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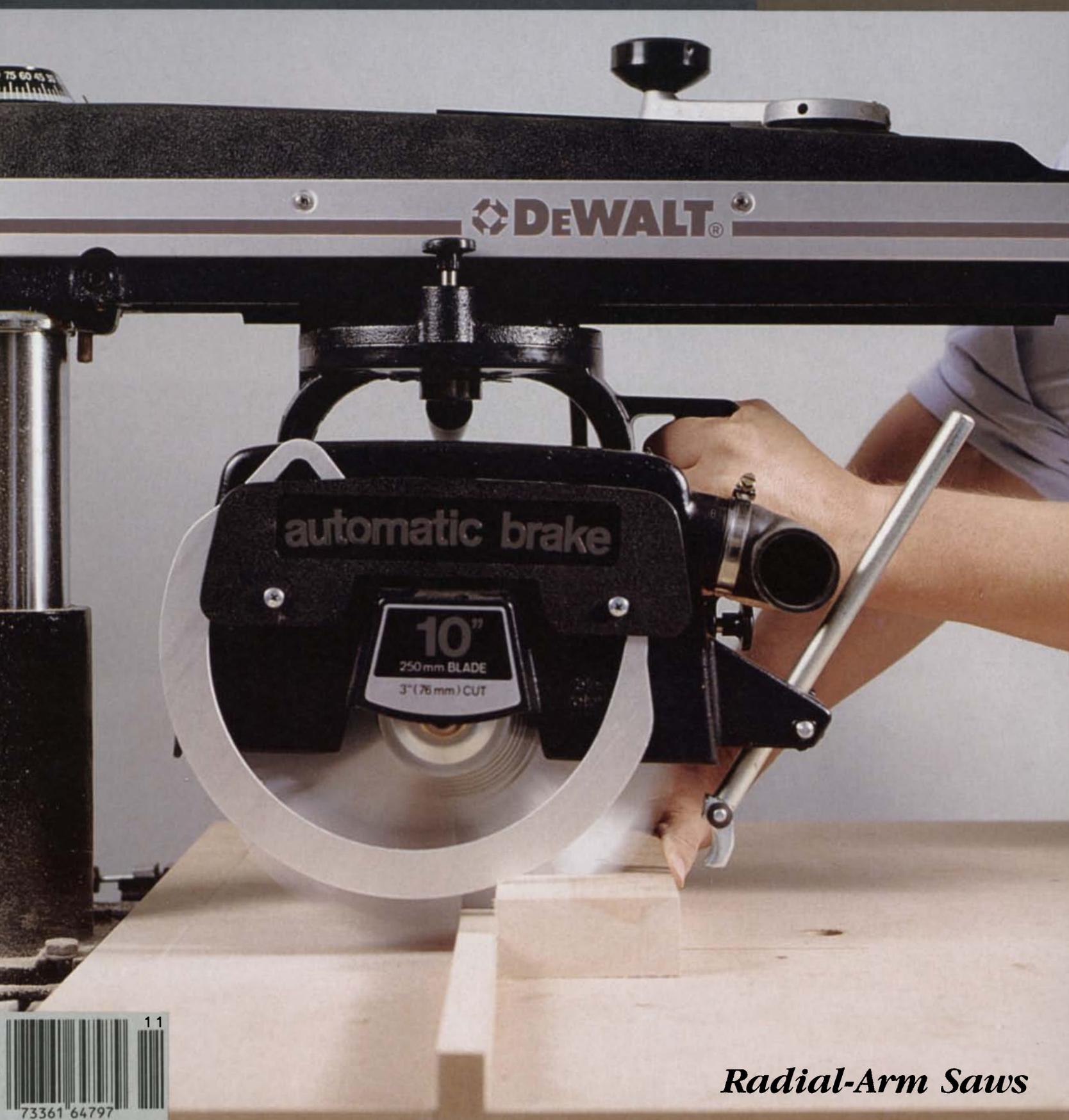


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Fine WoodWorking
November/December 1988

*Shaping cabriole legs is not as difficult as their complex shape might at first suggest. Eugene Landon shows how it's done on p. 84. Cover: The radial-arm saw, its uses and adjustments, as well as a product review of six popular models, is covered on pp. 60-67.*



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***DEPARTMENTS***



***ARTICLES***



**Postmaster:** Send address changes to The Taunton Press, Inc., PO Box 355, Newtown, CT 06470.

**Home-cooked spline weights**—In *FWW* #72, p. 18, you described how to melt lead on a gas grill to make spline weights, but you should have stressed the hazards of melting lead a bit more thoroughly. The health considerations involved with melting and casting lead are so grave that our company discontinued all lead operations several years ago. One of the easiest ways of contracting heavy metal poisoning is the inhalation of lead fumes. Lead melts at approximately 620°F and doesn't boil until 3,164°F; however, it does fume at remarkably low temperatures, depending on a variety of circumstances. A person working with lead over a backyard barbecue will be exposed to lead fumes about the same way a person sitting around a camp fire will be exposed to wood smoke. There are also additional hazards involved in the pouring of the molten material.

Lead is an industrial metal that is alloyed with a great many other metals, and each alloy has its own characteristics as to melting temperatures, boiling temperatures and toxicity, so using scrap material can really be opening up the possibility for a number of additional dangers.

It is possible to do this type of lead casting safely, but it takes a great deal of care and trouble, which is a big part of the reason why the cast weights are so expensive to buy. I think a person might be better off purchasing these weights and devoting his time and money-saving efforts to any one of the other excellent articles your magazine offers. *—Thomas J. Walz*
*Rearden Metallurgical Labs, Tacoma, Wash.*

**Another way to lay out curves**—In *FWW* #71, p. 45, you describe an expensive and somewhat cumbersome spline device for marking large curves. As an industrial and architectural patternmaker, I do a lot of curved work; the last curved piece I made was more than 22 ft. long.

The device I use for laying out large and not-so-large curves can be made from a piece of nylon string and scrap pieces of Plexiglas, Masonite or any other flexible material that's about 3/16 in. thick by 3/4 in. wide. Simply cut a narrow kerf or drill a small hole in each end of the scrap piece; thread the string through both kerfs or holes; pull the string until the desired curve appears; then wrap the excess string a couple of turns and pull it back through the kerf or hole. In essence, you have just made a large bow. *—Michael Plesh, Sunland, Calif.*

**Rave reviews for "The Deltagram"**—I thoroughly enjoyed Walter Schutz's article "The Deltagram" in *FWW* #72, p. 120. It sparked a lot of pleasant memories for myself and a fellow woodworker I share an office with.

We both well remembered that the majority of projects in high-school woodshop came from *The Deltagram.* We also recalled, with smiles and chuckles, the built-up turning projects, the art-deco furniture and lamps, the World War II-inspired army toys for the kids, and the pretty models with 1940s hair styles. Also, during the World War II issues, Delta would flavor their ads with a patriotic "Buy war bonds now, so you can buy Delta tools later."

We both still have a few dog-eared copies of *The Deltagram,* and it's fun to look through them and still find one of those tricky turnings you'd like to try. We have wondered many times if Delta would ever reintroduce the magazine. Schutz probably answered that question by noting the ever-increasing competition it would have today that it didn't have then.
*—Robert T. Granger, H.M. "Bud" Smith, Mustang, Okla.*

**Magnificent tool chest**— The back cover of *FWW* #71 presented a magnificent collection of woodworking tools assembled by H.O. Studley. He was identified as a carpenter and stonemason. After careful scrutiny, I was unable to locate any tools that are used in the stonemason's trade. I did, however, notice that to the immediate left of the second hinge from the bottom are the paramount tools of the speculative mason: the square, compasses and the level. Brother Studley was a free and accepted mason of a lodge of master masons. The mistake was easily overlooked by a person not associated with the craft. To the left and right of the square and the compasses are the representations of the two pillars on the inner porch of King Solomon's Temple.
*—Neal D. Cooper, Anchorage, Alaska*

**The meaning of IPS**—In the article on wooden lamps, (*FWW* #71), I nearly fell out of my chair laughing when I read the explanation pertaining to the conduit used in lamps. For your enlightenment, the correct designation for such is 1/8-in. IPS, which means "iron pipe size" and not, as stated, 1/8-in. IP, meaning "inside perimeter." Inside perimeter, indeed!
*—P. Kretchmer, Elmira, N.Y.*

**Fireproof room lowers insurance**—Watching my insurance rates climb to astronomical heights over the years has really been hard to take. Every year at renewal time was this frantic search for a new company or someone to finance these huge amounts into something reasonable on a monthly basis.

This year, I insured myself in the form of a fireproof tool room. What used to be an office is now clad with two layers of 1/2-in.-thick Sheetrock, and the door is 2-in.-thick solid fir. I give it at least an hour—the fire department isn't far away. All hand tools, power tools, clamps, bits, bolts, etc., are checked in at night. Insurance on the basic building is very inexpensive, and it seems this idea of being responsible for your own tools can apply to other shops: Used shipping containers might be good frames for a fireproof vault. I am currently looking for heat-reflective, waterproof, insulative and very tough fabric to cover some stationary tools well enough to prevent total loss.

I realize this system is not 100% foolproof, but I sleep better knowing I won't lose everything. By paying insurance, you are gambling with your tools. I prefer to take a more active role in protecting my investment. *—Gary Boudreaux, Nevada City, Calif.*

**Caution on eye safety**—One of the things I enjoy the most from *FWW* is the attention to detail as well as the attention to safety. Why, however, publish the article on eye safety on p. 70 of issue #72 and publish a feature article with a guy having his head almost in the center of a spinning tree trunk on p. 87 without any eye protection or face shield?

I, the reader, expect all people who work with tools, regard-

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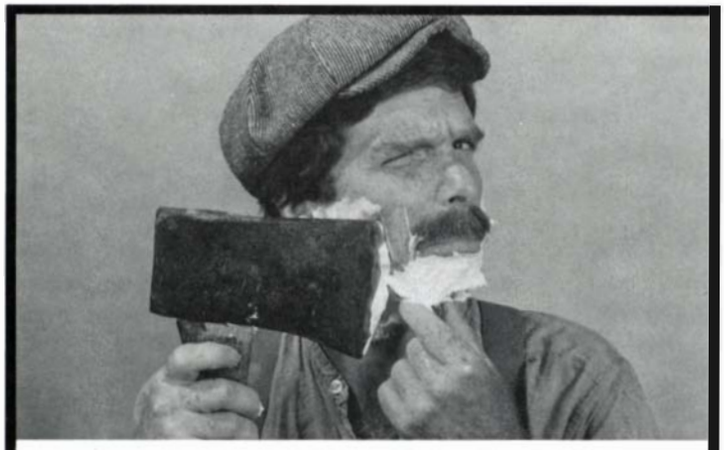

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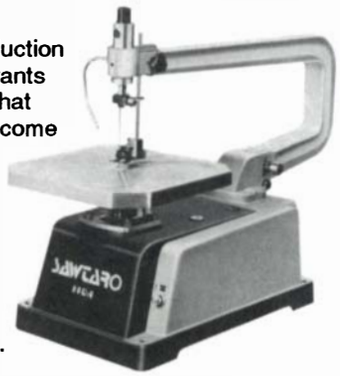

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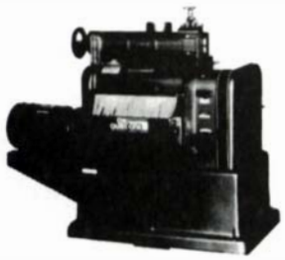

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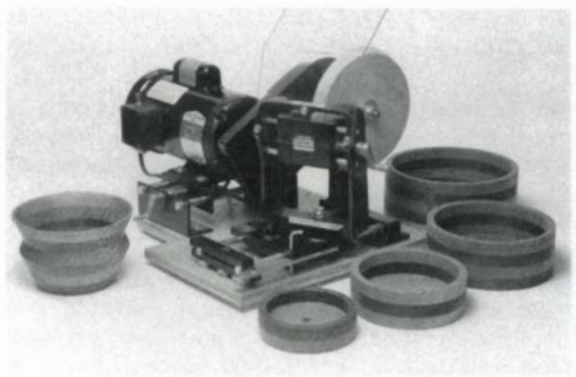

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less of their skill level, to respect the dangerous nature of their tools. I also expect the editors not to condone such irrational behavior and to deny all pictures or diagrams that exhibit "the accident waiting to happen." *–J. Osicek, Wheeling, Ill.*

**Monster turnings**–In respect to Mark Knudsen's "Titan turning" in *FWW* #71, p. 110, it looks like he's done a fine job. But being a patternmaker for 37 years, I have made many a core box larger and heavier than the bowl. It would have been much simpler to make the segment rings and mount three or four, turn to size and then mount three or four more, and so on.

I'm sure I could have turned the bowl my way in less than 16 hours. *–Clyde A. Gish, Enterprise, Kans.*

**New life for teak**–In reference to W.E. Wistehuff's question (*FWW* #71, p. 12) on restoring the color of his teak table, there are several products available that will restore the original teak color to faded or grayed teak. These are sold at marine stores for use on teak boat decks. One brand I have used is "Deks Rens." It is basically a diluted mixture of oxalic acid.

Merely wet the wood thoroughly, apply the acid with a stiff brush and let it sit for 10 minutes. Then, wash thoroughly with clean water. For heavily faded wood, two treatments may be necessary. I use it on my boat all the time, and it always brings back the original color. *–Michael Rotolo, Rivervale, N.J.*

**Keep kids out of shop**–A letter in *FWW* #71, "Danger: children in workshop," sent chills up and down my spine as it made me relive a nightmare that occurred in my home workshop about three years ago.

My daughter enjoyed sitting at my workbench coloring with her crayons or gluing scraps together, while I went about my tinkering. On this particular day, she was sitting on a tall shop-type stool (with a back), keeping herself occupied. Suddenly, without any time on my part to react quickly enough, she pushed off the workbench with her feet and fell over backwards, her head hitting the sharp corner of the rip-fence rail on my bandsaw on her way down. Blood was all over!

After a heartbreaking trip to the emergency room and several stitches later, my daughter was fine. Luckily, she doesn't really remember what took place, but once in a while, I hear her mention to her younger sister how she fell off "that" stool. Unfortunately, this accident is very vivid to me.

I think every so often you need to read an article of this nature to remind you that even the best of intentions can have a very unpleasant ending. Do yourself and especially your child a favor and keep them out of the shop; scoot them into the playroom where they belong.

It's difficult living with this guilt: knowing the child you love and who has complete trust and faith in you was injured because of your negligence. *–Alan Sandler, Garnerville, N.Y.*

**Polishing off wax myth**–I liked Bob Flexner's debunking of some wax myths in his article in *FWW* #70. He reminded me of when I went through the Army's parachute school at Fort Benning, Ga., in 1946. We used to wax the maple parachute-packing tables and our boots (my, we were proud of those boots!) out of the same can of Johnson's Paste Wax, just like the one shown in Flexner's picture. Gave 'em both a nice shine. *–Chad Skaggs, Brockport, N.Y.*

**Common-sense tool rehab**–Recently you related the story of a fellow who obtained an ancient industrial bandsaw and got in over his head ("Notes and Comment," *FWW* #69). I feel there is a lesson here. Except for vulcanizing of the tires, I feel the author could have saved himself a lot of money and grief if he approached the problem differently.

First off, being old and industrial means the machine is assembled from a number of iron castings. Because these castings are put together with screws, bolts and nuts, one often can disassemble the machine and move (transport) it easier, piece by piece.

While apart, it is far easier to clean and paint before reassembly. In almost all cases, except where a special mounting or a gear train is involved, it is far cheaper to replace a three-phase electric motor with a single-phase motor than it is to buy a phase converter. Even better would be to buy a used motor or a rebuilt one from a local electric-motor repair shop. Don't forget a magnetic motor starter.

And in so doing, one can incorporate a modern power transmission system (V belts), instead of those huge, flat belts and sheaves. When rewiring, don't forget to electrically ground the machine. Install a separate work lamp with a switch, too.

*–Roger S. Apted, Milton, Wisc.*

**Whistles and pioneer crafts**–I very much enjoyed the two articles in *FWW* #71 describing whistle-making from cane and twigs. This spring, my daughter, a third grader, took part in a pioneer-living day as part of her school curriculum. One of the "pioneers" at the living-history center demonstrated various pioneer crafts. One demonstration the children particularly enjoyed was the making of twig whistles.

I was reminded that day of a delightful poem my now-deceased grandfather used to recite as he made twig whistles many years ago. Despite diligent searching of poem indices and collections and numerous inquiries, I have been unable to locate a copy of this poem. Surely, some reader must know this poem and can tell me how to find a copy. *–Denis G. Foster, Bellingham, Wash.*

**Mahogany-Masterpieces claims**–*FWW* has received a number of inquiries about the status of Mahogany Masterpieces Inc. of Suncook, N.H., and its owner, Robert Major. The company is apparently no longer in business. Some individuals have informed us that they have lost considerable sums of money paid for woodworking machinery that was never delivered. Attempts to recover these losses by direct dealings with the company or with Major have been fruitless so far.

A joint investigation by the FBI and the New Hampshire Attorney General's office into possible violation of federal and state laws is being coordinated by FBI special agent Ben Cumbie. The federal laws in question relate to fraud by wire or mail; state laws include the New Hampshire Consumer Protection Act and those dealing with theft by deception.

Anyone with a claim against the company is asked to write to the FBI's office at Box 1414, Concord, N.H. 03302. In addition to your name, address and telephone number, you should specify the amount of the loss involved. Retain all correspondence related to your dealings with Mahogany Masterpieces and Robert Major. More detailed information will be solicited either by personal interview or by a detailed questionnaire.

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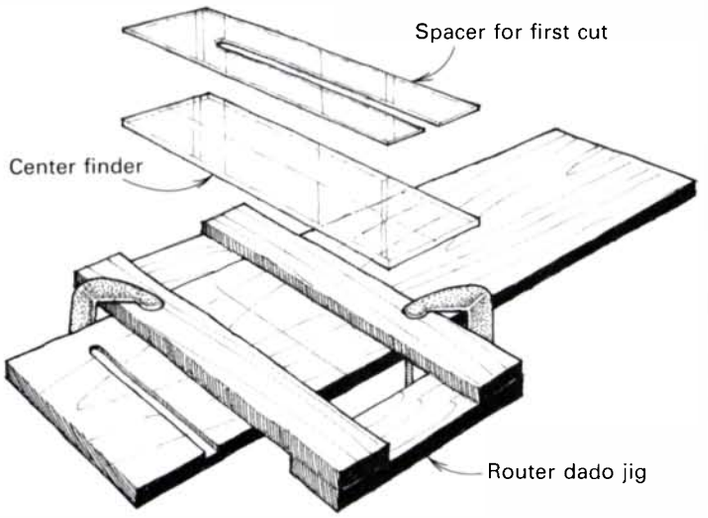
## Routing dado joints



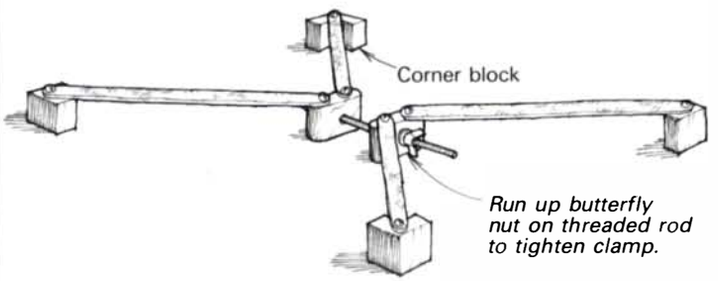

In the high-school furniture-making class I teach, we use a router and a parallel guide like the one shown above to cut most of our dado joints. Even though the guide alone helps reduce errors, we use two simple plastic fixtures to increase accuracy and reduce the number of mistakes made by new woodworkers.

The first fixture is a clear plastic position finder, which we use to locate the guide quickly and accurately on the workpiece. To make one, cut the plastic the same width as your router base and as long as the guide. Then, scribe a centerline the length of the finder. To use it, first lay out the centerlines of the dados on your workpiece. Place the position finder in the guide, move the guide so the scribe line is positioned over the layout line and then clamp the guide in place.

The majority of our dado cuts are ¾ in. wide and ⅜ in. deep, which is too heavy a cut to make in one pass. Rather than reset the routing depth over and over for each cut, we use the second fixture, a 3/16-in.-thick piece of plastic, as a spacer for the first cut. Like the finder above, cut the spacer the same width as the router base and the same length as the guide. Cut a 1-in. slot down the middle of the spacer to within a couple of inches of one end. To use, put the spacer between the guide fences, set the router for the full ⅜-in. depth of cut and make the first pass. Remove the spacer and make a second pass to the final depth. *—J.K. Blasius, Bowling Green, Ohio*

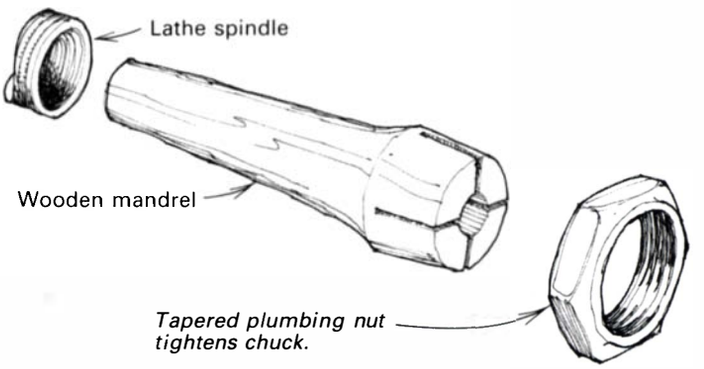
***Quick tip:*** I use a short length of self-sticking, open-cell-foam weather stripping on the end of a popsicle stick to spread glue. Different widths and thicknesses of the foam are commonly available at hardware stores. Throw the applicator away when done. *—Sandy Allen, Santa Cruz, Calif.*

## Picture-framing clamp




For clamping picture and mirror frames, I have made several sizes of the jig shown above. In use, the corner blocks fit over the mitered ends of the molding. When the wing nut is tightened, equal pull is placed on the four arms, which pull the miters equally together. For best results, when the clamp is tight, its arms should be at about 90° to each other. This angle depends on the length of the arms in relation to the size of the frame; hence, the various sizes. For frames of unusual proportions, a few assorted lengths of ⅜-in. threaded rod give me all the range of settings I need. *—C. Robson, Coe Hill, Ontario, Can.*

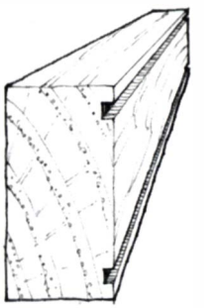
## Wooden lathe chuck




I originally made this wooden lathe chuck to hold pieces of ¼-in. dowel stock. But the design could be sized to fit any dowel or even to serve as a small collet chuck. To make the chuck, first turn a Morse taper on a piece of hard maple to fit your headstock spindle. Tap the future chuck into your headstock and turn a 1½-in.-long head on the end. The head should be tapered slightly and sized to fit a nut made by sawing an iron pipe bushing in two directly behind the hex flats. To complete the chuck, drill an accurate hole through the center of the head, using a bit in the tailstock center. Then make two opposing sawcuts along the hole to allow for compression. Insert the dowel and tighten the nut, and the dowel will be held firmly. Because pipe threads are tapered, be sure to install the nut large-end first. A little oil on the nut threads will help.

*—Walter O. Menning, La Salle, Ill.*

## Eliminating glue squeeze-out



I discovered this interesting solution to an ancient gluing dilemma while restoring an old drawer. The drawer's guide was glued in place, but there was no glue squeeze-out to be seen. The maker had sawn two shallow sawkerfs into the gluing surface near the edges. When he applied glue to the center section of the guide and clamped it in place, any potential squeeze-out was contained in the kerfs.

*—John M. Gray, Syracuse, N.Y.*

***Quick tip:*** To prevent work from slipping and creeping, glue sandpaper (with contact cement) to the face of your tablesaw's miter gauge. *—Dean Chase, Nevada City, Calif.*

## Velvet drawer bottoms revisited

Frankly, I think David Miller (*FWW* #67, p. 8) is working too hard. There's another method for installing velvet drawer bottoms and jewelry box linings, using upholstery techniques. The result looks better, allows replacement and can be adapted to the sides and top of the box as well. First cut a piece of thin cardboard slightly smaller than the bottom of the drawer, then cut a piece of velvet a little longer and wider than the cardboard. With the velvet face-down on a table, center the cardboard on the velvet and trim each corner of the velvet at 45°. Apply a bead of quick-drying glue to one edge of the cardboard and fold the velvet's seam into the glue. After the first edge has set for a few minutes, glue the other edges to the cardboard,

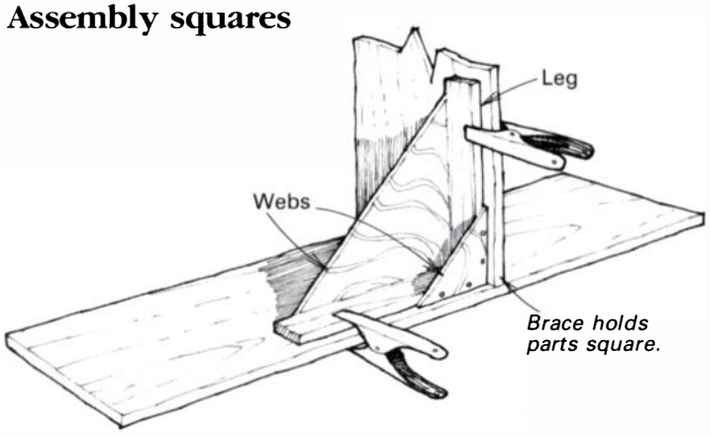
stretching the velvet as you go so there are no wrinkles on the face side. Finally, apply a dab of glue to the center of the cardboard back and press the bottom into place in the box.

This technique works well with velvet, felt and leather. It even works with silks and sateens, which telegraph glue spots badly and thus can't be glued directly to wood. This approach also works well with shadowboxes and collection displays, because you can mount the display items to the velvet insert with fine wire before placing the insert in the box.

*—Ernest B. Shipley, Oakland, Calif.*

EDITOR'S NOTE: Max Schulte of Springfield, N.J., submitted essentially the same method at about the same time.

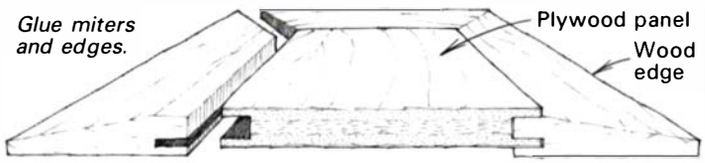
## Assembly squares




For assembling cabinets by myself, I have a set of assembly squares that I spring-clamp into corners to hold the parts perpendicular to each other. The squares act as a second pair of hands, holding the workpieces square and in alignment until I can spread the glue or drive home the screws. The webs are ¼-in. plywood, and the legs are 1x2s.

*—T.D. Culver, Cleveland Heights, Ohio*

## Hybrid paneling system




On a recent project that called for Georgian wainscotting on and around a stairway, I devised a way of combining solid-wood edges with ½-in.-thick plywood centers to produce large fielded panels. The approach takes advantage of the superior stability and affordability of plywood while avoiding the unsightly glue layers and voids that show on the beveled edges of all-plywood panels.

To make the panels, first cut all the plywood centers to size. Then make the solid-wood bevel stock for the panel edging. This can be done easily with a thickness planer and a shopmade bed to tilt the stock sideways a few degrees.

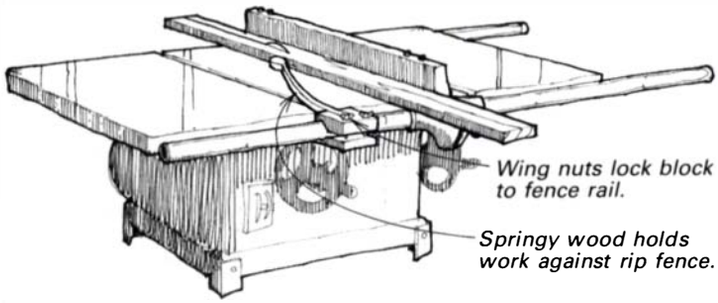
The panel centers are fitted to the bevel frame with a double tongue-and-groove joint. To produce this joint, use a ¼-in. slotting cutter on your router table to groove the edges of the plywood panels and a ⅛-in. cutter to groove the edge of the solid-wood bevel stock. The trick in routing the slots is to set the height of the cutter so you leave a ¼-in. tongue on the bevel stock, which will press easily into the slot in the plywood. And conversely, the tongue left on the plywood should press into the groove in the bevel stock.

Now carefully miter the bevel pieces, apply glue to the tongue and tap the frame gently into place around the panel. You may wish to pin each corner with a brad, but there's no need to clamp the assembly if the tongue-and-groove joints fit correctly.

I used this technique not only for the rectangular wainscotting panels, but also for the parallelogram-shape panels and triangular panels at the side of the staircase. My work was to be painted, but I see no reason why this technique would not look fine with a stained finish. *—William D. Lego, Springfield, Va.*

***Quick tip:*** I needed a quick repair on a minor veneer chip, so I tried some iron-on resin sheet from a fabric store—the stuff they sell to iron patches on jeans. I used a warm, not hot, iron and applied some pressure while the patch cooled, much like using a hot-glue gun. This was several months ago and the patch is still holding fine. *—Tom Dewey, Coudersport, Pa.*

## Flexible hold-in

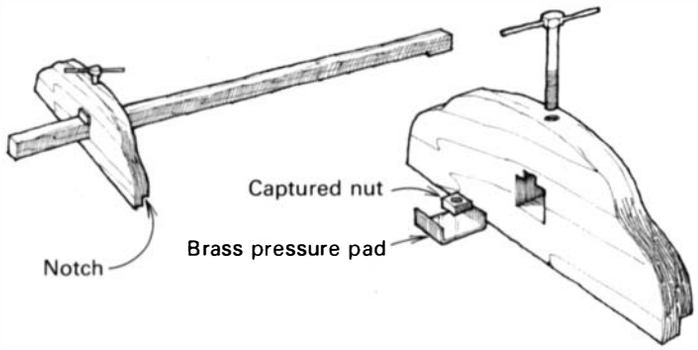



Most featherboards or hold-ins utilize an angled board with numerous sawkerfs cut into one end. The flexibility of these featherboards is pretty limited, so they must invariably be reset after every cut. The alternative design shown in the drawing offers a much greater range of flexibility and requires fewer adjustments as ripping progresses. The bandsawn spring is dadoed into a split block that slides on, and locks to, the rip-fence rail for quick adjustment. The length of the spring and the strength of its action can be tailored to suit. Hickory or pecan are common springy woods that adapt well to this type of use.

*—Bert. G. Whitchurch, Hemet, Calif.*

***Quick tip:*** The tops of 12-oz. frozen juice cans fit "soup" cans perfectly, making them temporary storage containers with lids. *—Robert E. Wright, Center Sandwich, N.H.*

## Marking-gauge locking device




Many of us make marking gauges and other tools that require a beam to be locked where it slides through the fence. A wedge can be used, but a screw is more positive and more accurate. Of course, screws with wooden threads are nice, but the means for cutting them are uncommon in the average tool kit. So here is an alternative. The version shown in the sketch is a panel gauge (as used by Frank Klausz in *FWW* #70, p. 74), with its fence notched to ride the edges of large panels. This raises the beam above the surface of the panel, cutting down friction and increasing accuracy.

For the screw, you need nothing more than an ordinary ⅜-in.

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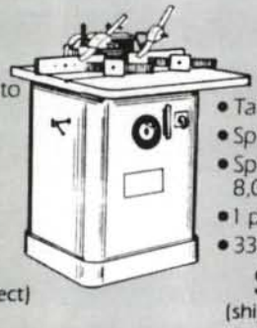

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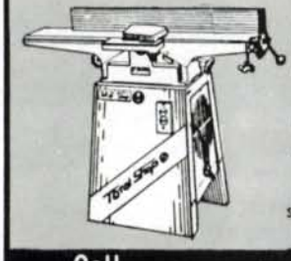

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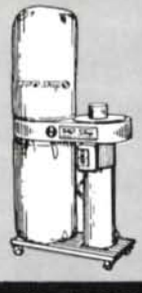

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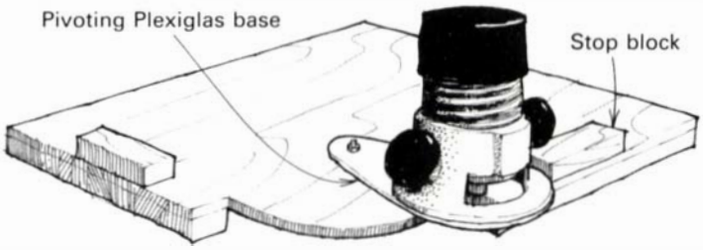
bolt with a square nut. Cut a slot above the beam mortise into which the square nut will slide and be captured. Also enlarge the mortise to allow enough clearance for a pressure pad bent up from 1/16-in.-thick brass. Bend up the ends of the pressure pad high enough to hide the ends of the nut slot. To complete the gauge, drill a hole for the bolt down from the top of the stock into the nut-capturing slot. You may wish to install a 3/16-in. rod through the head of the bolt so it can be tightened without a wrench.

*—Percy W. Blandford, Stratford-upon-Avon, England*

***Quick tip:*** A good way to get at stubborn areas when stripping a finish is to saturate some coarse sawdust with a mixture of four part alcohol and one part lacquer thinner. As a final step, this can be rubbed into tight spots on spindles or into decorative moldings around panels. The sawdust acts as a mild abrasive and also absorbs the sludge from the old finish. Sawdust residues can be brushed away or vacuumed up easily when dry. *—Ron Fink, Burnaby, British Columbia*

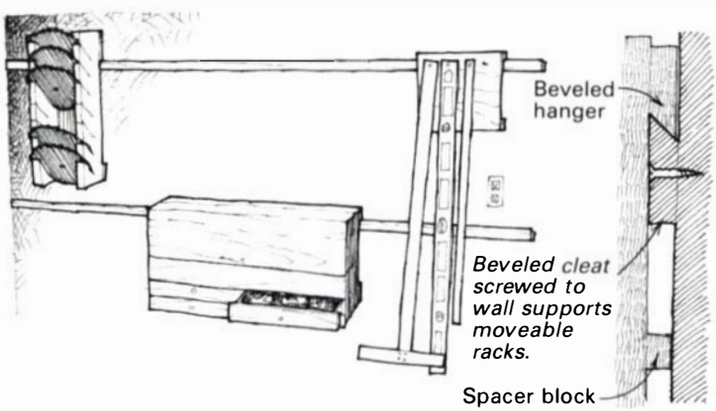
## Milling radiused corners on tabletops




Faced with the prospect of milling 80 identical radiused corners on a run of restaurant tables, I came up with the "Corner King" jig shown in the sketch. It's built from a square of 1/4-in. plywood, with fences attached to the bottom on two sides. A pivoting Plexiglas base was designed to allow a 1/2-in. router to swing through the proper radius (4 in. in this case). Adding stop blocks to the top limited the travel of the bit to 90°.

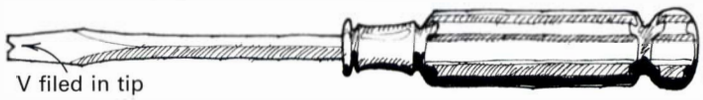
A nice feature of the jig is that the first pass with the router cuts the jig's base into a perfectly radiused pattern. In practice, I set the jig on a corner, traced the radius pattern directly off the base, removed the jig and trimmed the bulk of the waste with a jigsaw. Then, I screwed the jig to the tabletop and used the router to finish the corner. *—Al Dorsa, St. Croix, Virgin Islands*

## Cleat-system shop organizer




Being a compulsive organizer, I have moved things around in my shop many times and I anticipate more moves in the future. To accommodate all this rearranging, I have come up with a cleat system that makes practically everything in my shop portable. The system consists of two beveled cleats attached to the shop walls. One cleat is attached 40 in. from the floor, a good working height, and the other at 64 in., a good hanging height. Any item I want to attach to the wall is fitted with a reverse-bevel hanger, as shown in the sketch. I use the system to hang my toolbox, router box and drill box, to fasten a grinder to the wall, to position my work lights and to attach hooks for rules and brooms. I use the cleats to hang everything that can be used in several locations. Later, I plan to build an identical cleat system inside a panel truck so I can transfer equipment between shop and truck quickly and neatly. *—John Loughrey, Madison, Wisc.*

## Removing paint-filled screws

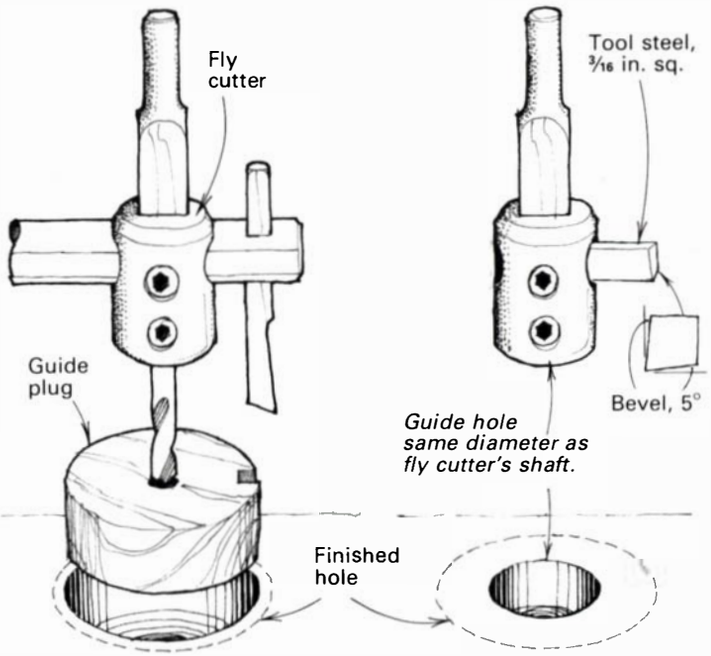



I have been a carpenter all my working life and have covered just about all aspects of the trade. A simple but effective trick that's not often seen is a screwdriver modification for removing screws whose slots have been filled in with paint. File a small V right in the tip of the blade. Now just hammer the screwdriver into the slot and unscrew. The V will allow the tip to penetrate the paint, and it doesn't affect the screw-turning aspects at all.

