had on hand.) This piece is a bit more difficult than the square stand. It calls for a few curves, and the joinery is slightly more demanding.

Build the Post

The first step is constructing the post. Original plans for these lamps call for a solid piece with a hole for the lamp cord bored through its length with a brace and bit or a red hot poker. For practical and aesthetic reasons, however, I've chosen a different approach. It's difficult to bore a long, straight hole for this lamp and impossible for a floor lamp post. In addition, using a solid piece of wood for the post means that the quarter-sawn figure of the oak can only appear on two sides. Therefore, a reasonable solution seemed to be a method employed by Leopold Stickley, brother of the more famous Gustav Stickley, who largely popularized the Arts & Crafts-style furniture in the United States.

Brother Leopold dubbed his process "quadralinear" construction. It consisted of selecting thinner stock, mitering its long edges and gluing it up around a center post. The result was a stout, hollow post with attractive quarter-sawn grain all around. Although the method required more labor, there was a savings in material since the thinner stock used was less expensive than thicker material.

To make the lamp post, cut four pieces of ⅝" thick material to rough length, and then cut them to the finished width. Next set your saw blade to 45 degrees and cut the miters on both long edges of each piece, making sure you don't cut any additional width. Since you should have a space in the center of the post for a wire chase, we won't make a center post as Leopold Stickley did for his massive chair or table legs. To glue-up the lamp post, simply use masking tape instead of clamps to hold the four sides in place while the glue dries ***(photo 2)***.

If you plan to build more than one lamp, you can save time by building a longer post and cutting it into two or more pieces.

Make the Base

Band saw or jigsaw the cross members for the base as shown in the PullOut™Plans. You may either round over or chamfer the outside top corners of the cross members.

The two members of the base are connected with a half-lap joint. I cut this joint on the band saw, cleaning up with a rabbet plane and a side rabbet plane. Alternatively, you could use a handsaw and chisel to cut the joint, or the dado blade on the table saw. Be sure to get a tight fit between the members. Drill and countersink two holes through the bottom of the cross brace 1½" from the center of the cross. These will be used to secure the corbels to the base. Then drill a ⅜" hole for the lamp conduit to exit from the post.

Now band saw or jigsaw the corbels from ¾" stock to the shape of the full-sized pattern in the PullOut Plans. Then smooth the edges with a drum sander.

Extra Variations

To add your own original touch, consider some other Arts & Crafts motifs. For instance, you could change the shape of the post and base from square to hexagonal. By combining two lamp bases with a horizontal crossbar, you can mount two lights for a library lamp.

If you choose a square shade, you can add wooden shade supports to the corbel base in lieu of supporting the shade on a lamp harp.

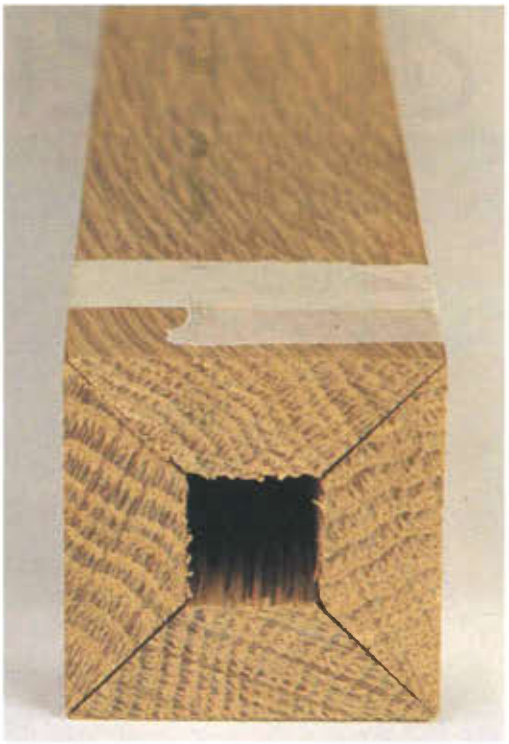


***Photo 2** The quadralinear design saves material and puts quarter-sawn grain on all four sides.*

Apply the Finish

See "Two Classic Finishes" on page 50 to duplicate the old-fashioned finish we used. However, any Mission-style finish, such as fumed oak, black wax, or a dark stain, is suitable for the project. For cherry, I'd recommend boiled linseed oil and wax.

Test fit the lamp hardware, then remove it for finishing. Before assembly, you may find it easier to pre-finish some parts, especially the spindles in the square stand design. Sand to break any sharp edges on the stand.

Finally, apply felt to the bottom of the lamp to prevent it from scratching your furniture.

Choosing a Shade

Now that the base is finished, all you need is a light bulb and a shade. Several types of shades are consistent with the Arts & Crafts-style. What they have in common are subdued colors, humble materials and a handcrafted look. A simple wicker shade is the least expensive option, but surprisingly difficult to find. I had the easiest time locating parchment shades, which come in several natural colors. Punched tin or copper shades have a rustic appearance, and you can make them yourself. The most elegant shades are mica or art glass, held together by wooden or metal frames. For detailed instructions for several shade types, consult *Popular Mechanics Company, How to Make Mission-Style Lamps and Shades* (Dover, 1982), a reprint of a 1911 manual. PW

***James J. Townsend** is a woodworker in Washington, D.C. He and his wife just welcomed a new addition to their family.*

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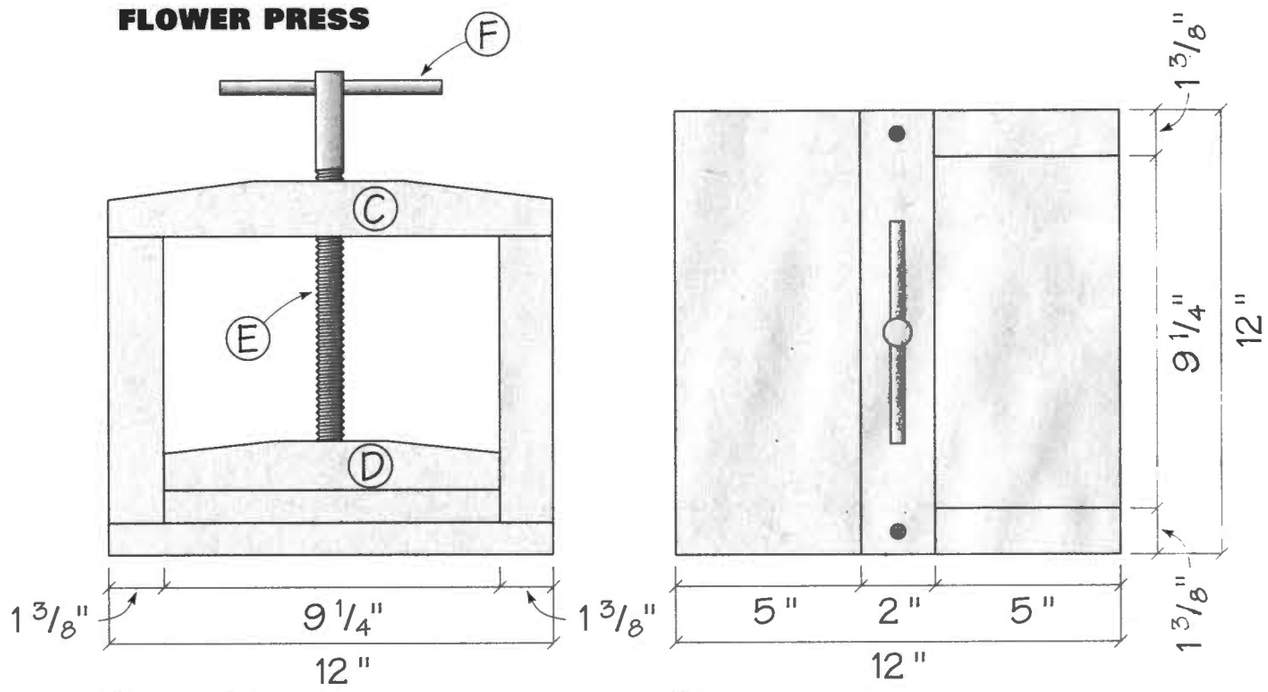
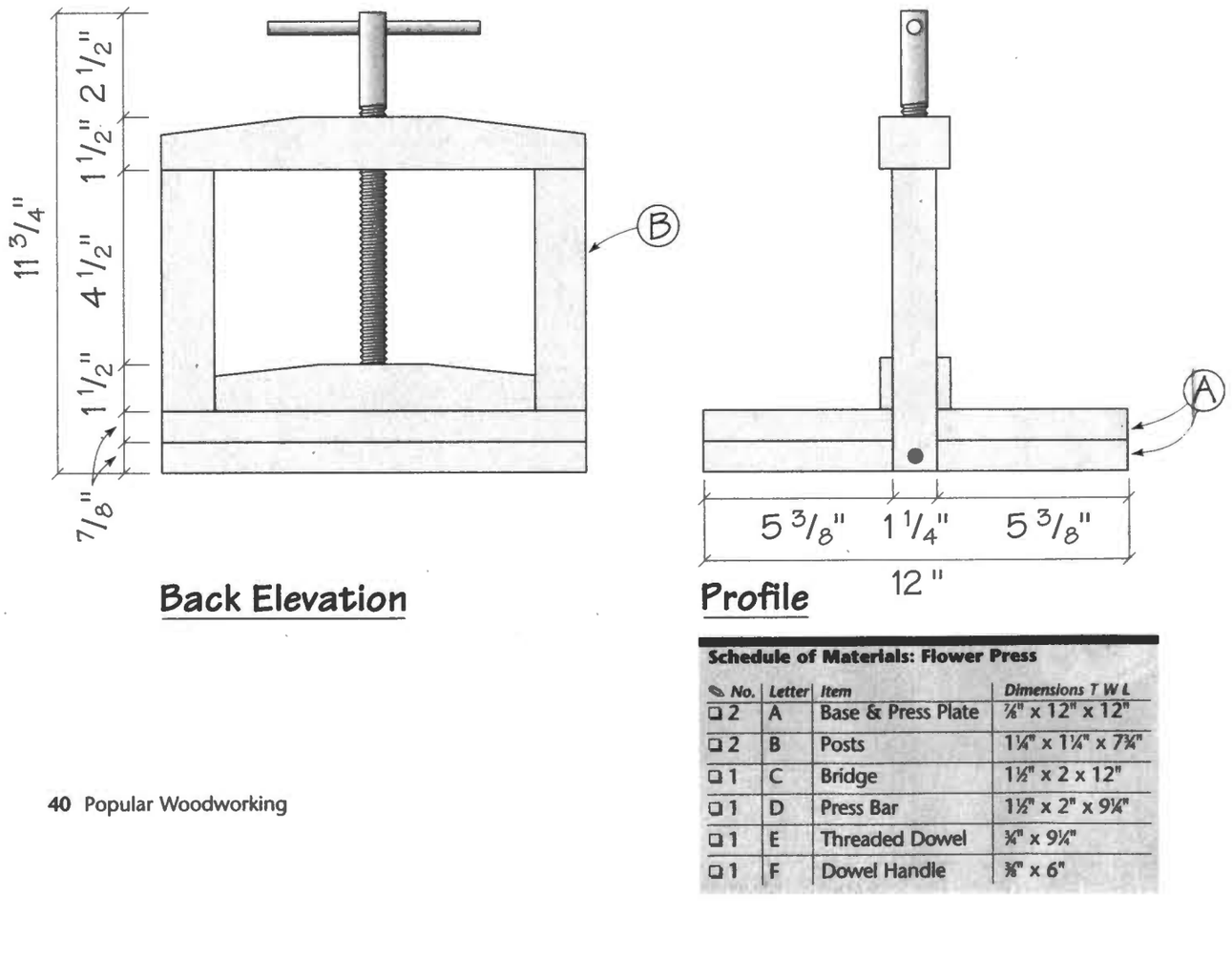
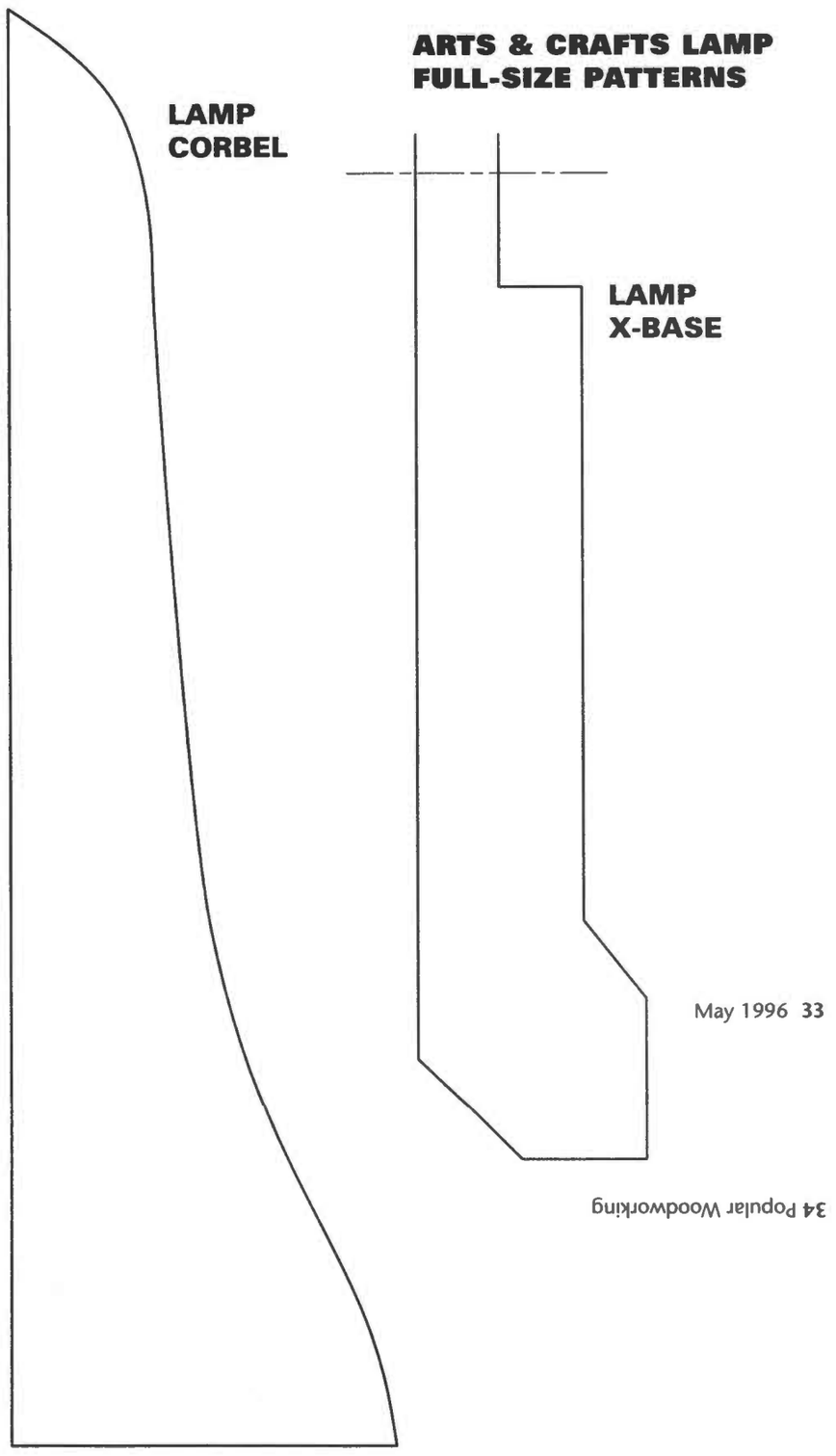