*—Reg Fuller, Turramurra, New South Wales, Australia*

## Two hole-enlarging methods

To enlarge a hole in wood when you don't have the exact size bit you need, use a fly cutter with a hardwood plug over the pilot bit as a guide. Make a plug the same size as the hole to be enlarged, and wax the plug so it turns freely. If the hole is going to be enlarged only fractionally, cut a slot in the plug's side to hold the cutter bit, as shown. *—C. Dean Hawley, Tulsa, Okla.*




When I needed to drill several precise 2-in. holes and my fly cutter proved unsatisfactory, I thought of replacing the crossbar in the fly cutter with a shopmade cutter, as shown above. I ground a 5° bevel on a length of 3/16-in. tool steel and locked it in place. Then, I drilled a pilot hole the same size as the diameter of the fly cutter's shaft. This device bores clean, sharp holes that are amazingly accurate. *—Samuel W. Pool, Cupertino, Calif.*

*Methods of Work buys readers' tips, jigs and tricks. Send details, sketches (we'll redraw them) and photos to Methods,* Fine Woodworking, *Box 355, Newtown, Conn. 06470. We'll return only those contributions that include an SASE.*

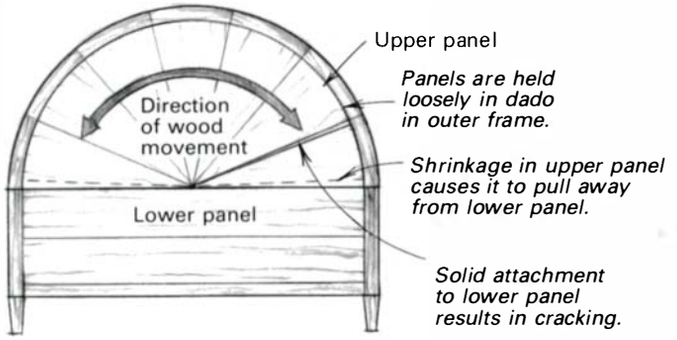
## Headboard wood movement

***Last August, I built a bed with a special headboard. The paneled headboard's semi-circular outer frame is made of a series of arcs cut from 2x6 red oak, doweled and glued end to end (I used Titebond glue throughout). The lower half of the panel is two wide edge-glued boards, and the upper half is a series of pie-shape wedges doweled and glued edge to edge, creating a fan-like design. The panel halves are doweled and glued together, and the whole assembly floats in a dado cut into the outer frame.***

***In early December, the headboard's designer said that a ¼-in.-wide crack had opened up between adjacent wedges in the upper panel. How should I repair the piece so the problem won't reoccur?***

***–Claudia Kavenagh, New York, N.Y.***

***Eugene Wengert replies:*** The humidity in a home changes throughout the year: very dry in the winter and humid in the summer. Wood will respond to these changes by shrinking and swelling. Fortunately, these humidity changes will be quite slow, and good finishes will help to reduce the rate of shrinkage and swelling. Because your headboard was made in August, the wood probably was close to maximum expansion in response to the summer humidity, assuming it had been dried properly in the first place. After the bed was finished and moved into a home that was heated in the winter, the wood undoubtedly went through a contraction phase, and the panel shrunk in size.




Because wood shrinks across the grain and not along it, the headboard's lower half will shrink in width but not length. The pie-shape pieces of the upper half, however, shrink individually in width, parallel to the arc, so the panel will contract like a folding paper fan. This will pull up the two bottom wedges (see the drawing above). Because you've glued and doweled the upper panel to the lower, you've essentially created a cross-grain situation where the lower wedges are immobilized against the long-grain edges of the lower panel. As a result, when these wedges shrink, they will develop cracks. If the joint between the wedges had been stronger, the wood itself would have cracked when the shrinkage occurred.

The best way to repair the headboard is to take it apart and correct the cross-grain problem. You'll need to create a floating joint between the upper and lower panels, possibly by grooving the mating edges and fitting a loose spline along the joint. This will allow the fan shape to change without causing cracks or opening a gap between the upper and lower panels. Before you reglue the upper panel, make sure the pie-shape pieces are all at the same moisture content, preferably about 6%, but it's better to be a little on the dry side. Glue the wedges back together with adequate amounts of glue immediately after planing the edges. Clamp them firmly, but not with so much pressure that you squeeze out all the glue. The shop should be warm enough for the aliphatic resin glue to cure properly: about 70°F. Finish the panels on all sides before assembling the frame. Unfinished wood (even small areas) will permit rapid moisture changes, but a good finish, such as varnish, will minimize the effects.

[Eugene Wengert is a professor of wood technology at Virginia Polytechnic Institute in Blacksburg, Va.]

## Using PEG on a goblet

***A recent Q&A column (FWW #67) discussed nontoxic finishes for wine goblets. As a newcomer to turning green wood, I was wondering whether PEG (Polyethylene Glycol 1000) might serve two purposes in making a goblet. Could I first cure and stabilize the green wood in PEG, then use the PEG as a nontoxic finish?***

***–Mark Wiele, Halifax, Nova Scotia, Can.***

***Philip Moulthrop replies:*** I have worked with PEG as a stabilizer for approximately 10 years. PEG's main purpose is to prevent cracking, checking and dimensional distortion caused by wood shrinkage during the drying process. It functions well as a stabilizing agent when treatment is done in accordance with recommended concentrations and specified soaking times. The absorption of PEG is usually confined close to the surface area and does not penetrate very deeply. PEG is nontoxic; however, it is soluble in water, acetone, some alcohols and other solvents.

Unless the wood is subsequently sealed, the use of liquids in the goblets will slowly remove the PEG from the wood pores, and this could result in cracking or warping. PEG is also hygroscopic and attracts moisture from the air. If the goblet is not coated with an impervious sealer, the wood will feel and appear damp and clammy when left in a humid environment.

Though PEG should work as a stabilizer for a turned wood goblet, the goblet should be coated with a nontoxic wood sealer, such as No. 100 clear-gloss epoxy (available from Peterson Chemical Corp., 704 S. River St., Sheboygan, Wis. 53081), to preserve its stability and finish.

[Philip Moulthrop is a lawyer and part-time woodturner in Marietta, Ga.]

## Repairing a veneered dining table

***I have a dining table that was made in about 1915, probably in South Carolina. The table is oak, about 40 in. by 60 in., with extension leaves at each end. The veneered top is framed with oak, with a scored line where the veneer meets the frame. The veneer has been damaged by burns at three spots; at least one of these has been patched with some kind of filler. I don't know what the finish is, but aside from the damaged spots, the table is in good condition. What options do I have for repairing the top?*** ***–David Rigler, Santa Cruz, Calif.***

***Bob Flexner replies:*** The best approach would be to remove a section of veneer, glue in a new piece, then restain and refinish the surface. The procedure I recommend is as follows: First, cut out the damaged areas using an X-Acto knife or razor knife. The lines of the cuts should be parallel or diagonal to the grain of the wood, or better, curved to follow the grain. Try to cut out a pattern that won't make the repair obvious, and avoid cutting across the grain, as this will make the patch stand out. Straight cuts, say in a diamond shape, are easier to pull off, because you have the aid of a straightedge and a plane to help shape the patch for a tight fit. But curved, irregular patches are easier to disguise. The veneer remaining in the areas you are patching can often be popped loose from the substrate with a chisel. In cases where the veneer resists easy separation, you must either cut it away with a chisel or crystallize the old glue by squirting some alcohol under the veneer with a syringe and then popping it loose.

The patches can be cut from veneer or from a thin slice of solid wood. Finding veneer with reasonably matching grain shouldn't be that difficult. Don't worry about the color too

much, but if you can't get an exact match, it's better to select a patch on the light side. The patches should be as thick or thicker than the surrounding veneer. Two layers of presliced veneer can be used to achieve this.

You can make tracings of the areas to be patched and transfer them to the new veneer with carbon paper, or you can simply cut the patches slightly oversize, then trim them. After scraping the old glue off the substrate, glue and clamp the patches in place using white, yellow or hide glue. When the glue is dry, trim the patches level with the surrounding surface using a hand scraper, a plane or sandpaper and a flat block. Try to avoid damaging the surrounding wood. If you've done a good job, you may be able to "pad in" the color and finish the patches to match the surrounding area. Alternatively, you can refinish the entire top.

[Bob Flexner is a professional finisher and restorer in Norman, Okla. His videos, "Repairing Furniture" and "Refinishing Furniture" are available from The Taunton Press, Box 355, Newtown, Conn. 06470]

## Making brittle veneer more flexible

***Some time ago, I heard about a solution that would make brittle wild-grain and burled veneers flexible enough to be pressed flat easily. What is this solution?***

***–Ken Hardin, Arlington, Tex.***

***C. Stuart Welch replies:*** The solution I use for limbering up hard-to-handle veneers is prepared as follows: First, take 2 part urea-formaldehyde powdered glue, 1 part flour, 3 part water, 1½ part glycerine and 1 part rubbing alcohol. I use Weldwood urea-formaldehyde glue, which is available from hardware stores. I buy my glycerine and alcohol at the drugstore. Mix the glue and flour together, adding water a little at a time so the mixture doesn't lump. Slowly add the glycerine and alcohol, stirring the mixture until it's smooth. Because of the possibility of skin and lung irritation from the glue, wear gloves and use adequate ventilation.

The veneer can be painted with the mixture, but better results come from soaking the material. Large pieces will need to be soaked in a tray. My tray is a simple plywood box lined with heavy-gauge polyethylene plastic or vinyl. After the veneer has soaked in the solution for one hour to three hours (longer for really bumpy veneers), hang the veneer up until it is dry to the touch. Then, clamp the veneer between two flat boards, with clean newsprint between the boards and the veneer. Replace the paper after a couple of hours with fresh paper; otherwise, it will stick and need scraping off.

After three or four hours, remove the paper entirely and clamp the veneer lightly for a day or so until it dries completely. Keep the veneer clamped until you're ready to glue it down. After treatment, even the gnarliest veneers will be quite flexible and easy to handle. Some shrinkage will occur, so treat your veneers before trimming them to size.

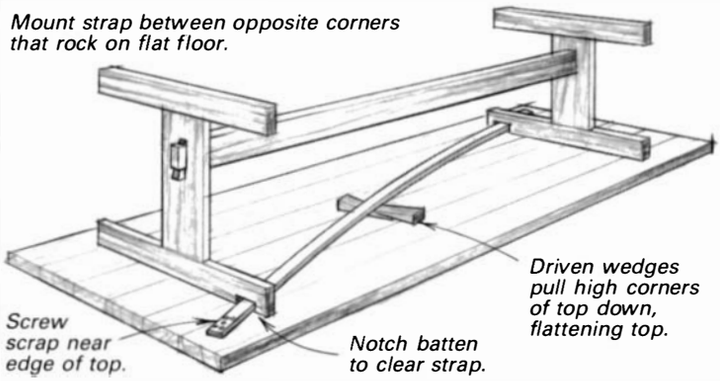
[C. Stuart Welch is a furniture designer/craftsman. He lives in Marshall, Calif.]

## Straightening a twisted top

***I recently purchased a 15-year-old wormy chestnut trestle table at a local auction. When I got the table home and examined it carefully, I found that the top was twisted along its length. The top is made of 7½-ft.-long, 4-in.- to 5-in.-wide 8/4 boards and has two battens screwed to the underside. Can this twist be corrected?***

***–Alden H. Andersen, Deer Park, Md.***

***Sandor Nagyszalanczy replies:*** A twisted tabletop can sometimes be staightened by attaching a diagonal strap to the underside of the table and inserting wedges to pull the high corners down and flatten the top. First, place the table, top down, on a flat floor and find the pair of opposite high corners. The top will rock on these corners rather than lie flat on the floor. Next, remove the battens that attach the trestles and cut a piece of strap iron or flat iron long enough to span diagonally between the high corners. The strap should stop just shy of the table's edge so it won't be seen when the table is upright. A hard maple strap will work for straightening a 4/4 top, but an iron strap will probably be needed to pull a thicker, 8/4 top straight. Drill four or five holes in each end of the strap, and screw it securely to the underside of the top, as shown below.




The next step is to make a pair of wedges (from the same kind of wood as the table, if you wish) that are 8 in. or 10 in. long and 1 in. high at the thick end. Drive these against one another at the midpoint of the diagonal strap until the tabletop sits flat on the floor. You may need to reposition the wedges or drive another pair to accomplish this. Before the battens can be reattached, they'll have to be notched to clear the straps, and you may have to plane the tops of the battens so they fit flat on the underside of the top. Turn the table upright and check the top by sighting across a pair of winding sticks set parallel to the table ends. The wedges may need to be adjusted again now and also whenever abrupt humidity changes cause the wood to move unevenly.

[Sandor Nagyszalanczy is an assistant editor at *FWW*.]

## Tropical mystery wood

***I recently acquired some dense South American hardwood that's yellowish in color and close-grained, like maple. One of the pieces has "Paraguay" stamped on it. The wood is exceptionally hard, and I went through many chisel sharpenings while chopping out a simple mortise-and-tenon joint. Can you tell me anything about this mysterious wood?***

***–Gabriel Lugo, Wilmington, N.C.***

***Jon Arno replies:*** Judging by the sample you sent me, I'm not at all surprised that your chisels took a beating. This wood, "Pau Marfim," or *Balfourodendron riedelianum,* when dry, can be one tough customer to work.

Pau Marfim is a member of the citrus family *Rutaceae.* Its native range extends from northern Argentina to southern Brazil, and it is quite common in central and northern Paraguay. Although it's on the small side when compared to many other South American exotic species, Pau Marfim can attain a maximum height of about 80 ft. and a diameter of 30 in. It generally produces a well-formed trunk, or bole, capable of yielding straight, clear lumber up to 30 ft. long.

Pau Marfim is a popular wood within its native range and has become increasingly more common in international commerce in the past decade or so. It is diffuse-porous, fine-textured, usually straight-grained and rather bland yellowish or creamy white in color, with little contrast between heartwood and sapwood. At a glance, the wood looks somewhat like sugar maple or yellow birch. Despite the superficial resemblance, Pau Marfim's

working characteristics are not at all like maple or birch. With a specific gravity as high as 0.73 (oven-dry weight/green volume), its density is more comparable to our native hickory.

Like hickory, Pau Marfim is a tough, highly elastic wood with outstanding wear properties and high resistance to suddenly applied loads. The wood is excellent for tool handles and flooring. Its fine texture and yellow color make it suitable as an alternative to boxwood for drawing instruments and rulers.
[Jon Arno is a woodworker and amateur wood technologist in Schaumburg, Ill.]

## Oil-finishing rosewood

***I'm building a dining-room table from South American rosewood. I applied an oil finish made of ⅓ pure tung oil, ⅓ linseed oil and ⅓ semigloss polyurethane. Some of the wood I purchased is kiln dried; some is air-dried wood that I kiln-dried myself. The latter wood I chose for the tabletop, because it has dark, dense, beautiful streaks. While the kiln-dried wood takes the oil beautifully, the streaks in the air-dried wood will not accept the finish. What's going on?***

***—Larry L. Brooks, Battle Ground, Wash.***

***Dick Boak replies:*** All the genuine rosewood species *(Dalbergia)* contain varying amounts of natural resins and oils. These resins can react with the solvents present in many oil-base finishes, and as a result, oil-base finishes often will not dry or cure when applied to rosewood. It's most likely that the kiln-dried wood you purchased is a rosewood substitute, like Morado (*Machearium scleroxylon,* often marketed as Bolivian or Santos rosewood). This would explain why it took the oil finish without problems, while the heavily streaked wood did not.

Another source for problems might be your oil mixture. As a rule, it's not wise to mix finishes not intended to be mixed. You may get lucky every now and then, but more than likely you will create a nightmare like the one you've described. Pure oils like 100% tung oil or boiled linseed oil might work on rosewood by themselves, but I doubt they're compatible with polyurethane. If you feel absolutely compelled to mix your own finishes, by all means check with a chemist or technical consultant at the company that makes the products you're using. Also, always do a test on a scrap or on the underside of your piece before applying your new concoction.

To finish your table, I suggest you skip oils altogether. If you are after the appearance of a hand-rubbed oil finish, you can still achieve it with vinyl sealer and nitrocellulose lacquer and avoid all the problems you've had with oil finishes. First, use a paint remover containing methylene chloride to remove the mess that the other finish left on your tabletop (the remover breaks the bonds that the polymerized oils in the finish have formed). Next, sand the rosewood with 220-grit sandpaper, and don't wait more than 10 minutes before you apply the new finish. Spray a coat of vinyl sealer light enough to leave the wood pores open. After the vinyl has dried, scuff the surface lightly with Scotch-Brite pads to defur the raised grain. Then, spray two light coats of either flat, matte or satin nitrocellulose lacquer in rapid succession. Wait a day, rub out the finish with 0000 steel wool to remove the sheen, and finish up with paste wax.
[Dick Boak manages The Sawmill, the exotic-wood sales division of The Martin Guitar Co. in Nazareth, Pa.]

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by Dick Burrows

**Bandsaws and bimetal blades**—One of the most widely read articles we've published in recent years presented a couple of unorthodox methods for tuning up and using a small-shop bandsaw (*FWW* #63). Among the more controversial sections was an enthusiastic recommendation for using ¼-in. bimetal blades. According to the author, these blades, tensioned to an unusually high level (15,000 psi for general use and even higher for resawing), would solve almost any bandsawing problem.

Since the article was published, we have received a steady stream of compliments from readers astounded at the quality of cuts they get from their bimetal blades. Other readers, however, have told us they don't think the bimetal blades, which were originally designed for cutting steel, are a shop cure-all, nor does the performance of the blades justify their high cost.

Recently, we've begun to hear a couple more disturbing claims. Art Gschwind, president of Suffolk Machinery in Patchogue, N.Y., said people assumed too much from the article. He feels some people figured that if the method works well with a ¼-in. blade, it will work even better with a ¾-in. blade. That was never recommended in the article, and these wider bimetal blades should not be used on small-shop machines.

Gschwind explained that bimetal blades are brittle, and they can shatter in several spots at once. A piece of the broken blade could fly like a spring and hit the machine operator. The thicker ¾-in. blades weaken rapidly when bent many times over 14-in. wheels found on most small-shop bandsaws. The metal fatigue is aggravated by the short length of most bandsaw blades, which means the blades are bending almost constantly when the saw is running at the normal 3,000 feet per minute (fpm). According to Gschwind, if you are going to use the narrower ¼-in. blades, they should be run at 1,500 fpm, the speed recommended in the article for resawing.

Gschwind's company, which welds and markets custom bandsaw blades, was deluged with requests for bimetal blades after the article appeared, but Gschwind says he won't recommend bimetal blades for any woodcutting, except for some special plywood and particleboard operations. Instead, he recommends flexback carbon blades running at approximately 3,000 fpm for woodcutting. He says he won't even sell a bimetal blade under 90 in. long, to prevent people from running them on saws using blades that are 80 in. or less.

A spokesman for Milford Products, a blade dealer in Branford, Conn., says his company also doesn't recommend bimetal blades for woodwork, but safety isn't the question: The cost of the blades can be five to six times higher than that of carbon-steel blades. Many customers balk at the price and usually can't see that saw performance improves five to six times. Palmer did think we should stress again that recommendations in the article only applied to ¼-in. blades, not to all bimetal blades.

Bob Candiano, an engineer with American Saw Manufacturing Co. in East Longmeadow, Mass., and one of the people interviewed for the original article, said he has not heard of any problems with the blades, safety or otherwise, but he did caution against using the wider blades.

**Landslide on the Rockwell scale**—Judging from the mail in recent weeks, none of us here has an aptitude for metallurgy. Something about that cold, often difficult-to-work material mystifies us. About a dozen readers took us to task on our item on hardness and the Rockwell scale in *FWW* #71, p. 14.

The Rockwell scale is not a simple thing to define. There are two types of Rockwell hardness tests, the standard test and the superficial test, and each test involves many different scales. Carl Dorsch, a tool steels research engineer in Pittsburgh, Pa., wrote that these tests gauge hardness by measuring the depth to which an indenter can penetrate the surface of a test piece under a given load. The two tests differ in terms of the load applied to the indenter and the nature of the indenter itself, but basically, the Rockwell superficial test is used when the specimen is too small or too thin for the standard test. Each test requires various scales, because several combinations of load and indenter types are needed for satisfactory readings over wide ranges of hardness.

"For tool steels, the Rockwell C scale is the most common standard test. Three Rockwell N scales (three different loads) are the superficial equivalents. The C and N scales use a diamond-tipped indenter (not the 1/16-in.-dia. ball mentioned in the Q & A column) because they are testing for hardened steels. The Rockwell B and superficial T scales use the 1/16-in.-dia. hardened steel ball, but these scales can only be used on tool steels in the annealed (soft) condition," Dorsch said.

Lloyd Emond of Milwaukee, Wisc., identified the most common Rockwell scales: Rockwell B (1/16-in.-dia. ball, 100kg load) for testing soft steel, aluminum or copper alloys; Rockwell C (diamond indenter, 150kg load) for hardened steels and any other material over Rb100; and Rockwell A (diamond indenter, 60kg load) for measuring the hardness of hard, thin materials, such as carbide. He added that because of the different scales, saying "Rockwell 60" means nothing: The scale must be indicated.

The Rockwell C scale often encountered by woodworkers ranges from 0 to 100, but Dorsch says no current tool steel can be hardened over Rc70. The usual maximum for cutting tools is Rc65. "As a practical rule," Dorsch said, "cutting tools such as wood chisels cannot be scratched or cut with a metal file if they are hardened to about Rc60 or above."

Hardness of a cutting tool is not the only factor that determines the quality of a cutting edge. Jerry Glaser of Playa del Rey, Calif., pointed out that any carbon steel containing 0.6% carbon can be hardened to Rc60. A hard steel can also be brittle, so toolmakers often have to temper the metal, intentionally reducing its hardness, to make the metal tougher.

"The toolmaker has to make a choice between his desire for a long-lasting edge and a tool sufficiently tough to prevent breakage from impact or shock loading. An edge that is too hard and brittle will break or chip in a gross manner. On the other hand, an edge that is too soft will roll or bend under use," Glaser said.

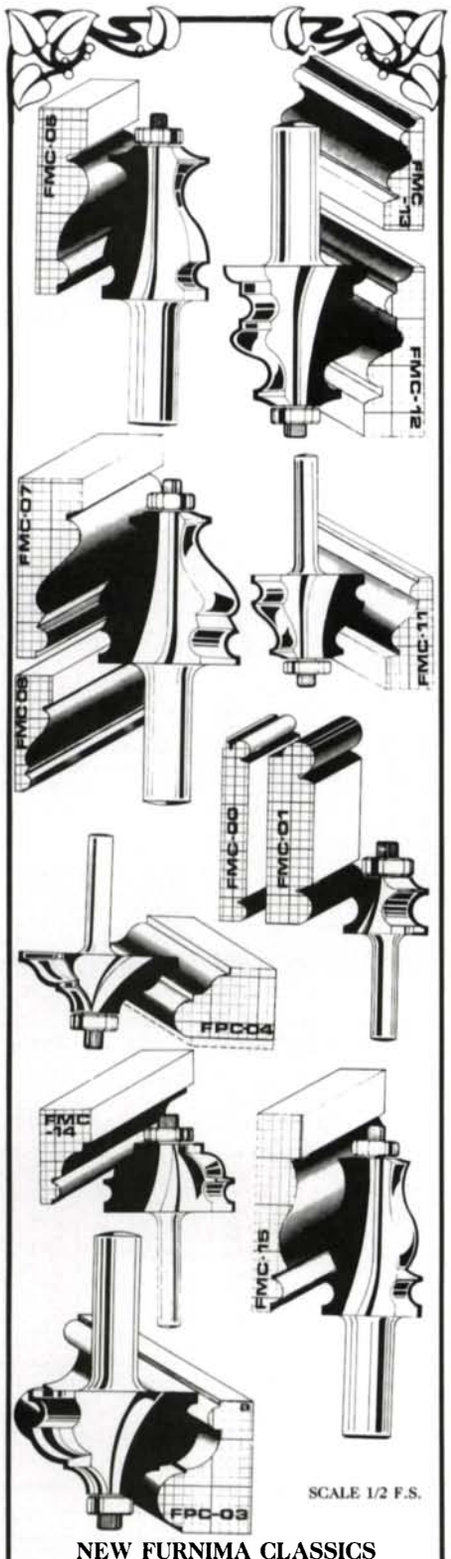
**Math and the woodworker**—Next to metal, perhaps our biggest problem area is mathematics. Many of our readers don't share the weakness, however, and catch us every time. The latest incident involves our method for calculating the moisture content of wood in *FWW* #71, p. 18.

Frank Swingle of Indianapolis, Ind., put it this way: "If the wet weight is divided by the dry weight and then multiplied by 100, the result will not be the moisture content, but a number 100 percentage points higher than the true moisture-content percentage. Perhaps your editor studied under the same math teacher as that prosperous retailer who, when asked the secret of his success, said he bought his products for $1 and sold them for $4, and you'd be surprised at how that 4% adds up."

Arthur Hoyt Jr. of Conway, Ark., recommended we modify the calculation so it reads as follows: wet-wood weight minus dry-wood weight, divided by the dry-wood weight. That figure multiplied by 100 gives the percent of moisture. Hoyt said he was hoping we had made a mistake in this one; otherwise, he's been teaching heresy in his chemistry courses for the past 19 years.

**Help for drawermaking**—Paul Harrell, who wrote about making curved drawer fronts in *FWW* #71, has asked us to clarify his recommendation on where readers can get additional help on making drawers. We listed *FWW on Boxes, Carcases and Drawers,* but Harrell says the reference should have been specifically to Alan Marks' article in the book. □

*Dick Burrows is managing editor at* FWW.

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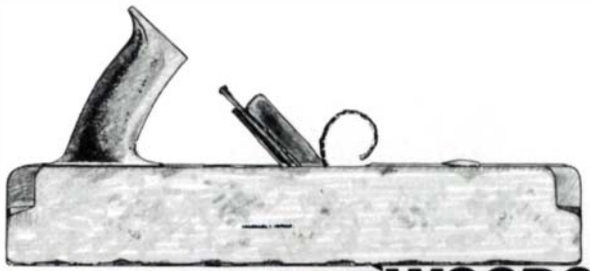

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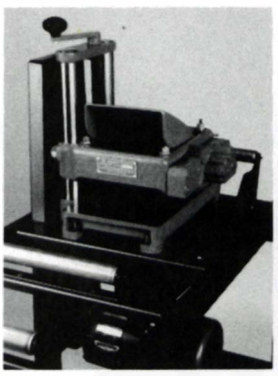

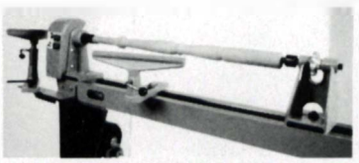

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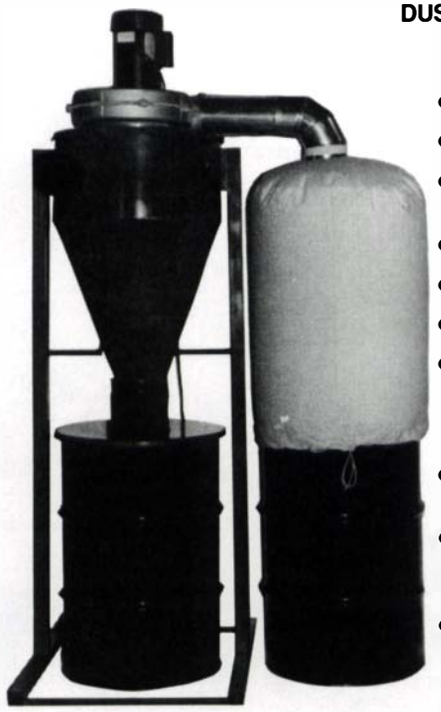

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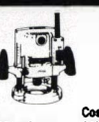

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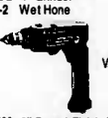

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| 7 1/4"x5/8" (w/Diamond) 24Th | 15 |
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| 7 1/4"x5/8" (w/Diamond) 60Th | 24 |
| 8"x5/8" 40Th | 25 |
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| 10"x5/8" 24Th | 27 |
| 10"x5/8" 40Th | 30 |
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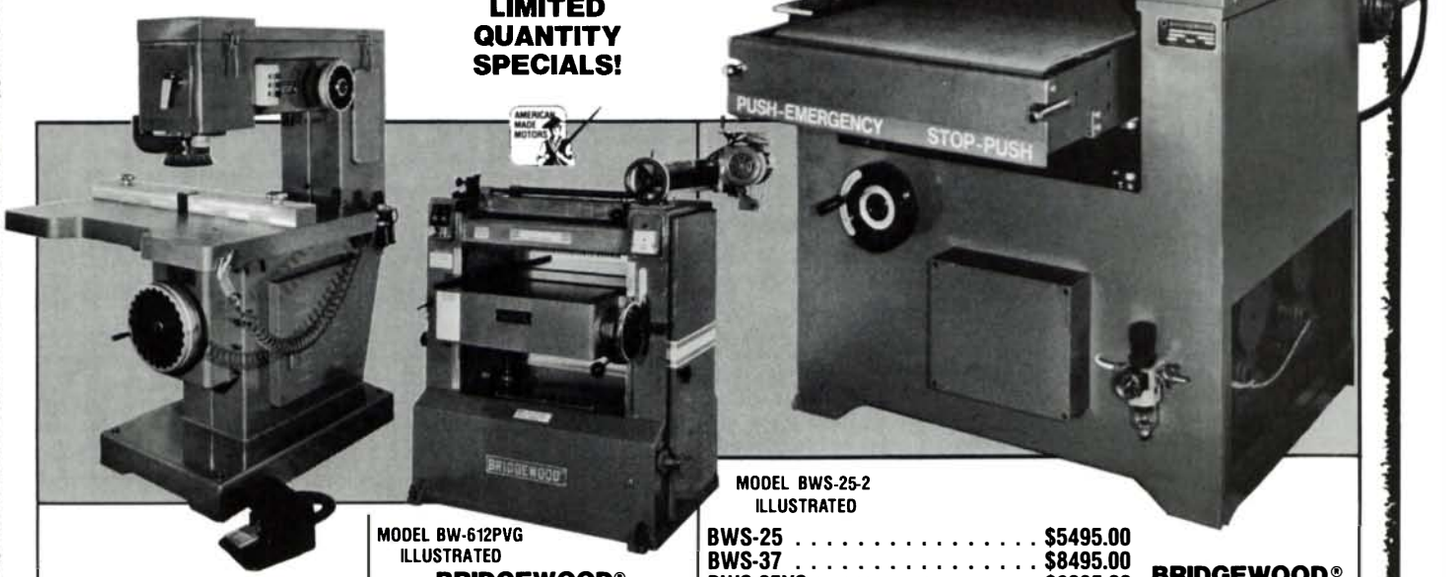


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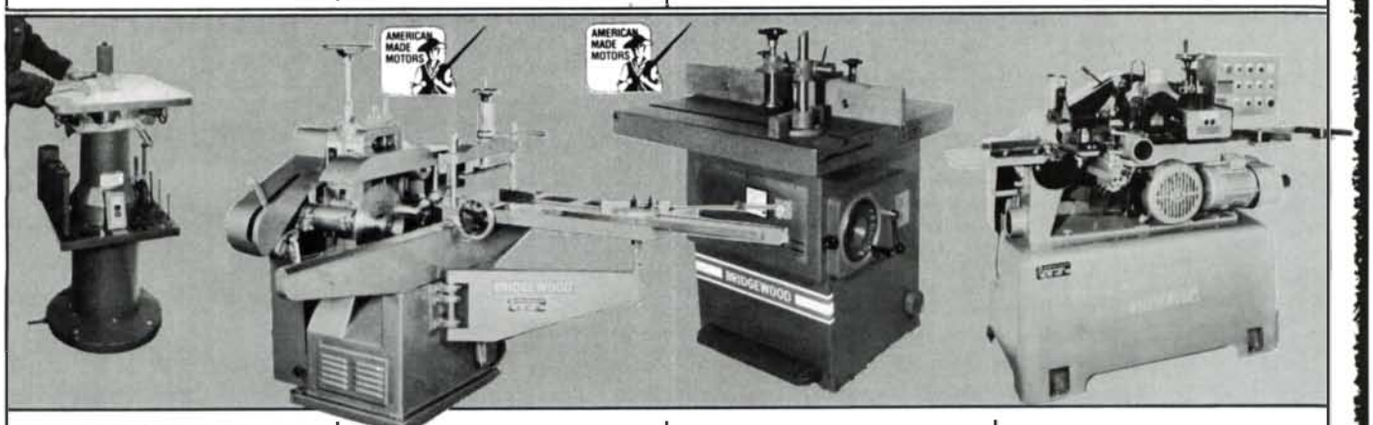


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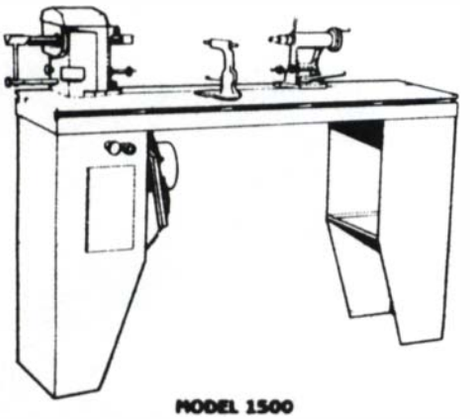

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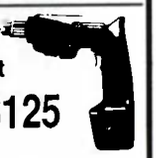

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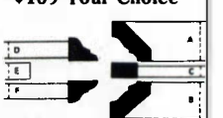
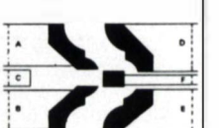


21 Cabinet Set



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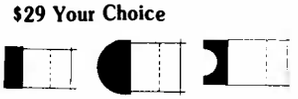
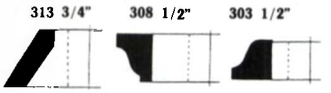


311 1-1/2" 306 1" 301 1"
312 1" 307 3/4" 302 3/4"
313 3/4" 308 1/2" 303 1/2"



336 Bevel 332 Sash 331 Sash

323 Ogee 324 Cove 319 Drawer

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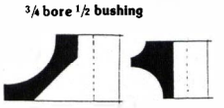
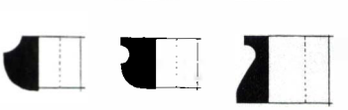
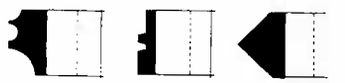


3280 3/4" 323 Round



317 Round 320 Cove 329 Ogee



325 Round 321 Glue 330 Vee

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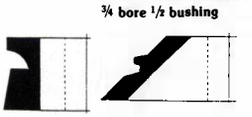

333 Door 337 Lock Mitre

335 Vertical

327 Ogee Bead

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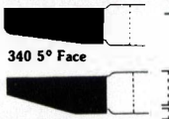
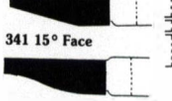
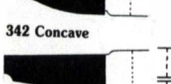


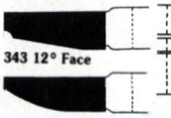
340 5° Face



341 15° Face



342 Concave



343 12° Face

344 Convex

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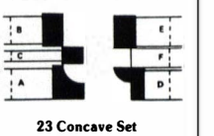
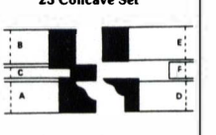


23 Concave Set



24 Ogee Set

25 Convex Set

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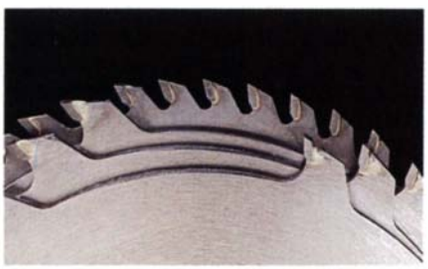

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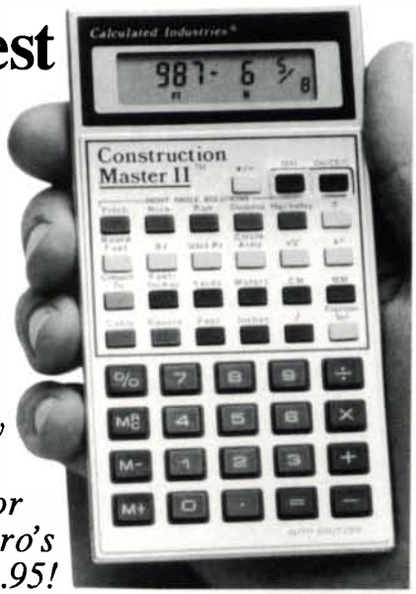


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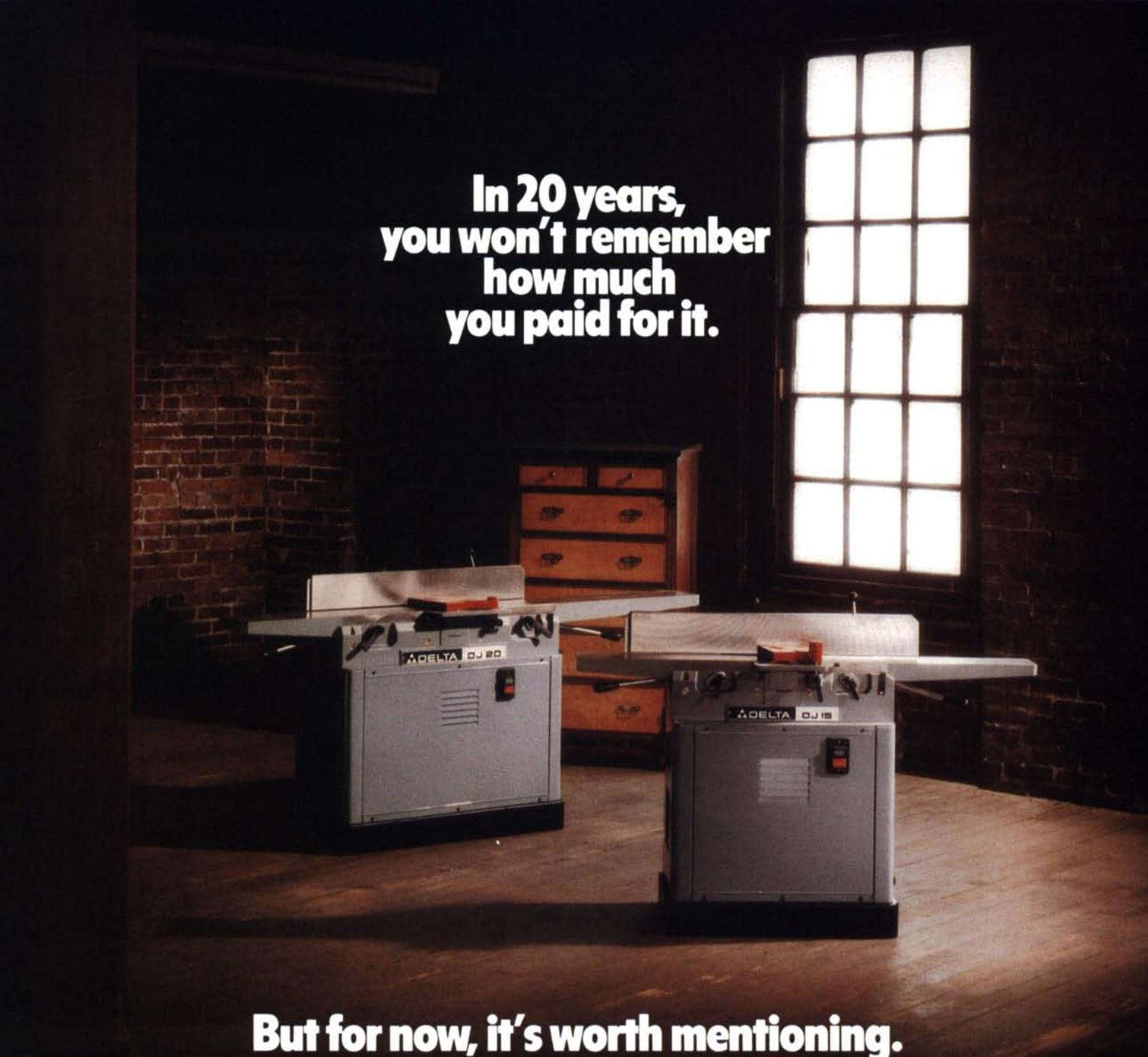


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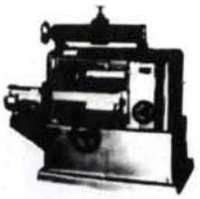

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| TS380 | 14" Miter Saw | $ 369 |
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| JBS-18 | 18" Bandsaw | $ 749 |
| WSS-3-1 | Heavy Duty Shaper | $1225 |
| JWS-34-1 | 3/4" & 1" Spindle Shaper | $ 969 |
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| JSG-6 | Belt-Disc Sander | $ 529 |
| DSS-15 | Scroll Saw | $ 119 |

## HITACHI

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|---|---|---|
| F-1000A | Jointer-Planer | $1395 |
| CB75F | Resaw Bandsaw | $1645 |
| C15FB | 15" Miter Saw | $ 409 |
| C10FB | 10" Miter Saw | $ 279 |
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| JS020 | 1000 Biscuits | $ 29 |
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| 6012HDW | 3/8" Cordless clutch drill | $ 109 |
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| 3536 | 36" long | $ 15.50 | $ 88 |
| 3648 | 48" long | $ 17.00 | $ 98 |
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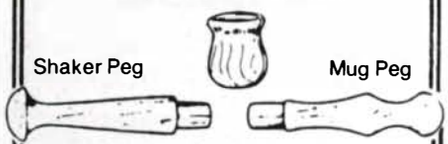


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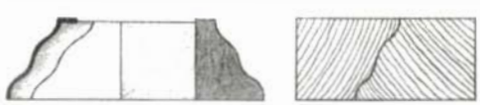
Reversible Detail

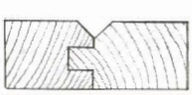


**MODEL G1714** **$39.95** PREPAID TO YOU!

Reversible Detail

**MODEL G1715** **$39.95** PREPAID TO YOU!

½″ V-Paneling Set



**MODEL G1716** 2-Pc. Set
**$79.95** PREPAID TO YOU!

¾″ V-Paneling Set

**MODEL G1717** 2-Pc. Set
**$85.00** PREPAID TO YOU!

1″ V-Paneling Set

**MODEL G1718** 2-Pc. Set
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Grizzly IMPORTS, INC.

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This incredible product was formulated specially for woodworking.

- Keeps machine surfaces clean without affecting the wood.
- Prevents resin build-up on blades.
- Keeps blades cooler and smoother cutting.

**MODEL G1751 10 oz. Bottle**

ONLY **$8.95** PREPAID TO YOU

## 7 PC. FORSTNER BIT SET

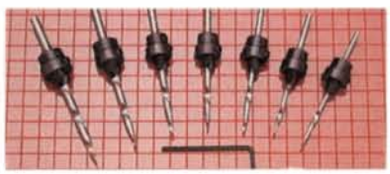
**MADE IN AUSTRIA**

This high quality set consists of 1/4", 3/8", 1/2", 5/8", 3/4", 7/8" & 1" bits. Comes in sturdy wooden box.

**MODEL G1752**

**$49.95** PREPAID TO YOU

## 7 PC. TAPERED COUNTERSINK SET



Predrill holes for woodscrews easily and correctly the first time! This very high quality set is Made in Japan.

**MODEL G1728**

**$39.95** PREPAID TO YOU

## PANTOGRAPH

Enlarge or reduce images right on the wood accurately. Comes with a scribe point & lead. Made in Japan

**MODEL G1731**

**$18.50** PREPAID TO YOU

## CERAMIC EDGE-TRIMMER

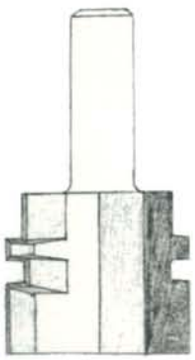
Cleanly trim laminates, veneers and plastics. Available in beveled or round cut

**MODEL G1729 ROUND** **MODEL G1730 BEVELED**

**$18.50** PREPAID TO YOU

## CARBIDE -TIPPED ROUTER BITS

### GLUE JOINT BIT



1/2" Shank
1 1/2" Cutting dia.
1 1/4" Cutting height

**MODEL G1349**

**$24.50**

PREPAID TO YOU

### BEADING BITS

| | | |
|---|---|---|
| G1350 | 1/8"R x 1/4"Shank | $9.95 |
| G1351 | 1/4"R x 1/4"Shank | $10.95 |
| G1352 | 3/8"R x 1/4"Shank | $12.95 |
| G1353 | 1/2"R x 1/4"Shank | $13.95 |
| G1354 | 1/8"R x 1/2"Shank | $9.95 |
| G1355 | 1/4"R x 1/2"Shank | $10.95 |
| G1356 | 3/8"R x 1/2"Shank | $12.95 |
| G1357 | 1/2"R x 1/2"Shank | $13.95 |

ALL PRICES ARE PREPAID TO YOU

### THUMBNAIL BIT

1/2" Shank

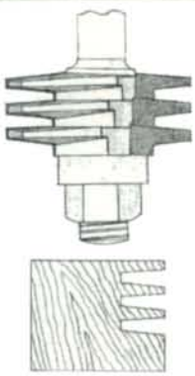
2 1/2" Cutting dia.

**MODEL G1365**

**$32.50**

PREPAID TO YOU

### FINGER JOINT BIT



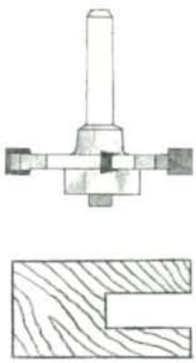
1/2" Shank
2" Cutting dia.
For up to 1" material

**MODEL G1364**

**$55.00**

PREPAID TO YOU

### SLOT CUTTERS



| | | |
|---|---|---|
| G1358 | 1/8"x1/4Shank | $16.50 |
| G1359 | 3/16"x1/4"Shank | $17.50 |
| G1360 | 1/4"x1/4"Shank | $17.50 |
| G1361 | 1/8"x1/2"Shank | $16.50 |
| G1362 | 3/16"x1/2"Shank | $17.50 |
| G1363 | 1/4"x1/2"Shank | $17.50 |

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### DOOR LIP BITS

For 3/4" material

1/2" Shank

**MODEL G1348**

**$28.50**

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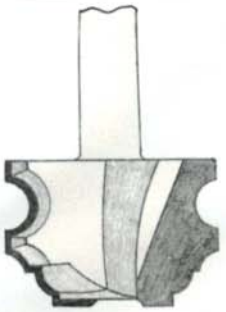
## CARBIDE -TIPPED ROUTER BITS

### CLASSICAL MULTI-FORM BIT



½" Shank, 2" Cutting dia.
1¼" Cutting height

**MODEL G1347**

**$28.50**

PREPAID TO YOU

### DRAWING LINE BITS

**G1721** ⅛"R x¼" Shank
**$11.50**

**G1722** ¼"R x¼" Shank
**$11.95**

**G1723** ⅜"R x¼" Shank
**$12.95**

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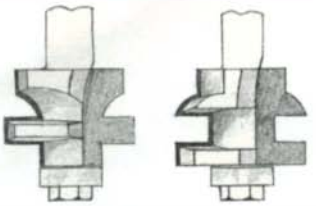
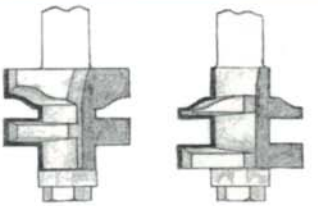
### 2 PC. STILE & RAIL SETS



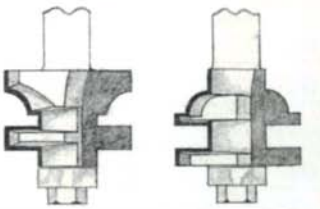
Quarter Round
**MODEL G1619**
**$75.00**
PREPAID TO YOU

### 2 PC. STILE & RAIL SETS



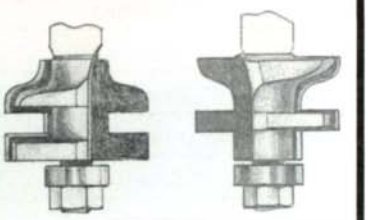
Traditional
**MODEL G1620**
**$75.00**
PREPAID TO YOU

### 2 PC. STILE & RAIL SETS



Roman Ogee
**MODEL G1621**
**$75.00**
PREPAID TO YOU

### 2 PC. STILE & RAIL SETS



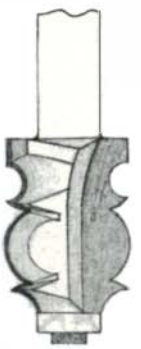
Ogee
**MODEL G1622**
**$75.00**
PREPAID TO YOU

### FACE MOULDING BIT

½" Shank
1-1/16" Cutting dia.
1⅝" Cutting length

**MODEL G1366**
**$32.50**
PREPAID TO YOU

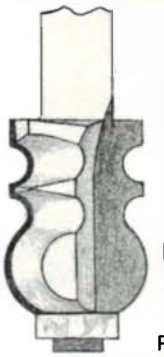
### FACE MOULDING BIT



½" Shank
15/16" Cutting dia.
1⅜" Cutting length

**MODEL G1367**
**$29.95**
PREPAID TO YOU

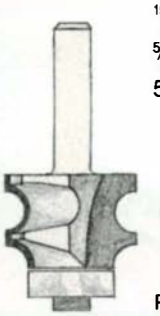
### FACE MOULDING BIT



½" Shank
15/16" Cutting dia.
1⅜" Cutting length

**MODEL G1368**
**$29.95**
PREPAID TO YOU

### FACE MOULDING BIT

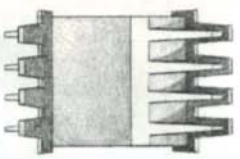


½" Shank
15/16" Cutting dia.
⅝" Cutting length
5/16" Bead

**MODEL G1369**
**$19.50**
PREPAID TO YOU

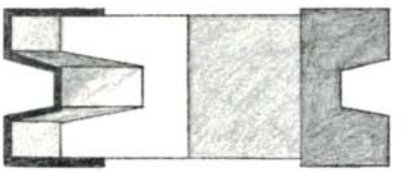
## CARBIDE-TIPPED SHAPER CUTTERS

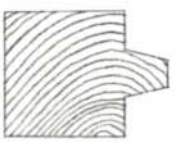
### REVERSIBLE FINGER JOINT



**MODEL G1712**
**$79.95**
PREPAID TO YOU

### WEDGE GROOVE





**MODEL G1710**
**$29.95**
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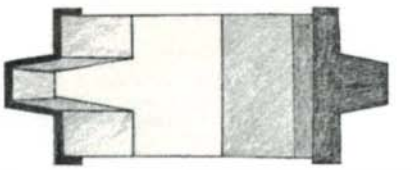
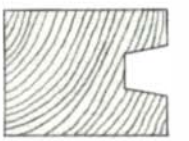
### WEDGE TONGUE





**MODEL G1711**
**$29.95**
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Made right here in U.S.A, these superb quality bases are made specially to fit our Grizzly machines. However, some sizes are universal and will fit other brands as well! Please check with us.

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| G1023 | Tablesaw | G1740 | 89.95 |
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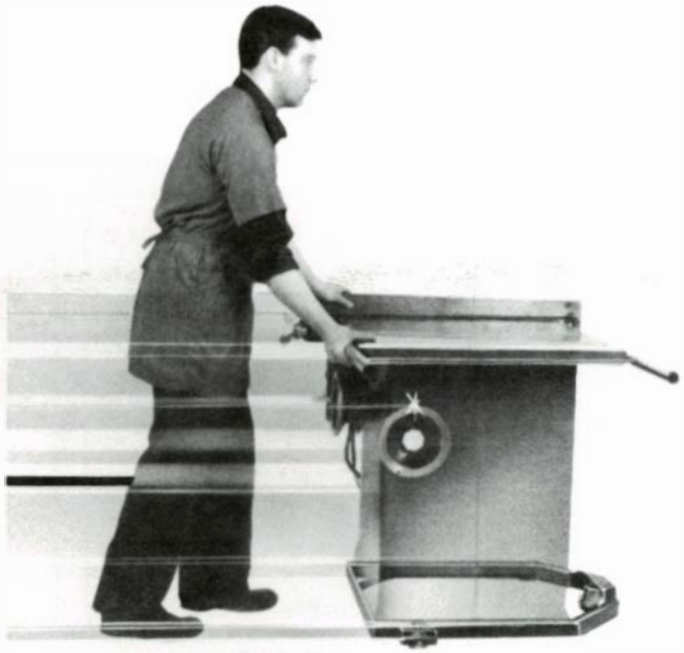
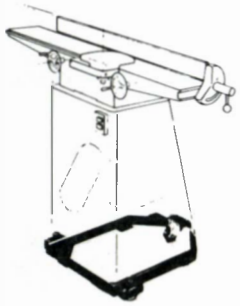
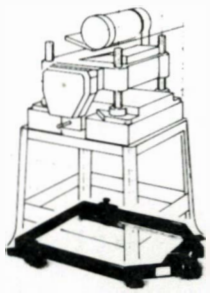
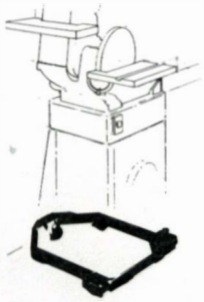
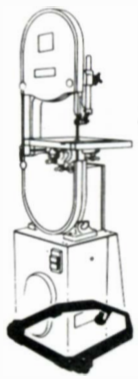
| G1538 | 16" Bandsaw | G1742 | 89.95 |
| G1012 | 18" Bandsaw | G1743 | 89.95 |
| G1182 | 6" Jointer | G1744 | 89.95 |
| G1018 | 8" Jointer | G1745 | 89.95 |
| G1024 | ½" Shaper | G1746 | 89.95 |
| G1026 | 1" Shaper | G1747 | 89.95 |
| G1021 | 15" Planer | G1748 | 89.95 |
| G1033 | 20" Planer | G1749 | 169.95 |
| G1014 | 6/9 Sander | G1750 | 89.95 |
| G1535 | 18" Scroll Saw | G1750 | 89.95 |











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**MODEL G1630**
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**ALSO AVAILABLE:** Green shophelpers for shapers. Used as hold downs, these green shop helpers are very popular with shaper owners.
**Model G1578 Only 74.95 Prepaid to you**

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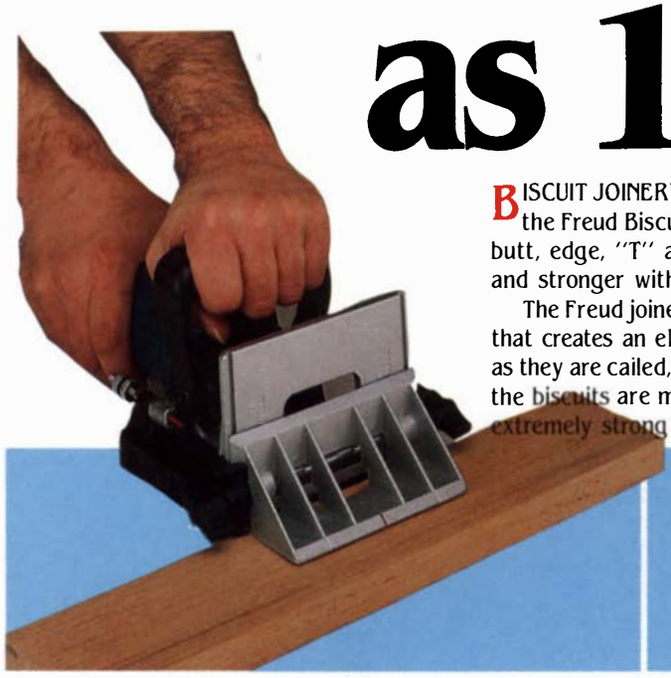
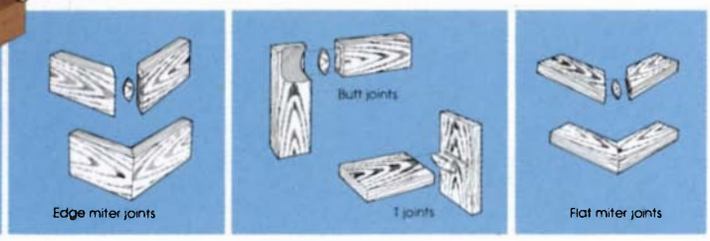
# FREUD'S BISCUIT JOINER: It Works as Easy as 1·2·3



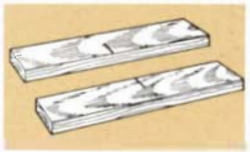

BISCUIT JOINERY is now easy and economical with the Freud Biscuit Joiner machine. Joints, such as butt, edge, "T" and others, can be made quicker and stronger with the use of the Freud joiner.

The Freud joinery machine is a plunge cutting tool. It has a rotating carbide cutter that creates an elliptical slot in the surfaces to be joined. The splines, or "biscuits" as they are called, are inserted into the slot along with any water based glue. Because the biscuits are made of wood, the water makes them swell in the joint making an extremely strong and firm bond.




## 1 Lay Out

The boards that are to be joined should be placed together and the location of each joint marked on both pieces. The vertical fence is adjusted to the depth desired for the slots. Turning the wing nuts on the side of the fence allows it to move easily in the tracks. The fence is accurately calibrated to allow you to easily move it to center of the joint *(See Figure 1).*



At this point, you have determined the horizontal location of the joint by marking the wood and vertical location of the joint by setting the fence.

## 2 Cut

*You are now ready to make the slots for your biscuit joint.*

There is a red indicator line on the front of the fence and a corresponding red mark on the base plate *(See Figure 1).* You can use either of these marks for alignment with the lines drawn on the mating pieces of wood.

With the wood securely held in place, align the red mark with the line on the board. With one hand you can grasp the body of the machine. The other hand is placed on the handle. Turn the machine on and, with a steady forward motion, push the joiner body forward to make the biscuit slot. Repeat the process for each marked area on all of the wood pieces.

*Simple and Easy!!!* The wood particles are automatically ejected through the machine's exhaust port.

## 3 Assemble

Apply a water based glue to the slots and surfaces being joined. Insert the biscuits in the slots and push the boards together. For best results you will need to clamp the joint together for the glue manufacturer's recommended drying time.

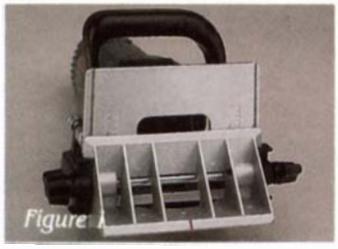
There you have it, 1-2-3!! An extremely strong joint produced quickly and easily by you and the Freud Joiner Machine.

You will find a complete instruction "How to" book with each machine. Illustrated with photographs and drawings, it is designed for those woodworkers not familiar with biscuit joinery. The Freud biscuit joiner will prove to be a highly valued tool for your woodworking projects.

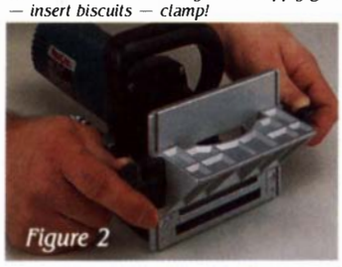
*At a List price of $285.55, the Freud JS100 Joiner Machine is now on sale through your local Freud distributor for $195.00.*

MITER JOINTS? NO PROBLEM!

*By reversing the fence, you can join mitered pieces* (See Figure 2). *The steps are the same.*




*Mark the location of your joint and set the fence to the vertical height needed. Line up the fence with the mark and make your cut. Apply glue — insert biscuits — clamp!*

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Fine Woodworking November/December 1988

# Furniture-Making in Toronto

## *Style and success in Canada's largest art market*

by Tom Hurley

*Since the early 1970s, a growing group of Toronto woodworkers has been building fine furniture and demonstrating top-notch entrepreneurial skills, too. Among them is Gord Peteran, who built the 20-drawer dresser shown here, which has a pattern of ebony pull knobs dotting its white face.*

Photo: Elaine Brodie

A few years ago, when Toronto was told its population had quietly overtaken that of Montreal, the news seemed to act as a cue for this cosmopolitan city of 3½ million to emerge from urban adolescence into adulthood. Indeed, visitors to what is now Canada's largest city can detect a certain swelling of local pride as they explore its safe and leafy downtown streets and enjoy the city's relatively recent cultural blossoming. As Toronto has grown, so has the demand and appreciation for quality, in everything from ethnic cuisine to home furnishings. In many ways, the story of woodworking here on the shore of Lake Ontario over the last couple decades has been the story of the city's best makers rising to meet the confidence and taste of a city that has finally grown up.

In the late 1960s and early 1970s, to talk about woodcraft in Toronto was to talk about bandsawn, lacquer-dipped pull toys and pine reproduction cannonball beds. While the hippie movement had contributed to a rising profile of crafts, a sense of contemporary design had scarcely begun to penetrate the world of small-shop furniture-making. It wasn't until later in the 1970s that the concept of a woodworking community really began to emerge. Although many tested the water, found it cold and decided to drop out, designers/makers such as Stephen Harris, Paul Epp, Stephen Hogbin and others hung in to lay the groundwork, seeking out and educating the fledgling market. In the 1980s, with the hippie hangover long past, a new generation, with a sharper entrepreneurial sense and with technical and design skills in many cases honed at the nearby Sheridan College School of Crafts and Design, has taken up the challenge. While the number of full-time designers/craftsmen may not be rising dramatically, those who occupy the foreground these days are doing daring and sophisticated pieces for a market that suddenly seems willing to snap up as much top-rank work as can be produced.

Reaching this Toronto clientele has always been the challenge, one that has been met with the help of private gallery outlets for comtemporary crafts, such as Prime Canadian Crafts, whose founder, Suzann Greenaway, points out that Toronto is North America's second largest art market, second only to New York. Prime Canadian Crafts and another downtown gallery, Dexterity, display and sell craftsmen's work, make referrals and show makers' portfolios to prospective buyers. Also on the rise is the role played by architects and interior designers, who are beginning to see the value of connecting clients with designers/craftsmen for sometimes extensive residential and corporate interior commissions.

A number of other influences have also been working to broaden and vivify the local woodworking scene. Some of these are institutions, including the Ontario Crafts Council, with its regular gallery shows, portfolio bank and grants to craftsmen. Other contributors, from the wood studio of the Ontario College of Art to specialist suppliers of exotic hardwoods and high-quality tools, have all made it easier for artists and makers to develop their woodworking skills.

As I was researching this article last year, I noticed that in a single week, Torontonians could choose among visiting a major musical instrument-making exhibition at the world-famous Ontario Science Centre, a traveling show called "Chairs—Designed and Made in Ontario" or the opening of the "Virtu" show, a fast-rising annual event showcasing the leading edge of Canadian design in residential furniture.

Eating up all this highly photogenic activity are the local print media, who have been happy to promote a star system among designers/makers and indulge their readers' growing interest in architecture and interior design.

While such supporters play an important role, it is the makers themselves—lest we forget: the primary producers—who are the real heroes. Those whose work and words fill the following pages are a somewhat arbitrary handful of the best, representative of a larger furniture-making community, which like its urban setting, has never bloomed brighter.

**Sheridan College School of Crafts and Design**—Last year in Toronto, the Ontario Crafts Council hosted a show of fine contemporary crafts produced by past and present students of Canada's largest and best-equipped crafts school, the Sheridan College School of Crafts and Design (SOCAD). The show celebrated the school's 20th anniversary (it opened in 1967, the year of Montreal's influential Expo '67). The show's title, "Tenacity of Vision," summed up well the contribution of the multimedia school, and particularly of its furniture studio, which offers the only full-time program of its kind in Canada.

Earlier this year, SOCAD moved a short distance to a new 45,500-sq.-ft. facility at the Sheridan College main campus in Oakville, Ontario, 20 miles west of Toronto. In its new home, SOCAD will no doubt continue to attract students from all over Canada, from the U.S. and from countries as far away as Singapore for its diploma furniture program. The curriculum, spread over three years and recently graduating roughly 10 students a year, includes training in design and technical processes, plus complementary courses ranging from art history to business practice.

**Donald Lloyd McKinley**—"It isn't that the school necessarily makes good graduates," says Donald Lloyd McKinley, studio master of the furniture program, "rather, there are good people who

***Donald Lloyd McKinley, a studio master at the Sheridan College School of Crafts and Design, built this slantable/bench with a wane-edge maple top. The piece is 14½ in. high, 89¾ in. long and 33 in. wide.***

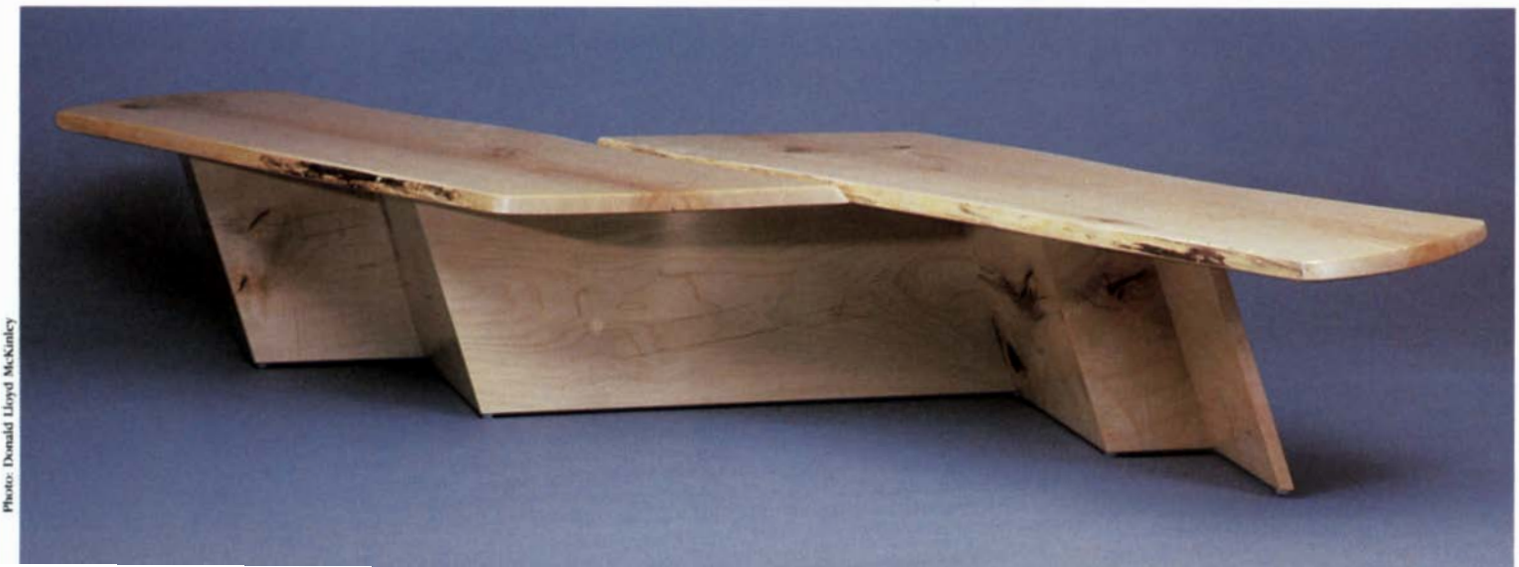


Photo: Donald Lloyd McKinley

become graduates." McKinley's eagerness to credit his students is typical of this committed educator and well-known part-time designer/craftsman. Originally from Oklahoma, McKinley was invited to set up and run the furniture studio back in 1967 and has since become a Canadian citizen. With an extensive academic and practical background in both crafts and industrial design, McKinley has acted as the ship's keel for 21 years. Highly knowledgeable, articulate, witty and occasionally intimidating to those who first come up against his formidable intellect and presence, McKinley is acknowledged as an excellent teacher. During critiques of students' work, he's likely to turn the piece upside down and make allusive connections that elicit a smile, if not a blush. Assisting him over the years have been a number of additional top-rank faculty members and technologists, whose biases and skills continue to leave their mark on the program. "My role has been to counterbalance the other person. Fortunately, there's always been an alternate resource to myself," says the 56-year-old McKinley.

Changing faculty has meant some shifts in focus over the years, with fluctuations in the interest accorded to production furniture and industrial design as opposed to one-off craft pieces. The current part-time instructor is the well-known designer and maker in wood Michael Fortune; the technologist is Stefan Smeja. Both are graduates of the program.

While not all graduates opt to pursue the craft full-time, a significant number have gone on to careers in design, to work in production management or to establish themselves as independent designers/craftsmen. The undeniable fact is that in any representative show of Canadian contemporary woodworking, there will be multiple connections to the Sheridan College program. "I would guess that in some ways the contribution the school has made is that it has stayed in business 20 years," says McKinley. "We'll endeavor to see that the quality of the product remains high, and gets better.... It's the tenacity thing."

**Stephen Harris**—For close to 20 years, Stephen Harris has shone as one of Canada's preeminent designers and makers in wood. He blazed a trail for many who followed, and now at age 49, he is recognized as the dean of the Toronto fine furniture-making scene. The publicity-shy Harris would wince at such a title, but the fact is that through the 1970s and early 1980s, his downtown studio—for many years at 86 Nelson St.—was a celebrated address and focal point for the craft. Besides leading the way with his own work, Harris shared his studio with other equally creative form-givers, including industrial designer and maker Paul Epp, artist Stephen Hogbin and designer and maker Michael Fortune. When you add together the assistants who have worked for Harris on Nelson Street and more recently in his current workshop across town, you have a Who's Who of Woodworking in Toronto.

Harris' characteristic style is a sumptuous one, a blend of organically based forms and curves accented with precise, sensuous ridges or with the sculpted terracing of multiple planes. His ability to make joinery preserve the flow of the grain can make wood look like a plastic material. Over the years, he has tackled virtually all the major genres: mirrors, rocking chairs, cabinets, dining suites, boardroom tables and entrance doors, not to mention the finely made cedar-strip canoe he enjoys paddling along the north shore of Lake Superior.

Recently, Harris was busy refining his installation skills as he completed mirrored paneling, a wardrobe, cupboards, doors and bedroom furniture for a series of rooms in a Toronto high-rise penthouse suite. "There's an excitement generated by being able

Photo: Peter Paterson

***Stephen Harris** built his lighting-showroom ladder, above, using curly maple/ebony, rubber treads and spring-loaded retracting casters.*

to do larger-scale things," he says, "things that are components to the whole rather than isolated pieces." For a craftsman who has sustained a personal vision of the whole for so long, that excitement is well deserved.

**Michael Fortune**—Of the group of Toronto designers and makers in wood who have risen to prominence within the last 10 years, Michael Fortune is currently Toronto's busiest and most successful. "My week is fractured. I couldn't even keep notes on it," admits the 37-year-old bearded craftsman. Fortune works a long, six-day week, teaching two days in the furniture program of his alma mater, Sheridan College, and spending the rest of the week in his home-based studio. He also makes time to serve on the board of the Ontario Crafts Council and travel to give workshops and demonstrations. He has made an instructional video on hand-mirror construction.

The heart of all this activity is Fortune's west-end shop, where machines, benches, wood and works-in-progress cram every inch of an 850-sq.-ft. former garage heavily insulated for sound and heat. If a prize is ever given for compact efficiency, Fortune's

Photo: Elaine Brodie

***Gord Peteran's** side chairs feature vertical-grain stained oak sides and a trapezoidal leather-covered seat.*

Photo: David Allen

***Michael Fortune** builds dining chairs in limited-production runs. His 'Number One Design,' above, is American black walnut with English holly inlay and an embossed leather seat.*

shop will win it. Sharing in such a prize will be his two full-time employees, John Stollmeyer and Mark Paddison, who execute Fortune's designs with the help of what they call "production packages"—boxes containing all the necessary notes, jigs and patterns for a given limited-production piece.

Fortune's involvement with a piece sometimes begins in the tree lot of a client or acquaintance who invites the craftsman to use his shop-built chainsaw mill to slice the butt into boards, which then go for kiln- or air-drying. Fortune is an acknowledged expert on steam and hot-pipe bending and an innovative technician able to quickly add an overhead router arm to make the most of the precision sliding bed on his 1938 slot mortiser.

From the beginning, Fortune's work has been characterized by a loving attention to detail and a control of line that works to make his best pieces—mostly tables, chairs, cabinets and small accessories, such as hand mirrors—beautifully resolved in three dimensions. Embodying all these virtues is his popular "Number One Chair," a fresh and highly elegant design based on slender branching and converging steam-bent members. Although he doesn't want to be identified with just one chair, Fortune admits that the "Number One" may end up being "one of those three or four good pieces in the 40 years or so you're allowed to work."

**Gord Peteran**—Two major influences have fed the work of Gord Peteran, a craftsman who is coming to be known for his unique and often eccentric mix of traditional and avant-garde values. Certainly formative was the time Peteran spent in the late 1970s as a student at Toronto's well-known Ontario College of Art (OCA), graduating in 1979. His interest in two-dimensional work persists: "Every summer I do 50 or 100 oil paintings," says the 32-year-old Toronto-born artist and full-time furnituremaker. In the years before and after art school, Peteran worked as a rebuilder and refinisher of antique furniture, an occupation that provided a second, balancing influence. "I really loved what the small-town craftsman was producing," says Peteran, "and his interpretation of these overcelebrated European styles coming into our country."