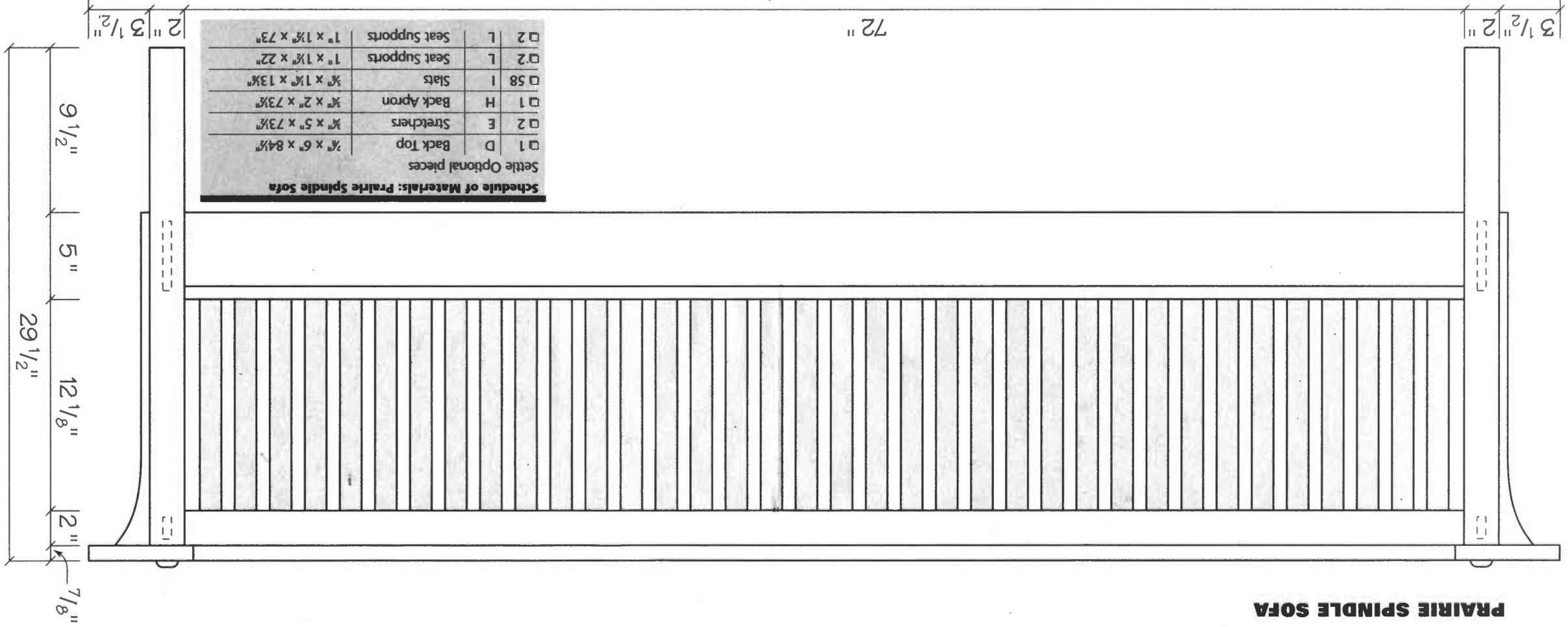
Schedule of Materials: Flower Press

No.	Letter	Item	Dimensions T W L
❑ 2	A	Base & Press Plate	⅛" x 12" x 12"
❑ 2	B	Posts	1¼" x 1¼" x 7¾"
❑ 1	C	Bridge	1½" x 2 x 12"
❑ 1	D	Press Bar	1½" x 2" x 9¼"
❑ 1	E	Threaded Dowel	¾" x 9¼"
❑ 1	F	Dowel Handle	⅜" x 6"

ARTS & CRAFTS LAMP FULL-SIZE PATTERNS



PRAIRIE SPINDLE SOFA

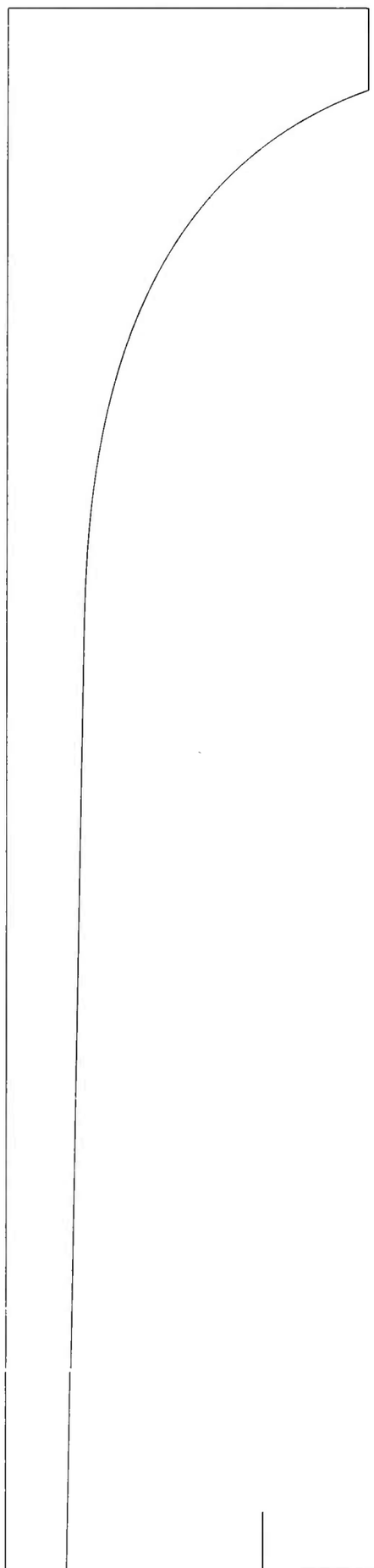


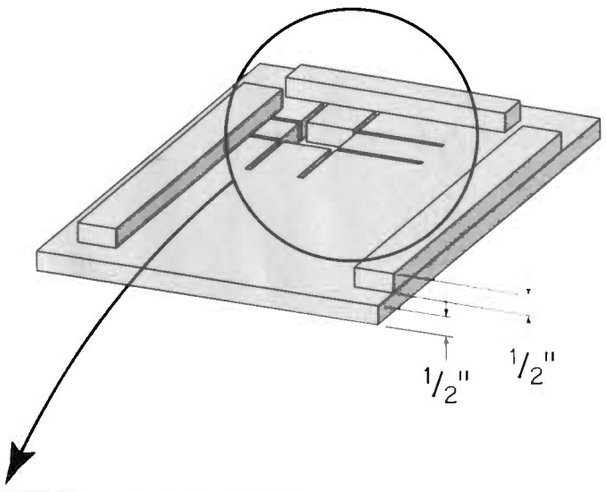
Schedule of Materials: Prairie Spindle Sofa

No.	Letter	Item	Dimensions T W L
❑ 1	D	Back Top	¾" x 6" x 84½"
❑ 2	E	Stretchers	¾" x 5" x 73½"
❑ 1	H	Back Apron	¾" x 2" x 73½"
❑ 58	I	Slats	¾" x 1¾" x 13¾"
❑ 2	L	Seat Supports	1" x 1½" x 22"
❑ 2	L	Seat Supports	1" x 1½" x 73"

Settle Optional pieces

CHAIR CORBEL





THROUGH TENON ARM JIG
(Shown upside down)

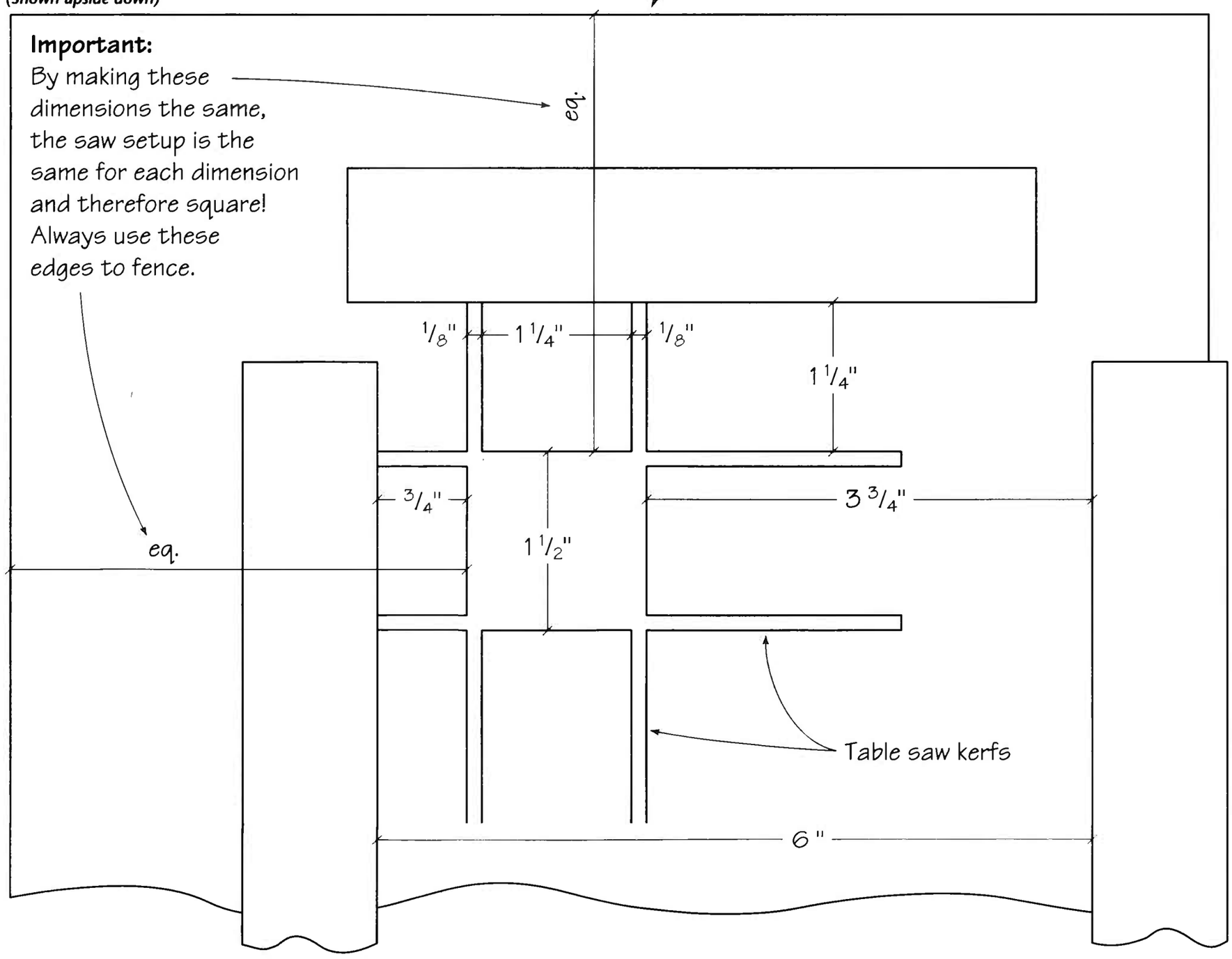
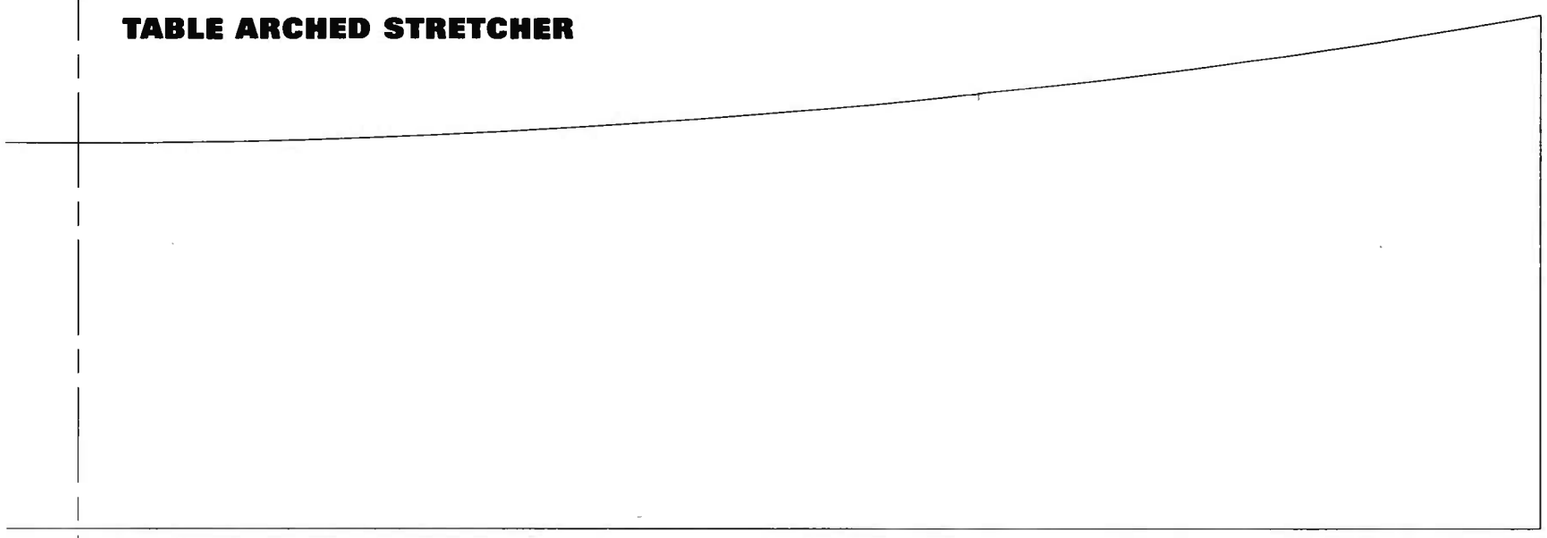
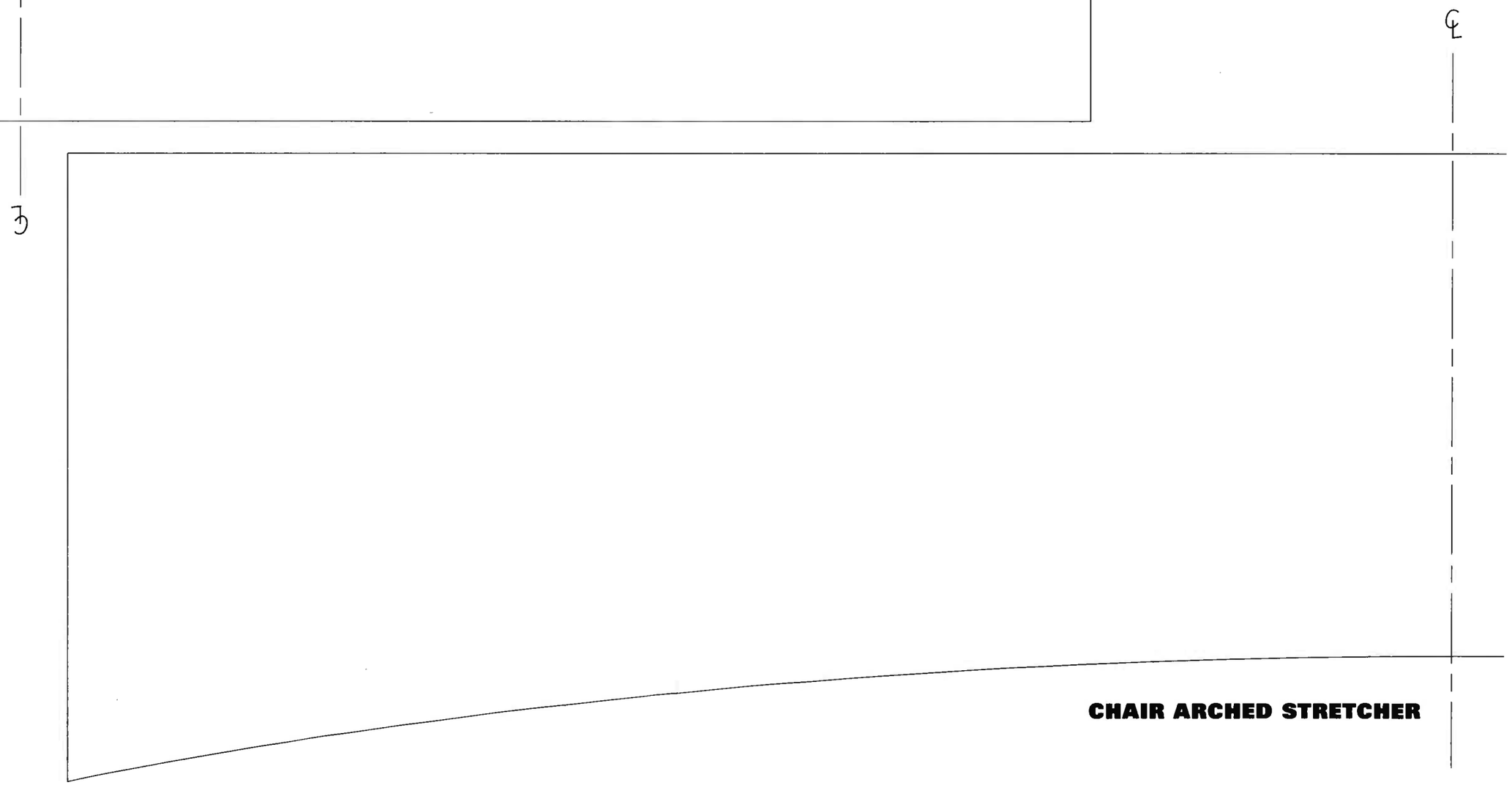


TABLE ARCHED STRETCHER





CHAIR ARCHED STRETCHER

Finishing Without FEAR

By Bob Flexner

MOST WOODWORKERS DON'T LIKE FINISHING It's not that the job is physically demanding or intolerably messy — much of woodworking is at least as bad on both counts. Finishing is disliked because it seems so unpredictable. Something is always going wrong, and the causes are seldom obvious.