In the nine years Peteran has been designing and making residential furniture (full-time for the past three years), his former work of buying, selling and restoring antiques has continued to provide creative energy. "I feel I'm constructing the furniture that I wish I had found, or that I wish had been made," he says.

If the world of antiques added to his stylistic and technical vocabulary, art college promoted the artistic urge to rediscover the familiar, to make and see things afresh. The two together make Peteran's current work perform an important function: "to seduce the viewer into a more private and prolonged investigation." Indeed, a closer look always brings surprises: carefully mapped mock-graffiti enlivening the surfaces of an otherwise crisp, clean dresser; the usurping visual interest offered by the pattern of ebony pull knobs dotting the white face of a 20-drawer dresser; the satire on proportions in a tall secretary/cabinet with exaggerated, top-heavy crown molding and spindle legs. "I like to think," says Peteran, touching on the appeal of his best work, "that there's a secret each piece might reveal if it were closely examined." However hard defining that appeal may be, its presence animates pieces in which Peteran is experimenting with both form and woodworking technique. His "Box Chair," for example, was designed to exploit inexpensive quarter-cut oak boards—the waste from veneer mills—which form the vertical-grain sides of a box-storage seat that is trapezoidal in plan, a shape playfully suggesting a rectangle in distorted perspective. The resulting chair, for all its oddness, is enchantingly droll, a quality that in fact is rarely absent from a conversation with its maker.

**The Design Cooperative**—In Toronto, as in other cities, the escalating price of industrial space and equipment has led a number of craftsmen to share tools and facilities in a woodworking cooperative. Currently perhaps the best-known such venture in Toronto is The Design Cooperative, organized in 1983 and occupying 2,700 sq. ft. in an older downtown industrial building. It consists of woodworkers Joel Robson, Peter Fleming, John Ireland and Robert Diemert, as well as silk-screen artists Ingrid Bachmann and Gitte Hansen and weaver Barbara Walker. All four woodworkers are graduates of SOCAD.

**Joel Robson**—Joel Robson is a tall, enthusiastic and warmly engaging woodworker, who at age 36, happens to be the oldest of the quartet making up The Design Co-op. Like his partners, Robson is articulate about both his current work and his earlier formative influences. Born in Toronto in 1952, he expanded his sense of the world and its man-made forms after high school through a year of travel in southern Europe and Israel in 1970. He

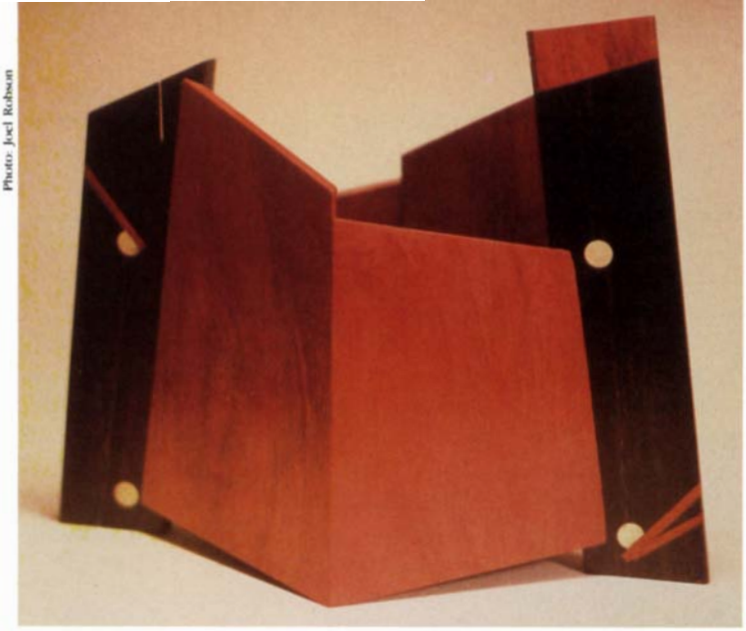


Photo: Joel Robson

***Joel Robson** enjoys building geometric containers with mixed exotic woods. This container measures 11x6x4 in.*

later came to wood as a building material during seven years as a carpenter in Vancouver. Wood, however, has not beenhis only medium. "I did clay before I did wood," he explains, "and I was doing shapes in clay very similar to these tapering forms in wood."

After a year of ceramics at a Vancouver college, Robson moved to Toronto in 1980, spent three years at Sheridan College, then became part of The Design Co-op.

"I try to bring the immediacy of drawing to the work," says Robson. To do this, he has developed a number of expressive techniques: dyeing the wood, then scraping away portions of the surface color; creating linear dyeing by wrapping forms with steel wire that reacts with the material's tannic acid; and using tools ranging from a Dremel grinder to a circular saw for gouging and marking.

Besides a series of popular lamps, Robson does a certain amount of routine casework. He enjoys making tables and bold geometric containers from mixed exotics as well as from his favorite wood: maple, about which he quips, "It's a tractor or a Rolls; it just depends on what you want from it."

Robson's success comes from pursuing a private vision without snubbing the rules of the larger craft game. "I don't like being part of the trend," he declares. At the same time, Robson freely admits he keeps a list of all the jurors who see his work, for his promotional mailing list.

**Peter Fleming**—Pushing back his dark hair, which constantly threatens to blinker his right eye, furniture designer and maker Peter Fleming talks to visitors with the same playful energy and epigrammatic flair he embodies in his work. "I'm interested in jogging people's minds," admits the 28-year-old Design Co-op member, "but I wouldn't consider it down on a guerrilla level."

Guerrilla or not, Fleming is in the business of artistically subverting many of our routine expectations about furniture, especially containers, tables and desks.

Engaging in what often appears as a tongue-in-cheek rebellion, Fleming has developed a reputation for his capacity to surprise. A number of his containers and cabinets, for example, have been based on the inverted pyramid—oblique lines and tapering forms in perpetual joust with the expected vertical. Multiple slanting legs give a coffee table the look of a tipsy centipede; childlike, multicolored epoxy inlay squiggles animate an otherwise demure side table. "I do a lot of longhand letter writing," adds Fleming, "so I'm interested in writing desks from an archaic viewpoint." A recent drop-leaf secretary desk mixing dark and light hardwoods dominates the room like a compacted cloud form supported on three cylinders clad in green, patinated copper.

Fleming knows well that the liberties he takes with form demand flawless technical execution. "I work in a very precise way—you have to if you want to pull off pieces that would be of extremely dubious merit if they were badly made," he says. Fleming's two most important power tools are the biscuit joiner and the router. Besides using solid hardwoods and veneers for his domestic commissioned pieces, he enjoys incorporating other materials—copper, leather, slate and colored epoxy. There's a protean imagination at work here, drawing in a coy and mischievous way on everything from remembered childhood storybooks to a fascination with medieval illuminated manuscripts. And while his pieces function to delight and serve his clients' needs, they also inhabit what their maker calls "the imagination of a world that doesn't actually exist."

"I'm making furniture for a world that's a purely imaginative construct. It's like developing a stage set," says Fleming with characteristic provocation, "for something that is going to happen."

***Peter Fleming** gives his centipede table a slightly tipsy look by adding multiple slanting legs. The red oak and ebony piece is 15¾ in. high, 13¾ in. wide and 41½ in. deep.*

**John Ireland**—Tool choices often reveal the craftsman, and in the case of Design Co-op member John Ireland, the tool with the most to say is his turn-of-the-century, 7-ft.-bed, 14-in.-swing, belt-drive machine lathe. His lathe and collection of old Stanley planes are just a couple of the things that keep Ireland in touch with the design richness of history. "My idea of what I'm comfortable with in terms of technology stops around 1920," says the 31-year-old maker, who attributes the presence of turnings in much of his recent furniture to his love for the old lathe.

With a painter/sculptor father and an architect brother, Ireland developed his artistic talents early and has been reading about art

Photo: Jack Ramsdale

history since he was a child growing up in Toronto. After Ireland quit high school, he did renovation work for a few years, then gravitated to fine carpentry and cabinetwork, finally enrolling at Sheridan College to develop his design skills and confirm his enjoyment of the particular scale represented by the objects we call furniture.

"I'm interested in the way that shapes can provoke feelings in you," says Ireland, who talks easily about the French Empire, baroque, Greek and Egyptian influences in some of his work. "I don't like a lot of modern stuff—the boring, brutalist geometry that really has very little feeling in it. 'Postmodern' is a word I tend not to use—it always reads wrong." In spite of such disclaimers, Ireland's work—mostly tables, chairs and cabinets—is identifiably and sometimes startlingly contemporary, with its visible through-dowel joints and provocative shape combinations of contrasting wood species in both veneer and solid stock.

Ireland's feeling for architecture gives him a penchant for site-specific pieces that may, for example, help modulate between different levels of privacy as one moves through a house. On a recent front-hall table, the support leg nearest the front door is a formal, square-section pillar, while the far end consists of a softer series of turned spindles. "I really like working with something asymmetrical," says Ireland. "Normally you design half a piece and put it against a mirror and it repeats itself. With an asymmetrical piece, you can't stop thinking when you're designing. You can't go on automatic pilot."

**Robert Diemert**—"My background," says 35-year-old Robert Diemert, "was a very traditional one." Indeed, of the four member furnituremakers, Diemert brought to Toronto's Design Co-op studio the most lengthy formal training. He apprenticed for four years in the late 1970s in the Ontario shop of a European-trained cabinetmaker, then took evening courses in carving before entering the three-year Sheridan College furniture program in 1980. He has also been among the lucky few to spend time working for industrial designer Paul Epp, and on a contract basis, in the studios of the well-known Toronto designers/makers

Photo: Jeremy Jones

***John Ireland** loves the lathe, and it shows in his furniture. This table's top and base are bird's-eye maple connected by turned purpleheart supports and a Macassar ebony end post.*

Photo: Kaya

***Robert Diemert** designed this console table to echo stepped-ceiling cornices using Australian lacewood, padauk, east Indian rosewood and Persian red travertine.*

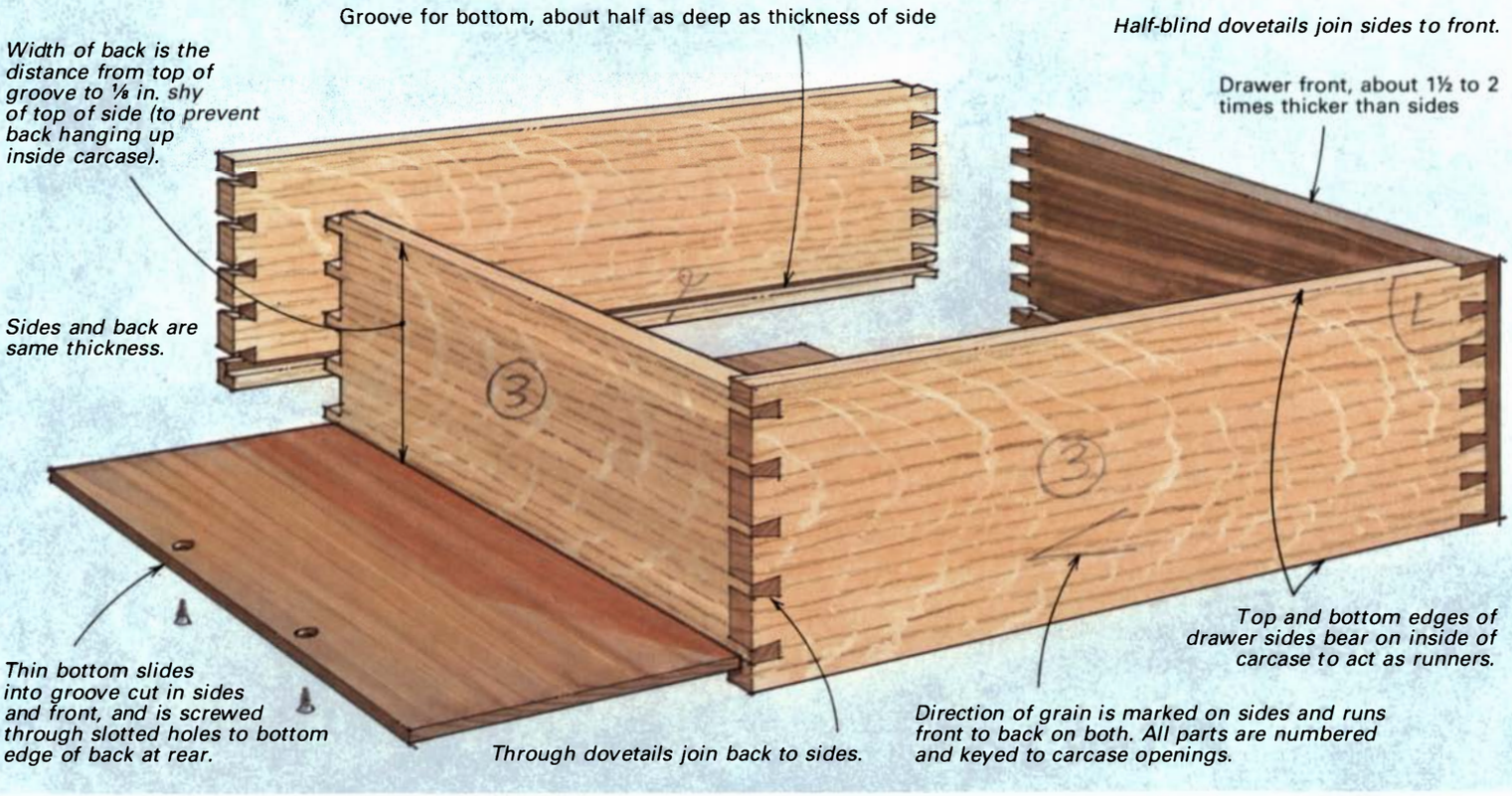
Stephen Harris and Michael Fortune.

Diemert's training has equipped him well for his current mix of commercial and residential commissions and speculative work. "I'm still learning design and how to use it in the compromise situation with a client and a commission," says the soft-spoken maker. "I find it interesting to solve other people's problems and bring a little of what I've got to it." For all his modesty and pliability, Diemert brings a *lot* of what he's got to his work, with solid technique supporting an adventurous design sense. Last year, he spent a month in discussions with a Bell Canada staff architect over designs for tables that would successfully echo the stepped-ceiling cornices of the office space. A resulting console table has a lacewood top resting on sets of padauk end pillars that enclose a rosewood vertical open-lattice grid. Captured in the center of the grid is a slab of Persian red travertine stone.

"I don't make art furniture," insists the craftsman, adding that "for me, furniture is first of all functional: It has to serve its purpose." As if in response, the artist in Diemert replies: "What I would strive for in all the pieces I do is an elegance of some sort. It's not always easy to obtain." □

*Tom Hurley is a writer living in Toronto. Donald McKinley's work was featured in* FWW *#31, pp. 50-55.*

**Fig. 1: Anatomy of a dovetailed drawer**




# Multiple-Drawer Construction

## *Pretrimming the parts makes for a piston-like fit*

by Alan Peters

One disadvantage of building one-of-a-kind furniture or cabinetry is that you must constantly break new ground and develop construction methods for each and every part. This can be an exhilarating challenge, but it's very time-consuming, because you can seldom set up predictable, time-saving procedures for repetitive operations.

No matter how unique the piece though, you can always save time on a dresser or desk by employing a standardized drawer-production routine. This isn't to imply you must compromise on the quality of materials or joinery; in fact, I make drawers for most of my case pieces from solid wood and dovetail all four corners. I do this efficiently by following a systematic method for choosing drawer materials, marking, cutting and assembling the drawers into the completed carcase. The result is a simple, solid drawer with a piston fit—my shop's trademark. In this article, I'll describe how I built the drawers on the chest shown in the top photo on the facing page, but you can apply the method to most wooden drawers.

**Design**—My basic drawers have a front, back and two sides, all dovetailed together. The drawer bottom slides into a groove dadoed into the sides and front and is slot-screwed to the bottom edge of the back. The drawer slides in and out of a carcase that contains the drawer and also guides its movement. With this simple arrangement, you save time by not adding separate guides on the drawer sides or installing and aligning runners inside the carcase. The disadvantage is that both the carcase and the drawers must be made and fitted accurately for the drawer to slide smoothly, and these drawers are susceptible to binding or rattling if they expand or shrink.

Despite its simplicity, my system offers several design variables that can alter the appearance of a drawered carcase piece considerably. I often make my drawer fronts to fit flush with the carcase front. Alternatively, overlay fronts create a clean look, because very little carcase shows. But, they're more trouble to fit than flush fronts: In addition to fitting the drawers, you must trim the

overlays so the gaps between adjacent fronts are even and equal. It's possible with either flush or overlay fronts to make an entire bank of drawers from matching boards or veneer leaves, thus creating an uninterrupted flow of grain across the front of the case piece that is visually striking.

Handles and pulls offer another design option. Applied handles, such as knobs or wire pulls, are the easiest to fit, but if they're not chosen carefully, they can look stuck on and can spoil a front's clean appearance. To avoid this, I often incorporate a wooden pull or hidden finger recess as part of the drawer front itself. This may take more time, but it's a detail that adds character to a piece. One option, as shown in the bottom photo at right, is to rout a cove with a core-box bit, then attach a short section of dowel made from a contrasting wood for the pull. Also, the fronts on this drawer are joined to their sides with through dovetails, and the exposed joinery provides another visual detail.

To give more visual interest to the walnut case piece, shown in the top photo at right, I started with regular flush-front drawers, but added a twist: I carved out curved hollows in the frame members beneath the drawer fronts. This lends an otherwise straightforward piece a curvaceous look, and the 1-in.-deep hollows provide access to finger pulls on the drawer bottoms. This does require the face frame's rails to be wider than otherwise necessary—a disadvantage if you want to get maximum drawer space in minimum carcase height.

**Drawer materials**—The first step toward building a solid, stable drawer is to choose the right materials. Drawer sides should only be cut from top-quality, mild-grain and preferably quartersawn timber. It's good to use lumber that planes easily and shows minimum movement or warping over time. My favorites are Honduras mahogany and quartered English oak. I like my drawer sides to contrast the fronts, so I usually use mahogany with light-color drawer fronts, such as ash or sycamore, and oak with rosewood or walnut fronts. From time to time, I've also used teak for drawer sides because of its excellent wearing properties. Wavy-grain sycamore can be nice on special cabinets where the visual quality of the sides is important, but the wood's interlocking grain planes poorly, and this can cause problems in drawer fitting.

I usually make my drawer fronts from the same wood as the carcase, and I save the highly figured sections for these most-visible parts. To make a stable front out of a wild-grain board, I may cut ⅛-in.-thick veneers and glue them to both sides of a mild-grain board of the same species. I also use this method to create grain patterns on drawer fronts, such as a book-match between adjacent fronts, or when I don't have enough figured solid wood to cover the drawer fronts for an entire piece.

For consistency of movement and sheer convenience, I use the same timber for the backs as for the sides, machined to the same thickness. Wherever possible, I use the offcuts after having cut out the sides. For drawer bottoms, I almost always use solid cedar. I love the smell, and so do my clients, but happily the moths and worms do not. If I need to make extremely thin bottoms to get the maximum depth inside a drawer, I use thin plywood, such as ⅛-in. Baltic birch, and then veneer it on both sides with cedar.

All drawer stock must be thoroughly dry and allowed to stabilize in your workshop. Sticker the planed boards in the warmest part of the shop for weeks, if possible. Allow the air to circulate around each board. If your shop is not heated or as dry as it should be, bring the boards into the house. The relevance of this advice depends on the climate where you live and the destination of the furniture piece. I live in one of the wettest parts of Britain, where central heating is needed more than half the year.

***Although the author's walnut chest of drawers, above, has 19 dovetail drawers, his organized system of marking, cutting, assembling and fitting results in drawers with a piston fit. The piece has a frame-and-panel carcase and bent-laminate drawer fronts that provide a built-in pull underneath.***

***To achieve a pull that's integrated with the design of the drawer front, the author routs a cove in each front, then attaches a short section of dowel made from a contrasting wood for the pull. The through dovetails on the fronts provide another visual detail.***

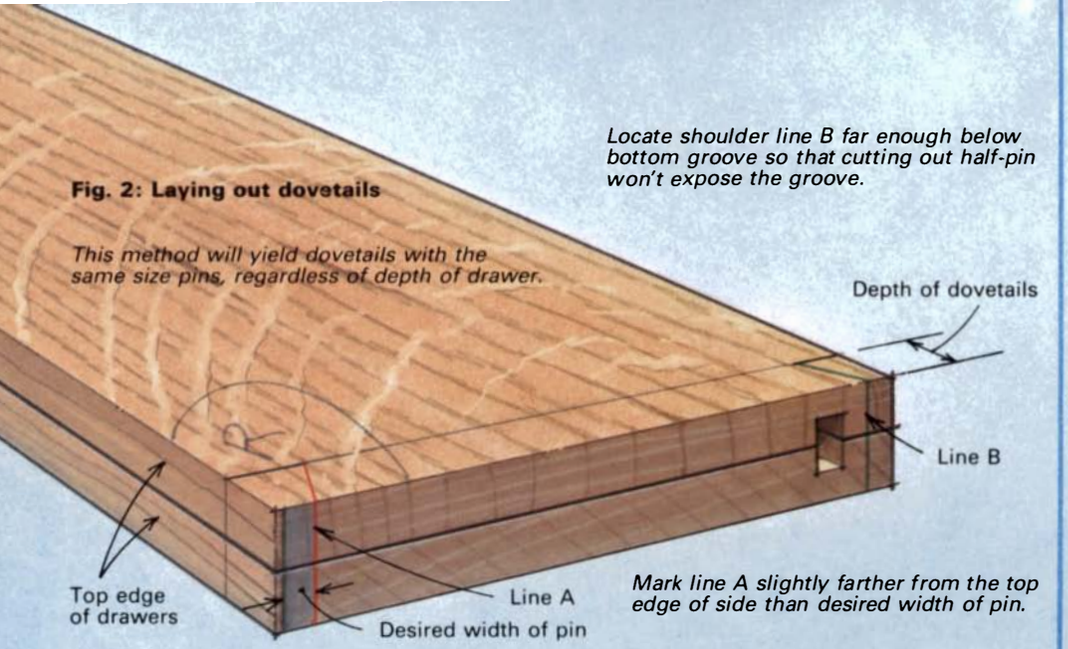
Shipping a drawered chest to a drier climate can cause even well-fit drawers to rattle, so I always take the precaution of buying my drawer stock thoroughly dry and keeping it that way.

**Construction**—Whether I'm building five drawers or 50, I group all my cutting, assembling and fitting work together so I complete each step on all the drawers before moving on. This exploits the fact that the more you repeat a process, the faster and more skillful you become.

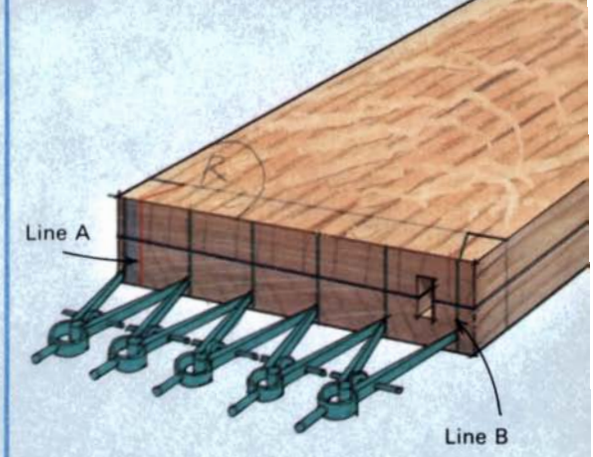
Before cutting out the parts for flush-fitting drawers, I go through the stickered boards and set aside any severly warped pieces. I then joint one edge of each board and rip the boards to width. I determine the widths by measuring the height of the openings on the carcase, then rip all the sides and fronts 1/16 in. wider so there's extra to be trimmed later. The backs are cut as wide as the sides minus the distance from the bottom of the side to the top of the groove to be dadoed for the drawer bottom and an extra ⅛ in. for carcase clearance (see figure 1 on facing page).

I cut all the drawer parts to length on the tablesaw using a crosscut carriage and length stop, but you can use a radial saw or miter box as well. Next, I number each set of drawer parts, keying them to a particular opening in the carcase. I do this even if the drawers are all the same size, because there are inevitably small discrepancies in the carcase. I then pair up the sets of draw-

Drawings: Joel Katzowitz; photos this page: Alan Peters; other photos: Paul Bertorelli




**Step 1:** *Lay a matching pair of drawer sides on top of one another with inside surfaces touching. On the endgrain, mark the position of the half-pins (lines A and B) with a pencil and square.*




**Step 2:** *Set a pair of dividers to the estimated width of one tail plus the desired width of one pin. Place one point of the dividers on line B. Walk the dividers across the width of the side, and by trial and error, reset the dividers until the point reaches one pin width beyond line A. Mark square lines from these divider points, except the point that fell beyond line A.*

***Using a plywood box as a demonstration carcase, the author shows students attending a seminar he taught at Anderson Ranch in Colorado how to fit and pretrim the sides of a drawer before assembly. This method makes it easier to achieve a close fit between drawer and carcase, and it minimizes the trimming required after the drawer is assembled.***

er sides and mark rights and lefts, indicating the grain direction on each. I try to align the grain of the sides so I'll be planing with the grain, front to back, when fitting the completed drawers later.

**Carcase construction**—Whether you use a slab or frame-and-panel construction, a smoothly operating drawer is as dependent on a solid, square carcase as it is on good drawer construction. Build and finish the carcase before you start the drawers. During the final assembly, make sure the carcase sides and dividers are flat and free from wind, and all parts are square and true to one another. Equally important, the drawer openings should never be smaller at the rear than at the front, but preferably a fraction larger so the drawers won't bind at the rear.

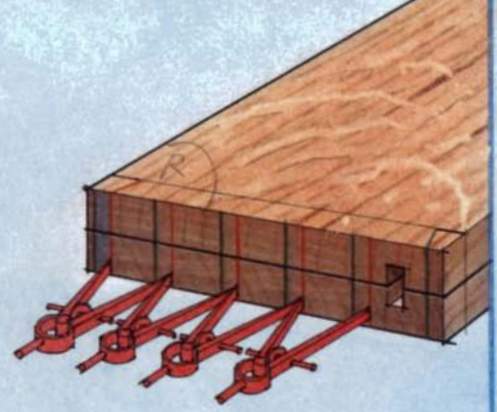
After you've glued up the carcase and removed the clamps, allow the piece to settle for awhile, preferably a few weeks. This is especially important with a solid-wood piece, because the tension and moisture that can build up in a board during glue-up may distort the case later on and ruin a close drawer-to-carcase fit.

Before making the drawers, it's prudent to check each drawer opening with a straightedge: Lay it inside the drawer aperture, both vertically and horizontally, and remove any humps or dips in the frame around the opening with a shoulder or chisel plane. Leave the back of the carcase off, if possible, until after the drawers have been fit. Once the carcase's outside has been finished, wax all the inner surfaces that the drawer will contact.

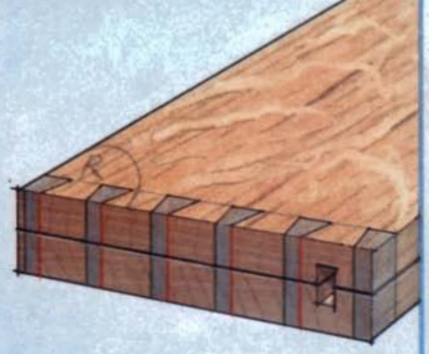
**Prefitting**—The next step may seem unorthodox, but it will save you a lot of trouble getting a good drawer-to-carcase fit. Before cutting the corner joints and assembling the drawers, prefit each drawer piece into its respective carcase opening. Using a bench vise and a jack plane, trim each side down until it slides smoothly in and out of the carcase, as shown in the photo at left. After all the sides are done, prefit all the drawer backs, trimming both edges and ends until each back slips snugly into the carcase opening. When you trim, forget your try square and ruler: Hold the back up to the opening, reach in from the open back to mark where it is proud and plane that edge to fit. Prefit the drawer front using the already-trimmed back as a template to mark where it needs trimming. Then, trial-fit each front into its opening and make it a tight fit so it enters only about ¼ in. for final fitting after assembly. Once all the drawer parts have been prefit, plow the groove for the drawer bottom on the insides of the fronts and sides with a straight bit and router or with a dado blade and tablesaw. The groove width should allow a snug fit of the drawer bottom, and groove depth should be half the drawer side thickness.

**Dovetailed corners**—Dovetailing all four corners of a large batch of drawers can seem an endless task, but once again, an orderly approach speeds things up. Laying out the dovetails can be particularly tedious if you have lots of different drawer depths and need to figure out many different pin-and-tail spacings. My layout method, illustrated in figure 2 above, only requires you to pick a desired pin thickness and then follow a step-by-step procedure. If you mark the half-pin lines the same on all the drawer sides and keep the same desired pin thickness, this method will produce evenly spaced dovetails, regardless of the width of the drawer side. Mark out and cut the tails on the drawer sides, a pair at a time, until all the sides are done. Next, scribe the pins on the fronts and backs directly from the tails. I usually cut the pins for a half-blind dovetail on the drawer fronts so the joints won't show on the front of the case, and cut through dovetails on the backs. It's more efficient to cut and chisel the waste from each row of pins immediately after marking. If you could do with a refresher on the finer points of dovetailing, see *FWW* #57, p. 52.

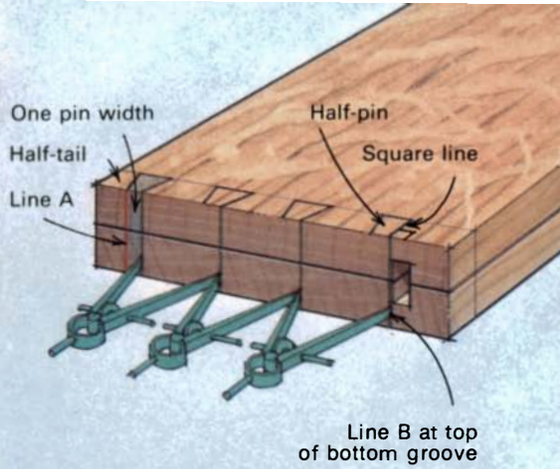
Test-assemble all the drawers, but don't knock the dovetails together all the way, just ⅛ in. or so. Clean up any fitting prob-



**Step 3:** *Keeping the same divider setting, plant a point on line A and walk the dividers back across the end of the drawer sides. These points mark the other side of each pin at the desired width.*



**Step 4:** *Using the pin lines as a guide, mark and cut out the pin waste. Using the same divider setting and line A and B positions, repeat the process to lay out the front dovetails on drawer sides of the same width.*




**Step 5:** *To lay out the back dovetails on the sides, mark line B at the top of the bottom groove and mark line A to reference half-tail at top. Starting with dividers on line B, set dividers to walk down and end up one pin thickness shy of line A. Mark one side of pins, then place dividers on line A and walk down to mark other side of pins. Cut out pin waste.*

lems with a chisel, and then sand and wax all interior surfaces of the drawer parts. When you're ready to glue up the drawers, coat the joints adequately but sparingly so you won't have to do a lot of cleanup inside the drawers later. Clamps should never be used when gluing dovetail drawers, because they can introduce distortion that will appear only after the clamps are removed. Simply drive the dovetails together with a hammer and hardwood block. With the drawer assembled, minus the bottom, test for wind by sighting across a pair of winding sticks layed on top of the drawer. Also check for square by measuring the drawer diagonally. The two diagonals should be the same; if not, clamp the drawer diagonally until it is square. Set the drawer aside on a flat surface until the glue sets, preferably overnight.

**Final fitting**—If the prefitting is done properly, the final trimming of the bottomless drawers is a breeze. You should only have to plane the dovetails true and flush on each drawer down to the pins and remove any sharp edges and corners. As you slide each drawer in and out of its opening, the wax you applied to the inside of the carcase earlier should mark the drawer enough to reveal the high spots to be planed and sanded. Carefully plane the drawer sides and bottom edges until the drawer slides smoothly, but not so much that it rattles in the carcase. Plane the sides with the grain from front to back, as previously discussed. To support the drawer while planing the sides, take a thick piece of scrap plywood as wide as the inner width of the drawer, secure it to the bench and slide the bottomless drawer over it, as shown in the photo at right. Final trimming is not a job you should rush: Work with care and patience so the shavings only come off where required. When the drawers all slide like silk, sand and wax the drawer sides and all running edges.

The drawer bottoms can be made at any stage, but don't install them until the drawers are assembled and fitted. If you make solid-wood bottoms, run the grain from side to side and make each bottom wide enough to be screwed to the underside of the back through slotted holes to allow for subsequent shrinkage. The bottom's length should make for a tight fit, but take care not to bulge out the sides. Sand and wax each bottom and slide it into the drawer. Make one final check to see that the drawer operates smoothly with the bottom in place, then glue the bottom at the front groove and set the screws at the back.

***Supporting a drawer while planing the sides for a final fit can be done with a piece of scrap plywood, at least 1 in. thick and as wide as the inner width of the drawer, secured to the workbench. The bottomless drawer slides over the plywood and is held securely without clamping.***

Any needed knobs or pulls can be fit after the drawer front has been sanded and finished. If your drawer-front design features built-in handles, these may need some final attention, such as rounding off any sharp edges. Also, if your carcase has built-in drawer stops, now is the time to do the last bit of trimming and fiddling so the drawer fronts will align properly. □

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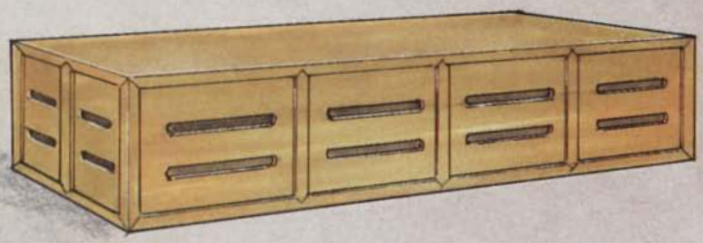
*Alan Peters is a British furnituremaker and operates Aller Studios in Kentisbeare, Devon, England. Peters will be offering a course in basic handworking skills the last two weeks of August 1989 at Anderson Ranch, Snowmass Village, Colo. For more information, call (303) 923-3181.*

**Fig. 1: Gustav Ecke's theory of the evolution of the box pattern**



A. 1000 B.C.–mitered frame-and-panel sides

B. 9th Century A.D.–ornamental cut-out in panels

***This rosewood table, left, built by the author, possesses the simplicity of form and understated decoration characteristic of Chineses domestic furniture. Not modeled after any one piece, this walnut bench, below left, demonstrates elements common to the post-and-rail method of construction, such as the apron that extends part way down the legs and the curved pieces on the ends of the top, known as 'bird's tails.'***

# Learning from the Chinese

## *Decorative elements adapted to contemporary furniture*

by Allan Smith

C. 13th and 14th Century A.D.–
*Bottom frame members of side panel disappear, and vertical frame members end in foot-like projections, but outer edges are still straight.*

D. 15th Century A.D.–*Legs are one solid-shaped piece, curved on outside. Bottom frame is still in use.*

When I started designing furniture about 15 years ago, my plan was to make pieces of simple form, using oil-finished hardwoods to achieve a "natural" look. I rejected ornamentation such as carving, inlay and applied moldings. The beauty of the wood itself would be the main attraction. The result was austere but serviceable furniture, which I liked at first but eventually became bored with. The need to put more life into my designs sent me to the library on a quest for inspiration, where I discovered some masters of simplicity, including the Shakers, Gustav Stickley, Edward Barnsley and James Krenov. But when I came across *Chinese Domestic Furniture* by Gustav Ecke in the shop where I worked, I knew I'd found what I had been looking for: furniture of simple but highly refined form, beautifully proportioned, light, graceful and strong, enlivened by subtle shaping and unpretentious decoration.

Nowhere in *Chinese Domestic Furniture* is there any mention of the individual designers or makers of this exquisite furniture. The written records of China contain very little documentation of furniture or its makers. Some authorities infer from this that woodworking was held in low esteem compared to pottery or bronze work, even during the Ming period (A.D. 1368 to 1644), when much of the best furniture was built. It seems that furniture-makers were considered "tradesmen" rather than "artists," in spite of their high level of skill. For the past several centuries, Chinese furniture has been collected and analyzed chiefly by Westerners.

European appreciation of Chinese furniture began in the 18th century and was at first focused on the highly decorated furniture of the Chinese aristocracy. Although in form it often resembled more modest Chinese furniture, it was usually covered with colored lacquer, extensive carving or both. Only recently, as more austere furniture has become fashionable in the West, has the undecorated hardwood furniture of China become known here. This furniture, known as "Chinese domestic," demonstrates Chinese furniture design in its purest form and is now widely considered to be the highest achievement of their woodworking tradition. It was intended for the private households of the middle class, a relatively small group made up of merchants, scholars, artists and civil servants. It is distinguished from other Chinese furniture by the use of hardwoods of exceptional quality, finished with thin coats of clear resin and wax and brought to a high polish, but without other surface adornment, such as carving, inlay or painting.

It is not surprising that a simple, natural style of furniture with restrained decoration evolved where materials of exceptional quality were available. The tropical forests of Southeast Asia supplied Chinese furnituremakers with some of the world's most spectacular woods, including several species of rosewood (*Dalbergia*) and padauk (*Pterocarpus*), which are known for their rich colors and strong, often irregular figure. The peak of development in Chinese furniture design was reached at the time when the quality of lumber available to Chinese woodworkers was at its highest. As trade with the West increased and supplies of the best wood dwindled, a decline began to set in.