The fear of finishing leads many of us to avoid trying anything new, and as a result we find ourselves using nothing more demanding (or rewarding) than oil or oil/varnish blend finishes. Although these are almost foolproof to apply, they offer little possibility for decoration and almost no protection for the wood against wear and moisture vapor exchange. Avoiding new ways to decorate or protect wood makes the craft of finishing boring and problematic. So finishing sinks even lower on the woodworker's scale of what he or she would like to be doing. This anxiety and frustration can be significantly reduced by better understanding the process, thereby making it more controllable, and thus more fun.

A New Approach to Finishing

The approach many woodworkers take to finishing actually *creates* problems. Woodworkers *expect* it to be trouble-free. This attitude is cultivated by manufacturers of finishing products and by book and magazine publishers who promote their products and information as producing "professional results" or "perfect finishes" "every time." But nothing in a craft such as woodworking can be problem-free. No matter how much you practice, mistakes occassionally crop up. The trick is knowing how to fix them.

If you're one of the countless woodworkers who doesn't like finishing, you can learn a couple of lessons by turning to your *woodworking* experience.

The first trick is to practice finishing on scrap wood. You commonly do this in woodworking. You practice cutting dovetail and mortise-and-tenon joints on scrap wood before you try them on good walnut. But, when it comes to finishing, it's likely you have no patience for practice. You apply a stain directly to a project that has taken weeks to build, or you try filling pores or rubbing out a finish without ever having practiced the steps on scrap wood. Is it any wonder that finishing seems somewhat scary?

The second tip to apply from your woodworking experience is to keep in mind that when you make a serious mistake, such as cutting a board too short or dovetails backwards, you don't throw up your hands in resignation and decide that you have no talent for the craft. You just start over with new wood and are more careful the second time, learning from your mistake. The same can be done with finishing as well.

Except for blotching, all finishing problems can be fixed with very little effort — the worst case being that you have to strip off the stain or finish and start over. Blotching on woods with swirly grain or uneven density is a bigger problem because the only way to remove it is to sand, plane, or scrape to below the depth to which the stain has penetrated. This can be a lot of work and result in an unattractive, or even dished-out, surface.

Stripping and starting over isn't pleasant, but neither is making a new wood part from rough lumber. People commonly strip and refinish old furniture. It may help to remember that professional finishers and refinishers, who practice the craft every day, still have to strip and start over far more often than they'd like to admit. Don't think something is wrong with you just because you make mistakes now and then. If you could get it right every time, the craft would lose its challenge and become boring.

Finishing without FEAR

Get In Control

The trick to gaining control over finishing, and thus reducing frustration, is to understand what's happening when you apply a particular stain or finish to wood. This means knowing a little about the wood *and* the finishing products you're using.

Since blotching is both a common and serious problem, let's look at its causes and show how easy it is to prevent or fix when you understand what's happening. In the process, you'll see that at least part of your frustration is caused by inadequate instructions from manufacturers.

There are three types of blotching:

- Blotching caused by the grain of the wood.
- Blotching caused by glue squeeze-out.
- Blotching caused by allowing a stain to partially dry before wiping off the excess.

The Wood

Wood is a natural material and often uneven in grain direction and density. Some woods, such as pine, fir, aspen, poplar, cherry and birch, tend to be more uneven than others. When you put a stain on these woods, it often penetrates unevenly, resulting in a blotchy appearance.

To reduce or eliminate blotching in a wood like pine, use a gel stain (left), or fill the pores with a stain controller before applying a liquid stain (right). The center has been left untreated.

You may not know that blotching will occur in a wood until you actually apply the stain. Therefore, it's essential that you try the stain on a scrap piece of the same wood first. The trial step is especially important because nothing can be done to remove this type of blotching after it's applied, short of removing all the wood to below the penetration of the stain.

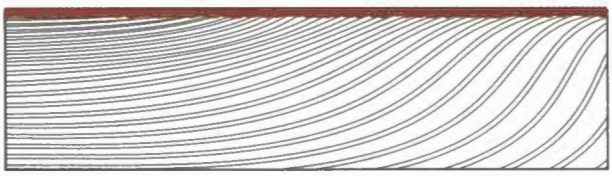
Blotching can be prevented, however, simply by keeping the stain from penetrating unevenly in the first place. In other words, keep all the stain very near the wood's surface. There are two easy ways to do this:

- Use a gel stain which doesn't flow, and thus won't penetrate.
- Fill the pores first with a stain controller so the stain can't penetrate.

Gel Stains

Gel stains are commonly advertised as easy-to-use, but this is not their real value in finishing. Their real advantage is reduced blotching, but I don't know of any manufacturers who mention this quality directly on their cans.

Gel stains are thick. In fact, they resemble latex wall paint. When you roll latex paint onto a wall, the nap of the roller pulls the paint out into small nibs that remain behind just as the roller leaves them. The nibs don't flatten out and run down the wall as they would if you were using enamel paint.

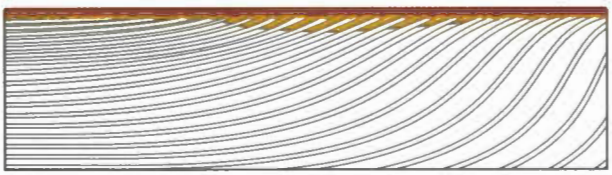


Gel stains don't flow, so they don't penetrate. They remain very near the surface of the wood, even in areas of swirly grain where liquid stains would penetrate.

In the same manner, a gel stain doesn't flow unless it's pushed by your rag or brush. And, because it doesn't flow, it doesn't penetrate into the wood. The thicker the gel stain, the less it penetrates, and the more effectively it reduces or eliminates blotching. But, keep in mind that the quality that works so well when giving pine and cherry an even coloring works to a disadvantage on figured woods like bird's-eye maple and crotch mahogany, where you usually want deeper stain penetration to bring out the beautiful grain and figure.

Stain Controllers

Stain controllers can be used before applying a penetrating stain to keep it from soaking in unevenly. Stain controllers are composed primarily of slow-evaporating, petroleum-distillate solvents. They work by filling up the pores and less-dense parts of the wood so the stain can't penetrate. Instead, the stain just mixes with the solvent near the top surface.



Stain controller fills the wood's pores so the liquid stain can't penetrate. It mixes with the stain controller near the surface.

To use a stain controller successfully, apply it to the wood with a brush or rag until all parts of the wood stay wet — until no more controller is being absorbed into the wood. This usually takes continued applications for five to ten minutes, but the number of applications needed will vary depending on the wood and the ingredients used in the stain controller. No manufacturers that I know of explain in their directions that more than one application may be necessary.

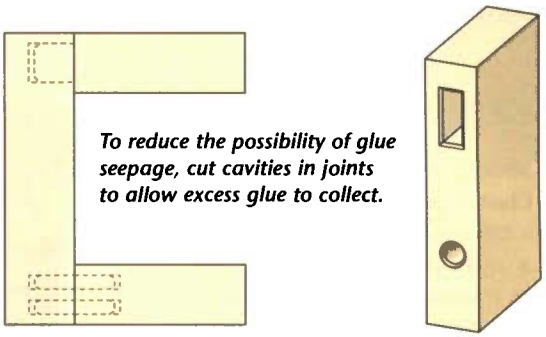
When no more dry spots appear on the wood, wipe off all the excess stain controller and apply the stain as quickly as possible, within 30 minutes is best. If you wait too long, enough of the stain controller will have evaporated so that the stain will again penetrate and blotch the wood.

Glue Seepage

Glue squeeze-out at joints prevents stain penetration much like a stain controller does, by filling the wood's pores. But, in this case, the filling causes color unevenness because it's only found near glue joints. All the seeped glue must be removed before the stain is applied or the wood will appear blotchy.

Glue seeping out at joints can be reduced by cutting cavities in the joints where excess glue can lodge. For example, cut the mortise or dowel hole ⅛" deeper than needed and chamfer the ends of the tenon or dowel. (Most dowels come already chamfered.) Then cut a bevel into the top edge of the mortise or use a countersink to bevel the top of the dowel hole. These cavities will provide space for a little excess glue without seepage. Of course, using a judicious amount of glue should be the first step in preventing glue squeeze-out. If glue still squeezes out, there are only two ways to remove it: dissolve it off, or take it off mechanically by sanding or scraping. There are no secret methods.

Seeped glue seals the wood pores, preventing stain penetration. You must remove this glue to get an even stain color.



To reduce the possibility of glue seepage, cut cavities in joints to allow excess glue to collect.

You can dissolve animal-hide, white and yellow glue with water even if the glue has dried. By heating the water or adding an acid, such as vinegar, you increase the effectiveness. Water raises grain, however, and stain will absorb more into this area, making it darker. To even the stain penetration, you must resand this area after the wood has dried.

Toluene *(toluol)* and xylene *(xylol)* soften cured white and yellow glue enough so they can be scrubbed off with a coarse cloth or soft-bristle brush without raising the grain. Xylene is the solvent included in products like Goof Off®, which are sold to remove latex paint spatter or grafitti from furniture or walls. These products also soften white and yellow glues because these glues have similar chemistry to latex paint.

You can also sand or scrape off the glue to below where it has penetrated. Then sand the area to the same grit as the rest of the wood so the stain colors evenly.

If you've already applied stain before you notice the glue seepage, the correction is the same. You still have to dissolve or mechanically remove the glue. The problem you may experience here is that the stain acts as a lubricant for sandpaper, causing the scratching to be a little less than it would be without the stain. The result is that more stain applied to this area won't color quite the same, usually leaving the wood lighter in color. If this happens, correct the problem by applying stain to the entire part — rail, stile, leg, etc. — and wet sand this part with the same grit sandpaper you've used elsewhere or one grit lower. Then wipe off the excess stain.

If nothing you do evens the coloring, apply paint stripper to the entire project and strip out as much of the color as possible (paint stripper will also remove white and yellow glue). It's not necessary to remove all the color. Now resand the entire surface with your final grit sandpaper and restain. The stain should come out evenly as long as it's not the wood itself that's causing the blotching.

The Stain Drying

If the stain dries in spots before you start wiping off the excess, it will wipe off unevenly, producing a blotchy look. If you catch this problem early, you can correct it by simply applying more stain, or the thinner for the stain, which will soften the dried stain enough so it can be ragged off.

If the blotched stain has dried hard, you may have to use paint stripper to remove it. Once you've removed the dried surface stain and some of the penetrated stain, resand the wood with the finest grit sandpaper you used before, and restain. This time, however, work faster. Work on smaller parts at a time or use a slower drying stain so the problem doesn't occur again. Unfortunately, manufacturers seldom provide enough information to warn you that their stain may dry rapidly.

A Final Word. . .

Don't let your fear of finishing ruin your fun or your project. You can overcome your anxieties and improve the quality of your projects by learning finishing as you leamed woodworking. Take the time to study and understand the problems which can arise when applying any finish. Be patient and test your finish on scrap material of the same wood before using it on your completed piece.

And remember, as with any craft, finishing will *never* be problem-free. The trick to achieving success, and with success greater enjoyment, is to understand how various finishing products work. With greater understanding, more control of the process will follow, and you'll be able to take the precautions necessary to prevent most problems. And when problems do occur, you can fix them, even though it may occassisonally mean stripping and refinishing. PW

Bob Flexner *is the author of* Understanding Wood Finishing *and two videos,* Repairing Furniture *and* Refinishing Furniture. *He spent two years as a woodworker and finisher in Denmark, then settled in Norman, OK, in 1976 and started his own woodworking and furniture restoration shop. He and his Danish-born wife have two grown sons.*

PRAIRIE SPINDLE CHAIR

This Arts & Crafts reproduction will last a lifetime (or more).

By David Thiel

Gustav Stickley is known for quality Arts & Crafts designs, and this Stickley-inspired Prairie Spindle Chair is no exception. The lack of through tenons in this design give the piece a more contemporary appeal, while the traditional quarter-sawn white oak (see "What is Quarter-sawing?"), pegged tenons and solid construction techniques make it true to the original Arts & Crafts design.

The piece isn't very complicated, but I won't tell you it can be built in a weekend. There's a *lot* of repetitive work in milling the many mortises and tenons.

As mentioned, I used quarter-sawn white oak for the chair, but I found it difficult to purchase. Many local lumberyards don't get a lot of requests for quarter-sawn white oak. They'll order it, but you'll have to buy in quantity. If you're looking for heavier stock (8/4, 10/4), you may find the search difficult and the result pricey, but, as with the moritses, the final result is worth the extra effort.

Another option to purchasing 10/4 material is to use a process called quadralinear posts (a distinctive Leopold Stickley construction technique) where four boards are mitered and then glued around a center post. This not only gives you the heavier stock without the expense, but also displays the quarter-sawn faces with their figured medullary rays on all four sides of the legs. (This technique is discussed in further detail in "Arts & Crafts Lamps" on page 30 in this issue.)

Construction

Construction begins with preparing the lumber according to the Schedule of Materials. The chair requires 82 mortise and tenon joints. To help you accomplish these with the least amount of hassle, I'll walk you through a couple of options.

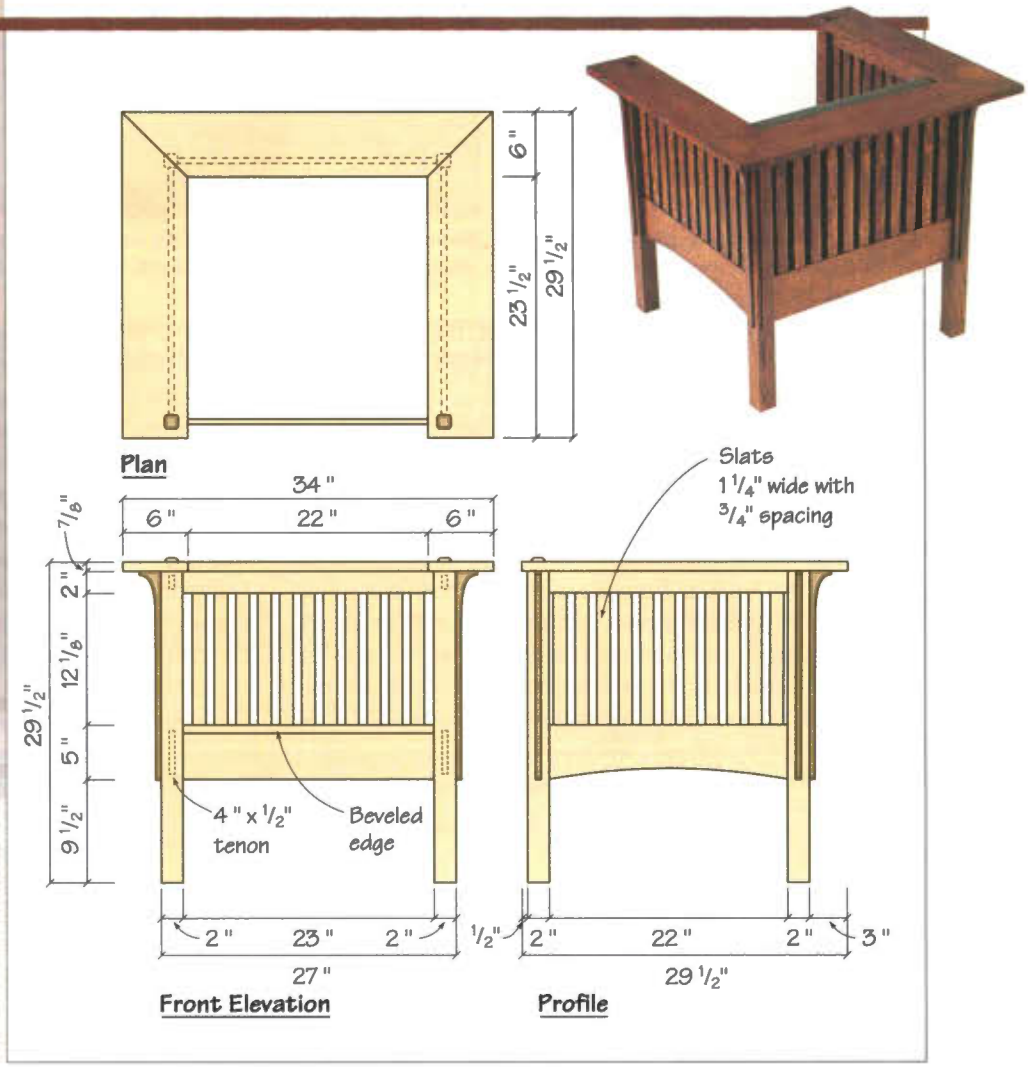
I'd strongly suggest that if you're going to machine these 82 joints, consider making *two* chairs and 164 joints. While producing one may take 12 hours, making two will only take 15 hours. It so happens that when I bought my lumber I came up with enough to make three chairs and the side table shown (see the "Stickley Side Table" in this article). You may also want to build a matching sofa (or settle, as the Stickleys called it) using the same construction designs. I've included the sizes for the settle along with a set of drawings in the PullOut™Plans.

***Photo 1** A benchtop mortiser makes the repetitive work more manageable.*

Before you move on to the next step, you should take a few minutes to check your table saw for square. That includes blade setting, rip fence-to-blade and miter slots, and miter gauge-to-blade. Believe me, the last thing you want to do is spend a lot of time cutting parts and discover the whole thing's out of square.

Once your material is milled, start with the mortises in the legs. Each leg will receive two ½" wide x ⅞" deep and 4" long mortises for the stretchers between the inside faces of the legs. These mortises start 10" up from the bottom of each leg, so this is a good time to determine the legs' orientation, making

PHOTO BY RON FORTH PHOTOGRAPHY



sure the best quarter-sawn figure is seen. Clamp the legs together with the bottoms flush, then mark the mortise locations.

The rear legs will also receive two ½" wide x ⅞" deep x 1½" long apron mortises on the same faces as the stretcher mortises. These mortises are started ¼" down from the top so the aprons will be flush to the leg top. The front legs will receive only one apron mortise per leg, located on the side facing the back legs.

I used a benchtop mortising machine ***(photo 1)*** to cut all the mortises on the chairs, except for the through mortises in the arms. If you don't have a mortiser and don't plan on getting one (this project is a great excuse to buy a new tool), there are a number of other ways to produce the mortises. The traditional method, for those of you who are purists, is to mark and cut the mortises by hand using a chisel. As it is, I don't even have enough time to use the *power* tools I have, so hand chopping 82 mortises wouldn't even be my *second* choice. My preferred second method would be to set up a jig for a plunge router using a ½" bit. A couple of self-centering router jigs are also available that are designed for making mortises, and as all of the mortises are in the centers of the pieces, this also would be a good alternative.

Schedule of Materials: Prairie Spindle Chair

No.	Item	Dimensions T W L
❑ 2	Front Legs	2" x 2" x 29⅝"
❑ 2	Rear Legs	2" x 2" x 28⅝"
❑ 2	Arms	⅞" x 6" x 29½"
❑ 1	Back Top	⅞" x 6" x 34"
❑ 2	Stretchers	¾" x 5" x 24½"
❑ 2	Side Stretchers	¾" x 5" x 23½"
❑ 2	Side Aprons	¾" x 2" x 23½"
❑ 1	Back Apron	¾" x 2" x 24½"
❑ 33	Slats	⅝" x 1¼" x 13⅛"
❑ 6	Corbels	¾" x 2½" x 19"
❑ 22	Pegs	⅛" x 2" dowels
❑ 4	Seat Cleats	1" x 1" x 22"
❑ 2	Seat Frame Pieces	¾" x 2" x 24"
❑ 2	Seat Frame Pieces	¾" x 2" x 23"

Photo 2 *Time spent carefully laying out the mortise locations will pay in big dividends during assembly.*

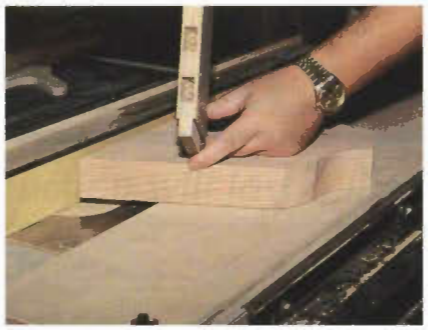


Photo 3 *A feather board provides stability and safety while cutting the tenons.*

Photo 4 *A simple setup on the miter gauge makes cutting the tenons more consistent.*

Once you've completed the leg mortises, move to the side stretchers and aprons and mark them for the 11 slats ***(photo 2)***. Each slat will require a 1" wide x ⅜" deep mortise, so the mortise should be marked starting 1¼" in from each end (¾" allowance for the tenon), and at 1" intervals between. This will give you proper locations for the tenons and allow ¾" spacing between the slats.

The back stretcher and apron are marked similarly, but the first mark is made 1¾" in from either end and then every inch.

Cutting the through mortises in the arms will be among your final tasks, so you're through with mortises for now. The next step is to make all the tenons. Whichever piece you start with, the stretchers, aprons or slats, the process will be the same — three steps with dimension adjustments. Again, there's more than one way to make a tenon, but I used the basic table saw and a couple blocks of wood.

You'll get differing opinions as to which step of forming the tenon should be taken first. I prefer to form the cheeks first and define the shoulder last. This method prevents the saw-kerf from being visible on the shoulder — a big reason for doing it this way! The other reason is to prevent a waste piece from being trapped by the blade and kicked back at you. In this case the waste on most of the pieces is all sawdust, so there's no concern about kickback.

I started with the slats and set my rip fence for about ⅜" and the blade height for 7/16". By running the slat through with one

STICKLEY SIDE TABLE

The matching side table (or taboret) shown in the ***photo at right*** is an easy addition to this Stickley seating group. The cutting sizes shown in the Schedule of Materials will allow you to assemble the table using mortise and tenon joints as found in the chair article.

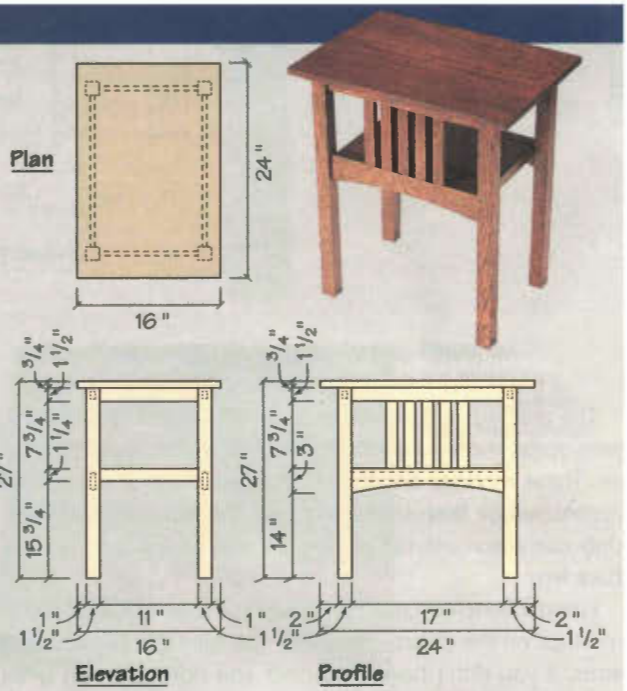
Begin by cutting the mortises in the legs using the steps described in the chair article and the ***diagrams at right*** to locate the mortise locations. Once the legs are mortised, the stretchers and aprons are also mortised to accept the five slats per side. The slats use the same ¾" spacing in between, but the location of the mortises is determined from the center of the side rather than the edge.

Next cut the ½" thick x 2½" wide x ¾" long tenons on the ends of the stretchers and the ½" thick x 1" wide x ¾" long tenons on the aprons. The final tenons are the ½" thick x 1" wide x ½" long tenons on either end of the slats.

The arch on the underside of the stetcher is illustrated full-size in the PullOut™Plans. Assembly begins by placing the slats into the apron and stretcher to form the slat assembly, then gluing and clamping the assembly between two legs.

Once both side assemblies have dried, the two shorter aprons and the shelf are glued between the two sides to form the table base. I added end caps to the shelf to give it a more massive appearance without increasing the material's thickness. Biscuits can be used to attach the caps prior to assembly. The shelf can be simply glued in place, or a biscuit joiner can be used to help alignment. The shelf sits between the legs and is set ¼" below the stretchers' top edge.

The top can be fastened using cleats or other methods, but should not be glued to the base, as the top will expand and shrink with changes in humidity.



Schedule of Materials: Stickley Side Table

No.	Item	Dimensions T W L
❑ 4	Legs	1½" x 1½" x 26¼"
❑ 1	Top	¾" x 16" x 24"
❑ 2	Stretchers	¾" x 3" x 18½"
❑ 2	Aprons	¾" x 1½" x 18"
❑ 2	Aprons	¾" x 1½" x 12"
❑ 10	Slats	⅜" x 1¼" x 8¾"
❑ 1	Shelf	⅜" x 11¾" x 15¾"
❑ 2	Shelf caps	⅜" x 1¼" x 11¾"

***Photo 5** Use a stop block on the miter gauge to set the tenon shoulder depth.*

***Photo 6** The side assemblies should fit snugly, but if you force them you'll split wood!*

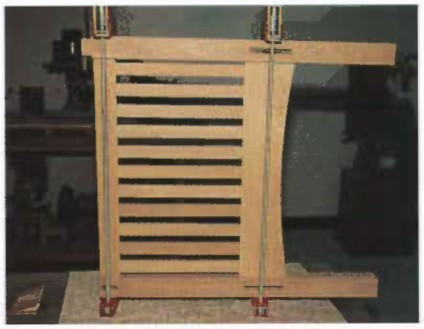


***Photo 7** When attaching the legs to the side assembly, the best grain should face outward.*

face against the fence, then turning it and running the opposite face against the fence, I was assured my tenon would be centered. Now the only trick left was to get a good fit in the mortise.

Once I was happy with the fit, I attached a feather board to my saw. This kept my fingers away from the blade while making sure the slat didn't wobble during the cut, making the tenon too thin ***(photo 3)***. Four passes on each slat, and I was well on my way to tenon heaven.

The next step is cutting the width of the tenons. I used the same rip fence setup method described above to determine the proper fit and center of the tenon, and then attached a board to my miter gauge to brace the slat against while making the cut. ***Photo 4*** shows a second piece attached to the miter gauge to keep the slat tight against the rip fence. Note that the horizontal board attached to the miter gauge should be 1/16" to 1/8" away from the rip fence to avoid binding. With my miter gauge set up this way, it was relatively easy to run the four passes on each slat.

The last (and most important) cut for the tenons defines the shoulder. Again, the rip fence and miter gauge can be used for this step, or the shoulder depth can be cut using a stop block clamped onto the miter gauge as shown in ***photo 5***. Four passes are made on each piece, and then the blade depth is reset and the width passes are made.

These same steps are used to form the tenons on the stretchers and aprons. Pay attention to the last shoulder cut, as the waste piece can bind between the blade and the fence.

The through tenons for the front legs are made last. Again, the same three steps are used, with the final tenon size being 1½" x 1½" x 1". Remember, pay attention to the potential hazard of flying waste pieces.

Before you begin sanding, now is a good time to cut the profile on the corbels, or arm supports, and to cut the arch on the bottom of the side stretchers. Full-size templates are provided for both in the PullOut Plans. I used a band saw to make the cuts wide of the pencil lines, then sanded much of the saw marks out with a sanding drum chucked into my drill press. When cutting the corbels, the pieces can be interlocked to waste as little wood as possible.

Final sanding for the curved edges is done with a random orbit sander. The most important consideration in forming the corbels is to make sure the top and glue edge form a square corner, and that a good jointer pass is left unsanded on the long edge.

Another detail prior to sanding is the 45 degree bevel on the top front edge of the front stretcher. Not only is this an attractive detail, but it also may keep your legs from going to sleep! I made the cut on the table saw, leaving a 3/8" face on the top edge.

After you've sanded all the pieces, you're ready to assemble. Start with one set of side aprons and stretchers and 11 slats. Test the tenon fits for any problems, and use a chisel to adjust the fit if necessary. To assemble the side, I clamped the stretcher into my front bench vise and applied glue to all the mortises. Make sure you use enough glue, but remember that too much may keep the tenon from seating all the way in. My tenon fit was tight enough to require just a little persuasion with a dead-blow hammer, but if your tenons require more than a friendly tap, you risk bulging out the thin, 1/8" sides of the mortise.

After all the tenons are seated in the stretcher, remove the piece from the vise and place the apron in the same position. Start the first tenon into the mortise of the apron and tap it into place, then start the second and so on, until all the tenons are started ***(photo 6)***. Then either tap the tenons home, or use a clamp to pull the assembly tight.

Next, dry fit the tenons of the assembled side into the mortises on the front and back legs. When the fit is good, apply glue to the mortises, assemble and clamp ***(photo 7)***.

While the sides dry, drill the legs for pinning the tenons then

WHAT IS QUARTER-SAWING?

Quarter-sawing is the practice of first cutting a log into quarters and then cutting the resulting pie-shaped wedges into boards. When a quarter-sawn board is examined from the end, the annular rings will run 45 to 90 degrees to the face. This results in a board with extraordinary stability. Boards with ring angles between 45 and 80 degrees are known as rift cuts and angles between 80 and 90 degrees are fully quarter-sawn.

Quarter-sawn oak was, and still is, the wood of choice for Stickley pieces. When quarter-sawn, its medullary rays (tissues radiating from the pith of a tree trunk that intersect the growth rings and carry sap) yield a very unique decorative pattern with exposed rays known as flakes.

Quarter-sawn oak has near vertical end grain. *Flat cut wood has less than 45 degree end grain.*

***Photo 8** When drilling the peg holes, a piece of tape on the bit inexpensively controls depth.*

***Photo 9** Keep the saw blade parallel to the leg surface while cutting the peg flush.*

***Photo 10** By clamping diagonally across the chair frame, square can be adjusted to perfect.*

insert the pegs. I marked my ⅛" drill bit with tape to keep the depth at 1½" and drilled two holes at each stretcher tenon and one hole at the apron tenon. The holes are drilled ⅜" in from the edge and at the center of the apron tenon and 1" in from each stretcher tenon's width ***(photo 8)***.

I cut my oak pegs to 2" lengths and then sanded a champfer on one end to allow it to slip into the hole easily. After putting a small amount of glue into the peg hole, I tapped the peg home, making sure the peg's end grain runs opposite the grain of the leg. Though this doesn't make the pegged joint any stronger, the greater contrast is attractive because it calls attention to the expressed joinery detail. The ½" of peg protruding from the hole is then trimmed flush to the leg ***(photo 9)***, and sanded.

After the sides are dry, use the same procedure to assemble the rear slat assembly. Then glue it and the front stretcher between the sides and clamp ***(photo 10)***. You should also check for square at this time, using a clamp to adjust.

The next step is to simply glue the corbels in place. The important factor is to center the corbel on the leg and keep the top flush with the leg top on the back leg and the tenon shoulder on the front leg ***(photo 11)***.

SAFETY TIP

The center of a piece can be safely cut away (as with the arm jig) without cutting through the perimeter of the piece.

Mark the cutout location, then (with the blade stopped and lowered below table height) adjust the rip fence to place an edge of the cutout directly over the blade.

Turn the saw on and, while holding the piece down firmly (clear of the blade), slowly raise the blade up into the piece.

When the saw intersects the marked lines of the cutout, lower the blade (while still running), below table level; then turn the saw off. Repeat the steps to complete the cutout shape.

This tip is suggested for MDF or thin soft wood boards. Hard wood may cause dangerous kickbacks.

Next cut the chair arms and back cap to length, using a 45 degree miter joint for the back comers. The miter will be glued together using biscuits to align and strengthen the joint, but first cut the through mortise for the front leg tenons.

First make the router template shown in the PullOut Plans. Use a table saw to make the cuts, and simply tack some ¾" x ¾" strips to the underside as indexing guides. These guides provide correct arm placement, while allowing you to only use one clamp to hold the template in place during routing. (See the Safety Tip at left for more information.)

I used a top-mounted bearing flush cutter in my router ***(photo 12)*** so the size of the template opening is the same as the mortise. Once the template was complete, I fit it over one of the arms and marked the location of the mortise. Then I used a 1⅛" boring bit chucked into the drill press to clear away most of the waste from the hole before routing.

Unless you want to make two templates, you'll have to work from the underside of one of the arms, so pay attention to which side displays the best figure.

After clamping the template back on the arm, I then used the router to mill the rest of the mortise. I used a backing board to keep from cutting into the workbench top. The last step is to square out the mortises' comers using a chisel. Be careful with this step, as the top surface should mate perfectly with the tenon.