**Traditional construction**–Our knowledge of Chinese furniture is based on a relatively small collection of pieces that survive to the present day and on a few drawings and paintings depicting the furniture, so it is difficult to trace its historical development in detail. However, all the evidence we have points to a remarkably unbroken tradition in which a few enduring forms and decorative elements have been repeated for thousands of years.

This stylistic consistency is partially due to the limited, although highly developed range of techniques employed by Chinese woodworkers. Their method of furniture construction can be summarized in a few simple rules. First, panels must "float" in a frame to accommodate the wood's seasonal movements. The typical panel was planed very thin, fitted into grooves in a frame and braced with battens fitted into dovetailed housings in the back of the panel. Second, corners are mitered where any two furniture parts meet in the same plane. Thus, the mitered frame with floating panel is a fundamental building unit of Chinese furniture. Third, furniture is assembled with locking joints, which allow wood parts to move without cracking and permit disassembly for moving or storage. The basic joint was the mortise and tenon, with locking pins only where necessary. There was little, if any, use of veneer, lamination or any other technique requiring glue. Following these rules was, in part, a practical necessity in a place where changes in the weather could be severe, high-quality glues were not available and furniture was expected to last for generations. This limited range of techniques forced the creativity of Chinese furnituremakers into narrow channels. But the designs that ultimately emerged are renowned for their harmony of structure, line and detail.

**Elements of design**–In both furniture and room design, great stress is placed on balance and symmetry. Major furniture pieces stand alone, centered along a wall, or they are placed in pairs, two identical or complementary pieces side by side. The structure of most furniture conforms to one of a small number of basic patterns. Chests, benches and tables conform to either the "box" pattern or the "post-and-rail" pattern.

**Box pattern**–The low table pictured on the facing page shows the final evolution of the box pattern. According to a theory first presented by Gustav Ecke in the 1944 edition of *Chinese Domestic Furniture,* this pattern originally consisted of a low box or platform with mitered frame-and-panel sides. Figure 1 details how this "box" was modified over the centuries. In later pieces, legs made of one solid, shaped piece replaced the two frame members joined at the corner. After the bottom frame disappeared alto-

Drawings: Kathleen Creston

Photo: Allan Smith

***The mitered panel doors and the profile of the top edge give this ash buffet an Oriental flavor, even though the construction methods are those of modern plywood cabinets.***

gether, the legs of all but the lowest tables were strengthened with connecting rails. Finally, the outside edges of the legs were made to follow the curves of the inside edges, resulting in the mature design shown. With the use of solid legs came one of the most influential features of Chinese furniture: the "horse-hoof" foot. European designers borrowed this detail, usually turning the foot outward and using it as the termination of a cabriole leg. Both orientations of the foot, inward and outward, are present in Chinese furniture.

**Post-and-rail pattern**—The bench shown on p. 52 exemplifies the post-and-rail pattern, which is familiar from Oriental temple gateways. This pattern's primary unit is a "rack" consisting of two upright posts (legs), often set at a splay, connected by a rail or rails and supporting a "yoke," which in this piece is the bench-top. Often an apron was run under the top and down the posts to strengthen the connection between these components on chests, tables and chairs. The curved pieces at either end of the top, known as "bird's tails," are a common decorative feature of post-and-rail tables. Tall chests were constructed from a pair of racks with solid panels in place of the rails, and with back, floor and doors hung between the posts. Drawers were often hung between the posts of altar tables.

**Decoration**—I think the most appealing aspect of Chinese domestic furniture is its harmony of structure and decoration. The Chinese used decoration to clarify structure and to make structural elements perform a decorative function. This can best be understood by distinguishing three broad types of furniture decoration: Formal decoration consists of the overall shape and proportions of a piece of furniture. Form is usually distinguished from decoration, but forms themselves can be decorative, especially when they depart from the conventional. Consider, for example, the bold curves of bentwood furniture, the exaggerated height of Art-Nouveau chair backs or the flowing "organic" shapes of stack-laminated furniture. Surface decoration includes anything that is seen or felt on the surface of a piece but makes little or no contribution to its form, such as inlay, painting or shallow carving. Structural decoration includes brackets, rails, latticework and moldings, which contribute to the strength of a piece without greatly modifying its form.

The forms of Chinese furniture are simple and fairly standardized, often falling back on the box or post-and-rail patterns. At the same time, the proportions of pieces are varied freely according to practical requirements. Tall chests, for example, come in many sizes, some with upper and lower levels, open shelves or drawers. Tables come in an even larger variety of sizes, with a variety of aprons, rails and brackets. The chairs have rectangular seats and straight, sometimes slightly angled legs, with gracefully curving backs and arms. Although the proportions always seem to be carefully planned, I don't know of any formula governing them. Symmetry, however, is nearly always maintained. Any asymmetrical piece is normally accompanied by a mating piece of complementary asymmetry.

Surface decoration is minimal, limited to a little bit of carving or decorative hardware and the wood's rich color and figure. There is never any attempt to conceal the structure behind paint, veneer or carving. However, the construction method is not always clear. Through tenons, dovetails and locking pins are often apparent on early pieces, but concealed joints later became the norm.

Chinese domestic furniture excels in its structural decoration. Aprons, braces, brackets and rails are treated as opportunities for decoration. They are gracefully, sometimes even whimsically shaped, becoming the primary adornments of otherwise austere pieces. The subtle use of decoration that clarifies or emphasizes structure can be seen in the table on p. 52. The bead around the insides of the legs and apron helps define the leg-apron structure as a unit supporting the top. The transition between this supporting structure and the top is defined by the groove around the top of the aprons. The 45° jog in the otherwise straight line of the rails connecting the legs brings these rails into harmony with the other elements of the piece, each of which ends in a 45° miter. Even the horse-hoof foot ends in a vestigal miter where it would join the no-longer-existing bottom frame member.

The approach to design in Chinese domestic furniture can be summarized as follows: Take a traditional form and adapt it to the specific practical needs of the user, for example, for storage or for use in a particular setting; adjust the proportions of the piece to form a harmonious whole; select elements of structural decoration, such as brackets, moldings and aprons, from the traditional design vocabulary and adapt them to the proportions of the piece; and then shape them inventively within the canons of Chinese taste. Finally, add a small amount of surface decoration, such as the convex or concave rounding of surfaces, small carvings or hardware.

The buffet or sideboard pictured above, at left, shows my use of this approach in a piece designed for a light, airy modern interior. I used mitered panels for the top and the doors, together with the indented waist separating the top from the case, to create a distinctly Oriental feeling. The miters add a note of contrast to the rectangular facade of the cabinet and complement the angled edge of the top as well. There is much about this piece that lies outside the Chinese tradition: the recessed plinth, the overlay doors with wooden pulls and the blond wood (ash) with a white Formica top panel. However, I think a little of the Chinese domestic spirit still lives in it, in virtue of its symmetry, simple form and restrained decoration. □

*Allan Smith builds custom furniture in Hopewell, N.J.*

## Further Reading

*Chinese Domestic Furniture* by Gustav Ecke. Charles E. Tuttle Co. Inc., Box 410, Rutland, VT 05701-0410; 1962 (a facsimile of original 1944 edition).

*Chinese Household Furniture* by George N. Kates. Dover Publications Inc., 180 Varick St., New York, NY 10014; 1948.

*Chinese Furniture* by R. H. Ellsworth. Random House, 201 E. 50th St., New York, NY 10022; 1970.

*Chinese Furniture* by Michel Beurdeley. Kodansha International USA, Ltd., c/o Harper and Row Publishers, 10 E. 53rd St., New York, NY 10022; 1979.

# Chinese details; plate joinery

My interest in Chinese furniture is aesthetic, not antiquarian. I have not tried to reproduce Chinese originals, but to adapt Chinese design principles to my own furniture, which is built by economical modern methods. I employ plate joinery where appropriate on case pieces.

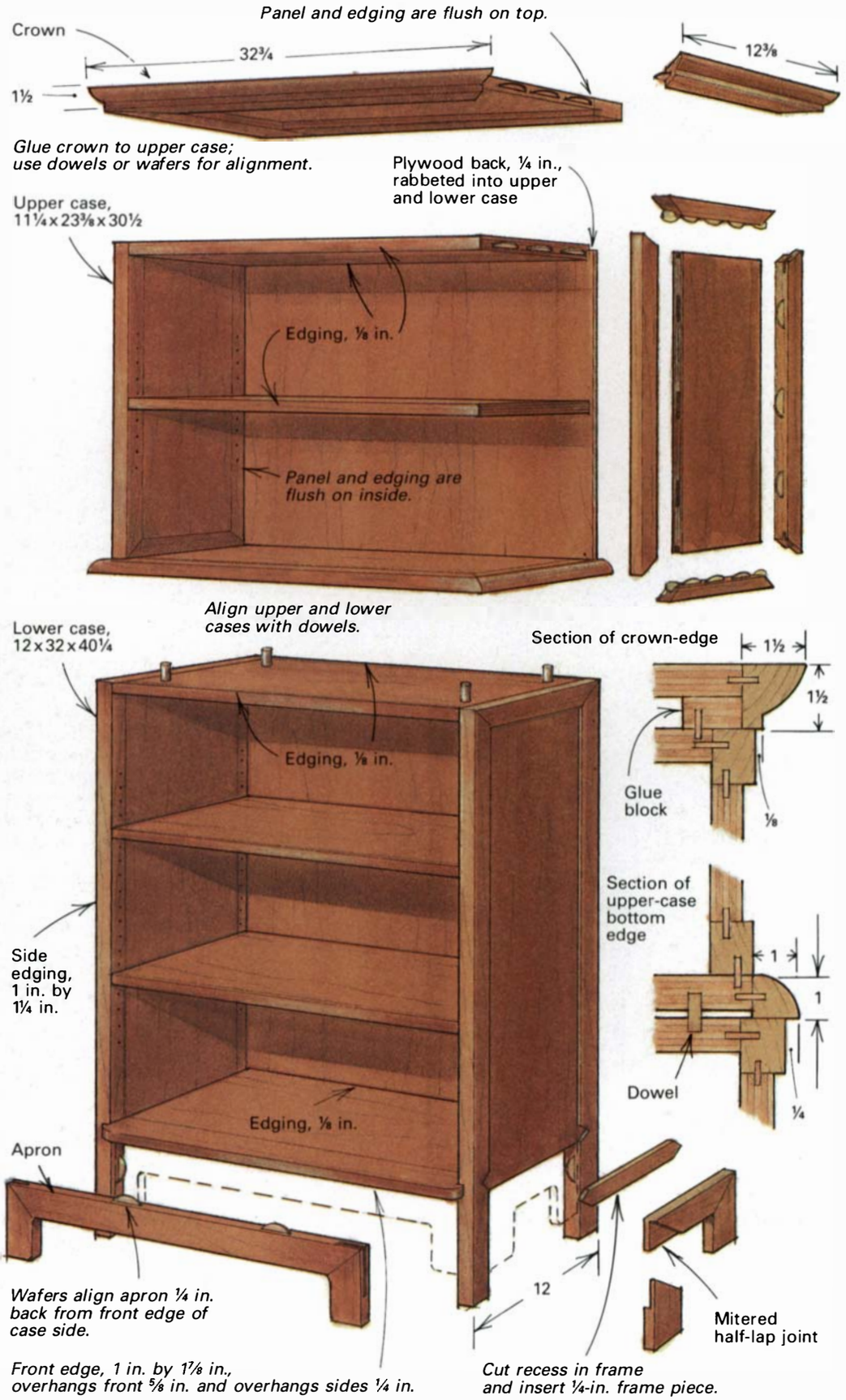
The design of this walnut bookcase is based on several Chinese two-section chests. These chests were often tapered narrower at the top than at the bottom, and the vertical frame members usually extended downward to form the legs. The originals were built entirely of solid wood with mortise-and-tenon joints. My bookcase preserves the look of these traditional pieces, with the narrower upper case and the legs formed by the vertical frame pieces, but the upper and lower sections are essentially plywood cases with solid trim. The mitered frames of the sides, which traditionally would have enclosed floating solid panels, are glued to plywood panels.

*This walnut bookcase, constructed using plate joinery, shows a simple form enriched with Chinese details: mitered side panels, overhanging crown and an apron under the bottom shelf.*

**Fig. 2: Chinese-style bookcase**

*All panels are ¾-in. plywood with solid edging.*

*Edging and panel joined with wafers–typical of all plywood components.*



# Opaque Lacquers

## *A rainbow of colors from your spray gun*

by Gregory D. Johnson

***The plywood cabinet above is the focal point in Jorge Cao's Manhattan apartment. Up to eight coats of lacquer were applied to some parts of the cabinet, and extensive masking preserved the details while it was being sprayed. Johnson uses this cabinet in describing the process in the text. The table at left was designed and built by Robert Kawalski of Worcester, Mass. Closed-grain woods, here maple, provide the smooth, flat surface needed to show off the table's high-gloss finish. Peter Dean of Charlestown, Mass., created the chair at right. Its mahogany frame was sprayed with a color lacquer that complements the upholstery.***

Photo above: Steve Turino; photo below: Dean Powell

Often the design of a furniture piece creates a framework for showing off exquisite woods and veneers in a pleasing fashion. Other times the wood's grain pattern visually pulls the contour of a piece in the wrong direction or otherwise detracts from the design. Designers frequently rely on solid colors to remove these distractions, to highlight the design and to allow the eye to travel uninterrupted over the form. The best color system I've found for this kind of work is opaque lacquer, which contains a variety of colored pigments suspended in clear lacquer. It provides great workability, produces a high-quality finish and gives the designer a palette of tones and shades that can be combined to play on the senses or act as a counterpoint to natural- or stained-wood components.

Adding color lacquers to your repertoire of finishes will provide you with the ability to create stronger contrasts and sharper lines than those possible with other finishing procedures. In this article, I'll tell you what you need to know to get started.

**Special considerations**—If you can spray clear lacquer, you already know how to work with the opaque material, so I'll concentrate here on a few new problems that usually only crop up with colors. For a refresher on basic spraying and mixing operations, see my article on clear lacquer in *FWW* #62.

When you begin working with opaque lacquer, you'll notice

that a solid color shows flaws in the surface much more readily than a clear finish. Freed from the distractions of wood grain, the eye picks up every surface flaw. Darker colors emphasize imperfections more than lighter ones. It's difficult to get and keep large horizontal surfaces like tabletops or desks level, flat and free of imperfections, particularly if the surfaces will be subject to hard use. Fortunately, many designers are aware of how difficult it is to produce perfectly flat wooden surfaces and often prefer to use glass or marble tops instead.

As a piece ages and the wood expands and contracts, the hairline cracks that may develop around joints and gluelines will be more apparent with a color finish than with a clear finish. The type of substrate is also important: It's difficult to get a level finish with open-grain woods like oak or mahogany, because the lacquer shrinks, allowing the grain pattern to show through. For some pieces though, this tendency can be used to advantage to provide a more dramatic visual appearance.

The term "building a finish" is pretty descriptive when dealing with lacquer colors. To ensure crisp lines and maximum control of color, areas to be stained or left clear need to be sealed, clear-coated and masked prior to spraying the lacquer colors. A clear finish involves a transparent sealer coat followed by several transparent topcoats. A solid-color finish starts with a gray- or white-primer surface coat and is followed by the desired color lacquer, which in turn, is top-coated with clear lacquer for added depth and durability. The white primer is especially important with bright yellows, orange and some greens, because they have limited hiding power. The clear topcoats also will change the color values slightly, and this effect varies according to whether the topcoat is matte, semigloss or gloss. Spot repairs are almost impossible to match if you run out of a custom color and have to mix more, so be sure to mix enough for the job at hand.

**Wall-mounted cabinet**—Here I'll describe how I used opaque lacquers to finish the wall-mounted cabinet shown on the facing page. It was designed by architect Jorge Cao of New York, N.Y., and was built by Steve Turino of Charlestown, R.I. This piece is a particularly good example, because it has both plain and veneered doors, several large, vertical surfaces and fine details. Because of the details and number of colors involved, masking techniques are especially important here. The cabinet's four plain doors are ¾-in. birch plywood edged with ¼-in.-thick maple. These, along with the cabinet's frame, are lacquered with a medium satin gray that I've formulated to match the wall color in the room where the piece will be installed.

The corner column on the right side of the cabinet is bird's-eye maple stained a lighter satin gray. The top of the column is a burgundy lacquer with a strip of medium gray along its top edge. From the base of the column, the bird's-eye maple continues along the bottom of the cabinet, concealing a light fixture that illuminates the space beneath the cabinet.

The two larger doors flanking the corner column are birch plywood edged and veneered with ash. The V-grooves creating the grid on each door are lacquered a darker gray. To avoid exposing rough edges of plywood when the V-grooves are cut, the plywood panels are first inlaid with a grid pattern of maple strips prior to applying the ash veneer. The inside of the cabinet is lacquered with clear semigloss. The top is a solid piece of marble double-beveled and set back ¼ in. from the edge.

**Surface preparation**—After sanding with 150-grit paper, the cabinet is scrutinized for defects such as scratches and dents. These are easily corrected at this point, so it pays to be thorough.

***Johnson uses plastic masking tape to produce sharp, clean color edges. Here he is using a single-edge razor blade to remove the tape "bridging" the V-grooves between adjacent ash door panels. After masking the middle of the panels, the door will be ready to be sprayed with primer.***

But because lacquer tends to magnify the defects, you'll initially discover some you've missed as spraying proceeds. Later, I'll tell you how these can be handled.

The cabinet's interior is finished with clear lacquer. I spray two coats of sanding sealer, dry-sanding after the second coat with 240-grit silicon carbide paper. One coat of clear gloss completes the job.

The ash-veneered panels on the doors are bleached, sanded and filled with a white-paste wood filler. After sanding again, I brush on a white glazing stain. The excess is wiped off and the stain is applied with a dry brush to form a feather pattern. I finish the panels with two coats of clear lacquer.

The bird's-eye maple column is finished using a clear oil-base stain that I tint with a little bit of artist's gray pigment. When the column is dry, I apply sanding sealer and clear-gloss coats. The interior, panels and column can now be masked in preparation for spraying of the opaque lacquer.

**Masking**—For small areas and details, masking is done with tape alone; for openings and broad areas, tape and paper do the job. For fine lines, such as along the ash panel edges in this piece, 3M plastic masking tape preserves a virtually perfect line, because it prevents the color from "bleeding" under the tape edge—a common problem with paper tapes. Use good-quality tape: The cheaper stuff has unpredictable adhesion and can be frustrating to apply.

The cabinet's interior is masked off with a piece of cardboard cut to fit the opening snugly and held in place with plastic masking tape. I use plastic masking tape to define the edges of the ash panels, carefully pressing it into position, bridging the V-grooves as I progress from panel to panel. Then, with a single-edge razor blade, I carefully slice and remove the tape bridge at each panel corner so these areas will be exposed when sprayed. The middle of each panel is covered with nonabsorbent, 3M Scotch masking paper, which is held in place with ordinary masking tape. Once the stained and lacquered maple column is completely masked off with tape and paper in the same way, I'm ready to apply the primer.

**Priming**—A nitrocellulous-lacquer gray primer is available from most lacquer manufacturers. I buy my primer from Mohawk Finishing Products or Star Chemical Co. (see sources of supply on p. 59). The gray primer acts like the sanding sealer commonly used under clear coats to seal and level the surface. The primer's high-solids content (30%) allows me to achieve a heavy build with two to four coats, and the stearate sanding additives make it easy to sand (with 220-grit paper) and level the surface without clogging the sandpaper. The primer cures enough so that it can be sanded within two to three hours of application. However, it takes weeks to reach a full cure, and a small amount of shrinkage does occur during this time. This usually isn't a problem for vertical surfaces,

Except where noted, photos: Gregory D. Johnson

***Plastic automotive putty is used to fill dents and scratches visible following the primer coat. The cured putty will be sanded level prior to spraying the color-lacquer and final clear-lacquer coats. Lacquer has the effect of emphasizing even small defects, but the putty is easy to apply and allows minor repairs to be made at any point during the process.***

but with large, flat, horizontal surfaces like tabletops, the slightest unevenness is noticeable, and the shrinkage allows the wood grain and joint seams to "telegraph" through.

I've had good luck working with alternative materials to eliminate this problem. I've tried a catalyzed polyurethane gray primer called Polane Spray fil, made by Sherwin-Williams (see sources of supply). Heat lamps and forced hot air can be used to accelerate curing the polyurethane primer and therefore shorten the time required for full shrinkage. This catalyzed primer produces a base coat with superior adhesive properties and does not chip as easily as lacquer primer. It must, however, be mixed precisely and applied within eight hours of being mixed. It is also extremely toxic, containing isocyanates, which can cause immediate lung and eye irritations, and with prolonged usage, can have serious health implications. When using it, I wear a full face mask with an air-supplied respirator. Special filters, available for cartridge-type respirators, are necessary for protection against isocyanates.

More recently, I've been experimenting with a polyester-base primer. Like the catalyzed polyurethane, high temperatures are used for curing, but there appears to be no shrinkage at all with the polyester-base primer. The same extreme care discussed above also applies in the handling and use of this material.

With all of that said, you should keep in mind that ordinary lacquer primer works fine for most solid-color jobs, and it's a lot easier to use: You only need to dilute it with lacquer thinner and you'll be ready to spray. Also, the safety and health precautions are less stringent than required when using the catalyzed materials mentioned above. However, you should work in a well-ventilated area and wear an organic respirator. For the cabinet at hand, which has no critical horizontal wood surfaces, the lacquer primer is ideal.

The primer mixture is not critical, but I normally use it diluted 50/50 with lacquer thinner. This mixture sprays well and allows a good buildup with two to four coats. Everything except the V-grooves that separate the ash panels on the doors gets sprayed. The V-grooves were primed earlier with clear sanding sealer when the panels were finished. I use a clear sanding sealer instead of the gray primer where a solid color meets the edge of natural-finish or stained wood, because later, when I remove the ridge formed where the color meets the wood, there is no danger of sanding through to the primer's different color.

Primer dries to a matte finish due to the high content of sanding additives. Even with the low sheen, I'm amazed at how effective the gray primer is in highlighting any small imperfections. After the second coat of primer has dried for an hour or so, these small trouble spots can be repaired with a red putty such as Nitro-Stan, which is available from automotive-supply stores and Standard Coating Corp. (see sources of supply). With a plastic spatula, I apply a thin layer directly on the primer. No surface preparation is required. Deep scratches or indentations must be filled several times, and longer curing time is necessary to allow for shrinkage. If the putty is sanded too soon, before shrinkage is complete, any "dinks" will show up again later. White or light-color lacquers don't cover the red putty very well; for these, I use Acryl-blue glazing putty, available from 3M (see sources of supply).

I let the putty dry for at least an hour, then I sand the entire surface with 220-grit finishing paper, being careful to make repaired areas flat and level. On large pieces like this cabinet, I use orbital sanders and sandpaper-covered blocks. At this point, the main objective is to get a perfectly level surface, so I don't worry about sanding through the primer. If it happens, I just spot-spray with additional primer and lightly resand. This is the time to try to get a perfect, defect-free surface, but I don't spend hours on it; repairs are still possible later, after the solid-color lacquer has been applied.

**Color matching and spraying**—With the surface ready for the custom-color lacquer, the often tedious and sometimes frustrating job of mixing the color to match the sample begins. It is possible to find some lacquer suppliers willing to match a color sample, usually for a minimum quantity of 1 gal. I prefer to mix it myself, because all too often the customer isn't really sure of what he or she wants. Sometimes the sample is difficult to work with: Matching or complementing a color theme in a fabric sample is demanding. I've found that the quickest and easiest way to get the job done is to charge the customer my hourly rate and have them come in while I'm mixing the color. It's surprising how quickly they are able to settle on a color.

I buy my basic solid-color lacquers in 1-gal. or 5-gal. containers. I modify these with concentrated lacquer-tinting colors—raw umber, burnt sienna, chrome yellow and lithol red—which I purchase by the quart. Lithol red is the deepest, strongest red tint I've found; I used to have trouble formulating burgundy colors until I discovered it. Earth tones—umber, sienna and chrome yellow—come in handy for the more subtle tones I can't seem to get with the basic colors alone. Because I've had a lot of experience, I'm comfortable estimating the proportions by eye, but if you're just beginning, you may want to measure the quantities carefully.

I dilute the color lacquer 50/50 with lacquer thinner, making it easier to mix and spray. It's important to check customized colors with a sample by spraying a scrap piece. I let the scrap piece dry to the touch and then hold it next to the sample. I add very small quantities of the tinting color, checking often against my sample to prevent overshooting the color. A good way to see subtle changes is to drip some lacquer on a tray, and as more tint is added, let the drippings run together. There's nothing worse than spending a lot of time on a custom color and then spoiling it, so when I'm unsure of the effect a particular tint will have, I pour a small amount of my master brew into a container and begin experimenting. When I think the color is right, I get a second opinion—the customer's. I try to closely estimate the amount of lacquer I'll need so I don't end up with a gallon or more that I'll never use. Also, I save a small amount for later reference or touch-up repairs.

I spray on at least three coats with one-hour drying time in between. I keep an eye out for any imperfections I may have missed earlier. Often these glossier coats show up some flaws that the dull primer hides. I use the Nitro-Stan putty once again, taking the time to let it dry, leveling it and then spot-spraying the area again with color lacquer before going on with the next coat of color.

**Final steps**—I get a good feeling when I finally remove the masking materials to reveal the fine lines and contrasting colors. It's critical to remove these materials no more than a few minutes after the final color spraying is completed: Waiting too long can cause the hardened film to peel unevenly along the tape line.

I sand all the previously masked areas with 320-grit paper. Ridges formed where adjacent colors meet are sanded lightly, but I don't try to level them at this point. It is better and safer to finish leveling the lacquer ridges while building the final clear coat. Light sanding (320 grit) of the white-ash squares on the doors ensures they are good and clean before the next coat of clear lacquer goes on. I touch up here and there where necessary, using a small artist's brush to dab color on; for larger corrections, I mask off around the problem area and spray with the gun turned way down.

For the clear topcoats over solid colors, I use a prefiltered Mohawk high-solids lacquer, which has almost no amber tone. This is a durable topcoat, and its clearness makes it a good choice to cover the stained white-ash panels. If a piece is finished with a single color, I finish the clear coats with what I call "clear color": a 50/50 mix of the custom color with clear-gloss lacquer. This creates good depth, because the color is continuous through the layers. This won't work for multi-color pieces, so I use untinted clear lacquer.

***Color-matching is an art form. As Johnson adds small amounts of tinting colors, he "puddles" the subtly different hues together to gauge his progress in matching a color sample.***

When everything looks clean and crisp, I spray on three to four clear-gloss coats of lacquer, allowing at least one-hour drying time between each coat. It's not necessary to sand between each coat, because the lacquer bonds to itself. But, I do sand the small lacquer ridges between colors with 320-grit paper. After three coats of gloss lacquer, ridges and surfaces should be level.

After the last coat of clear gloss, I let the piece dry overnight. Then, I sand all surfaces with 240-grit dry-lube finishing paper. Finally, I spray on two coats of semigloss lacquer, and when it's dry, I rub out the finish using the method described in *FWW* #62.

High-gloss lacquered surfaces are best cared for and protected by the frequent application of a plastic polish; for semigloss finishes, use a good-quality furniture-cream polish. □

*Gregory Johnson does custom woodfinishing and antique restoration at The Johnson Co., Inc. in Newton, Mass.*

## Sources of supply

*Lacquers, sealers, thinners:*

Mohawk Finishing Products, Inc., Route 30N, Amsterdam, NY 12010
Star Chemical Co. Inc., 360 Shore Drive, Hinsdale, IL 60521
Sherwin-Williams Co., 101-T Prospect Ave., N.W., Cleveland, OH 44115
Donald M. Steinert, 800 Messinger Road, Grant's Pass, OR 97527 (polyester finishes only)
Pratt & Lambert, Inc., 75 Tonawanda St., Box 22, Buffalo, NY 14240

*Masking paper and tapes, abrasives, fillers:*

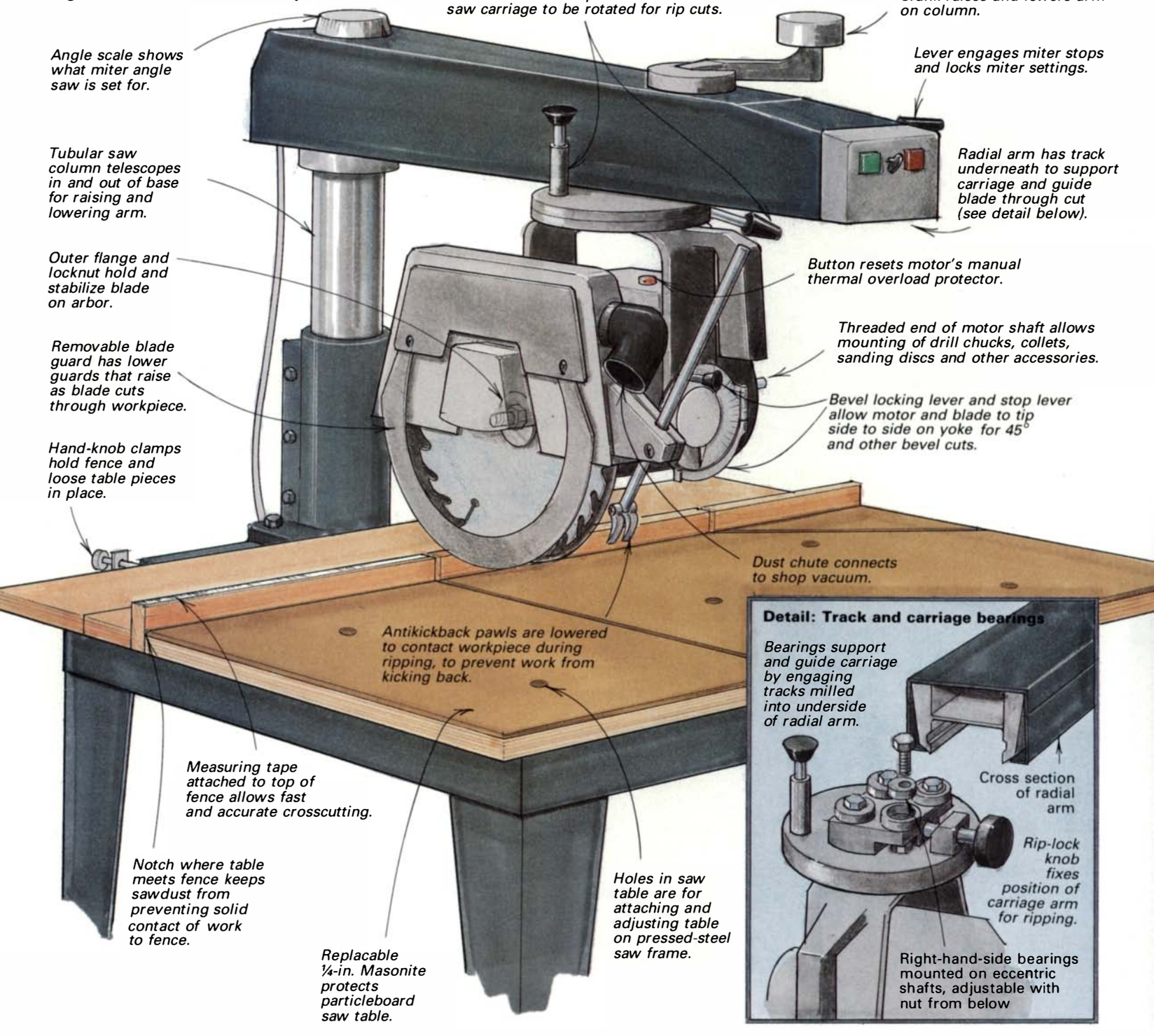
3M Company, 3M Center, St. Paul, MN 55144-1000
Standard Coating Corp., 461 Broad Ave., Box 56, Ridgefield, NJ 07657

# Radial-Arm Saws

*Sizing up six popular models*

by Sandor Nagyszalanczy

**Fig. 1: Radial-arm saw anatomy**






Drawings: Kathleen Creston

The radial-arm saw has a split personality. Manufacturers have hyped it for years as the "all-in-one" shop tool, because it can single-handedly rip and crosscut, cut joinery, and with attachments, shape, drill, sand and even plane wood. On the other hand, many serious woodworkers have shied away from the radial-arm saw because of it's notorious reputation for inaccuracy. In fact, getting even a simple square crosscut with a poorly adjusted saw can be an exercise in frustration.

When I was making furniture full-time, I avoided the radial's personality dilemma by relying on an old cast-iron monster with an arm beefy enough to be used as a crane and a giant blade that could tear through tree trunks, with power to spare. Unfortunately, small shops usually don't have the room or the budget for an industrial-size radial and are left to buy a saw from the ranks of smaller, lighter-duty machines. But do all new small radial saws deserve the bad reputation alluded to above, or can small design variances and manufacturing quality make all the difference between a junker and a dream saw? To find out, I tested radial-arm saws made by six manufacturers, one model from each: Black & Decker 1712, Delta Model 10, DeWalt 7770-10, Inca 810, Ryobi RA200 and Sears 19825. I've summed up my observations and experiences with these saws and added a chart of their vital statistics on p. 62. As I discovered, design and construction aren't the only culprits for giving radial saws a bad name. In fact, these differences aren't as important to good performance as proper adjustment and good-use habits. Therefore, accompanying this article are two sidebars on adjusting and using a radial, which contain some hints to help you turn your recalcitrant machine into a sweet-cutting saw.

The radial-arm saw is an intimidatingly complex piece of machinery, as you can see from the drawing on the facing page. It's design, however, is based on a simple cutting principle that distinguishes it from most saws: For all crosscutting jobs, the workpiece remains stationary and the blade moves to make the cut (a powered miter box does this, but it doesn't have the crosscut capacity of the radial). This feature makes the radial great for crosscutting long or heavy boards, which would be difficult to push accurately across a tablesaw.

The radial-arm saw is basically a motor-driven circular sawblade mounted on a carriage that rolls the length of an arm suspended over a saw table. The workpiece is supported by the saw table and aligned by the saw fence during cutting. In addition, the saw's arm pivots, raises and lowers, the carriage tilts and the yoke rotates. All these settings change the orientation of the blade relative to the workpiece for different kinds of cuts. This is what gives the radial-arm saw such tremendous woodworking versatility: By pivoting the radial-arm saw from side to side, you can make miter cuts up to 45° or more. Tilting the carriage so the blade is angled relative to the saw table allows for bevel cuts. By setting the saw to both bevel and miter at the same time, you can cut compound angles. The carriage can be rotated so the blade is parallel to the fence in order to rip boards to width between the fence and blade. Once set, the angles of the arm, carriage and yoke are locked in place either with screw knobs or lever locks. Often-used angles, such as 90° and 45°, have positive stops, such as tapered pins or bolts that lock into holes or slots and quickly and accurately set the saw to those angles. The radial arm can be raised and lowered to set the blade's height relative to the saw table.

The price you pay for all of the radial-arm saw's versatility is that you must carefully keep *all* the saw's moving components adjusted and aligned in order to get consistent, accurate cuts. Practically everything on a radial is subject to adjustment, including the table, arm, yoke, carriage bearings and column. Some of these adjustments allow you to fine-tune the accuracy of the stops used in setting the saw to often-used bevel and miter angles (like for regular square cuts or 45° miters). In addition to the adjustment of the stops, adjustment of the saw blade's horizontal and vertical alignment relative to its travel along the arm is necessary for a true, clean cut. For an explanation of alignment and to get an idea of how to go about adjusting a radial-arm saw, see the sidebar on p. 66.

**Saw construction**—To handle the weight of the motor carriage and the tremendous stress that cutting exerts on the radial arm and column, a radial-arm saw has to be built sturdy. Ideally, the arm should be cast iron (cast alloy is used on cheaper saws) and reinforced with ribs to help resist deflection. The track for the carriage needs to be ground straight and true for the saw to achieve straight cuts. Since these tracks are subject to wear, the most durable tracks are either machined cast iron or made up of two replaceable steel rods. The tracks should also be designed to shed sawdust, which can foul the smooth motion of the carriage and ruin the cut. Depending on the saw's design, three or four replaceable ball-bearing rollers ride in the track to support and guide the carriage. The roller assembly adjusts to set the tracking pressure so the carriage can roll smoothly but without play.

The yoke connecting the motor and the blade assembly to the carriage should mount at both front and rear to stabilize the blade during cutting. The motor should have built-in thermal protection and an arbor long enough to hold a dado set. The saw's blade guard should be easy to remove for blade changes, and it should have antikickback pawls and a splitter for ripping. To be useful to the cabinetmaker, a radial should have the power and capacity to cut through at least 8/4 hardwood in one pass.

A tubular steel column supports the arm and is housed in a cast base bolted to a sheet-metal saw frame. The column supports the arm and allows the arm to pivot for miter cuts. The column telescopes in and out of the base via a crank-driven screw to set blade height. The saw table is typically a piece of ¾-in. particleboard fastened with brackets to the saw frame. The brackets allow the table to be adjusted parallel and square with the arm. Screw knobs at the back of the saw table clamp two or three loose table inserts and the fence in place. The clamps allow these pieces to be reassembled in any order. This is because, on miter cuts, the fence must be moved closer to the column to get the maximum width cut. Even so, most radials give 3 in. to 4 in. less capacity mitering to the left than to the right.