Before gluing the mitered arms and back piece, I gently tapped the arms into place over the tenons and marked the height of the arm on the tenon with a pencil. Next I carefully removed the arms, and used a biscuit joiner and glue to fasten the mitered pieces together.

While these dried, I marked a ⅜" line around the top of the tenon, then used a random orbit sander to form a chamfer around the top of the tenon. This gives the chair an elegant finishing touch.

WOOD´WORDS (wood´wurds) *n.*

medullary ray: a vertical band or plate of unspecialized tissue that radiates between the pith and bark in the stems of trees.

settle: a long seat or bench, usually wooden, with arms and a high back. Term used commonly in defining Stickley furniture pieces.

Stickley, Gustav: (1858-1942), architect and furniture designer considered to be the most influential supporter of the Arts & Crafts movement in America. Founded the Craftsman Workshops.

Stickley, Leopold: *(1869-1957)* younger brother of Gustav; founded L. & J.G. Stickley Co. with brother John George. Precursor to the current L. & J.G. Stickley, Inc.

taboret: a small, usually portable, stand. Term used commonly in defining Stickley furniture pieces.

Photo 12 *A flush cutting knife makes clean work of the through mortise in the arm.*

Photo 11 *Gluing on the corbels is fairly simple, but watch for glue squeeze-out.*

Photo 13 *While gluing the arm assembly to the chair, you have another opportunity to check for squareness.*

WORKING WITH AN UPHOLSTERER

If you're like most woodworkers, you only use a needle for splinter removal. So unless you're lucky enough to know a seamstress who can make the chair cushions, you'll need the services of an upholsterer.

I worked with Cincinnati upholsterer Jeff Rankin, involving him in the project from the beginning because I didn't want to overlook any details that were important to him. In a preliminary phone call I learned that a frame with webbing and a cushion 3" to 4" thick would establish my finished seat height. We also determined the thickness of the back cushion, which is important in deciding the seat depth.

Fabric selection was the last question. Jeff suggested I'd save money by getting it myself. He simply advised me to buy 1½ yards of fabric, while he would supply the other materials.

Back at my shop, I completed the seat frame. Then I purchased the fabric, and dropped it all off at Jeff's so we could review the job. I told him there was a ⅛" space allowance around the frame for fabric wrapping; and we agreed that the cleats to support the frame wouldn't be installed until he completed his work.

You should know that if you're resourceful, you can do the upholstery work on the seat. The sewing for the back cushion is simpler than most clothing. All the materials are readily avialable at fabric stores. If you hire the work done, as a benchmark, I paid $25 for the fabric and $75 for Jeff's time and materials.

— by Steve Shanesy

Photo A *The seat cushion shown upside down. Rubber webbing has been stapled in place on the frame. Strips of muslin have been glued to foam, which is cut 1" larger than frame size.*

Photo B *The muslin has been pulled and stapled in place on the frame bottom. Begin pulling and fastening from the center of each side, then work toward the corners for consistency.*

Photo C *Right side up, the foam is formed by pulling and fastening muslin to give the cushion its final shape.*

Photo D *The upholstery fabric is stapled in place using the same method as the muslin. A layer of fiber fill is simply placed between the foam and fabric to give the cushion loft and smooth any irregularities. Fit the fabric in the corners neatly.*

Once the arm assembly dries, apply glue to the entire top edge of the chair aprons and corbels and place the arms over the tenons. Before clamping, check the chair again for squareness and clamp the arms to the chair while adjusting for any unevenness ***(photo 13)***.

The last two steps are finishing the piece (I used the finishing process discussed in "Two Classic Finishes" on the next page) and making the seat and back cushions (see "Working with an Upholsterer" above).

After that, the chair is ready to put to important work. Ease down, wiggle into a comfortable position and read *Popular Woodworking* while you plan your next project. PW

Photo E *The back cushion is rectangluar cut foam wrapped with fiber fill.*

Photo F *The zippered back fabric is sewn with separate end pieces to give it the proper angled shape of a bolster.*

David Thiel, *associate editor of* Popular Woodworking, *has been working in or running custom cabinet shops since he could push a broom.*

Two Classic Finishes

Produce authentic looking Early American Maple and Mission Oak finishes without all the hassle.

By Jeff Jewitt

Of the hundreds of finishes that we've done in my shop over the years, there are two that we are asked to do on a regular basis — Early American Maple and Mission Oak.

The Early American Maple finish, which duplicates the look of antique maple, is a soft, yellow brown with reddish accents. The Mission Oak finish is popular because of the recent interest and collectable appeal of Mission furniture based on the designs of the Stickley brothers and their contemporaries. This finish can range from light to dark tones *(see **photo above**)*, but takes advantage of white oak's large, open pores and accents them with a contrasting color. Customers like these finishes because they fit in with most decorating schemes. I like them because they're straightforward and easy to do.

The two finishes utilize techniques that some woodworkers may not be familiar with — staining with dyes and glazing. Staining wood with dyes imparts a background color that appears to be part of the wood itself. The goal in both of these finishes is to approximate the natural coloration that the wood takes on due to photo-oxidation of the surface by exposure to light and air. Glazing is a process of applying pigmented color in a thin film between coats of finish to impart depth, add color and simulate an aged look. In wood with large pores like oak and ash, the glaze settles in the pores to add a contrasting color. Both finishes use these techniques and are discussed in the instructions for the separate finishes that follow.

It's important to understand that the overall color of an old piece of furniture is built up of layers of different colors. There is a dominate undertone that's the result of natural processes that change the color of the surface, sometimes referred to as

***Photo above** shows — **Back (left to right):** knife tray with Early American Maple finish, letter holder with Light Mission Oak finish. **Front (left to right):** Early American Maple sample board, Dark Mission Oak finish and Light Mission Oak finish.*

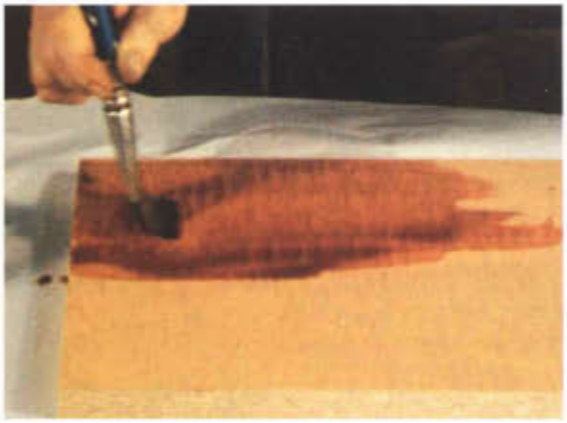


***Photo 1** Flooding the surface of the board with dye.*

***Photo 2** Scuff-sanding the dried dye very lightly with 320 grit. Use your hand to back the paper.*

primary patina. The next color comes from the color of the finish itself. Oil-based varnishes and shellacs all have color which becomes part of the wood's overall color. Like wood, they react with light and air. This is responsible for most of the yellow color seen on old pieces. Lastly, there is a build-up of waxes, oils from polishes, and grime which adds a dark color to the piece. The last two colorations are sometimes referred to as secondary patina.

Both finishes are easy to do if you follow the steps in order and secure the proper materials. I use powdered "aniline" type water dyes, which are available from many woodworking catalogs. These are dissolved in water and applied to wood to achieve the desired color. Glazes may be trickier to find, but the one I like the best, Heavy Bodied Glazing Stain, is made by Behlen. It's only available in clear, so color must be added by the finisher. Dry pigments, artist's colors, Japan colors or Universal Tinting Colors (UTC's) can all be used to tint the glaze. For finish, I use shellac made from dry flakes. If more protection is desired, a coat of varnish or lacquer can be applied over the shellac to increase the durability.

The most important requirement is to practice on samples first, because applying a new finishing technique on your project always spells disaster. (For more information, see "Finishing Without Fear" in this issue.) Cut up 3" x 5" sample boards and apply the finishes exactly as described in the text. Most of the preliminary coloring steps leave the wood looking horrible, so it's important to carry the entire process through to completion before judging your results.

***Photo 3** Sealing with linseed oil.*

***Photo 4** Sealing with a two-pound cut dark shellac.*

Early American Maple Finish

Maple, if left unstained, takes on a yellow tone over time, gradually deepening to a darker yellow-reddish brown. This is the color that you see on maple pieces in museums and most cherished by collectors. Figured maples are the most striking, since the figured areas deepen in color against the lighter wood surrounding them.

1. Staining: To match antique maple finishes, start with the background or undertone color. I use a honey-amber water dye available from suppliers of dry dyes. Other dyes, with names like Early American Maple or Honey-Maple, will also work. Whichever dye you choose, it should be a predominately yellow tone with hints of red and black. Before dyeing, sand the wood to 150 grit and then raise the grain by sponging it with distilled water. When it's dry, sand with 220 grit. This minimizes the raised grain from the application of the dye. The dye's concentration should leave the wood a honey-straw color when applied. Since all dye powders vary in concentration, it's impossible for me to give precise mixing instructions. The best I can say is that I usually start with the manufacturer's recommended mixing ratio and then dilute that by the same amount of water. If this is too light, add more dye. If it's too dark, add more water. Apply the dye by flooding all surfaces by brush, rag or spraying ***(photo 1)***. Let it dry several minutes, then blot up the excess. This is where practicing on a sample is important. The goal of the dyeing operation is to establish the primary undertone of color. The color of the wood when dry should be light straw. Let the dye dry at least eight hours, then scuff-sand the surface very lightly with 320 grit sandpaper ***(photo 2)*** before proceeding to the next step.

2. Oiling: This step adds depth to the dye and brings out any figure in the wood. Apply a small amount of a drying oil, such as linseed or tung, to the dyed wood's surface ***(photo 3)***. About a thimble full per square foot is all that's needed — don't flood the surface. Wipe the oil on with a rag and let it dry several hours before proceeding to the next step. Caution: always dispose of your oily rags properly to prevent spontaneous combustion.

3. Sealing: The wood needs to be sealed before glazing. I use one or two applications of a two-pound cut shellac

***Photo 5** Making glaze for the Early American Maple finish.*

***Photo 6** Applying glaze with a stiff bristle brush.*

***Photo 7** Wiping off the glaze.*

***Photo 8** Applying wax with #0000 steel wool.*

Source List

Dye powders, glazing stain, colors and shellac are available from:

Garrett-Wade
161 Avenue of the Americas
New York, NY 10013
(800) 221-2942

Woodworkers' Store
4365 Willow Dr.
Medina, MN 55340
(800) 279-4441

Woodworker's Supply
1108 No. Glenn Rd.
Casper, WY 82601
(800) 645-9292

Dry dye powders are available from:

Woodcraft Supply
210 Wood Co. Industrial Park
P.O. Box 1686
Parkersburg, WV 26102
(800) 542-9115

made from dry flakes. If you use only one coat of sealer, the subsequent glazing step will darken the wood significantly. If you use two coats, the glaze has less tendency to "take." You'll need to experiment to get the feel for the difference. I usually use two coats when I want a very subtle color change from the glaze and one coat when I want a dark "dirty" look similar to very old pieces. I use dark shellacs like garnet or a dewaxed dark ***(photo 4)***. Apply one coat by brush or spray and let it dry 30 minutes. Then take some 320 grit sandpaper and very lightly scuff-sand all surfaces to knock down any raised fibers. Follow up with a light rubbing using maroon synthetic steel wool.

4. Glazing: Glazing establishes the final color of the wood and darkens the pores and any figured areas. I make the glaze by taking 1 cup of glaze and adding 2 teaspoons of burnt umber, 1 teaspoon Venetian Red and ½ teaspoon black ***(photo 5)***. Mix the glaze thoroughly, then check the color by smearing a small amount on some white paper. (It should be a chocolate color.) Apply it to all surfaces of the wood with a stiff bristle brush ***(photo 6)***. Wipe the glaze off, leaving only enough on the surface as a thin veil of color ***(photo 7)***. You can leave more glaze in corners and crevices to simulate an aged appearance. Then let it dry according to the manufacturer's instructions. For the Behlen glaze, I let it dry five hours. Remember that most glazes don't dry to the touch, so it's normal for the surface to feel tacky and easy to leave unwanted fingerprints even after drying. The nice thing about glazing is that if the color isn't what you want, or if it's simply too dark, you can remove it with mineral spirits and not affect the sealed finish underneath. Just wipe it off and try a different glaze.

5. Topcoats: The glaze needs to be sealed in with more finish. I prefer to apply another coat of a two-pound cut shellac over the glaze with a brush or spray gun. I don't use a rag since this tends to pull off the glaze from the surface. If you want an all-shellac finish, apply another coat or two of shellac. For more durability, apply a coat of oil-based varnish or lacquer. I don't recommend polyurethane since it may not adhere well to the shellac.

6. Waxing: When the final coat of finish is dry, rub it out using #0000 steel wool and a dark wax like Antiquax Brown or Minwax ***(photo 8)***. I usually thin the wax with mineral spirits to make it easier to apply. This cuts down the gloss slightly and imparts a mellow, satiny sheen.

WOOD'WORDS (wood'wurds) *n.*

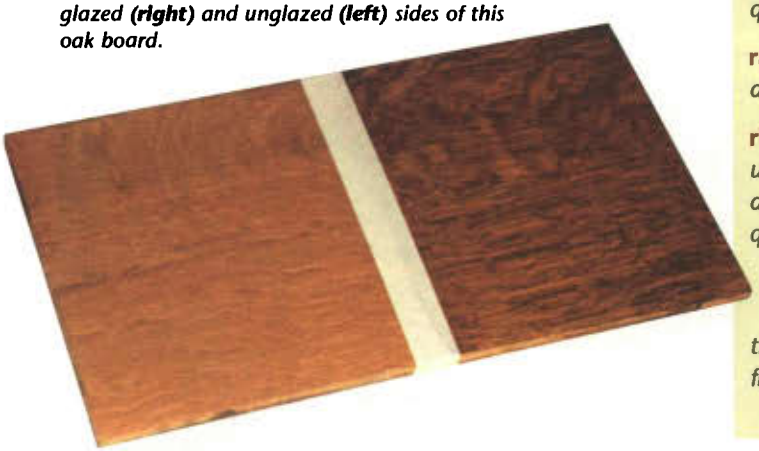
quarter-sawn: *Boards sawn radially from the log. In the case of oak (and beech and woods marked with medullary rays), the figure is prominent since the cuts are parallel with the rays. When looking at the angle of the annular rings to the face of the board on end grain, a board is considered fully quarter-sawn when the angle is between 80 and 90 degrees.*

ray flecks: *The dominant figure exposed when medullary rays are intersected during the process of quarter-sawing a log.*

rift cut (sawn): *Another term for quarter-sawn, the term is used when the angle of the annular rings falls between 45 and 80 degrees. Thus the board is rift cut, rather than fully quarter-sawn.*

scuff-sand: *Sanding process employing fine-grit sandpaper to scuff the surface of a finish without penetrating below the finish layer. The process is used to abrade the first coat of finish so that following coats will adhere better.*

Photo 9 *This board shows the true Mission effect achieved by the use of a dark glaze. Note the difference in effect between the glazed **(right)** and unglazed **(left)** sides of this oak board.*



Mission Oak Finish

The traditional method of finishing oak in the Mission or Craftsman-style involved exposing the furniture to very strong ammonia fumes in an airtight chamber. Ammonia fuming was preferred by Stickley because it colored the glassy ray fleck cells as well as the softer wood, establishing an even tone throughout the wood. An alternative method which yields excellent results is based on the steps below. It differs from fuming in that it will highlight the ray fleck on rift cut and quarter-sawn wood.

Proper surface preparation is of utmost importance in finishing oak. Sand the wood to 150 grit and pre-raise the grain with distilled water. Sand with 180 grit when dry and remove all the dust from the pores. You can use a brush or vacuum, but I find blasting the wood with compressed air the best. The pores must be clean and free of all sawdust before proceeding, so check the surfaces carefully.

1. Staining: You can leave the wood unstained if you wish, but I like to apply a dye to establish the predominate undertone of the piece. This can range anywhere from a light tan colored dye to a dark reddish brown. As mentioned earlier, it's important to experiment on scraps and carry the finish all the way to the end. This is the only way to tell if the color of the dye is right. Apply the dye by flooding all surfaces and blot up the excess. Let it dry eight hours before scuff sanding with 320 grit sandpaper, followed by a light rubbing with maroon synthetic steel wool.

2. Oiling: Oil the wood after the dye is dry by applying a small amount of linseed or tung oil with a rag. Let it dry several hours. Dispose of the rag properly as explained previously. Then lightly scuff-sand the surface with maroon synthetic steel wool.

3. Sealing: Apply two coats of a two-pound cut shellac. You can use any colored shellac you wish, either garnet, amber or light. Scuff-sand between coats with 320 grit paper. Before the next step, vacuum all the dust from the pores.

4. Glazing: The importance of this step cannot be stressed enough. One of the qualities that makes oak attractive is its large pores. By emphasizing these pores with a dark glaze, the true Mission appearance is achieved *(photo 9)*. Stickley did this with black wax, but I prefer to use an oil-based glaze. Take 1 cup of clear glaze, mixing in 2 teaspoons of black and 3 teaspoons of burnt sienna. This is a very dark glaze, so you may have to dilute it with mineral spirits. Apply the glaze with a stiff bristle brush, working across the grain to make sure it gets into the pores. Wipe the excess off with a dry rag. If the color is too dark or it dries quickly, apply some mineral spirits to the rag to help remove the glaze. Let it dry according to the manufacturer's instructions.

5. Topcoats: I believe that oak looks best with as little finish as possible, so I apply only one coat of shellac to seal in the glaze. If more durability is required, a thinned coat of varnish or lacquer can be applied over the shellac. I don't recommend applying varnish directly over the dried glaze because it tends to pull it up too much. Spraying the finish over the glaze is best, since this will minimize the removal of the glaze.

6. Waxing: After the final coat is dry, apply a paste wax to the furniture. Use a dark wax on the dark finishes and apply with #0000 steel wool. Buff the wax as soon as it hazes over to leave a soft sheen.

Applications

Two Mission-style projects that appear in this issue will look great after you've applied the Mission Oak finish as described here — a Prairie spindle chair (and table) and two lamps. And now that you're familiar with the techniques to successfully using dyes and glazes, you can continue to try your hand at producing finishes that give your work that special, warm, old-time look. PW

Jeff Jewitt *owns J.B. Jewitt Company in North Royalton, OH. He also specializes in conservation, restoration, period finishes and techniques. His book on period finishes is due out this year from Taunton Press.*

Working Wet Wood

Helpful tips to find, dry and turn wet wood.

By Tobias Kaye

For some species, turning wet is the only solution because they'll split if left to dry in the round. By experimenting with wood, you'll soon learn how long each type needs to dry and how they are best treated before and after turning. If you want to keep logs for wet turning, immersing the wood in water (such as a running stream) is a good idea.

An old branch lays on the curb, ready for the garbage collector. Small logs, still green, rest abandoned in a newly cleared stand of trees. Found wood can be acquired in any number of places. Such wood can make your woodturning very rewarding, and give your hobby a little history.

But before you shape an old log into a beautiful bowl or intricate box, you need to know some important techniques for working with wet, or green, wood. A little bit of theory about lumber drying behavior can go a long way — and help you to avoid splits, warps and discoloring that may ruin your projects.

Finding the Wood

Let's start at the beginning. Suppose you live in a city. How can you find pieces of log? Obviously, first you must find out who is cutting trees. If you see or hear someone wielding a chain saw, it's usually worth stopping to ask if you might have one or two short, fat pieces.

Your local parks department often has a garage where they keep tree trimming and removal equipment. Chances are that they have a stack of wood, too. They may want to sell a whole log, but once they know what you're looking for, they may be willing to keep choice pieces for you at no cost. Remember, too, that showing your finished work can only please those who are doing you a favor.

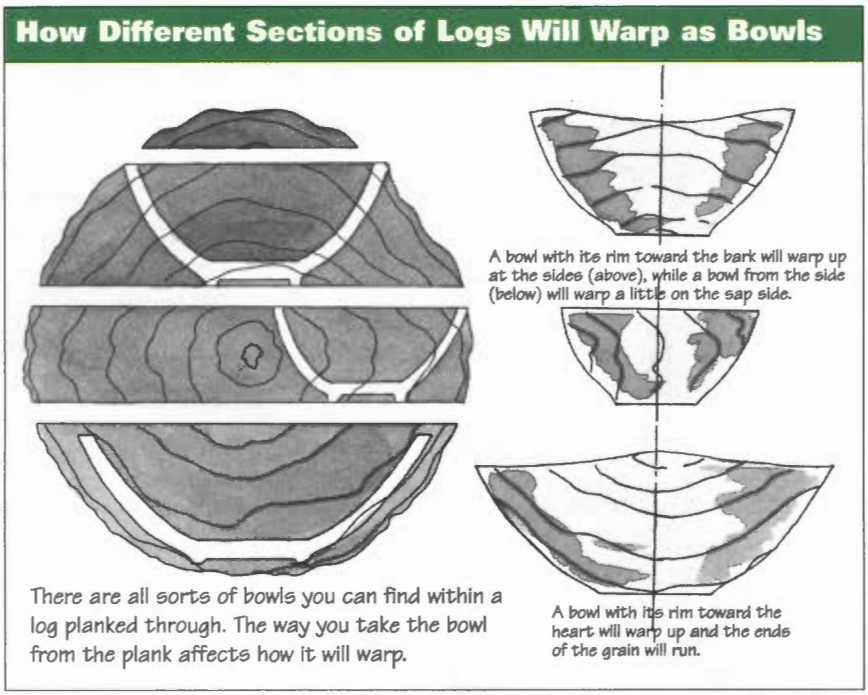
Private tree trimming people advertise in the Yellow Pages and local papers. Look under "Tree Service." Here again, many people love the trees they cut and are more than happy to see pieces made new for an extended life. If you're in the country, additional sources are firewood merchants and forestry contractors. However, the latter are mostly concerned with commercial softwood species, with little turning appeal.

I chose to turn wet holly for this bowl. If you'd like to use holly, you'll find it turns smoothly and you may not need to sand it. On the other hand, when you reach ***step 11*** *of this 16-step process and would like to re-turn it after it's aged, store it in a ventilated (not warm or windy) place. When turning holly, it must be wet because it won't survive drying thicker than one inch or so. It discolors less when dried fast. A bowl with ¼"-thick walls will take a week to dry because there's so much open end grain.*

HOW TO MAKE A WET WOOD BOWL

1 *The branch heart is at the bottom. There is reaction wood above it that will warp strongly from the heart.*

2 *The holly blank is 12"-long and will produce a 10½" bowl. Brush the dirt off the bark before band sawing the log in half.*



Recognizing Good Wood

Now that you know where to go, what do you look for? Depending on the size of your lathe, you should look for branch wood or small trunks (called "boles" in the trade) from 4" or 5" diameter to 16" to 20" diameter.

Some species, like yew and labumam, lilac and mulberry are unusually useful in small sections as well as in large. Other species to look out for are plum and most fruitwoods, which are pleasant to tum and often colorful. Holly and hawthorn are very close grained and smooth cutting woods; and hazel and arbutus have warm colors and a silky luster. Many other species are interesting, and anything is worth trying once before deciding whether to pass up or stock up.

Selecting Characteristics

Is there any special part of each tree that you should select? This depends on what you want from it. The straight sections of timber will warp and split less than the elbows and crotches. The most interesting grain patterns will be in the most difficult parts of the tree. The root stock, where the roots divide from the base of the tree, may contain interesting grain but will also be rich in stones, grit and other blade braking debris, even after all visible dirt has been hosed or hacked away.

Some trees, such as flowering hybrids and fruiting species, may have been grafted onto another type of root. Cutting through the graft mark may reveal an interesting grain pattern and color changes.

Burls are lumps that grow like warts on trunks or branches. Many have highly dramatic grain patterns within. If the burl has a smooth bark surface outside it'll be rich in color inside, but without the swirl and speckle commonly found in burls.

The dividing point where the branches leave the main trunk often contains a strong figure known as "flame grain." This is exposed by cutting down through trunk and branch at once, plankwise, to leave the two pieces in a "Y" figure. The flame is present near the heart as they divide and doesn't extend to the sides of the tree. This grain can be captured on a platter but would be cut away if a bowl is made.

Lastly, an elbow point where a branch tums sharply will often have good ripple figure in the crook.

Other types of figures may be caused by insect attack or fungal infestation. Look for bark patterns that depart from the

3 Cut the wood into two bowl blanks. This holly was stored on the ground, in the rain, for six weeks after being cut down.

4 Cut a flat off the side of the log half so the blank will sit on the band saw table evenly for circle cutting.

5 Draw a circle on the largest flat face of the log half and cut around it with the band saw.

HOW A LOG MOVES AS IT DRIES, AND A LOOK AT

Left in the round, large splits will form from the outside toward the heart. Cut the log overlength.

When a log is planked through (as above) the boards are fine when wet but move as they dry.

As the planks dry, checks form around the heart, and the outer boards cup away from the heart.

HOW TO MAKE A WET WOOD BOWL

6 Screw the faceplate to the widest face. This will become the hollow of the bowl after turning the foot.

7 Wet wood cuts beautifully with no dust. I am working outboard on the lathe, hence the left-hand rotation.

norm or signs of fungal growth. The patterns of fungal infestation are best seen on light woods such as beech, birch and sycamore. Fungus can be coaxed into wood by standing a log on end on a plastic bag covered with an inch or two of shavings or, better, of leaf mold from a forest floor. Cover the top of the log with mulch and tie a porous cloth over it to keep it in place; this will keep it moist if the weather is dry. Leave the fungal mixture on for six weeks for birch, twelve weeks for beech and twenty for sycamore. Then cut the log down the heart lengthwise. If the markings aren't advanced enough, tie the halves together and repeat.

Storing Wet Wood

Once you have a stack of wet wood, you must decide how to keep it until you can use it. Your choices are drying it, either planked or not, or keeping it wet.

However you choose to dry the wood, sealing the end grain is a good idea. Sealants reduce the rate of evaporation that would otherwise be faster from the ends than the sides. If the ends dry faster they shrink before the rest of the wood, which results in splits or checks.

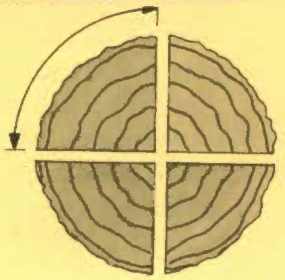
End grain sealer can be bought from woodturning supply stores as a wax emulsion to be painted on, which will dry and make the wood waterproof. Hot candle-wax (paraffin wax) can also be used, though this tends to flake off. Gloss paint is good too, especially if it's oil based. Microporous paints allow too much evaporation. White polyvinyl acetate (P.V.A.) woodworking glue can also be used, but this melts in

8 By using the lower wing of the gouge near the corner you can safely achieve an excellent finish.

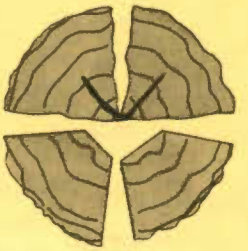
9 Shear scrape by passing the tool burr obliquely to the wood fibers to achieve a ridge-free finish.

10 Wipe with citric acid to wash the holly. It cancels iron stains and prevents the blank from turning grey.

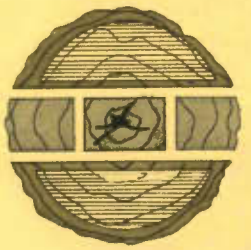
HOW YOU CAN MINIMIZE SPLITTING



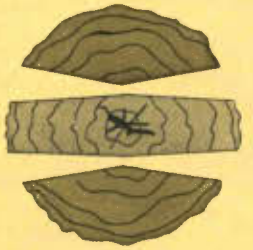
A log sawn in quarters like this will shrink along the arrows (radially), to look like the next diagram.



Remove the inner corners (or heart) to reduce heart shake (or splits) as the quarters dry.



You can turn bowls from the outer boards (flitches), free of heart. Use the rest for boxes and spindle work.



Radial shrinkage means that the flitches and the central board will change shape as they dry.

the rain. Whatever you choose, two coats are better than one.

Any attempt to dry wood that is in log form is doomed to fail. If you leave the bark on, it will crack in from the ends; and if the bark is removed, it will crack all around. Some woods, like yew and cyprus, will crack less than others, but the problem stems from the heart.

Growth rings around the heart try to get smaller as they dry. The heart and every growth ring inside the one we're looking at *(see above)* cannot get smaller fast enough to allow the larger rings to shrink. Therefore, the wood must split.

Wood doesn't like to split. It would rather warp and bend, but the stiffness of large sections, and in particular the heart enclosed within it, won't allow the movement drying requires. Therefore, the board has to split in order to move.

Removing the Heart

The only way to dry wood without risking serious shaking (another term for splitting) from the heart or toward it is to remove it. This is done either by planking, so only the central board is subject to heart shakes, or by cutting the log into flitches (half rounds), preferably again with a central plank, or into quarters and cutting or splitting off the central point of each quarter. Small sections of some species are less prone to split, and may dry with splits so small that they're either acceptable or fillable. Sculptural woodturning can sometimes benefit from the presence of shakes, as can some barky pieces.

The PEG Solution

One other way of avoiding problems in drying is to use polyethylene glycol 1000 (PEG). It's a waxy substance that, when diluted in water, will replace the timber's own moisture by osmosis, thus fattening each cell out so that it never shrinks to its dry size.

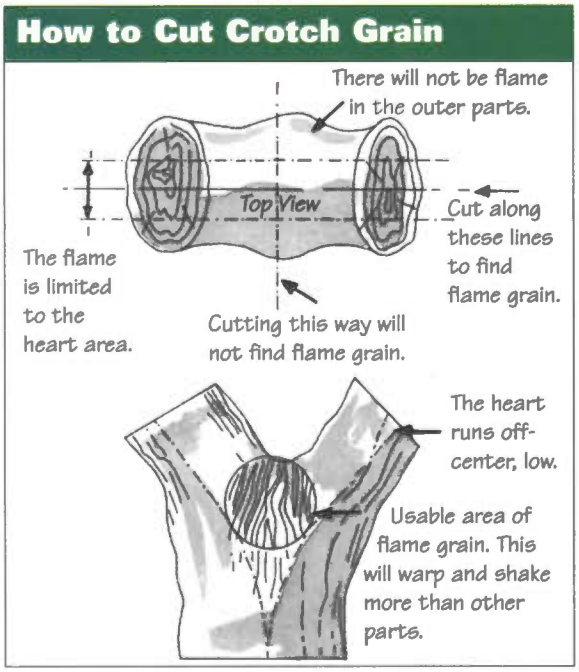
The process of soaking a half-finished workpiece takes several weeks, then problems arise. Though the wood won't shake or warp, it will sweat minute quantities of PEG with every change in the weather. This throws off the polish. Only the thickest and hardest of high build varnish-type coatings will stay on for more than a few months. Underneath the polish the PEG looks like an old, soft oil polish. If you're prepared for a matte and slightly sticky surface it's not too bad, and with a regular burnishing it can even look good.

11 *If you want to leave an 11" holly bowl to warp for about a month before returning, leave it about ⅛"-thick.*

12 *Thin the walls in stages, supporting the outside with your fingers. A round bevel heal gives you the smoothest cutting.*

13 *Shear scraping the inside.*

You can find flame grain at the crotch of a tree. This is where two branches meet, or a single branch divides from the trunk. Cut down though the trunk to expose the flame.



Keeping Timber Wet

The option of keeping your timber wet is suitable for some species for a limited period of time. As a rule of thumb, the harder the wood, the better it will resist rotting if kept wet. At one extreme, if you have access to a small river or stream, total immersion for up to several years is a very good method of wet storage. If you are immersing your wood, there's no need to use any seal at all. If you don't have this option, then cover the wood with a tarp. In wet weather, remove the tarp; and in windy weather, pin it low to the ground. In warm weather, allow good air flow past the wood, but soak it with water regularly.

Safe Drying

However you store your timber, keep an eye on it. If fungus starts to grow, it needs more air. If splits start to form, it needs to be either cut into smaller sections or exposed to more moisture. A rough guide for maximum thicknesses for drying is 6" to 8" for cyprus, yew and elm; 4" to 5" for acacia and ash; 3" to 5" for cherry, sycamore and walnut; 2" to 3" for apple and pear; 1" to 1½" for holly and hawthorn. The appropriate sizes for other timbers can be guessed at by comparing their grains with that of the examples given.

As a piece of wood dries, it can lose nearly half of its original weight. Weigh the wood twice a week with a two-week interval. If there's no change in the weight, the wood has stabilized.