**Testing the saws**—I made numerous crosscuts, miters and bevels in both hard and soft woods to see how smoothly and accurately each saw performed. For consistency, I used a 10-in. DML (1350 S. 15 St., Louisville, Ky. 40210-1861) "Radi-All" blade on the four 10-in. saws and comparable carbide-tooth crosscut blades on the other two radials. Because I could only try each saw for a limited time, I spoke with saw owners and manufacturers to get an idea of each saw's reliability and possible problems.

I found all the saws capable of delivering fairly smooth, accurate cuts, but this is greatly dependent on how well the saw is adjusted, and some saws are much more apt to come out of adjustment than others. In some cases, just bumping into the arm or hitting a knot with the blade throws the saw out. Generally, the more expensive the saw, the more it seems suited for heavy- or continuous-duty work.

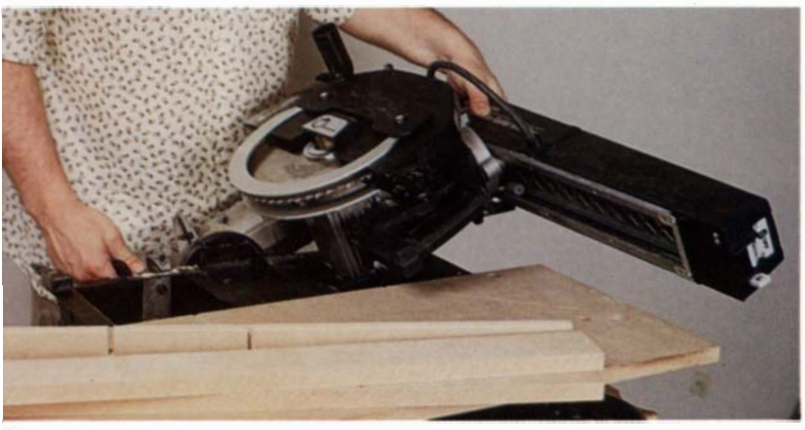
**Black & Decker 1712**—Made in Italy, this 10-in. radial is Black & Decker's portable model, with the power and capacity of a stationary machine. The 1712's column attaches to the frame with a cast-alloy pivot that allows the entire arm, head and column to

**Radial-arm saws**

| Manufacturer model number | List price | Blade diameter | Motor HP/ Amps at 110v | Maximum depth of cut | Maximum crosscut at 90° | Maximum crosscut at 45° (3/4 in. deep) | | Maximum rip capacity | Table size |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Left | Right | | |
| Black & Decker, 1712 | $400 | 10 | 2/11† | 2¾ | 13½ | 6 | 9½ | 19⅜ | 21x34 |
| Delta, Model 10 | $694 | 10 | 1½/11.5** (5.75 amps) (at 220v) | 3 | 14¾ | 9 | 10½ | 24 | 24¾x42 |
| DeWalt, 7770-10 | $990* | 10 | 3½/17** (8.5 amps) (at 220v) | 2 13/16 | 15½ | 8½ | 11 | 25¼ | 26⅜x36 |
| Inca, 810 | $599 | 9 | NA/9 | 2⅛ | 16½ 27½†† | 12¼ 20†† | 12¼ 20†† | 25 | 23½x5 5/16 |
| Ryobi, RA200 | $515 | 8¼ | 2/11 | 2¼ | 12 | 22½° only | 7½ | 17¾ | 21½x27½ |
| Sears, 19825 | $399* | 10 | 1½/11** | 3 | 13 | 6 | 8⅝ | 26 | 27x40 |

All dimensions above are in inches. * includes stand, ** automatic brake, † manual brake, †† with optional extension arm

*The Black & Decker 1712 is the only folding radial-arm saw with a 10-in. blade. The saw shown above is clamped to a Black & Decker Workmate to give it stability during cutting. Once the saw is positioned correctly and the loose table inserts are removed, the 1712 folds flat, below, for compact transport.*



fold down and be carried to the job site or stored flat (see the bottom photo on this page).

The Black & Decker's 11-amp induction motor has an aluminum housing that has fins to dissipate motor heat. The motor has no accessory shaft: Accessories mount directly on the saw's arbor shaft, which is, unfortunately, too short to hold a full 13/16-in.-wide dado set. A manual brake button is mounted on top of the motor housing. A metal blade guard provides upper and lower blade protection, but I found it apt to bind against the workpiece, especially on miter cuts, and a real pain to take off for blade changes, requiring the removal of three wing nuts.

The motor attaches to a cast-alloy yoke assembly that supports it at both front and rear, but there's no way to set the horizontal alignment. The yoke head has three steel bearings that ride in tracks cast into the underside of the saw's generously ribbed cast-alloy arm. These bearings are arranged so that two oppose one, therefore only one needs adjustment to set the tracking. Because the steel bearings ride in a nonreplaceable cast-alloy track in the arm, I would question how well this track would wear over time.

Although I found setting the 1712 to be straightforward, the elevation crank atop the column and the miter locking lever next to it were a bit hard to reach from the front of the saw. Both the bevel-lock and rip-lock levers are spring loaded and pull out so you can adjust the locking pressure without a wrench. Bevel and miter stops are set using a plunger lever, which provides a positive reference, but the stops stuck easily and were occasionally hard to disengage.

The Black & Decker performed smoothly and consistently gave me straight, true cuts while crosscutting and ripping. While the motor was adequately powerful for maximum depth cuts through maple, it seemed to take the blade an inordinate amount of time to get up to speed. The manual brake required brute force to press and even then was mostly ineffective. I found the saw arm easy to deflect accidentally by pulling the handle slightly to one side while advancing through a crosscut. The saw folds easily for transport, but you must first carefully set the elevation and rip-lock positions and remove part of the table. At 65 lbs., the saw is light enough to carry single-handed, but the handle of the folded saw is close to the table and makes for a cramped grip.

**Delta Model 10**—This Delta radial is a heavy stationary machine with a ribbed cast-iron arm. The Delta's 11.5-amp motor assem-

bly, however, is housed in plastic and supported in the front and rear by a cast-alloy yoke. The motor, featuring built-in thermal protection and an automatic blade brake, can be wired for either 110v or 220v. The on/off switch is located right next to the handle and is operable with the right-hand thumb—a refreshing convenience compared to the end-of-arm mounted switches on other saws. The upper/lower blade guard is designed so that the blade must be removed before the guard comes off—a definite inconvenience. Like the Black & Decker and the Inca, the Delta guard has the dust chute at the rear. Other saws have them at the front, and I found a front-mounted hose much more likely to get in the way. The head carriage is supported by four ball bearings, and one pair is adjusted to set tracking. Unlike other radials though, bearings can be conveniently adjusted from the top of the saw.

The Delta Model 10 is designed to be set from the front. The elevation crank is just below the table, and the miter stop and locking screws are big wing nuts on the front of the arm. The bevel, yoke and rip-lock knobs and levers are large, easy to grip and generally positive to set and lock. The bevel stop locked easily and securely; however, the lever-action yoke stop didn't engage very positively and needed some fooling with for a true 90° or 45° cut.

When I tried the Delta, the carriage rolled with little effort, and all the cuts I got were straight and true. Unfortunately, the Delta's arbor won't hold more than ½ in. worth of dado cutters, limiting one's grooving abilities, but the saw ripped well thanks to the adjustable-kerf splitter/antikickback pawls. I also like the Delta's large 24¾-in. by 42-in. particleboard table, which has lots of room for miter cuts to the left of the column.

**DeWalt 7770-10**—This is a heavy stationary radial built in traditional DeWalt fashion, with lots of machined cast-iron parts. The model 7770-10 is DeWalt's top-of-the-line 10-in. saw and is now distributed by Black & Decker. It is also the most expensive radial-arm saw in the survey. For the extra money, you definitely get a lot more saw: Its 17-amp motor (8.5 amps when wired for 220v) and cutting capacities equal many 12-in. radials, although at 2 13/16 in., the depth of cut is just shy of the 3-in. cut possible on the Delta and Sears saws.

The DeWalt's thermally protected motor is housed in an all-metal housing, and the motor's automatic brake stops the blade in only five seconds. It's the only motor brake in the survey worth taking seriously: The Sears and Delta both take twice as long. Unfortunately, the DeWalt sports the same difficult-to-remove blade guard as the Black & Decker. A cast-alloy/cast-iron yoke supports the motor front and rear, and a three-point fitting allows both vertical and horizontal alignment to be adjusted accurately. The carriage rides on four bearings, two of which are eccentric-cam adjusted like the Delta, only harder to adjust from below the arm.

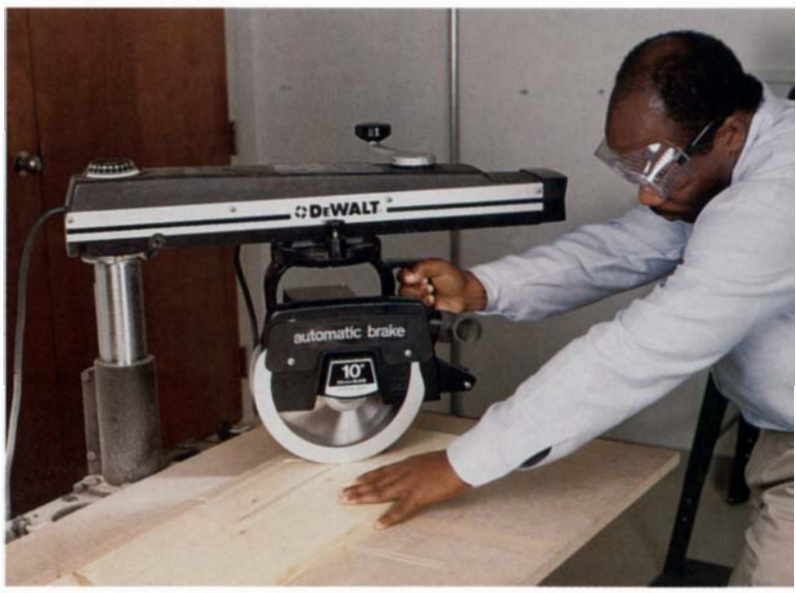
All the setting and locking handles on the DeWalt are big, comfortable to grip and located up front for easy access. The elevation crank, located near the front atop the arm, has embossed marks under the crank to give you a quick elevation reference. One owner told me that the crank's belt drive needs occasional tightening—maintenance that the gear-driven Sears and Delta elevation mechanisms don't need. Bevel, yoke and miter settings are extremely positive, with spring-loaded plunger stops that seat a tapered pin in a machined plate for a solid setting.

The DeWalt performed like a workhorse and did every task with power to spare. With repeatable accuracy, the saw delivered exceptionally smooth and true cuts, with no visible signs of track wander. The arm also felt stiff and hard to deflect. My only criticism is that the carriage feels heavy and requires a good amount of force to operate, which might get tiresome if you need to do loads of narrow crosscuts. DeWalt does, however, offer an optional automatic blade return—a safety as well as a work-saving device.

**Inca 810**—The unorthodox design for this radial saw came about in an unusual way. The employees of an Austrian appliance manufacturing company made the prototype of the Inca as a birthday present for their woodworker president. The president decided to put the saw into production, and they make the 810 for Inca. Instead of pivoting the arm on the column as other radials do, the 810's table rotates, making the Inca a "radial table" saw in the truest sense.

The Inca sports a 9-amp appliance-type induction motor that drives a 9-in. blade with a depth of cut comparable to most 10-in. saws. Four rollers support the saw carriage and ride on the out-


*Delta's Model 10, shown above fitted with the optional leg set, is the only radial-arm saw tested with an on/off switch next to the handle for convenience and safety.*




*Set up for miter cutting, the DeWalt 7770-10, above, has its elevation crank atop its heavy cast-iron arm and all of its angle-setting controls within reach.*


*The Inca 810, shown above with the optional extension rail, is capable of crosscutting a 27½-in.-wide, ½-in.-thick panel.*


*Ryobi's lightweight portable radial-arm saw (model RA200), above, has an 8½-in. blade that's capable of cutting 8/4 stock. The column and arm can be removed from the base for transport. Tapping the high RPMs of the router-type universal motor, the Ryobi is handy for plowing grooves, as shown below, or any other job using a router bit with a ¼-in.-dia. shank.*


side of a chrome-plated square steel arm. The entire arm can be replaced with an optional extension arm to give the Inca a 27½-in. crosscut capacity, by far the largest in the survey. The Inca's small laminate-covered table clamps to a square steel beam that also has a sliding support on it, to hold wide workpieces.

Setting the Inca for angled cuts is different than other radials, but generally easy and positive. As mentioned, the table rotates for miter cuts, with stops at 45° in either direction. There's no positive stop for a 90° cut, but the Inca's large protractor scale allows accurate resetting to square. For ripping, the Inca's four track bearings are set so you can remove the entire carriage, rotate it 90° and slide it back on the arm. Setting the bevel angle is a hassle, because four bolts must be loosened and there are no stops to establish square or 45°. Besides being spartan on the stops, the Inca boasts few adjustments. For instance, in lieu of adjustable bearings, the cast-alloy mounting posts for the track bearings spring inwards slightly to provide constant tension between the bearings and the arm beam.

In use, the Inca performed reliably, though when cutting 2-in. maple, the motor seemed on the verge of being underpowered. The saw cut smoothly, but all my cuts showed signs of track wander, even when I tried different machines. The upper/lower blade guard has an unusual kerf splitter that effectively prevents blade binding during crosscutting and ripping. Unfortunately, the spring-loaded lower guard hung up on the workpiece often, and the thumb lever that manually raises the lower guard was awkward to operate. The Inca's arm is very stiff, especially the extension arm that bolts to a vertical bar at the outboard end. However, I found that the arm tended to get out of parallel with the table. This isn't a problem for most crosscuts, but it's deadly for bevel cuts or for plowing grooves. When I tried to cut some rabbets with Inca's optional router carriage, which slides on and off the arm like the saw carriage, I had to shim the table to get the cut the same depth all the way across the stock. Aside from the handy height scale on the column, I didn't like the Inca's elevation mechanism much. The crank is located inconveniently on the side of the column at the rear, and the crank screw had almost two turns of slop. The Inca's open-frame construction allows it to be disassembled and transported easily, and the optional telescoping legs make this bench saw a freestanding machine.

**Ryobi RA200**—This model is Ryobi's entry into the portable radial-arm saw market, and it's the lightest (53 lbs.) and most compact saw in the survey. Although the Ryobi uses only a 8¼-in. blade, it has enough cutting depth to make 45° bevel cuts in 8/4 stock. Instead of folding, like the Black & Decker, the Ryobi's column lifts out of the base, and the saw transports in two manageable pieces.

The RA200 is powered by an 11-amp universal motor. It's arguable that a universal won't hold up under heavy use as well as the induction motors used in most other radials, but this design gives the Ryobi some truly desirable features. On the arbor end, the motor's 18,000-RPM speed is geared down to 5,000 RPM to run the blade. The other end of the motor shaft directly drives a ¼-in. router collet that's ready to use (see bottom photo this page). The compact motor is supported by the yoke only at the front, but it doesn't seem flimsy because the motor's so light. The radial arm is fabricated from pressed steel, but the track is machined and the steel is heavy gauge (.170 in. thick). The Ryobi is the only saw with a push-button arbor lock, which allows blade or bit changes with only one wrench, and the quick-release blade guard comes off with minimum effort. The lower guard is also the only one I tried that didn't hang up on the work while mitering.

Setting the Ryobi is very positive and simple for all the usual

miter, bevel and rip cuts. The spring-loaded stops for miter and bevel work are tight-fitting and accurate. Most of the settings on the Ryobi are "factory set," and the only real user adjustments are to make the table parallel to the arm and square to the blade.

I thought the lack of adjustability was a drawback at first, but the Ryobi cut extremely well and true as it came out of the box. The motor slowed considerably while crosscutting 8/4 oak, but all cuts were smooth and showed no sign of track wander. I was able to repeat all bevel and miter cuts to within ½°—a tolerance I couldn't better with any of the other radials I tried. Routing with the Ryobi is pleasurable, in part because of the motor's high speed and partially because the carriage feels light and rides extremely smooth. (Most direct-drive accessory shafts are 3,450 RPM—too slow for a clean cut with a router bit.) Two things I didn't like were the noise, much like a screaming router, and the odd choice of blade size that makes replacements hard to come by at a local hardware store. But these are minor complaints considering the Ryobi's versatility and low price tag.

**Sears 19825**—All the radial saws by Sears are mechanically identical, the only differences being the electronics and the legs or stands. The Sears model I tested features a built-in "electronic

# *Using a radial-arm saw*

**I've always had my radial-arm saw built into a long workbench, with auxiliary tables and fences to give long workpieces more support. If you don't have room for a built-in saw, or if you need to take the saw to the job site often, you may opt for a radial with bolt-on legs or a portable model. Take care though: If you move any radial saw, pick it up only by the frame and column; if you lift it by the table or arm, you may throw the saw out of adjustment. Also, avoid using extension cords that can rob the saw of power and cause motor overheating, and never use a cord not rated to handle the amperage of the motor.**

**Because I use my radial-arm saw mostly for straight cut-off work, I've installed a tape on top of the fence that I use with a clamped stop to get accurate cuts. I zero the tape to the blade after making adjustments or changing blades by loosening the table clamps and sliding the fence back and forth. My clamped stop is a hinged woodblock, so if I need to square a rough end before trimming to final length, the stop pivots up, out of the way.**

**If the upper guard on your saw has a dust chute, connect it to a vacuum system to keep chips and dust at bay or try fitting a length of flexible hose—the kind used to vent clothes dryers—between the chute and a trash can. The wind from the blade will blow chips through the hose with surprising force. Even with dust collection, take the time to wipe the tracks and carriage rollers clean every day or so. Never lubricate these parts with grease: A light, dry lubricant will prevent dust from sticking and keep things rolling smoothly.**

**Cutting with a radial:** **Once a radial saw is correctly adjusted and cutting smoothly, there are a few tricks I've learned that can help the job go more quickly and accurately. First, I prefer pushing the blade through the cut rather than pulling it—the more traditional method. The advantages to push-cutting are that the blade ends up on the other side of the fence after the cut, farther from harms way. Also, pushing prevents the blade from "self feeding" toward you (the tendency of a pulled blade that's climb-cutting) and stalling in the cut or jerking the saw out of adjustment. The disadvantage to push-cutting is that the blade can lift the workpiece, so you must hold the piece down firmly. Also, your crosscutting capacity is diminished, because the blade must clear the stock with the blade at the end of the arm.**

**Whenever crosscutting a board with a slight bow or cup, keep the hollow edge against the fence or the cup down on the saw table. This will keep the board from rocking and causing the blade to bind in the cut. If a gnarly grained piece binds the blade, try rough-cutting the end, then taking a light trim cut to final length. Also, a little groove on the saw table where it meets the fence will keep sawdust from preventing the workpiece to butt tight and true to the fence.**

**For miter, bevel or compound-angle cuts, I avoid setting and resetting miter and bevel angles whenever possible. Instead, I use angle jigs that mount on the saw table and change the angle of the workpiece relative to the fence.**

**The smoothest-cutting carbide blades to use on the radial-arm saws I've tried have a high alternating top bevel (ATB). I've also had success with thin-kerf blades. These are more subject to heat warping though and seem to run better if mounted on the arbor with large blade-stabilizing washers. If you experience splintering on the bottom of your cuts, try lowering the blade ¼ in. to ½ in. below the surface of the saw table.**

**Fitted with a dado blade, the radial-arm saw is great for cutting dados or rabbets and for joinery. I've often used a wide dado set to waste the cheeks on tenons. Just remember that if the thickness of the material you're cutting changes, the depth of the cut will also change. To set the depth of a groove, reference the blade's height from the top of the workpiece, not the saw table.**

**Many people have an aversion to ripping on the radial-arm saw, and with good reason: If the work binds on the blade or is fed from the wrong side of the blade, the saw can hurl a board, or worse, yank your hand into the blade. Make sure the carriage is firmly locked on the arm, and always feed the board against the rotation of the blade, with the guard tilted back almost touching the board on the infeed side. On the outfeed side, lower the antikickback pawls and splitter to contact the board, to prevent kickback.**

**Fancy cutting:** **The radial-arm saw's multitude of settings can do all sorts of fancy cuts that are difficult or impossible with other saws. For instance, you can cut coves by rotating the yoke so the blade is skewed to the line of cut, or you can actually hollow out a bowl by locking and rotating the carriage with the motor on. Beyond regular blades, there is a plethora of accessories made to fit on the accessory shaft, including sanding drums and discs, chucks for drills or bits, safety planer cutters and even jigsaws. For a thorough exploration of the applications of the radial, consult R.J. De Cristoforo's book *The Magic of Your Radial Arm Saw,* available from Black & Decker Inc., 701 E. Joppa Road, Towson, Md. 21204.**

**Safety:** **The radial-arm saw has lots of potential to be dangerous, because since the blade moves through the cut, it can cut you even if you stay still. *Always keep your hands clear of the blade's path, and NEVER reach behind the blade while it's still spinning.* The automatic blade brake found on several saw models is a great safety feature, because even an idling blade can cut you badly. The radial's blade can hurl cutoffs with tremendous velocity, so always wear eye protection and prevent hearing loss by wearing earplugs or earmuffs. Resist the temptation to cut with the blade guard removed, even if only for a few cuts: Unlike the tablesaw, the blade on a radial is completely exposed without its guard. If the lower guard persistently hangs up on your work, try smoothing its leading edges with a file and then waxing them.** *—S.N.*


*The Sears model 19825 comes with an electronic measurement display that shows the angle and height settings of the saw. The saw is set up in the photo for a rip cut, with the guard and antikickback arm in the correct position.*

measurement" device and plain stamped-steel legs. The 10-in. blade is powered by an 11-amp motor housed in plastic and supported from the front only by a cast-alloy yoke, which does allow horizontal heeling to be set. The quick-release blade guard covers the upper blade only, but a lower guard is available as an accessory. The arm on the 19825 is cast alloy, with a replaceable pressed-steel track on which ride four carriage rollers.

All the settings on the Sears are accessible and can be set from the front of the saw. Like the Delta, the elevation crank is just below the table and raises and lowers the saw arm with well-meshed gearing. Because the crank is at groin level, the crank's handle mercifully folds up out of harms way. Both the miter and yoke stop/lock handles operate positively, unlike the bevel lock, which feels mushy. Most adjustments on the Sears are made with a ⅛-in. Allen wrench, which offers little leverage if the screws are overtight or frozen. The saw does have screws for adjusting horizontal alignment at the rear of the yoke.

Aside from the Ryobi, the Sears is the only radial saw I set up right out of the box, and it took me over half a day to assemble and adjust the saw. The manual is extensive and clearly illustrated, and I didn't run into any assembly problems. I did have some problems adjusting the carriage bearings to ride smoothly. Even with the bearings set tight against the track, I still couldn't get cuts with the Sears that were clean and free from signs of track wander. This is probably due to the non-milled sheet-metal track—a cheap treatment for a part that's so critical to the accuracy of the saw. The arm was also easy to deflect by pulling the carriage to the side while cutting.

I was ready to dismiss the Sears electronic display as a sales gimick, but in use, I found the distance- and angle-measuring capabilities accurate and well worth the $50 extra. The liquid crystal display (LCD) on the end of the arm gives a readout of the saw's elevation, bevel angle, miter angle and distance of carriage on the arm for ripping. These measurments are fed to the electronic display by four encoders mounted on the saw. By selecting from six buttons, you can monitor any of the measurements while adjusting the saw. All the settings are stored in memory when you turn the battery-powered display off. The system was easy to use, and it gave accurate measurements to .010 in. and angles to ½°—certainly adequate tolerances for most cabinet work. The encoders must be kept clean of sawdust though, to prevent problems. □

*Sandor Nagyszalanczy is an assistant editor at* Fine Woodworking

# *Adjusting the radial-arm saw*

by Mark Duginske

**Of all the problems the radial-arm saw is prone to, none is more insidious than adjusting and aligning the saw. On a typical saw, this setup can take hours, require several studious readings of the saw's instruction manual and still result in unsatisfactory cutting performance.**

**It's fairly obvious that for a square cut, a radial's sawblade must be 90° relative to both the table and the fence. What's not obvious is that you can square a blade precisely and the saw may still not cut properly. This is because, in addition to being adjusted for squareness, the blade of a radial saw must also be adjusted for what I'll call "alignment," a more complicated adjustment than squareness. Alignment problems are often called "heeling." Heeling occurs when the leading edge of the blade and the blade's trailing edge, or heel, aren't perfectly lined up with the travel of the saw. The blade goes through the cut on a slight angle and the heel rubs in the kerf, causing splintering. Heeling can also burn the workpiece or be dangerous if the blade's dragging heel hurls a scrap. To eliminate heeling problems, blade alignment needs to be set in two separate axes: Alignment in the vertical axis, as shown in figure 2 on the facing page, is responsible for heeling problems with the blade square to the saw table. Horizontal-axis alignment affects blade heeling anytime the blade is tilted for a bevel cut, say 45° or more. Vertical alignment can be tricky and is often ignored in many radial owner's manuals.**

**Besides knowing how to adjust a radial, you must make the adjustments in the right order, because the accuracy of one adjustment is often built on a previous adjustment. The way in which adjustments and alignments are made on different saws varies, but the order in which they should be done is basically the same. I'll go through the basic procedures for setting up a saw, but for a complete treatment, read John Eakes book "Fine Tuning Your Radial Arm Saw," available from Lee Valley Tools Ltd., 2680 Queensview Drive, Ottawa, Ontario, Canada K2B 8H6, and consult your saw manual.**

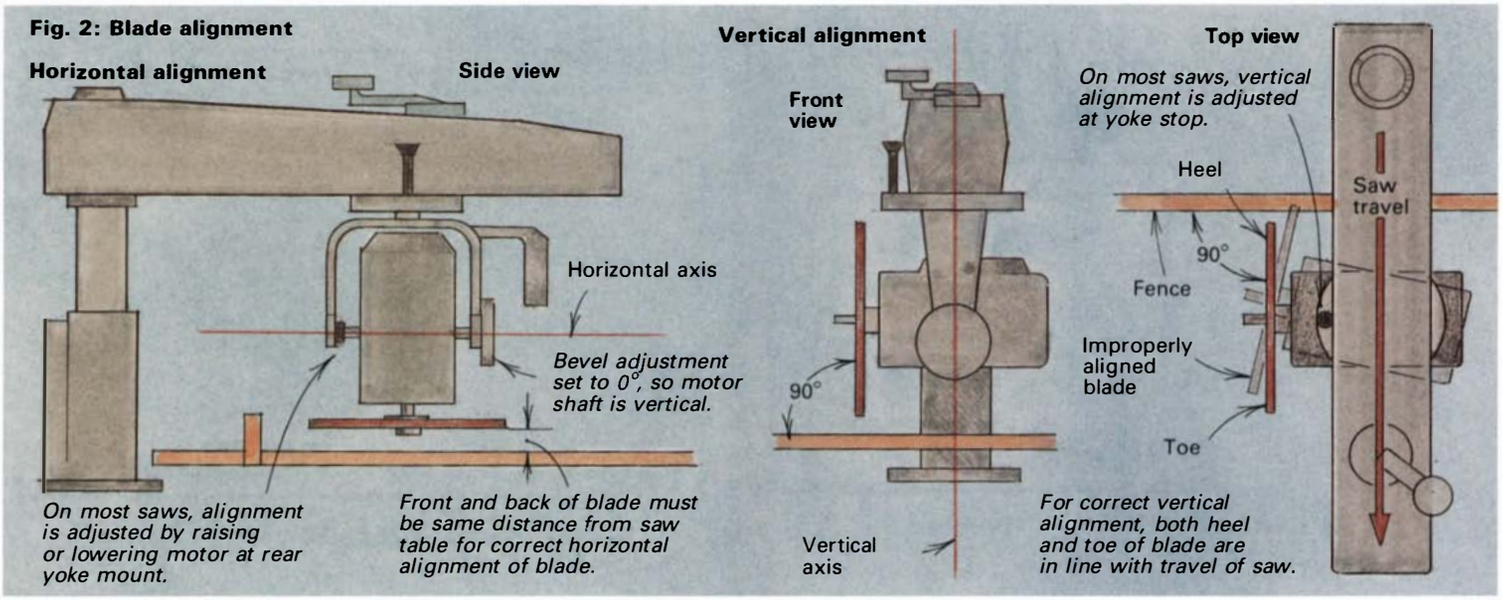
**Before starting, you have to unplug the saw and remove the blade guard.**

**Parallelism: Rotate the motor so the arbor is pointed downward. Check the distance between the saw table and the arbor with a feeler gauge. A gauge .025 in. thick is about right (see top, left photo on the facing page). Then, pivot the arm and slide the carriage over various spots on the table, adjusting the height of the table on its brackets until the feeler-gauge clearance is the same at all points. This makes the table parallel to the arm.**

**Horizontal alignment: Set the sawblade parallel to the table by tilting the blade down to a 0° bevel. Make a wooden test bar with four square, parallel edges. Lay the bar on the saw table under the blade so it is parallel to the arm, and lower the arm until the blade almost touches the bar. Make sure the bar isn't contacting a sawtooth. Slip a feeler gauge between the bar and blade to see if the gap is the same along the block. If it's not, the adjustment**


*A feeler gauge checks the distance between the vertical motor arbor and the saw table so the table can be adjusted true to the arm.*


*Vertical alignment is checked, above, with a framing square held at a 45° angle. One leg is against the blade and the other leg sits where the fence and saw table meet.*




on most saws is made where the motor attaches to the rear of the yoke. Some saw yokes, however, don't attach to the motor at the rear and don't allow this adjustment.

**Square blade to saw table:** Lay one edge of a large square on the saw table, parallel to the fence, and the other against the blade close to the arbor, avoiding the sawteeth. A large plastic drafting square is good for this, especially if you cut out a notch that'll clear the arbor, flange and lock nut. Follow your saw manual and adjust the bevel stop to square.

**Square fence to saw table:** Place a square flat on the saw table with one edge against the fence. Mark a tooth on the bottom of the blade and push the square over until it just touches the blade. Hold the square down and pull the carriage toward you. If the fence and blade are square, the tooth and the square will keep the same contact. If the angle is off, the blade will either move away from the square or walk over the square as you pull. Adjust the 90° miter stop on the column.

**Vertical alignment:** The previous adjustment established that the fence is 90° to the travel of the saw. Now you need to make sure the body of the blade is parallel to this path. Place one edge of the square where the fence and table meet, and raise the other edge so it's against the blade (avoid the teeth). If the square contacts the blade unevenly, the blade is heeling. Adjust the stop for carriage rotation according to your saw manual.

After you make the above adjustments and alignments, check them by cutting a few test pieces. To check the saw's blade-to-table squareness, start with a piece of plywood that's ¾x6x30 in. Mark the ends A and B, and draw a big X in the middle of the board. Now cut the test piece in half, flip one side over and put the cut ends in contact. Any deviation from a 90° bevel will be doubled and can be seen clearly. By placing the same piece up against the fence, any error in the fence-blade squareness will be doubled. Readjust the saw as necessary and repeat the test cuts until the saw cuts true and square.

Getting an adjustment perfect can be tough, especially when delicate adjusting screws have been overtightened. Instead, I get the adjustment as close as I can and use paper shims to change it a hair at a time. I use shims between the fence and saw table to fine-tune square cuts.

Once a radial-arm saw is properly adjusted, the alignment settings should stay secure for a long time if the saw isn't abused or moved. Adjustments for squareness should be checked and corrected periodically. □

*Mark Duginske is an author and cabinetmaker in Wausau, Wis.*

# Christmas Ornaments

## *Constructing a blizzard*

by Steven J. Gray

People are always looking for inexpensive but well-crafted novelty items. The trick to satisfying these sometimes contradictory requirements is to develop a method for easily reproducing saleable items. I've always admired high-quality mass production, but because most craft items are made one at a time, it's difficult for small-shop woodworkers to find production shortcuts without compromising on quality.

My search for an easily reproduced product turned up some wooden snowflakes that apparently were punched out of thin laminate made up from several different woods with contrasting color and grain. Because the wooden flakes were intricate and fragile, I assumed reproducing them would be complicated and expensive. And, I was not interested in jigsawing copies one at a time, so I put the idea aside. A few years later, while preparing for the Christmas craft shows, I remembered the snowflakes. In my mind, I could see the results I was after; all I needed was a little inspiration in the fabrication area.

What I came up with was a snowflake made up from six identical diamond-shape sections joined together to form a star shape. I decided to shape the cross section of each diamond, then glue up the required number of sections to form a bar of "snowflakes." I would then cut off thin slices to produce each individual snowflake. The drawing on the facing page outlines the process for a six-point snowflake, but the principle is the same for any configuration.

Initially, my snowflakes were a bit crude: They had gaps between their glued-up sections, which were often poorly aligned. Still, friends seemed to like them and even said they would buy them—if I could eliminate the gaps and poor fit. I thought these problems could easily be fixed by using jigs to hold the small, fragile snowflakes during their construction. The jigs would allow me to keep my fingers and hands clear of the cutting edges of the tools so I could concentrate more fully on the shaping operations and quickly achieve accurate and reproducible results.

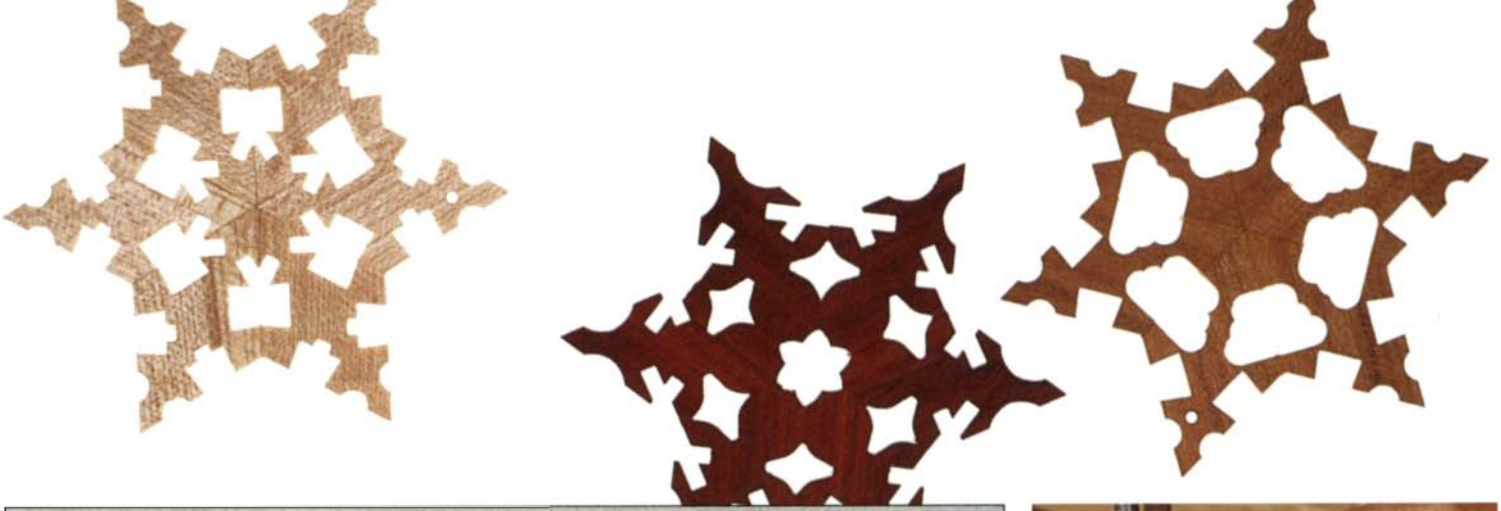
**Construction process**—Wood color and grain are important aspects of the snowflake, so I'm fussy about selecting lumber. I like to imagine how the finished snowflake will look against an evergreen tree. Redwoods and light-color woods are visually appealing, making them the most popular. Closed-grain woods, like maple and padauk, also sell well; they also are less apt to chip, and their glue joints hold up a little better.

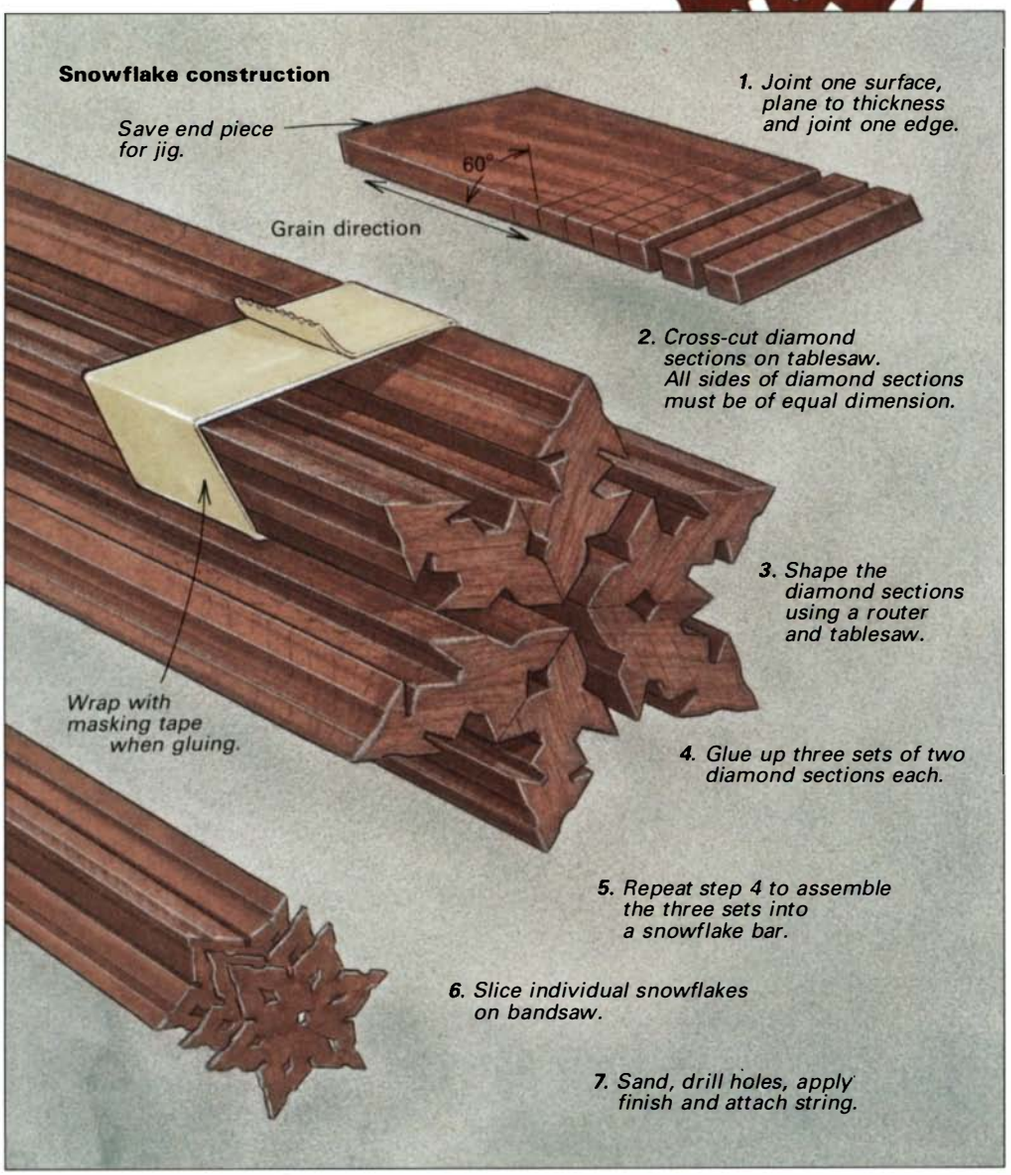
The shaping process removes a lot of wood (as much as 50%) and increases the piece's surface area significantly. This makes the segments more susceptible to humidity changes and subsequent wood movement, so I try to use clear, kiln-dried lumber whenever possible. For most of my designs, I use ¾-in.- to 1-in.-thick stock. Each board should be as wide as possible to maximize the output of snowflakes. My jointer-planer width limits me to about 10 in., which yields 60 to 80 snowflakes.

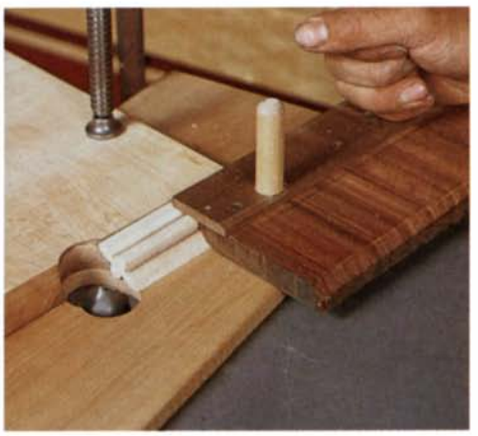
I begin by jointing one surface of the board flat and planing the flip side to the desired thickness. Then, I joint one of the long edges to provide a good reference surface for crosscutting the diamond sections on the tablesaw. The sawblade angle at this point is crucial in determining whether the sections will fit together snugly. Invest the time and effort to set the blade accurately. Any cumulative cutting errors will be minimized along with a lot of frustration, wasted time and material loss later on. The appropriate angle depends, of course, on the number of points in the snowflake; it can be determined simply by dividing 360° by the number of snowflake points. For the six-point snowflake described here, the diamond sections are cut to 60°. On my tablesaw, this requires setting the blade 30° from the vertical.

All four sides of the diamond section must be the same length, which means that the width of the cut piece must equal its thickness. I make a sample cut, flip the cut section end for end, rotate it 90° and slide it back up against the board from which it was cut. If there is any difference in height between the pieces, I adjust the fence and try again. Once the angle and width are set properly, I proceed to make all my cuts. I need six pieces for the six-point snowflake, but I make at least seven in case something goes wrong. At this point, I tape six of the pieces together to make a final check on the fit and alignment. If my setup is done properly, everything should fit, but occasionally a minor saw adjustment is necessary. One more thing: I save two waste pieces cut from the end of the board, because these have the correct angles for the jig and the fence needed to shape the segments.

The fun part of the construction process is shaping the sections. I don't plan this. I simply start making full-length cuts along the diamond sections using a thin-kerf blade on my tablesaw and a variety of straight and curved bits in my router (inverted and mounted in a router table). To move the segments safely past the cutters, I screw a combination hold-down/handle and an end stop to one of the waste pieces I saved, as shown in the top photo on the facing page. I clamp the second waste piece to the saw table or router table to serve as a fence.





***This hold-down/handle, above, is used while shaping the diamond sections on a tablesaw or on a table-mounted router. It's made from the waste end of the board from which the diamond sections have been cut. The simple vacuum chuck, below, fit to a shop-vac, holds the snowflakes during sanding.***

After making a few cuts, I hold the six sections together to see how the pattern is developing. I repeat this until I'm satisfied. Don't remove too much wood from the mating edges, or you'll risk having insufficient gluing surface and a weak joint. Individual cuts should not be made too deeply, because an identical cut will be made in the facing edge, and a weak spot may result.

Before gluing the parts together, I remove rough edges with medium sandpaper so the sections will mate cleanly. I've tried to glue all six sections at one time, but I don't seem to have enough hands to accomplish this easily. So, I do them in two steps. I first glue up two diamond sections, and when I have three sets of these ready, it's fairly simple to glue them together to form the snowflake bar. Masking tape holds the sections together and provides adequate clamping pressure while the glue sets up. Excess pressure results in misalignments.

I slice the individual snowflakes on a bandsaw using an L-shape scrapwood carrier mounted on the miter gauge. The horizontal section raises the bar off the table to prevent the tips of the snowflakes from getting caught and broken in the blade slot. The vertical piece backs up the bar to prevent tearout. A third scrap piece clamped to the table acts as a depth stop for cutting off uniformly thick snowflakes. I grasp the partially sawn-through snowflake as it emerges on the exit side of the bandsaw blade to prevent it from flying off as the cut is completed. While doing

Photos of finished ornaments: Michele Russell Slavinsky; drawing: Bob La Pointe

this, I'm careful to keep my fingers back from the blade, well-clear of the cutting edge. Because the cut is being made *with* the grain, troublesome formations of "fuzzies" do not occur (as they might if crosscutting), so edge cleanup—which could be a messy problem with the snowflakes because they have a large amount of exposed edges—is eliminated.

Devising a way to sand the snowflakes on my disc sander was a little tricky. My solution was to fashion a vacuum-clamp attachment for my shop vacuum. As shown in the bottom photo on the previous page, holes drilled in the flat plate provide suction, and the three adjustable stops securely hold the snowflake. I have to reduce the vacuum, by drilling additional holes in the side of the clamp, so the snowflake won't be "pulled" uncontrollably into the sander. Sanding is now straightforward: Just ease the snowflake into the sander steadily, keeping it parallel to the disc.

After drilling a small-diameter hole in one of the outer tips (I drill up to 10 snowflakes at a time), I finish the snowflakes with Watco oil. When the snowflakes are dry, I thread each hole with a decorative, metallic gold string. □

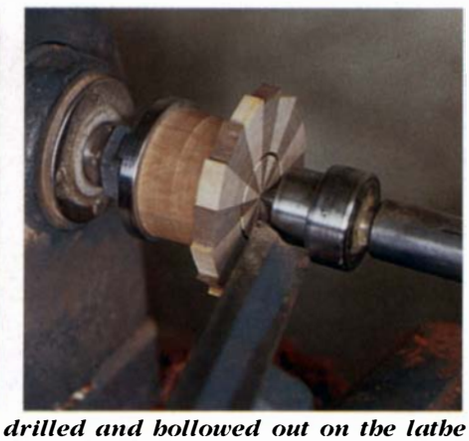
*Steven Gray and his wife, Debbie, operate a woodworking shop in Bozeman, Mont., specializing in kaleidoscopes.*

# Turning inlaid balls

The wooden, hollow-turned Christmas-tree decorations I make reflect my machinist background: They require a fair amount of precision to build. Also, a number of the turning tools I use are custom-shaped for a particular operation. Nevertheless, while specific tools may simplify the job, the ornaments can be made just as well with commonly available wood-shaping tools. Since each ornament is custom-made—the design evolves as I build them—and assembled piece by piece, they take quite some time to make. Making these ornaments is not for everybody, but it's an interesting process, and I hope you try it.

Spindle-turning wood spheres isn't difficult, but the solid spheres will quickly weigh down the sturdiest evergreen bough. I use a variety of Pennsylvania-grown hardwoods, such as dogwood, as well as many exotic woods. These turn well, but they are dense and heavy, so I needed a reliable method to hollow the spheres. I borrowed the idea of using a compression chuck made up of two turned donut rings, as shown below. The sphere is sandwiched between the rings and held in place by three threaded bolts with wing nuts. My chuck can handle 2-in.- to 4-in.-dia. ornaments, but they've got to be reasonably round; otherwise, they'll slip in the chuck. The chuck is mounted on a lathe faceplate while I bore a 1¼-in.- to 1½-in.-dia. hole about one-third of the diameter deep. This allows me to reach in and remove wood with a modified roundnose chisel bent 90°. I reduce the wall thickness to about 1/16 in. I reposition the sphere and repeat this operation 120° in both directions from the first hole. Now I need to fill the three holes in the hollowed sphere's surface.

Simple wood discs with contrasting color or grain pattern are



***The turned sphere is drilled and hollowed out on the lathe using a compression chuck to support the work, left. Decorative discs are turned to fit the drilled holes; the pressure of the tailstock center supports the disc while it's being turned, right.***

okay; I like to create different patterns that feature the wood's characteristics and give the ornaments a light, festive touch. I use my tablesaw, scroll saw and sometimes my milling machine (for swirl patterns) to shape sections from ¼-in.-thick wood. Then I assemble and glue the pieces one at a time, using a disc sander to make adjustments as I proceed. When the glue is dry, I center the assembly on my lathe, butting it against the end of a ¾-in. dowel chucked in the headstock. The workpiece is held by the pressure of the cone center in the tailstock. I use a parting tool made from an old file to cut the disc roughly to size and follow-up with a skew chisel to precisely match the holes in the spheres. I like to use a different pattern in each hole. After the discs are glued in place, I remount the sphere in the compression chuck using the cone center as a guide to correctly align the disc. The disc is face-turned flush to the sphere surface; sometimes I create a concave or recessed pattern in it for added interest.

Adding a finial to the top, and often the bottom of the sphere completes the ornament. The compression chuck is used again while I drill ⅜-in. holes in the sphere for the finial's tenoned end. The finials are made from solid wood or laminates and are turned on the lathe. I drill a hole for attaching a supporting string in the end of the top finial, and I shape the eyelet using hand tools.

I finish the decorations with at least two coats of a clear sanding sealer. Sanding between coats is done with Scotch-Brite pads, and I use a hand-rubbed wax for the final coat. □

*Dave Hardy is an active member of the American Association of Woodturners. He lives in Sellersville, Pa.*

# A New Light on Turning

by Michael D. Mode

Have you ever been turning a piece of spalted wood and wondered what the piece will look like after turning? Usually you have to stop the lathe to peek at the bowl or spindle in progress. There is a way, however, to see what you are doing while the lathe's still spinning by harnessing what's called the stroboscopic effect. Anyone who has used a timing light to tune up a car engine already understands the principle: When a bright, flashing light is set so its fraction-of-a-second light pulses hit a spinning object at exactly the same point in each revolution, the spinning object appears stationary.

I find strobe turning invaluable for speeding up my production turning, mainly for roughing out green bowls and boxes. The stationary image reveals the shapes of natural edges and surfaces, the wood grain's visual patterns and the quality of the cut. The strobe also makes it easy to detect and avoid serious flaws, such as open knots and cracks. I'd normally have to stop the lathe to examine the object, but the strobe lets me keep turning without interruption.

In my first experiment with strobe turning, an automotive-minded friend and I connected an old auto-engine distributor to a lathe. We wired a battery and a coil to a regular auto-timing light that tapped one of the distributor's spark-plug wires. My friend pointed the light at a scrap block mounted on a faceplate, and when I turned on the lathe, we were both amazed: The block was spinning at 1,200 RPMs, but the flashing light made it appear perfectly stationary. Cautiously, I made contact with a gouge and the wood magically disappeared from the block. As the spalted block became round, I could clearly see the grain pattern changing as layer after layer of wood peeled off. I hadn't experienced such fun since the first time I used a motorized lathe.

Although the timing light wasn't very bright, it proved the feasibility of the idea. But, there were problems with excess electricity from the distributor erratically triggering the strobe, so I started looking at scientific stroboscopes. Most of these are in the $400 to $700 range, which seems rather steep, but I found one lower-price model. The Ametek 964A "Strobette," shown at right, sells for $160 and is available from Ametek, Mansfield and Green Division, 8600 Somerset Drive, Largo, Fla. 34647; (813) 536-7831. The Strobette looks like a 6v flashlight, but it uses 110v household current and can deliver 200 to 6,000 flashes per minute.

Instead of triggering its flashes from the lathe's rotation, as the timing light does, the flash-rate dial of the Strobette must be manually set so it flashes synchronously with the turning—once per revolution. If your lathe speed is 800 RPM, the strobe should be set to 800 flashes per minute. Mount the strobe above your lathe, out of the way yet close enough so the light flashes directly on the turning. I hang my strobe from two cords so I can easily aim the light. Also, keep the ambient light around the lathe low. By setting the flash rate slightly out of phase with the lathe speed, the image will appear to rotate slowly either forward or backward. Also, cutting tends to slow the lathe slightly, so you'll see all sides of your piece as you cut.

**Dangers**—There are some dangers associated with the stroboscope. One is that some frequencies of flash rate can trigger epileptic seizures, and a warning about this comes with the instrument. The rapidly flashing light may irritate some people. Although I haven't experienced any adverse effects, I limit strobe use to short time periods during the critical formative stage of each piece.

Another danger is that the appearance of a turning object being stationary is just an illusion: You must remember not to absent-mindedly touch the spinning work and risk hand injury or have the chisel catch and tear the work from the lathe or the chisel from hand. In the case of irregular shapes, such as natural-edge bowls, it may be difficult to know exactly when your tool will contact the wood. Shining a desk lamp on one side of the turning will show you the piece blurred, as you would normally see it, without adding so much light as to obscure the strobe's stationary image. One major limitation of strobe turning is that we cannot perceive the stroboscopic effect below about 300 RPM; the stationary image disappears into the flickering light. I find 600 RPM to be a marginal lathe speed, and at 1,000 RPM, the image becomes fairly smooth. Therefore, strobe turning isn't effective on large-diameter pieces that must be turned at slow speeds.

Using a strobe may not revolutionize your turning, but it will increase your efficiency. Like any technique, the light requires some getting used to. After my experiences so far, I now feel quite disadvantaged without it, almost like working in the dark. □

*Michael Mode is a professional woodturner in Zionsville, Pa.*

***A strobe light freezes the image of a spinning natural-top box so it looks as if it's stopped and the shape of the edges and the grain pattern can be clearly seen.***

# Post-Office Desk

## *Simple construction in the Southern tradition*

by Carlyle Lynch

This simple desk was about all there was to some of the early post offices in rural settlements of 19th-century Virginia. Local woodworkers built the desks with a wide variety of native hard and soft woods, and the design often reflected their whimsey. The maker of the piece shown here is unknown, but the desk was almost certainly made in Grottoes, Va., or in a nearby village in the Shenandoah Valley.

Not fancy but well made, this walnut desk can afford a few subtle refinements without losing its character. For instance, its Spartan array of pigeonholes and shelves could be made symmetrical. Additional pigeonholes, proportioned and arranged differently, might enhance the idea of the post-office look. The simple, thin flat door panels might alternatively be replaced by raised panels, as suggested by the cross section in detail 4 of the drawing on the facing page. For historical purposes, I've drawn and measured the desk as it is, leaving to conjecture only hidden construction. Occasionally I'll depart from some visible detail, but I'll own up to it in the text. You are not so bound: Use the plan only as a guide or as a spur to your imagination.

Photo: Roy Early

***In the mid-19th century, desks like the one shown here were sufficient to serve the postal needs of a small Southern rural community. Few letters were written in those days, perhaps because postal rates were comparable to those of today.***

The desk consists of two pieces: The dovetailed cabinet simply sits on the table, which has a leg-and-apron frame. The aprons are mortised and tenoned to turned legs. Molding nailed to the tabletop butts against the front and sides of the cabinet to hold the cabinet in position. The simple molding design helps unify the cabinet and table sections, and although most easily shaped with a router, I prefer the more subtle appearance created by hand-shaping.

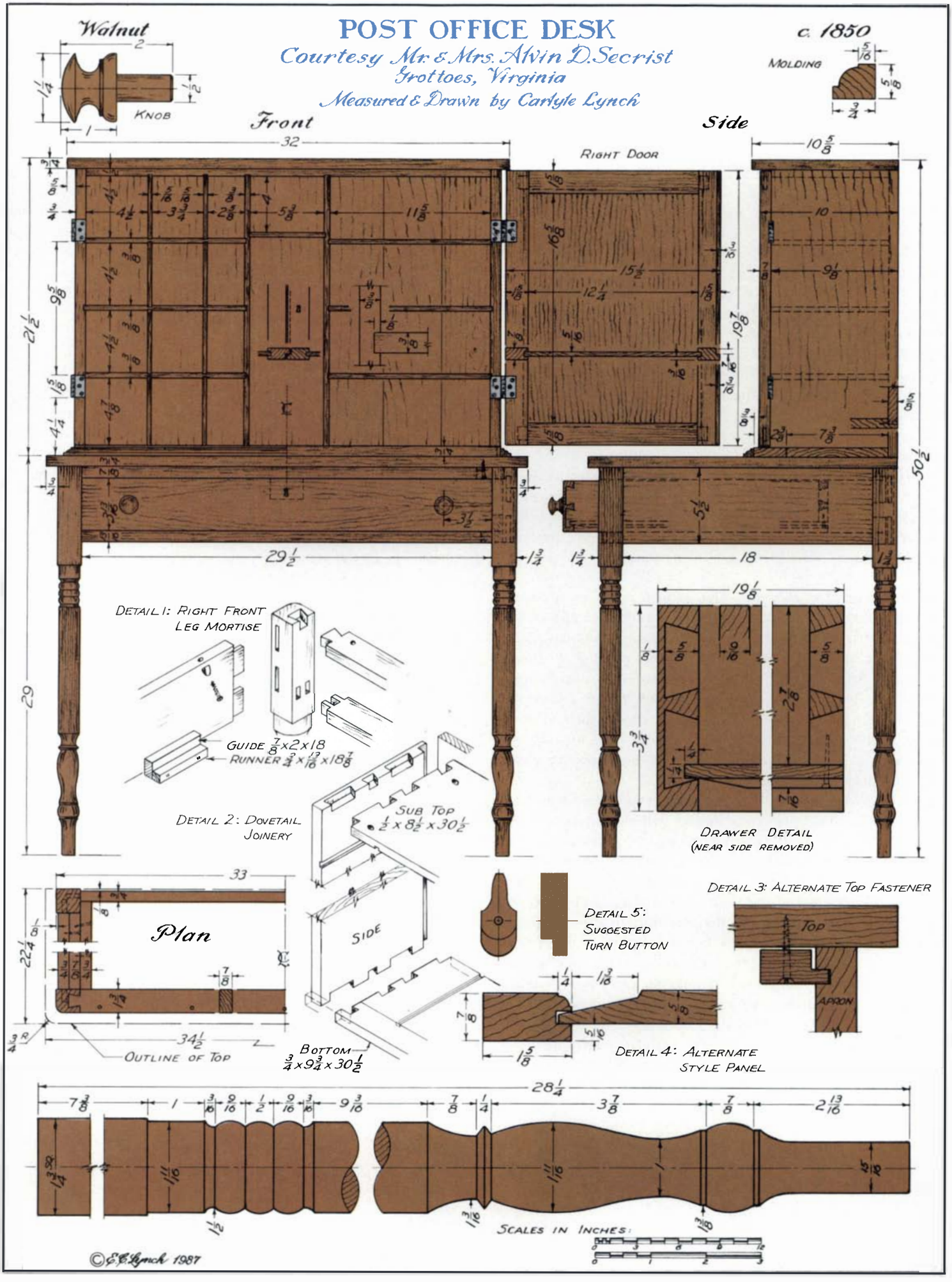
**Building the table and legs**—Construction is straightforward. Begin by turning a set of legs for the frame. The leg design is quite simple and reflects the taste of the craftsman. The outside corners of the front legs are shown rounded, but it was not uncommon for them to be left square. The legs were, of course, turned individually; one leg was turned by eye, then it was used as a model to scale and mark out the cove-and-bead locations for the other legs. Making duplicates this way led to small differences from leg to leg, which lent an appealing sort of charm to the piece.

The table-frame joinery is next. The top rail on the original is ⅞ in. thick; the drawer rail is 13/16 in. thick. Since boards were planed by hand in those days, the difference is probably due more to convenience than design. The human eye can easily pick up that 1/16 in. difference however, and you may find the variation more pleasing than not. The front rails are flush with the legs, but the back and side aprons are set in 3/16 in. This seemed a little too much, so I've changed it to ⅛ in.; you may want to make it even less. I've used 5/16-in.-thick tenons, and they can be as long as 1¼ in., which is allowed for in the materials list. Lay out and cut the mortises and tenons. Cutting them with traditional hand tools is not difficult, and the satisfaction gained is worth the effort.

There are two options for attaching the tabletop to its frame. Detail 1 on the facing page shows pocket holes bored for screws in the side and back aprons—the first option. The top drawer rail is also bored for pocket holes, but be careful to angle the holes enough so a screwdriver will clear the lower rail when you attach the tabletop to the frame. Detail 3 shows the second option, which requires cutting short grooves in the aprons to accommodate button clamps fashioned from pieces of scrapwood. Both methods were used in furniture of the period, but I prefer to use button clamps; the clamps hold the tabletop snugly to its frame but allow the top to move freely as it expands and contracts.

Assemble and dry-clamp the frame to check for fit and squareness. Make any adjustments, then glue it up. If you have a limited number of clamps, you can peg the tenons, as the original maker did, to hold pieces together until the glue dries. After the joints have dried, glue and nail the drawer guides and runners to the side aprons.

The drawer is made traditionally using hand-cut, half-blind


POST OFFICE DESK
Courtesy Mr. & Mrs. Alvin D. Secrist
Grottoes, Virginia
Measured & Drawn by Carlyle Lynch
c. 1850
Walnut
KNOB
MOLDING
Front
Side
RIGHT DOOR
DETAIL 1: RIGHT FRONT LEG MORTISE
GUIDE 7/8 x 2 x 18
RUNNER 3/4 x 13/16 x 18 7/8
DETAIL 2: DOVETAIL JOINERY
SUB TOP 1/2 x 8 1/2 x 30 1/2
SIDE
BOTTOM 3/4 x 9 3/4 x 30 1/2
DRAWER DETAIL (NEAR SIDE REMOVED)
DETAIL 3: ALTERNATE TOP FASTENER
TOP
APRON
DETAIL 5: SUGGESTED TURN BUTTON
DETAIL 4: ALTERNATE STYLE PANEL
Plan
OUTLINE OF TOP
SCALES IN INCHES:
©C.C.Lynch 1987

dovetails at the front and through dovetails at the back. The bottom is 7/16-in.-thick pine, with three edges beveled to fit a 1/4-in. slot cut in the front and sides of the drawer. The bottom is held in place by square nails driven into its rear edge up into the back of the drawer. Because nails tend to work loose over time, you may want to substitute screws. The 2 7/8-in. depth of the drawer seems a little shallow to be practical; to increase it a bit, use thinner pine or 1/4-in. plywood for the bottom, increase the number of dovetails and make them smaller to allow the drawer bottom to sit lower.

The walnut drawer knobs were turned on the lathe. As with the legs, their design seems to have been a matter of the turner's taste. They were probably spindle-turned, cut off and finished by hand. It's easier, after turning the tenon, to use a spigot or three-jaw chuck to hold the tenon end while turning the knob. Cut kerfs across the grain of the tenoned ends. Then, when you install the knobs, position the kerfs vertically and drive small wedges (dipped in glue) into them to hold the knobs tight. The holes for the knobs can be filed slightly elliptical (along the grain direction) from the inside, forming a taper, which will increase the effectiveness of the wedge.

Adjust the drawer to slide smoothly in the frame, set it aside and make the frame top. Unless you are extremely fortunate to have a single piece of walnut wide enough, you'll have to glue up two or more pieces to meet the 22 1/2-in. width. Two strips of pine screwed to the underside of the top through slotted holes will serve as drawer kickers. Once you fit the top to the frame, you'll be ready to start working on the cabinet.

**Constructing the cabinet**—The cabinet consists of walnut sides fastened to a walnut-edged pine bottom and a 1/2-in. pine subtop. The top piece is 3/4-in.-thick walnut, which overhangs the front and sides and is attached by screws running up through the subtop. Attaching the sides to the subtop, then screwing on the top, avoids the more complicated joinery that would be necessary, because of the overhang, to join the sides directly to the top. The subtop also simplifies cutting the dadoes for the partitions. Since the subtop isn't visible when the doors are closed, there's no need to stop the dadoes.

The subtop and bottom can be rabbeted to the sides and held with glue and nails; I prefer the look of half-blind dovetails. Both methods are authentic. Before assembling the parts, cut shallow dadoes in the sides, subtop and bottom to hold shelves and partitions. Traditionally, these were cut through and so are visible from the front except at the bottom, where a 2 3/8-in.-wide plain strip of walnut is edge-glued to the pine bottom after cutting the dadoes. This strip projects 3/8 in. beyond the front of the doors and is long enough to be flush with the sides. On the original piece, the pine bottom is 1/8 in. thinner than the walnut strip, creating an unnecessary dust catcher, so I made them the same thickness. Also before assembling, rabbet the back inside edges of the sides to accept 5/8-in. tongue-and-groove or ship-lap slats, which form the back of the cabinet. The subtop and bottom don't need to be rabbeted, because they are cut narrower than the sides and allow the back to butt against their full thickness. The inside partitions and shelves are a mixture of pine and poplar, fashioned from whichever was conveniently available. The arrangement of the nooks, wood variety and subtle dimensional differences between the vertical partitions and shelves works to avoid a monotonous look.

The design of the doors is quite simple: They're made using unadorned rails and stiles with thin flat panels. Brass butt hinges are gained into the door stiles and sides at the positions shown. The butting stiles of the doors are rabbeted so the right door overlaps the left when closed. A wardrobe lock holds the right door to the left where a simple metal catch engages a keeper on the cabinet bottom. A nice alternative to the metal catch and keeper is a neatly designed turn button of walnut, as shown in detail 5 on the previous page. Neither the drawer nor the doors use escutcheons for the keyholes, but brass-thread escutcheons would be appropriate for use with the wood drawer knobs.

The desk is most appropriately finished by applying a traditional, hand-rubbed oil. □

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*Carlyle Lynch is a retired designer, cabinetmaker and teacher. He lives in Broadway, Va. More of his drawings are available from Garrett Wade or Woodcraft Supply. His article "Ripple Molding" appeared in* FWW *#58.*

## BILL OF MATERIALS

| Amt. | Description | Wood | Dimensions |
|---|---|---|---|
| **Base:** | | | |
| 4 | Legs | walnut | 1 3/4 x 1 3/4 x 28 1/4 |
| 2 | Side aprons | walnut | 3/4 x 5 1/2 x 20 1/2, 18-in. s/s |
| 1 | Back apron | pine | 3/4 x 5 1/2 x 31 1/2, 29 1/2 in. s/s |
| 1 | Top rail | walnut | 7/8 x 1 3/4 x 31, 29 1/2 in. d/d |
| 1 | Drawer rail | walnut | 13/16 x 1 3/4 x 32, 29 1/2 in. s/s |
| 1 | Top, round front corners | walnut | 3/4 x 22 1/2 x 34 1/2 |
| 1 | Drawer front | walnut | 3/4 x 3 3/4 x 29 7/16 |
| 2 | Drawer sides | pine | 9/16 x 3 3/4 x 19 |
| 1 | Drawer back | pine | 5/8 x 2 7/8 x 29 7/16 |
| 1 | Drawer bottom | pine | 7/16 x 18 5/8 x 28 13/16 |
| 2 | Knobs, turn to pattern | walnut | 1 1/4 x 1 1/4 x 2 1/2 |
| 2 | Drawer guides | pine | 7/8 x 2 x 18 |
| 2 | Drawer runners | pine | 3/4 x 13/16 x 18 7/8 |
| 2 | Drawer kickers | pine | 7/8 x 1 x 18 |
| 1 | Top molding, miter ends | walnut | 5/8 x 3/4 x 32 1/2 |
| 1 | Top molding, makes two, miter one end | walnut | 5/8 x 3/4 x 23 |
| **Cabinet** | | | |
| 2 | Sides | walnut | 3/4 x 9 1/8 x 20 3/4 |
| 1 | Top | walnut | 3/4 x 10 5/8 x 32 |
| 1 | Inside or subtop | pine | 1/2 x 8 1/2 x 30 1/2, 29 1/4 in. d/d |
| 1 | Bottom front strip | walnut | 3/4 x 2 3/8 x 30 3/4, 29 1/4 in. d/d |
| 1 | Bottom | pine | 3/4 x 7 3/8 x 30 1/2, 29 1/4 in. d/d |
| 1 | Back, tongue-groove or ship-lap | pine | 5/8 x 30 1/4 x 20 3/4 |
| 6 | Shelves, 1/8-in. gain into sides and partitions | pine | 3/8 x 8 1/2 x 11 7/8 |
| 2 | Center partitions | walnut | 3/8 x 8 1/2 x 19 3/4 |
| 1 | Shelf | pine | 3/8 x 8 1/2 x 5 5/8 |
| 6 | Partitions | pine | 5/16 x 8 1/2 x 4 3/4 |
| 2 | Bottom partitions | pine | 5/16 x 8 1/2 x 5 1/8 |
| 4 | Door stiles | walnut | 7/8 x 1 5/8 x 19 7/8 |
| 4 | Door rails | walnut | 7/8 x 1 5/8 x 13 3/4, 12 1/4 in. s/s |
| 2 | Door panels, fill edges before installing | walnut | 5/16 x 12 3/4 x 17 1/8 |

Hardware: 2 pairs brass butt hinges, 1 5/8-in. pin by 1 3/4 in.; 1 drawer lock with barrel key, 11/16 selvage to key pin; 1 wardrobe lock with barrel key; 1 door catch for left door or wood button.

s/s = shoulder to shoulder  d/d = dovetail to dovetail

# The Socket Slick

by Michael Podmaniczky

I can remember the first time I ever read about a slick. It was about 12 years ago, and I hadn't a clue to what the author was talking about. Six months later, I asked an old boatbuilder friend about the giant chisel hanging in his shop. The thing looked as if it had been made by one of those novelty companies that sells Crayola crayons the size of cordwood. "That's a slick, you idiot." Already embarrassed, I asked, "What do you do with it?"

He picked it off the wall, tucked it under his arm like a firehose and took a paper-thin, 3-ft.-long shaving off the edge of a piece of 1-in.-thick pine. "But I can do that a heck of a lot easier with my jack plane," I said. "Sure you can, if the work's clamped to the bench," he replied, "but what if you can't get at it with your plane?"

He had a point. In tight spots, this bull of a paring chisel becomes indispensable. Handled, these chisels can be between 2 ft. to 3 ft. long, with a 2½-in.- to 4-in.-wide blade. Usually boatbuilders have these brutes for easing tight plank edges when the plank is already hung on the boat and they don't want to take it back to the bench for fairing. Though boatbuilders make particularly good use of the slick for making the big curved pieces that go into a boat, almost any woodworker could find a use for one.

If the bottom of a cabinet door binds and there's no clearance for your plane below the door (and you don't want to unhang it), try a slick. Taking a whisper off an installed drawer runner is virtually impossible with a plane, but a slick eases into this kind of hard-to-get-at spot with quickness and precision.

Different from big framing chisels, slicks are slightly bent at the socket so they can lie flat on their backs for smoothing large surfaces without the handle getting in the way. For this reason, you shouldn't hammer on the end of a slick, because mallet blows do not transfer directly in a line from handle to cutting edge. You could even break the handle. Besides, remember how this tool is held: under the arm. And the handle is quite long, often decoratively turned, so you wouldn't *want* to hit it. I'm always disappointed when I see a slick rehandled with a splintered piece of scrap and beat up with a claw hammer.

The only new slicks I've seen are available from Woodcraft Supply in Woburn, Mass., but older ones regularly turn up at flea markets and yard sales, often in the abused condition mentioned above. As with any chisel, the one thing to avoid is a used slick with a pock-marked or corroded sole, because each little pit will translate to a chip in the cutting edge. Look for the flattest sole possible in a used slick, and don't expect much from a new one, because their surfaces are belt-sanded instead of surface-ground.

Although every job may require a slightly different grip, the usual way to hold a slick is to tuck the butt end of the handle under your arm. For real meat-and-potatoes work, wedge the end high in the armpit, where the whole upper body can get behind it. For more delicate work, wedge the handle lower down, between the elbow and the area just below the ribs. If you are good, you can reach way out with the same hand, grabbing the side of the blade for one-handed paring. But it's easier if you choke up and hold the socket instead and grab over the top of the blade with your other hand. Don't hold the slick like it is a big, straight-edge turning chisel, because it is not. Your upper body provides the "third point" of contact for the slick that the lathe tool rest does for the turning chisel. This three-point grip on the long slick is what gives you amazing control.

Photo: Roy Berendsen

***Despite its cumbersome appearance, the socket slick allows a delicate shaving to be taken, even in situations where it's impossible to use a plane.***

To use the slick, lay its flat sole down on the work and try some slicing motions, without cutting at first. Your under-the-arm grip should provide the power and stability, and your lead hand the control. Now shrug your shoulder a fraction until the blade begins to bite, and practice long paring cuts. If the edge starts to dig in, just lower your shoulder until you get a fine shaving and the blade obeys your motions. It will feel much like a sheering cut on the lathe, where the tool cuts and rides on the bevel at the same time. In the case of a slick, the bevel is up and the contact between the sole and the work provides the guidance.

One drawback is that, unlike a plane, which can deal with rowed or curly grain, the slick can't help but lift or tear it. Before putting slick to wood, carefully check how the grain is running and try to approach from the most kindly direction.

I sharpen a slick just like any other chisel, and because it's pushed instead of struck, you can sharpen it to a fine edge—like a paring tool. Hollow-grinding the bevel first will reduce the amount of material that needs removal during honing. You may find it easier to bring the sharpening stone to the edge instead of trying to keep the bevel flat while supporting the massive blade. Just rest the slick's butt on your knee, lay the sole against the workbench (with the bevel facing you) and rub the stone across the edge until it's sharp.

Although a slick is about the size of a baseball bat, it can be stored quite compactly: The handle just slips out of its socket, because the slick is used quite gingerly and doesn't need a fused fit between blade and handle. But keep in mind the story of the guy who finished paring and let the tool hang down at his side with a jerk. Good-bye baby toe. □

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*Michael Podmaniczky is a contributing editor to* Fine Woodworking *and a furniture conservator at the Winterthur Museum in Winterthur, Del.*

# Wood Identification

## *Reading endgrain with a hand lens*

by Jon Arno

Wood identification is becoming increasingly difficult in today's complex and global lumber trade. Foreign species are especially troublesome, but with the popularity of terms such as "white woods," "spruce-pine-fir (S-P-F)" and "mixed hardwoods," the identity of even common domestic species is easily lost between stump and lumberyard.

Most woodworkers can identify a variety of woods by eye or by a combination of features, such as density, color, figure and even smell. But mistakes are inevitable, because almost every wood has a look-alike. However, the woodworker who really wants to identify domestic and exotic cabinetwoods can do so most of the time. For less than $100, you can purchase the needed reference books (see references, p. 79). The only other requirements are a $10 hand lens and a well-honed pocketknife. Although many woods are deceptively similar in outward appearance, under magnification, each species' anatomical structure, especially on the endgrain, will reveal the wood's unique signature or "fingerprint."