Timber that has become stable in a shed or garage is usually dry enough for turning. Unlike furniture, which needs great dimensional stability, most turning is no worse off for a small

HOW TO MAKE A WET WOOD BOWL

14 *Remove base chuck marks by holding the bowl between another cloth-lined blank and the tailstock.*

15 *Cut off any loose pieces of cloth and turn the side of the spigot to remove the dovetail shape and marks.*

16 *Sand the base flat with a hand-held block or a belt sander. If for food use, finish with salad oil.*

Drying Guide

Safe thicknesses for drying the following timber:

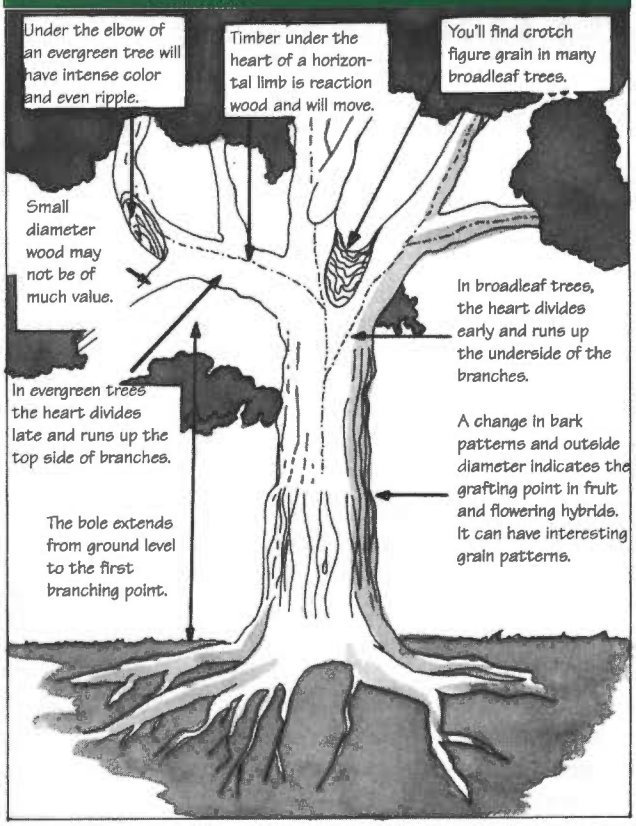
Cyprus, elm and yew	6" to 8"
Acacia and ash	4" to 5"
Cherry, sycamore and walnut	3" to 5"
Apple and pear	2" to 3"
Holly and hawthorn	½" to 1"

amount of warpage.

Electronic devices for gauging wood moisture levels are available, but I think rules of thumb are sufficient. For wet bowl making, leave a piece of log three inches longer than the required bowl size out in the air until splits appear in the end. At this point, cut the splits away. The wood that's left should be dry enough to sand without severe clogging, but wet enough to turn smoothly and warp nicely.

When planning a bowl from wet wood, it's good to know a little about how it will look when dry. Bark edge bowls will curve down slightly at the ends, becoming more oval and slightly less deep. A bowl turned with its rim toward the bark will warp down gently at the end grain and become slightly oval. The more common bowl with its foot toward the bark end and its rim to the center will become more oval with its rim rising at the end grain. The closer the heart is to the rim, the more acute the curve at the center of the up-rise will be (see ***"How Different Sections of Logs Will Warp as Bowls"***). Any piece of wood with strong figure in the grain, especially from areas of the tree mentioned earlier, will warp more and follow different rules than these examples. Some predictions can be made by applying the general pattern of pulling away from the heart. Treat knots as hearts and expect timber that was grown horizontal to pull toward the sky at the end grain. That is to say, the upward stresses that stopped the branches from sagging will be released to pull the ends of the bowl in the same direction. Spindles turned from this "reaction" timber can warp surprisingly.

What to Look For in a Tree



Finishing Green

Now that you know what to expect, you'll find that turning green wood is far easier than turning dry wood. Larger shavings come off with less vibration and less broken grain. Dust is virtually eliminated. Avoid contacting finished surfaces with iron or steel for long. Steel chuck jaws will leave black marks in most woods. In holly and sweet chestnut, even the finest particles of steel from the gouge can appear as black marks a day or so later. A final wash over with lemon juice after turning will avoid this.

Some woods will take a finish from the tool so fine that sanding can be avoided altogether. A surface finish like that found on antique wooden bowls is acquired best through time and use. PW

Tobias Kaye, an expert turner, writes, teaches and practices his craft from his home in Devon, England.

ED. — An earlier version of this article originally appeared in Good Woodworking, *a popular British magazine edited by Nick Gibbs.*

✔ TIP **By holding a light inside the holly bowl you can see if the thickness is consistent. Try to keep the walls evenly thick or thin.**

Solid Maple Flower Press

Preserving pansies? Mummifying marigolds? We've got your tool!

By David Thiel

Now that spring has blessed us with pleasant weather, May flowers can't be far behind. What better time is there to make a flower press, perhaps as a special Mother's Day gift?

The project is simple, with only one specialty tool required. To form the threaded dowel screw, we used a wood threading kit available from most mail order catalogs that costs about $35. If that price makes you hesitate, remember that you'll find many projects that will benefit from a wooden screw.

Start by cutting all the pieces to size according to the Schedule of Materials (see PullOut™Plans). Next, take the bridge piece and the press bar and mark them according to ***diagram 1***, removing the wedge-shaped material by machine sanding or sawing.

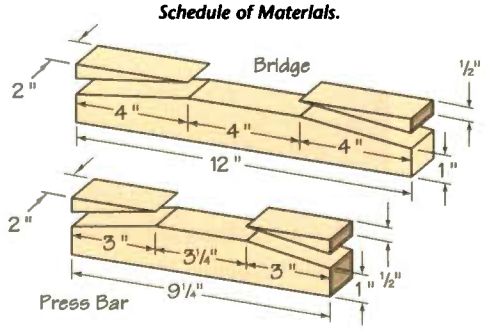
Afterward, move to the base and press plate pieces and make the notches. For the base plate, measure in 5⅜" from all four corners, mark the locations measuring along the two parallel long grain sides, then carry your lines in toward the center 1¼" and mark again. Connect the ends of each pair of lines, and you'll have the locations for the two 1¼" x 1¼" posts.

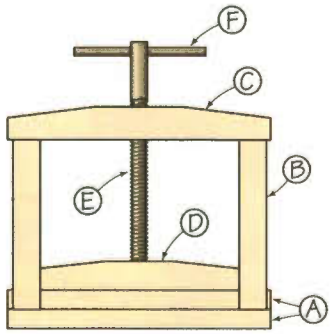
Cut out these notches using the table saw and miter gauge with the blade run up to the 1¼" depth, and the fence set for the 5⅜" dimension. With the board on edge against the miter gauge, run it through, moving the piece to cut on each line. Once you've defined the notch, cut the third side using a scroll saw. If that's not an option, the table saw fence can be moved to cut the notch away a kerf at a time. If you're good with a chisel, that's also an alternative. When you're done, clean up the notch with a file.

Next, notch the press plate along the long grain edges 1⅜"x 6⅜" (see PullOut Plans). These notches allow the press plate to be removed for easier placement of your flowers and blotter paper.

Now make the threaded screw mechanism. I used maple for the dowel. Many dowels that are commonly available are made of ramin, which is too soft to cut good threads. Maple holds the thread shape best for this project. I took a dowel twice the length of the required finished size and started the thread box from one end. Thread farther than necessary and then stop one-third of the way from the end. Back the thread box off the now threaded dowel.

Diagram 1 *See PullOut Plans for complete diagrams and Schedule of Materials.*





Flower Press	
Letter	*Item*
A	Base & Press Plate
B	Posts
C	Bridge
D	Press Bar
E	Threaded Dowel
F	Dowel Handle

HOW TO USE YOUR PRESSED FLOWERS

If your flower pressing experience is limited to sticking a daisy between wax paper in the pages of a thick book, there's a whole new world out there for you to try. First cut off unwanted stalks and foliage, then flatten the flowers gently with your fingertips. Arrange the blossoms face-down on absorbent paper, such as blotting paper, making sure they don't overlap. Then put a second sheet of paper on top. Now use your new flower press to exert pressure, keeping it in a warm, dry place for about three weeks. For thicker flowers, allow another week or two.

When choosing the flowers, thin, delicate ones, such as pansies, work best. You also can pick them to suit a mood, color scheme or season.

The range of possible pressed flower crafts goes as far as your imagination does. You could create a framed collage or use blooms to accent embroidery. You also could make greeting cards, floral candles and decorative bottles — or your own self-creation.

When attaching to paper, use paper glue to secure the flowers (be careful — they're very delicate). On embroidery, a latex-based glue works best. For candles, heat the area you'll be decorating with the back of a hot spoon, then press the flowers on the softened wax. Bottles can be decorated by dabbing varnish onto the outer surface, then pressing a blossom onto it until dry. After your design is complete, coat the bottle with a thin, even coat of varnish.

For more information, see *The Complete Flower Craft Book*, by Susan Conder, Sue Phillips, and Pamela Westland (©1993 North Light Books) or *Flower Craft*, by Jenny Raworth with Susan Berry, (©1995, Reader's Digest Books).

Measure from the point where you stopped threading and make a mark 2½" into the unthreaded end. From that mark, measure 9¼" back toward the threaded end and make another mark. Cut the dowel on your two marks and the threaded rod is at its finished size.

To make the hole to accept the threaded rod, mark the center of the bridge on its top surface. Accuracy is important here, or the mechanism will work poorly. Using a ½" bit, drill completely through the bridge, then use the tap part of the wood threading kit to thread the interior of the hole. Start from the top and apply consistent downward pressure. Go slowly and work to maintain a perpendicular relationship to the bridge. Once the tap is started about ½" or so, it should pull itself through on its own threads. Still, proceed slowly because speed can cause tear-out within the threads.

Once the hole is threaded, it's necessary to use the tap again, applying slight pressure away from the perpendicular to make the fit loose enough for a smooth operating mechanism. Test fit your threaded rod to see if a little tinkering will be required.

Next chuck a ¾" Forstner bit into your drill press and mark and drill the exact center of the press bar's top surface. This hole should only be made to a depth of ¾". Then turn the press bar over and, working from the exact center, drill a ⅜" wide hole, 3/16" deep. Using a 3/16" drill bit, connect the two previously made holes.

Test fit the threaded end of the dowel into the ¾" hole in the press bar. The dowel should slip straight in without threading and should have a slight amount of play. If necessary, lightly sand the threads to improve the fit. Then, with the dowel in place, pilot drill from the other side of the press bar into the dowel and attach it using a #8 x 1¼" pan head screw. Stop just short of tightening the screw all the way down. The press bar should rotate freely on the screw, as if on a gimbal.

To keep the press bar moving smoothly, I used the table saw to cut a ¼" wide x ¼" deep groove in the exact center of the inside face of each post. Then, using a piece of ¼" steel rod, I cut two pieces ¾" long and inserted them into ⅜" deep holes drilled in the ends of the press bar. When assembled, the pins slide into the grooves in the posts and guide the mechanism as it moves up and down.

You're now ready to assemble the press. I used screws countersunk into ⅜" diameter pockets, also drilled with a bit chucked into the drill press. Make your holes deep enough to hold the head of the screw as well as a button plug to conceal the screw. Make your holes in the posts centered ⅜" up from the bottom, then pilot drill and attach the posts to the base. I didn't use glue on the project because it would add little strength to the joints.

Now measure the space between the two attached posts and check to see that it is the same at the top of the posts. If not, you may want to cut a spacer to hold the proper spacing while attaching the bridge to the posts.

Locate the center positioning for the posts on the bridge and drill ⅜" countersunk pockets for your screws. Pilot drill the hole and attach the bridge.

The next step is to drill a ⅜" hole through the center of the threaded dowel for the ⅜" dowel handle. I made the handle 6" long and glued it in place.

All that's left is to sand the piece smooth. I vigorously rounded the edges of most of the pieces with 120 grit sandpaper, and then worked through 220 grit with a random orbit sander.

The choice of finish is up to you. A coat of Danish oil would work well. For a little more protection, you might choose lacquer or a coat of polyurethane. PW

David Thiel is associate editor of Popular Woodworking.

WOOD´WORDS (wood´wurds) *n.*

gimbal: *n. A device consisting of two rings, mounted on axes at right angles to each other so that an object, such as a ship's compass, will remain suspended in a horizontal plane, regardless of any motion of its support.*

tap: *n. A tool for cutting an internal screw thread. v. To cut screw threads in a collar, socket or other fitting.*

Notched Table Saw Jigs

These jigs have the answers to simplifying your toughest cutting chores.

When you need a component that can't be sawed accurately by conventional means, such as using a miter gauge or rip fence, or one that is too small to be hand-held safely, you may discover that a simple "notched jig" offers a practical solution.

What's a notched jig? It's simply a piece of wood with parallel sides and a shape cut out along one of its edges. The cutout, or notch, may be the shape of the part that you need, as would be the case if you required small wedges, or it may be the shape of the waste piece that will be removed, as would be the case if you were making a taper cut.

The jig, moved along the rip fence, acts as both a carrier for the work and a gauge for the cut. Thus, you can position workpieces precisely even when unusual shapes are required.

When do jigs of this type make sense?

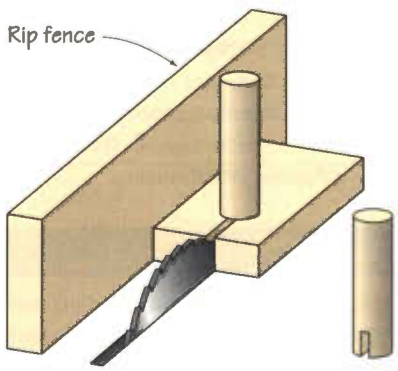
- When a component is too small for safe handling.
- When the shape of a part makes it impractical to produce by conventional means.
- When you need many small, identical pieces.
- When a slight error is magnified because the same cut must be repeated on multiple parts. An example would be a jig to cut frames with mitered comers. In such cases, you don't have to be off more than a degree or so to be frustrated at assembly time. The seemingly insignificant error is multiplied by eight!

Of course, if it's to do its job right, the jig must be made accurately. If you need just a piece or two, making a special device may not be worth the trouble. In such cases it might be more practical to lay out the shape of the part, rough cut it, then sand it to perfect shape. But for production output and when faced with a cut that might put fingers in jeopardy, opt for a notched jig — like one of those shown in the illustrations. PW

R.J. DeCristoforo is a contributing editor for Popular Woodworking.

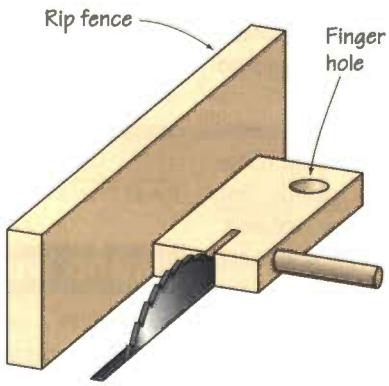
FOUR GREAT DOWEL JIGS

Dowel Notching Jig



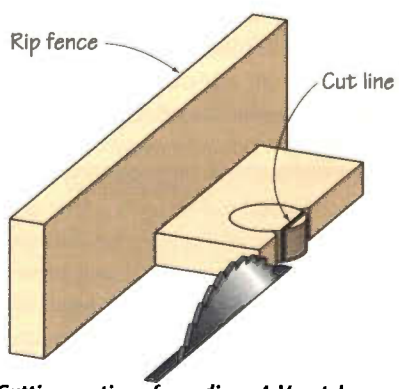
In this case, the "notch" is simply a hole in a carrier board that holds the cylinder or dowel in the correct position for the cut.

Dowel Cutting Jig



Cutting dowels to length accurately and with a minimum of feathering: finger hole for pulling back the jig after the dowel is cut.

Dowel Disc Sectioning Jig

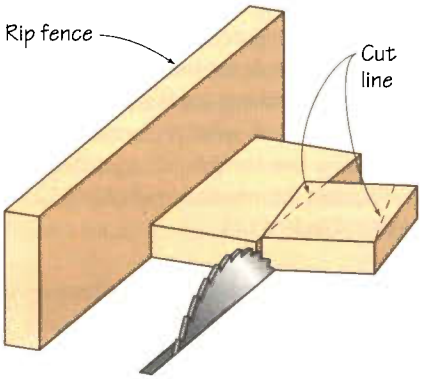


Cutting sections from discs. A V-notch would also work, but it would be more difficult to control the piece.

by R.J. DeCristoforo

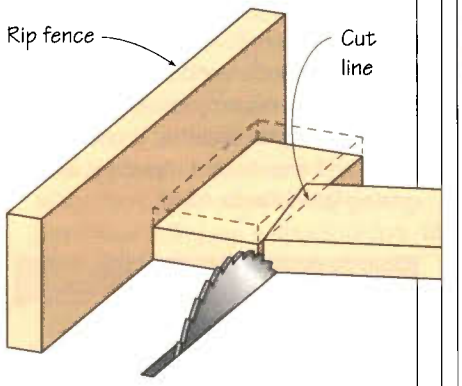
TWO GREAT ANGLE JIGS

Taper Jig



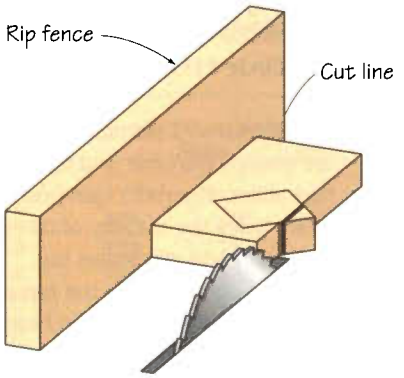
For tapers, the notch in the jig is the shape of the waste piece. For the same taper on the opposite side, flip the stock and make a second cut.

Wedge Jig



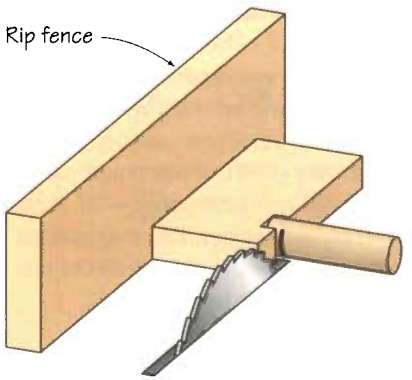
For wedges, the notch shape is the shape of the wedge. Make the cut with the point entering the saw blade first. For extra safety, add a ¼" thick rectangle to the top of the jig covering the notch. This lessens the chance of kickback.

OCTAGON JIG



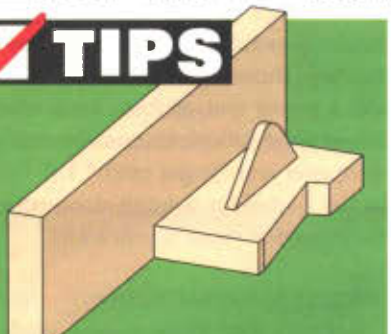
Odd-shaped pieces, like octagons, can be cut from squares held in a notched jig so corners can be removed. Form the notch on a scroll saw or band saw.

Dowel Disc Jig



Cutting the discs from dowels, a closet pole or lathe-turned cylinders. The notch is just wide enough to hold work firmly. The notch's depth equals the thickness of the required discs.

TIPS



- **Jigs don't have to be fancy, but notches must be accurate.**
- **Make them wide enough to provide ample room for your hand.**
- **Be sure the rip fence and saw blade are parallel.**

RESOURCE DIRECTORY

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ARROW FASTENER COMPANY, INC. is one of the oldest American hand tool manufacturers. In addition to its world famous line of all-steel staple gun tackers and staples, Arrow also produces a full line of Brute steel rule measuring tapes, rivet tools, hot melt glue guns and supplies. Arrow . . . the standard of excellence by which all others are judged. **Circle #106.**

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MAKITA U.S.A. is the U.S. Distributor of Makita's line of high-performance corded and cordless power tools. The company, which has nine branch offices, 50 service centers, and over 300 authorized service centers, features an extensive line of tools for both woodworking and metalworking applications. They also offer a line-up of pneumatic nailers, including brad and finishing nailers. For additional information, call (714) 522-8088. **Circle #115.**

RYOBI AMERICA CORP. offers a wide range of power tools, outdoor power equipment, and builder's hardware for the serious do-it-yourselfer and professional tradesman. Ryobi offers a wide selection of bench-top, cordless, portable and specialty power tools; a variety of gas, electric and battery-powered outdoor power equipment; and an assortment of builder's hardware. Designed and manufactured to exacting standards of quality, durability and reliability, yet affordable. Free catalog. **Circle #117.**

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THE VIDEO COLLEGE OF WOODWORKING, INC. The FUNdamentals of MODERN Woodworking is a 60-minute video with accompanying workbook, plus a set of plans and planning sheets, which takes you from a basic understanding of wood, tool selection, maintenance and safe operation, through the essentials of joinery, cabinet construction and finishing. **Circle #131.**

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ADAMS WOOD PRODUCTS is a manufacturer of solid wood furniture components. They make a variety of table bases, Queen Anne table legs, claw & ball table legs, turned legs, plus a variety of ready-to-assemble and finish dining chairs & occasional tables. These items are carried in stock in a variety of woods. There is no minimum order size as they can be purchased one at a time. **Circle #121.**

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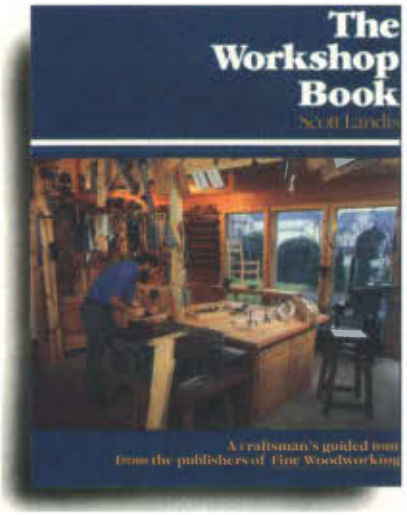
Continued from p. 29.



The Workshop Book, *by Scott Landis. 224 pages, hardcover, $34.95; ©1991, from The Taunton Press, 63 S. Main Street, P.O. Box 5506, Newtown, CT 06470-5506.*

Having read Landis' book about workbenches with great interest, I was looking forward to *The Workshop Book* with great anticipation. I already knew that Landis compiles interesting ideas and excellent photos, and that his writing skills are first rate. But workshops are much more personal than workbenches.

If you want to know what kind of shop you should build, Landis won't give you a recipe — but he will give you some suggestions and show you some of the finest shops in the land.

Through the first 150 pages, Landis offers lots of creative ideas and tools to solve workshop dilemmas. If you're contemplating the purchase of new equipment, you'll find the fourth chapter about machinery useful.

And if you love your shop as I love mine, you spend countless hours dreaming about how to make it perfect. So you probably shouldn't even look at chapter seven, "Dream Workshops." I thought my shop was well above average until I saw these. Now I'm not so sure.

The last chapter examines the issue of storage. Following some of the suggestions will either save you a great deal of space, or permit you to accumulate a good bit more stuff!

If you're interested in workshop history, layout, systems and fixtures, this book is a solid value, even at $34.95.

— by Hugh Foster

The Fundamentals of Modern Woodworking, *by Ray Scott. 62 minutes, VHS, $29.95 plus $4.95 shipping and handling; ©1994, from the Video College of Woodworking, attn: Dept. W, P.O. Box 261026, Lakewood, CO 80226-9026.*

When it comes to teaching woodworking, a picture is truly worth a thousand words. *The FUNdamentals of Modern Woodworking* proves this old saying by offering a basic woodworking instructional package. It offers plenty of pictures, but don't expect to build a Hepplewhite side table from this video. It's meant to show the basics.

The videotape walks the viewer through the construction of a bedside cabinet using rudimentary woodworking skills (including dadoes and rabbets), tools (including a circular saw, table saw, router and basic hand tools), and materials.

The viewer is treated to the entire process from layout, planning material usage, milling, dry-fit and assembly, as well an overview on staining and finishing. The information (which includes safety and basic tool use) is accurate and well-detailed.

As an added bonus (and an important part of the course), the video comes with a 44-page workbook which follows the processes shown in the video, providing expanded instruction on most of the topics. The workbook's appendix covers tool selection and maintenance, ending with a cross-referenced glossary.

Also included are complete plans and a planning sheet for the bedside cabinet, plus plans for other projects to be worked on independently.

Academy Awards may not be given out for this video; but the hosts are clear and concise, and they should put the viewer at ease. The videography is of good quality and does a fine job of visually highlighting the information discussed.

Bottom line: If I had a friend who knew little or nothing about woodworking, but wanted to get up to speed quickly, I think this video package would help accelerate the process.

The video ends with the host saying, "So now you're a woodworker, right?" and the audience replies, "No!" The video doesn't pretend to teach you everything, but woodworking works best when learned through experience.

— by David Thiel

R.J. DeCristoforo's Best Jigs, Fixtures and Shop Accessories, *by R.J. DeCristoforo. 264 pages, paperback, $16.95; ©1993, from Tab Books, Blue Ridge Summit, PA 17294-0850.*

I have never met him, but R.J. DeCristoforo is practically an old friend. I've been reading his craft articles since I was in high school. What a set of credentials this author has — 50 years of shop experience, 30 books and countless magazine articles. As you read his plans, you can't help but be impressed by his expertise. We should all build some of these projects in hopes that some of R.J.'s talent rubs off.

The list of chapter topics should be enough to convince you why you need this book: portable router overarm jigs, disc and belt sander jigs, double-duty drill press jigs, portable drill stands, miter gauge V-block jigs, bevel-sawing techniques, sculptured joint techniques, the master jig for a drill press, projects to increase shop safety, table extensions for the radial arm saw, and many more.

You'll find several of these topics valuable for general woodworking reference; and the entire book is packed with great examples of good woodworking technique. PW

— by Hugh Foster

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POST OFFICE BOX BRONZE DOORS No. 1 $6.50; No. 2 $8.00; No. 3 $9.00; plus $1.00 each shipping. SASE to: Hubbert Woodcrafts, P.O. Box 1415, Fletcher, NC 28732; (704) 687-0350.

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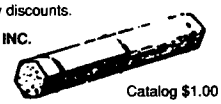

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COMING NEXT ISSUE

This issue will focus on your shop's cutting tools. Contributing editor Hugh Foster will pass along his expert advice on how to choose the best blades to improve your work and make it safer. And in "Tool Talk," R.J. DeCristoforo will discuss sharpening systems and their price categories.

You'll also get tips on how to get ultimate value out of your shop budget, whether you have as little as $500, or $3,000, or more, to spend on your total workshop tools and machinery.

Our quality projects continue with plans for a handsome heirloom rocking horse and an elegant cherry wine server. And with warmer weather just around the corner, our outdoor projects, including trellises, an arbor and a garden cart, should help you gear up for summer.

And, of course, we'll continue to offer our informative and entertaining columns on your favorite woodworking subjects. See you then!

CAPTION the CARTOON

sponsored by **BOSCH**

illustrated by Bob Rech

Submit your caption(s) for this issue's cartoon on a postcard to *Popular Woodworking*, **Cartoon Caption #18, 1507 Dana Ave., Cincinnati, OH 45207** by April 10, 1996. Winning entries will be chosen by the editorial staff.

The winner receives a Bosch 2 hp Electronic Variable Speed Plunge Router, Model B1450. Features include: microfine depth adjustability in all plunge positions, quick-change template guide system eliminates need for screwdriver, shaft lock for one wrench operation, self-releasing collet for sure bit gripping and ease of bit change, variable speed control with soft starts and constant rpm. The 11 amp motor operates at 12,000 to 22,000 rpm.

The two runners-up will each win a one-year subscription to *Popular Woodworking*.

The winner of our "Caption the Cartoon Contest #16"
from the January issue and recipient of the Bosch Electronic Variable Speed Plunge Router is:

Jim Evans, from Champaign, IL.

The runners-up receive a one-year subscription to *Popular Woodworking*:

Ames Stewart, from Knob Noster, MO, for:
"Arrgh, leave a little extra wood on this one, maytee. I've gained a few pounds over the years."

Robert W. Zinda, from Colgate, WI, for:
"First time I made a ball and clawfoot leg for somebody to wear!"

"We only sell this item by the board foot."

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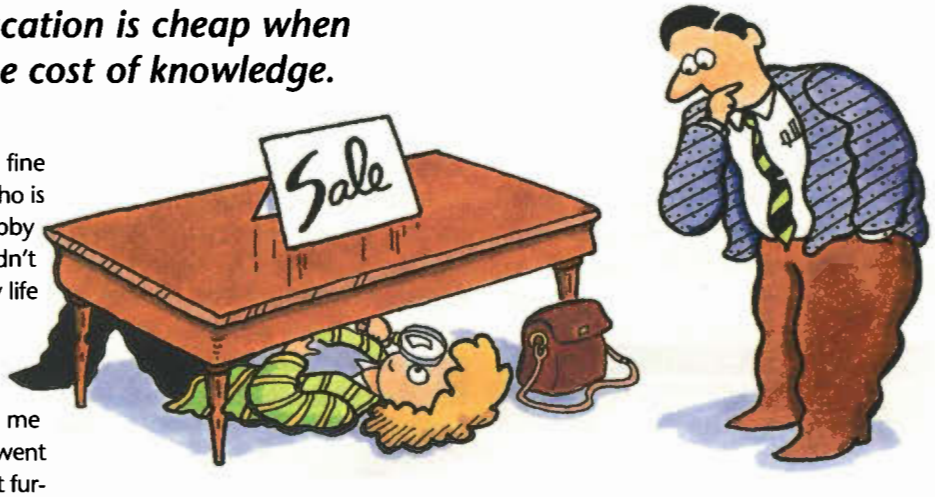

ILLUSTRATION BY MARK HEATH

I must credit my appreciation of fine furniture to my husband, Dan, who is a woodworker. I learned of his hobby shortly after I met him, but I didn't understand its full significance to my life until later.

When I started my first job after college, I was eager to replace the hideous furniture that had seen me through four years of school. Dan went with me to one of those big discount furniture warehouses to look at options. When we walked in I felt like a kid in a candy store — until Dan ruined my excitement.

He immediately began opening and closing doors and drawers, shaking his head and talking to himself about poor construction, bad finish, bad design and many other faults that were lost to me.

When I finally asked what was wrong, I received my first lesson in furniture construction. What I considered a great, wooden entertainment unit was overpriced particle board covered with some type of shelf paper!

To finish bursting my bubble, Dan told me a quality entertainment unit made from "real" wood would probably cost two or three times as much. I knew there was no way I could afford that, even with my new income.

From then on, my search for quality furniture became an obsession. I'd check my friends' houses for "real" furniture. If I found it, I began to wonder how they could afford it. Jealousy is an ugly thing.

The saying that a little knowledge is a dangerous thing is absolutely true. Once, while again shopping for furniture, I even crawled under a table I was admiring to check out its construction and materials. Much to my disappointment, the quality was only skin deep.

As I was creeping out from under the table, a salesman walked up and asked if he could help me. Being fairly embarrassed, I mumbled something about looking for a table. He began to tell me how wonderful that table was, extolling the virtues of solid cherry and its quality construction for such a reasonable price.

Bad move. Before I knew what I was doing, I loudly contradicted his pitch right in the middle of the store! Not only did I tell him the construction was poor and that it was not solid cherry, but I also informed him it was overpriced. Knowing no sale was pending here, he gave me the cold shoulder, and I promptly left.

Later, I arrived home and reluctantly recounted the story to Dan. He rolled his eyes and laughed. He said we might need to work on my tact, but he was proud of me for standing up for quality furniture.

When my woodworker and I settled down, we began to build our own furniture. I've learned a great deal over the past eight years by helping in the construction process. I've used many tools of the trade, particularly random orbit sanders. I sand a lot. In fact, it's my designated job. It's taught me to appreciate decent sanding work.

When we purchased our second home, we finally had the room and the means to build some larger pieces of furniture. Within three months, we'd gutted and remodeled the kitchen, making all of the cabinetry ourselves.

It was during this project that my education expanded to hardware. I discovered that drawer slides and hinges were also important to quality furniture.

Now when we visit friends, I don't have to crawl under their furniture. All I have to do is look at their doors and drawers. I was even caught once — I said I had a headache and was looking for aspirin. I don't think she believed me, but I took the aspirin to prove it.

My hardware obsession didn't end there. When we sold that house and bought the next one (yes, we do move a lot), we loved the layout of the recently remodeled kitchen. But there was one small problem — the cabinets had cheap barrel hinges! I actually hesitated about buying the house because of the hinges, until reason prevailed and I decided they could be replaced.

I sometimes long for the days when I was a furniture innocent. Ignorance can be a good thing, and is often a lot less expensive than knowledge. But in the end, I'm glad for what I've learned. I have a lot of respect for quality furniture, and I'm able to appreciate the impressive pieces we've built. So I guess I can learn to live with my obsession. I just hope Dan can learn to live with the fact that I'm planning to hand that sander back to him on our next project. You see, I've promoted myself to the design department. PW

Mary Latanich *is a full-time surgical nurse and a part-time shop assistant. She and her husband are currently remodeling their basement and installing oak wainscotting.*

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