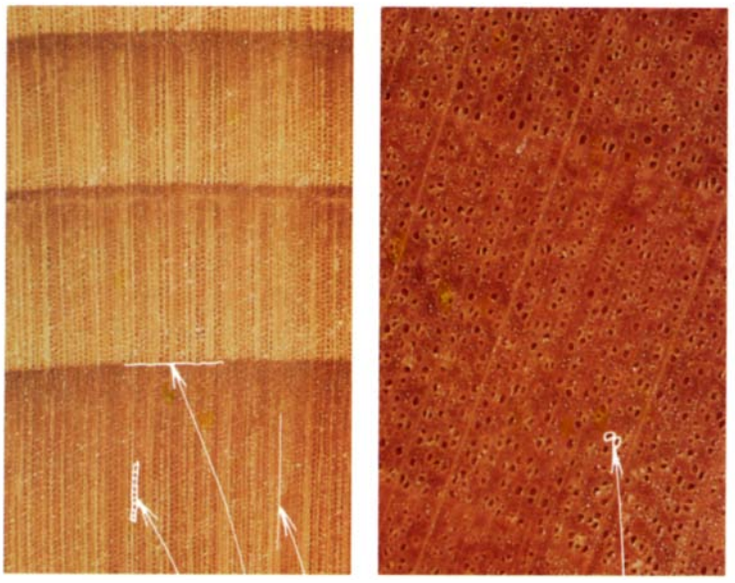
This system is not foolproof: Sometimes microscopic examination of individual cells, chemical analysis, ultraviolet tests and years of training are needed to identify a species. In some cases, not even the most advanced technology can prevail. For example, several species are sold as "white oak," and science, as of yet, has no foolproof way of distinguishing these by examining the wood alone. Nonetheless, it's surprising how far a woodworker can get with just a hand lens and some reference material.

Any lens with a reasonably broad field of view and at least 10x power will do. I prefer a jeweler's loupe with a wide-angle 10x lens at one end and a higher-power 15x lens at the other. The 10x lens will bring into focus the full width of at least one annual growth increment (the wood between two annual rings), which allows for a quick appraisal of the pore patterns. The 15x lens can then be used to study finer details.

It's necessary to have an absolutely smooth-cut surface on the endgrain of the sample or the features will be blurred. The cut should span at least one annual growth increment. For cutting, some specialists rely on disposable blades, such as scalpels or heavy-duty razor blades, but a well-honed pocketknife will suffice.

The following tips will help: Once the surface is cut, touch it to your tongue or otherwise dampen it. This brings up the contrast and makes details easier to spot. Next, position the sample so it receives maximum light. Now, bring the hand lens up as close to the eye as possible so the field of view will be as wide as the lens can provide. Finally, move either the sample or your head until the scene is brought into focus.

You will see the wood's cellular structure in about the same way it appears in the photographs here. Let's start by distinguishing between softwoods and hardwoods, then we'll examine some of the more important cabinetwoods. Here are things to look for:




Softwoods and hardwoods are normally easy to separate. While some hardwoods are softer and lighter than most softwoods, their anatomical structure is quite different. The endgrain of a typical softwood, such as balsam fir (*Abies balsamea*), reveals a simple structure made up of very small fluid-conducting cells called tracheids (A), annual rings (B) and cells that grow horizontally out from the center of the tree, which form the rays (C). Basswood (*Tilia americana*) is actually lighter in weight than balsam fir. However, being a hardwood, its endgrain reveals a more complex structure including pores (D), which are the cross sections of specialized fluid-conducting structures called vessels.

Some softwoods, such as pine (*Pinus strobus*), have resin canals (A), which under low magnification look much like the pores in hardwoods. But pores in hardwoods are many times more plentiful than are the resin canals in even the most resinous softwoods. Compare pine to walnut (*Juglans nigra*): The greater anatomical complexity of a hardwood is readily apparent.

Pine A

Black walnut

Hardwoods may be generally divided into ring-porous species, such as ash (*Fraxinus americana*), and diffuse-porous species, such as yellow poplar (*Liriodendron tulipifera*). However, many species are neither truly ring-porous nor diffuse-porous. To varying degrees, in most woods the pores are spread throughout the annual growth increment but tend to become smaller in the latewood, which is growth produced toward the end of the season. Moreover, in tropical regions, where growth occurs all year long, large and small pores may be spread throughout the wood in almost every pattern imaginable.

Ash

Yellow poplar

In most cases, an accurate identification is based on correctly appraising a combination of features. You must learn to read the entire signature. Take for instance elm (*Ulmus americana*) and hickory (*Carya ovata*): Both are more or less ring-porous (A), and both have light-color wavy bands in the latewood (B). Hickory is about half again as dense and heavy as elm, but a sample of hickory sapwood compared to elm heartwood could lead to confusion. Upon close examination, however, you can see that the light, wavy bands in hickory are formed by faint concentric rings of specialized storage cells called parenchyma, which are not associated with the latewood pores. In elm, these bands contain the latewood pores, making them bold enough to be easily seen with the naked eye. This feature, in combination with the fact that elm normally forms a single row of large, earlywood pores, helps to confirm the diagnosis. Furthermore, if the samples are fresh, elm will have a distinct, unpleasant odor, doubtless the genesis of the term "piss elm."

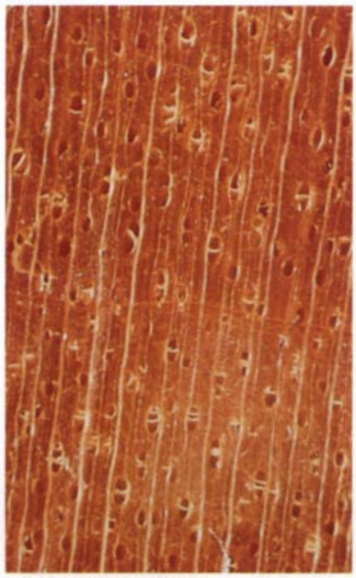
(continued on next page)

Elm A B

Hickory A B

Photos: John P. Limbach, Ripon Microslides; all photos have been enlarged about 2.75 times

Sugar maple



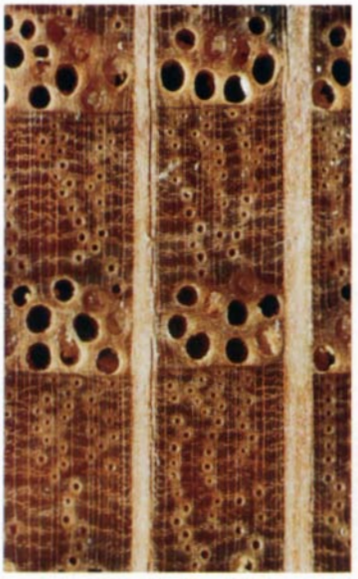
Black birch

Sugar maple (*Acer saccharum)* and black birch (*Betula nigra*) are two diffuse-porous, fine-textured woods with comparable color and density. Under hand-lens magnification, however, the rays on the endgrain of birch are narrower than the diameter of the largest pores; in maple, there are two sizes of rays and the wider ones are as wide as or wider than the largest pores. With a hand lens, separating birch from maple is easy, but distinguishing between the many species within a genus can be tricky, especially among the maples (*Acer*) and the birch (*Betula*).


Honduras mahogany

Lauan

Because of the sheer number of species involved and the often confusing trade names being employed today, identifying imported woods is a special challenge. Perhaps the area of greatest confusion lies with the many woods that are marketed as "mahogany." The true mahoganies come from the genus *Swietenia*, of which Honduras mahogany (*S. macrophylla*) is the most common. Lauan (*Shorea spp.*), however, is often marketed as mahogany. These lauans are extremely variable in color and density, and there are some 70 species in the *Shorea, Parashorea* and *Pentacme* genera whose woods are intermingled in the lumber trade. Note that under the lens, the growth rings in true mahogany are highlighted by a thin band of light-color cells (A). This is usually visible on the tangential surface of the board as well, without magnification.



Red oak

White oak

Both red oak (*Quercus rubra*) and white oak (*Quercus alba*) are ring-porous woods with prominent rays. White oak, however, normally has lighter-color rays, and the latewood is denser, with many small pores. Red oak has fewer, but larger pores in the latewood. The pores of white oak are clogged with a foam-like substance called tyloses (A), while those of red oak are normally open. White oak can therefore be used to make watertight barrels, whereas red oak cannot.

**Summing up**—At first, resorting to a hand lens and studying reference books may seem complicated and downright academic, but it isn't that difficult. In much the same way that old-time woodworkers memorized the general characteristics of the woods they used, the hand-lens user begins to memorize the end-grain signatures of the more popular cabinetwoods. You'll find the whole process is actually fun. And, it's always pleasant to avoid the problems of mistaken identity that haunt all aspects of woodworking. For example, to edge-glue ash and elm together is one of the best ways to invite a warped tabletop or panel. Also, mixing spruce and pine can be a finisher's nightmare. These two soft, creamy white woods look very much alike in the raw state, but they don't stain the same.

As you develop your hand-lens skills, it's a good idea to develop your senses as well. Each time I work with an unfamiliar species, I study it thoroughly. I visually examine it's color, texture and figure. I heft it and jam my fingernail into it to get a sense of its density. I even smell the fresh-cut sawdust to become familiar with its scent, which is often an important key to identification. Walnut, sassafras, catalpa, elm, cedar and many others have distinct odors that are hard to mistake. These odors are the product of complex and subtly unique volatile substances, which can be identified more exactly through chemical analysis, but your nose is often the only equipment you need.

I've had some old guys tell me that almost all woods have a scent, even those that we normally think of as being odorless. When the wood is moist or freshly cut, they can separate maple from birch or basswood and pine from spruce or fir on the basis of scent alone. Personally, my nose isn't that good, and while I do not challenge their honesty (they can in fact correctly separate samples of these species), I suspect their great skill is the product of other senses working in tandem. Through their eyes and hands, they are picking up other attributes, such as color, density, figure and texture, then instantaneously processing this input through a brain-based experience/memory program that would put a computer mainframe to shame.

The scientific community doesn't scoff at these skills; they are real and documentable. But this undisciplined approach has its limitations. Perhaps the most significant limitation is that you can never identify a wood you haven't studied or worked with before. While it might once have been possible for a woodworker to amass enough experience to recognize any wood he might encounter, there are so many species available in today's world market that learning them all would be virtually impossible.

As you gain more experience with wood identification, you'll find that the need to consult reference books and guides becomes less frequent and often is used only to make a final, confirming choice between two or three possible species. These "close calls" usually require an accurate and balanced appraisal of several features, including those not easily described in a book, such as color and odor. Because of this, I think it's essential to develop a collection of known wood samples. This starts by simply saving samples of each new wood you use, but it inevitably graduates to foraging through scrap piles at the local lumberyard and ultimately to joining organizations such as the International Wood Collectors Society (see references at right). The membership of the IWCS is worldwide, and the exchanging of wood samples is one of its founding purposes.

If the wood samples still can't help you decide the wood's identify, you can take the material to a wood technologist for microscopic examination. Most species can be identified by minute differences in the tissue, such as the surface texture of the cells or the way the cells connect to one another through valve-like structures called pits. This method's degree of certainty begins to approach what you would call "beyond a reasonable doubt."

As you pursue the more technical methods of wood identification, the process begins to circle back on itself. By exploring wood's anatomical structure, you'll develop a far greater understanding of how the cellular arrangement affects the general appearance—texture and figure—of a species. This allows you to become conscious of which features are distinctive and which irrelevant. In like respect, a little book learning on organic chemistry strengthens the awareness of why woods have unique color and odor.

It would be irrational to suggest it is time for the typical woodworker to clear off a place on the workbench for beakers, vials, Bunsen burners and a microscope. After all, your basic senses can still get the job done with reasonable certainty. It's just that nowadays, in the species-glutted lumber trade, it takes a few reference books, a drawer or two of samples and a hand lens to give yourself a fighting chance. □

*Jon Arno is an amateur woodworker and wood technologist in Schaumburg, Ill.*

## References

The books I use most often are:

*Understanding Wood* by R. Bruce Hoadley. The Taunton Press, Box 355, Newtown, CT 06470; 1980. Hoadley's book is an excellent place to start, presenting the basics of wood anatomy in an easily understood fashion. Fifty-four macrophotographs for major domestic species and a few imports are accompanied by clear, descriptive copy.

*Wood Identification Handbook* by Marshall S. White. Charles Scribner's Sons, 115 Fifth Ave., New York, NY 10003; 1982. This manual outlines the terminology of wood anatomy. It provides a fairly effective system for categorizing structural patterns and recognizing key details. The woods covered are limited to commercial woods of the eastern United States.

*The Wood Handbook for Craftsmen* by David Johnston. Prentice Hall Press, 200 Old Tappan Road, Old Tappan, NJ 07675; 1983. This book is currently out of print, but it may be available from libraries and used-book dealers. More international in scope, the book provides macrophotographs of approximately 100 species, including most major cabinetwoods imported into Europe and North America.

*Textbook of Wood Technology* by A.J. Panshin & Carl de Zeeuw. McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, NY 10020; 1980. This text deals strictly with domestic species but covers the subject in complete detail. Macrophotographs are provided for virtually all native woods. This is one of the best references on the subject, but it is also very technical.

International Wood Collectors Society (IWCS), c/o Robert M. Bartlett, secretary/treasurer, 2913 3rd St., Trenton, Mich. 48183. The membership of IWCS is worldwide, and the exchanging of samples is one of its founding purposes.

**A word about keys**—Some reference books offer keys to guide the user through a series of "yes/no" choices until an identification is made. The keys create a trail configured something like a branching tree. You start at the bottom of the trunk, then when the tree first branches, you determine which branch to take by answering a relatively simple question, such as whether the sample is a hardwood or a softwood. From there you proceed to the next branching and the next question. The process eventually takes you to the tip of a twig and, hopefully, to the sample's identity.

In theory, this is fine, but judgement and experience are needed to answer many of the key questions. Just one wrong choice, especially early on, and you can find yourself trying to decide whether your sample is a date palm or a bullrush, when plainly it's neither.

Keys can be helpful if used with caution, but for my money, a hand lens is more accurate and easier. For positive results, either method should be confirmed by comparing the wood to a known sample. —*J.A.*

# Wooden Pulls for Drawers and Doors

*Getting a handle on homemade alternatives*

by Paul Levine

Drawer and door pulls are a personal item, much like an earring or a tie tack. They are important design details that, when well crafted, add visual texture to what might otherwise be a featureless expanse of plastic laminate in the kitchen. Along with the cabinet faces, they help to establish a kitchen's feel.

There are plenty of good pulls on the market. In recent years, European hardware manufacturers have exported to the United States a rich variety of well-designed pulls and knobs made of wood, metal and plastic. These pulls are well suited to European-style cabinets, and many are available by mail order.

But if you're bored by the thought of store-bought pulls or just want something different, you can make your own. Making pulls involves a lot of extra work and certainly isn't for everyone, but I've seen many a prospective client run an appreciative hand over my custom-made pulls. They sell casework every time.

Wood, metal or plastic pulls, whether ready-made or custom-made, are most easily added to a door or drawer by screwing them directly to the face surface. Personal taste will determine where on the door or drawer they ought to go. As a general rule, however, surface-mounted pulls look best centered on a drawer face, while door pulls should be mounted near the top edge of a base cabinet door and the bottom edge of an upper cabinet door. Another option is to use a stile glued to the edge of a plywood face, which provides plenty of raw material from which to shape a pull. Finally, you can rout or carve a pull right into a solid-wood face.

**Cylindrical pulls**—The simplest pulls I've used are cylindrical button pulls, like those shown in the top, left photo on the facing page. These wooden pulls can be turned on a lathe, but I find it easier to cut them on the drill press, using a plug cutter. Plug cutters are available up to 1½ in. in diameter and up to 3 in. long. I make my pulls 1 in. in diameter and about ⅞ in. long. My drawers are plywood with solid-wood edging. I use the same type of wood for the pulls and begin with stock a little thicker than the pulls will be long. With the board clamped to the drill press, I run off an entire job's worth of pulls at once, making a few extras in case of mistakes, poor grain or unattractive color. For reasons you'll understand in a moment, I stop the plug boring just shy of the full thickness of the board, so the plugs remain temporarily captive in the holes.

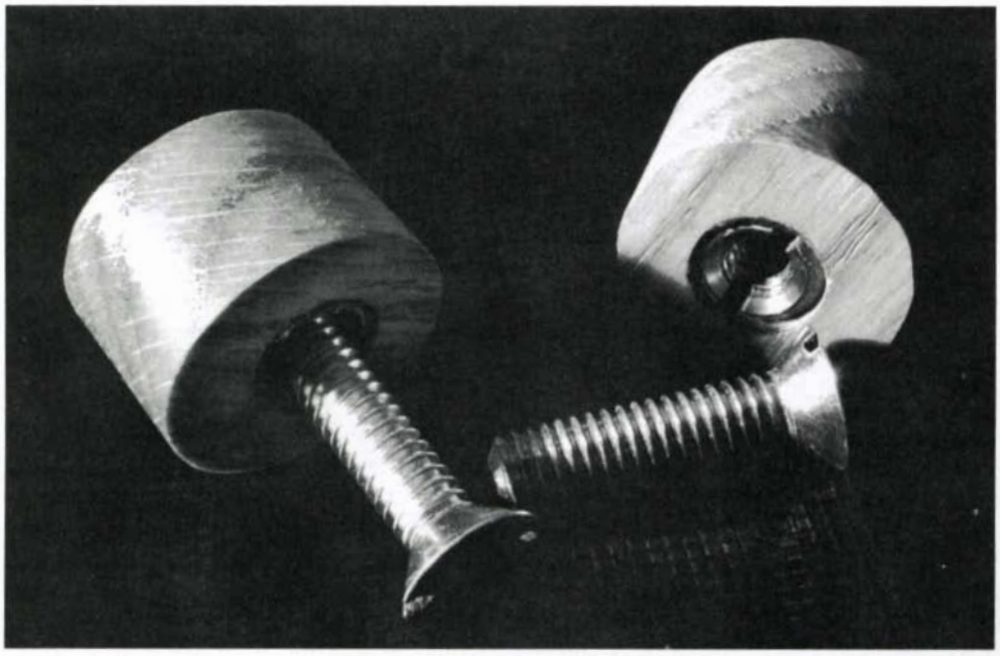
Cylindrical wooden pulls are fastened to the cabinets with machine screws passed through holes in the door or drawer face and into brass or steel threaded inserts let into the back of each pull. Threaded inserts come in various sizes and shapes (available from most woodworking mail-order supply houses), and the size hole required for an insert will depend on several factors. Inserts that are meant to be hand-threaded into the hole will require a slightly larger-diameter pilot hole than those that are meant to be power-driven. For example, brass inserts require a larger hole than steel ones of the same size, because brass is softer. Also, in the very hardest woods, like ebony, the hole should be just a hair smaller than the diameter of the external threads. If the hole is too small, either the insert won't go in or it will split the pull. I bore the holes for the inserts while the pulls are still attached to the board so I won't have to clamp them individually to the drill press.

I don't generally use brass inserts, because they're too soft, particularly in hardwoods, where the extra toughness of steel inserts makes them easier to drive. True, steel may react chemically with oak, but the insert is concealed by the pull, so any staining won't be visible. Even steel inserts can be difficult to drive in straight, though. I've found a neat trick for accomplishing this, which saves me lots of effort, especially if I have dozens of pulls to make. I cut off the head of a hex-head machine bolt sized to fit the insert's inside threads (usually ¼ in. dia.) and chuck it in the drill press with the bolt threads on the bottom. I thread an insert onto the bolt and turn the chuck by hand as I lower the insert into its hole. When all the inserts have been screwed in, I resaw the board on the bandsaw to cut the pulls free. This operation is quite safe, as long as you keep your cut well away from the inserts. If you should accidentally saw into the inserts, though, you will ruin the blade and the pulls.

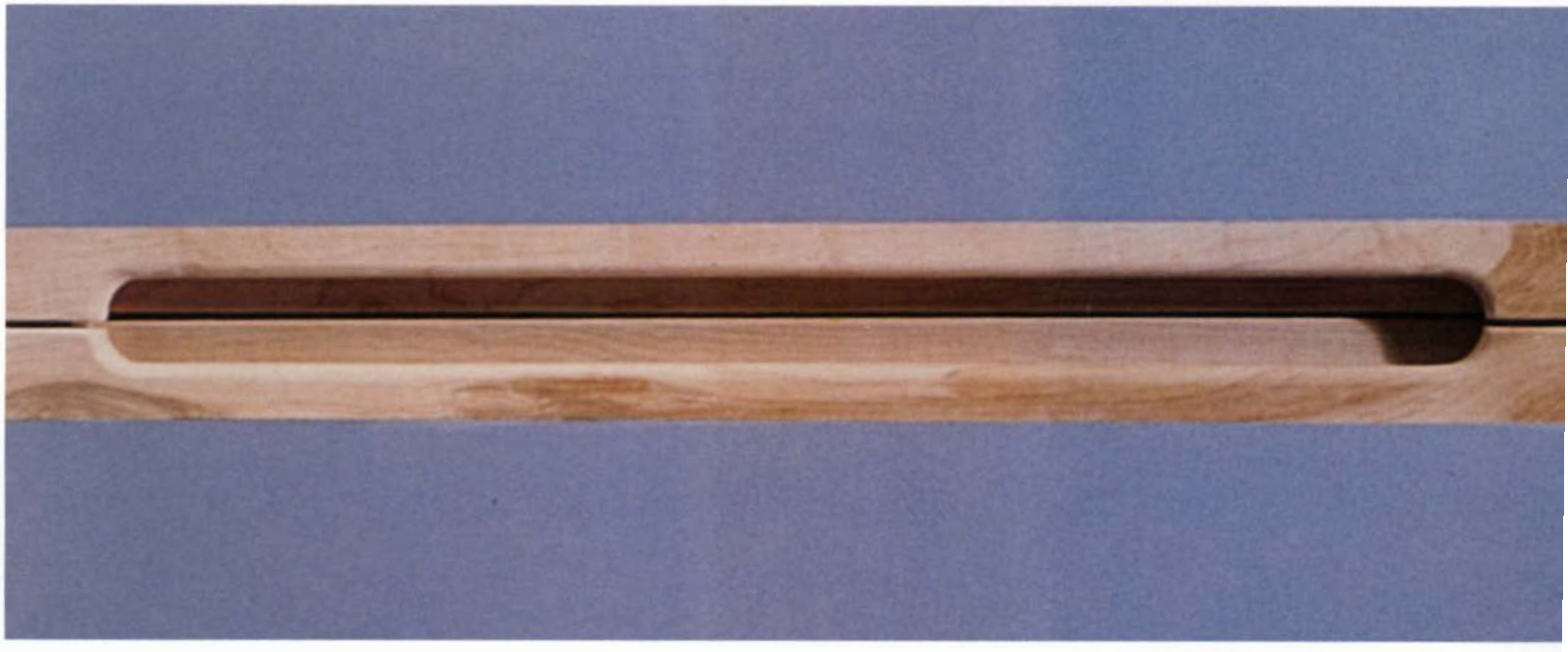
These round pulls look good on just about any cabinet design, but they're not always appropriate. Some people find their smooth sides hard to grasp, and they are especially difficult on heavy drawers or doors. You wouldn't want them on a file drawer, for example. You can improve the grip on this pull by cutting a notch into one or both sides of the cylinder. I do this by boring a hole across the pull while it's still attached to the board or by sanding a notch into the pull after it's cut free.

Yet another simple pull can be made by using the plug cutter to cut half-wafers in stock about ⅜ in. thick. Clamp two pieces of stock together at their edges, center the plug cutter on the seam and bore away. The resulting half-wafers can be attached with glue and drywall screws driven in from the inside of the door or drawer. Wafer pulls are suitable only for delicate applications, not for large or heavy drawers.

**Stile pulls**—Of all the various pulls I make, I like glued-on stile pulls best. Their chief advantage is that they require no pattern at all. Over the years, I've experimented with various stile widths, finally settling on 2 in. as the best choice, as shown in the bottom photo on the facing page. The stile can be glued to a vertical or horizontal edge, depending on whether the pull will be for a



***Button pulls, above, are simple to make and install. These are shaped using a plug cutter on a drill press and will be held in position with screws through the back of the drawer faceplate. Also easy to make is the stile pull, right, which requires only a drilled hole with smoothed edges. Stiles, 2 in. wide and glued to the drawer face in place of edging, provide plenty of material for routing pulls. The photo below shows routed maple stiles glued to the top of the door and bottom of the drawer face to form matching pulls.***



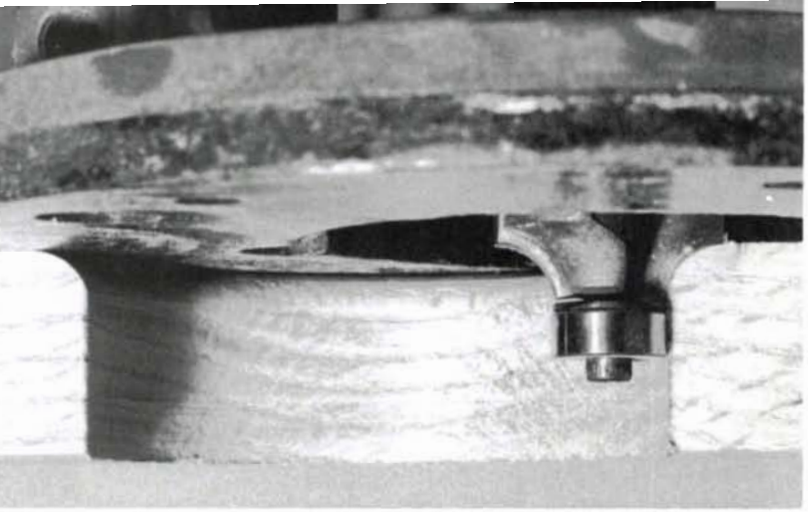
door or a drawer. In either case, the size of the plywood panel will have to be adjusted to allow for the stile's width.

The stile can be added to an already edged face, or it can be glued on in place of one of the ¼-in. edging strips. The method you choose depends on the look you want. If the stile is glued to edging that has been chamfered or rounded, a shadow line results, highlighting the stile. A stile installed in lieu of edging will appear cleaner and will form a more integrated part of the door or drawer face. Obviously, if you want wooden stile pulls, you'll have to make and install them as you're edging the faces. If you've chosen commercial pulls, you can install the faces when the edging is complete and add the pulls later.

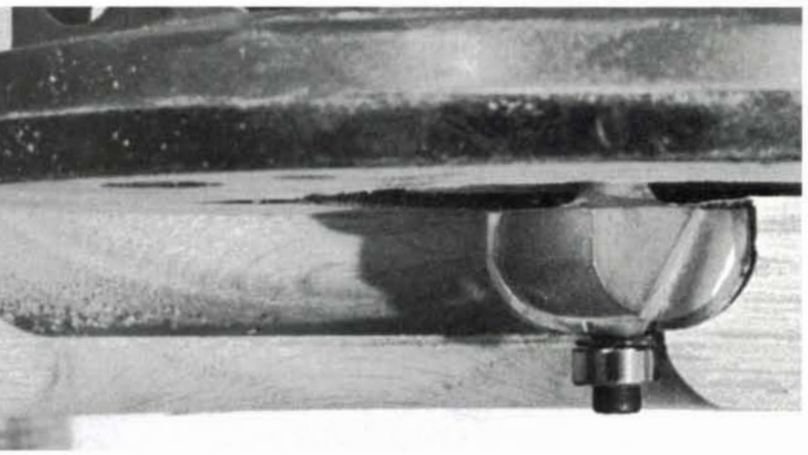
The simplest stile pull is the round pull shown in the top, right photo above. The cutout is a hole, 1⅛ in. in diameter or larger, bored on the drill press using a Forstner bit. Once you've decided on the location of the pull, simply bore the hole and then shape the edges of the hole to provide a comfortable and secure finger-hold.

After the hole has been bored, clamp the workpiece in a vise so the front of the stile faces up. Then, round the edge using a ¼-in. bearing-guided roundover bit, as shown in the top photo on the next page. Flip the piece over, and use a ⅜-in. bearing-guided cove bit to hollow out the back of the pull for the finger-hold (see the middle photo on the next page). Although I used to be rather precise about the exact depth of this cut, I don't bother to measure it anymore. Instead, I start by making a small cut, then drop the bit a little on each successive pass. After three or four passes with the cove bit, the pull is done, except for sanding.

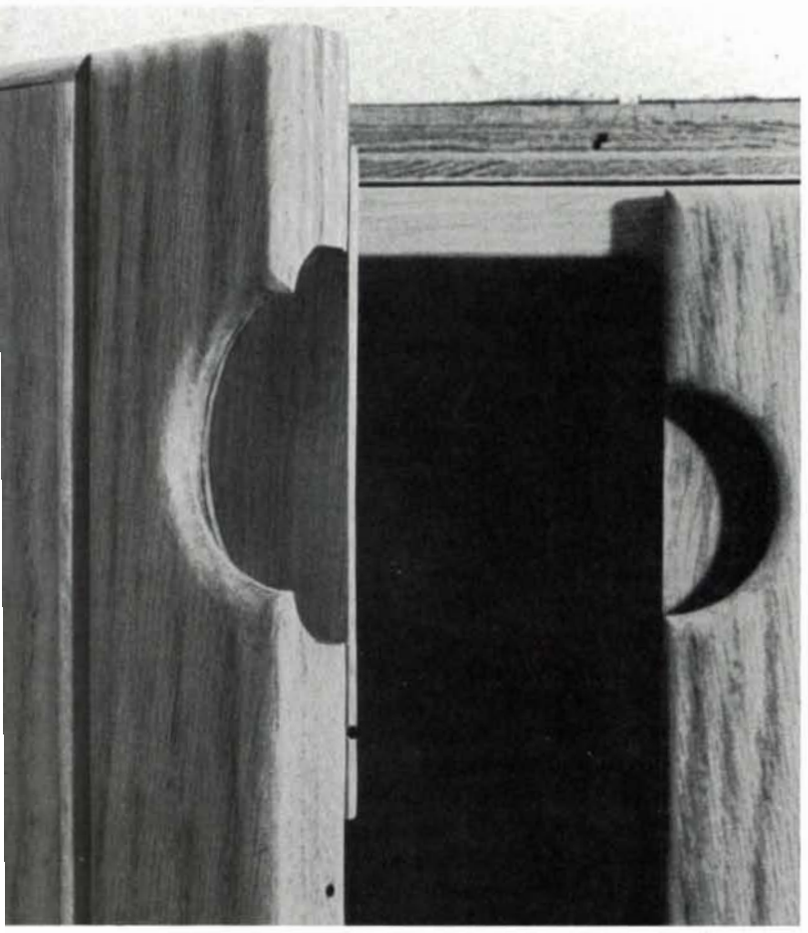
The pull is the first place you touch a cabinet, so it should be



*After the overall shape of the stile has been cut out, the pull's front edge is rounded over, above, using a router.*



*The back is shaped with a cove bit, above, guided by a pilot bearing (cut-away view shown for clarity). The finished pull, below, has a thin piece of wood glued to the back of the stile to close off the back of the pull.*



silky and inviting. Don't spare the labor here, because you'll regret it every time you open a drawer. I find that the best approach to sanding pulls is to use a combination of hand and machine sanding. I start with an orbital sander, then sand by hand. I begin with 100 grit, then go to 120, 180, and finally 220 grit. Sand all the parts evenly and be sure to get the finger-hold as smooth as possible.

You can vary the design further by making a split-round pull, which I often use on adjacent door stiles. To make one, rip a board into two 2-in.-wide stiles, then clamp them together and bore the hole. This method preserves the wood's grain and the cutout's circular shape. Now round over the front edge of the hole and cove the back, as you do for round stile pulls. A split-round stile pull needs a backup plate (see the bottom photo on this page) to close off the opening so the pull won't look like a bottomless, dark hole in the front of the cabinet.

Yet another variation of the basic round pull is the elongated version. To make one, bore two holes to form the ends of the cutout pull and remove the waste between them with a jigsaw. To get the waste cut perfectly straight, I follow with a router and trimmer bit, guided by a straight piece of plywood clamped to the back of the stock along the outside edges of the holes.

**Inset pulls**—An inset pull is a shaped hole or slot cut through the door or drawer face. To provide a finger-hold, a cove is routed into the backside of the opening, as described for the stile pulls. Generally, I only make an inset pull in solid wood, because through-routed slots in plywood aren't very attractive. However, it is also possible to cut the pull in a piece of hardwood let into a plywood drawer face or door.

The inset pulls shown in the photo on the facing page are one of my favorite inset designs. It was inspired by furniture I once saw in a book about Charles and Henry Greene, two turn-of-the-century architects best known for their skillful blending of Arts-and-Crafts style with Japanese motifs. I wanted to incorporate the Greene brothers' sense of rich, individual character in my own cabinets. This pull can be routed directly into a solid-wood drawer front or into a stile, which is then glued to a door or drawer face. If you choose the stile approach, the pull's shape can be routed into a pair of stiles that have been temporarily clamped together. When they are separated and glued to faces, the stiles will form pulls in adjacent doors or drawers.

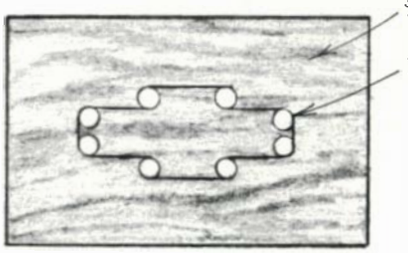
The process for making inset pulls is called pattern routing, and it ensures consistent results, because the same pattern is used to guide the router for each pull. Making an accurate pattern is really the only tricky part of making the pull; using the pattern as a guide makes the machining go pretty quickly. To begin, I draw a full-size outline of the cutout portion of the pull on a piece of ¾-in. plywood. As the drawing on the facing page shows, the pull's shape is defined by a series of ¼-in.-radius circles joined by straight lines. When laying it out, though, I don't bother drawing in the radii. Instead, I simply mark the centers of the eight circles and bore them out with a ½-in.-dia. Forstner bit. This method produces a cleaner, smoother curve than I could ever achieve by hand.

When the holes have been bored, I jigsaw the lines that connect their outside edges. With a mill file and 80-grit sandpaper, I shape the outside radii and smooth the pattern so the pilot bearing on the router bit will have an even surface to run against.

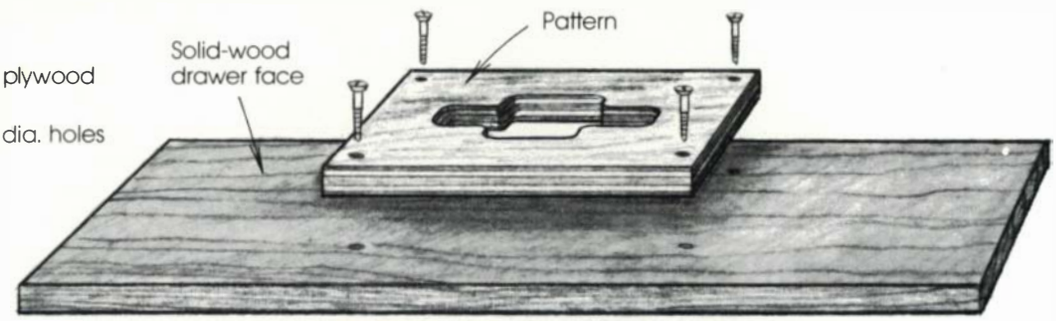
Once the pattern is completed, I make a test pull on a piece of scrap. Using the pattern as a guide, I bore the holes at each outside corner first. Then, I jigsaw almost up to the edge of the pattern. I then turn the pattern over and use a 1-in.-long bearing-guided trimmer bit to shape the cutout to the pattern. Finally, I

***The inset pulls above were made by using the pattern-routing technique described in the text. This design can be used in solid-wood drawer fronts, or if routed into a stile then ripped in half, on adjacent door or drawer fronts.***

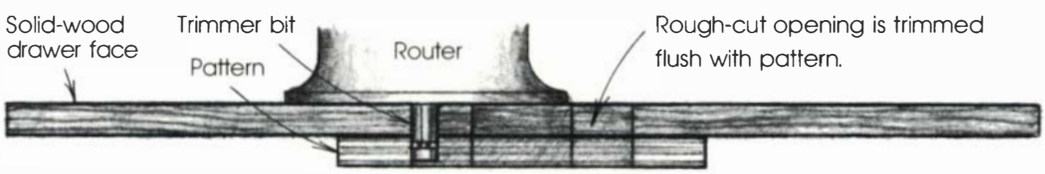
## Pattern routing an inset pull




1. Draw a full-size outline of the pull on a piece of plywood, bore holes at each corner and jigsaw to remove the waste. Then remove the cutout and smooth the inside edge of the opening.




2. Screw the pattern to the back of the drawer face. Bore holes at each corner, and saw between them with a jigsaw.




3. Turn the pattern over to trim the opening in the drawer face flush with the pattern.

round the inside edges of the pull, cut the cove on the backside and sand the pull smooth, as described for the stile pulls.

When I'm satisfied that the shape is exactly right, I perform each machining operation on all the pulls. Working this way ensures that all the pulls will be identical, and it saves endless resetting of the router's cutting depth. Also, if you are working on a stile, it makes sense to shape the pull before the stile is glued to the drawer or door face. This way, if you make a mistake cutting it, you haven't ruined the whole face. If you are shaping a drawer pull, the pattern can be screwed to the back of the face, because the screw holes will be hidden when the face is mounted.

Once the pull is cut into a drawer face, the face can be screwed directly to the front of a drawer, provided the front is made of the same material as the face. If it isn't, the contrasting wood will show through the cutout. To remedy this, you can let into the drawer front a piece of wood of the same species used for the face, or you can glue a 3/16-in.-thick hardwood plate to the back of the cavity. □

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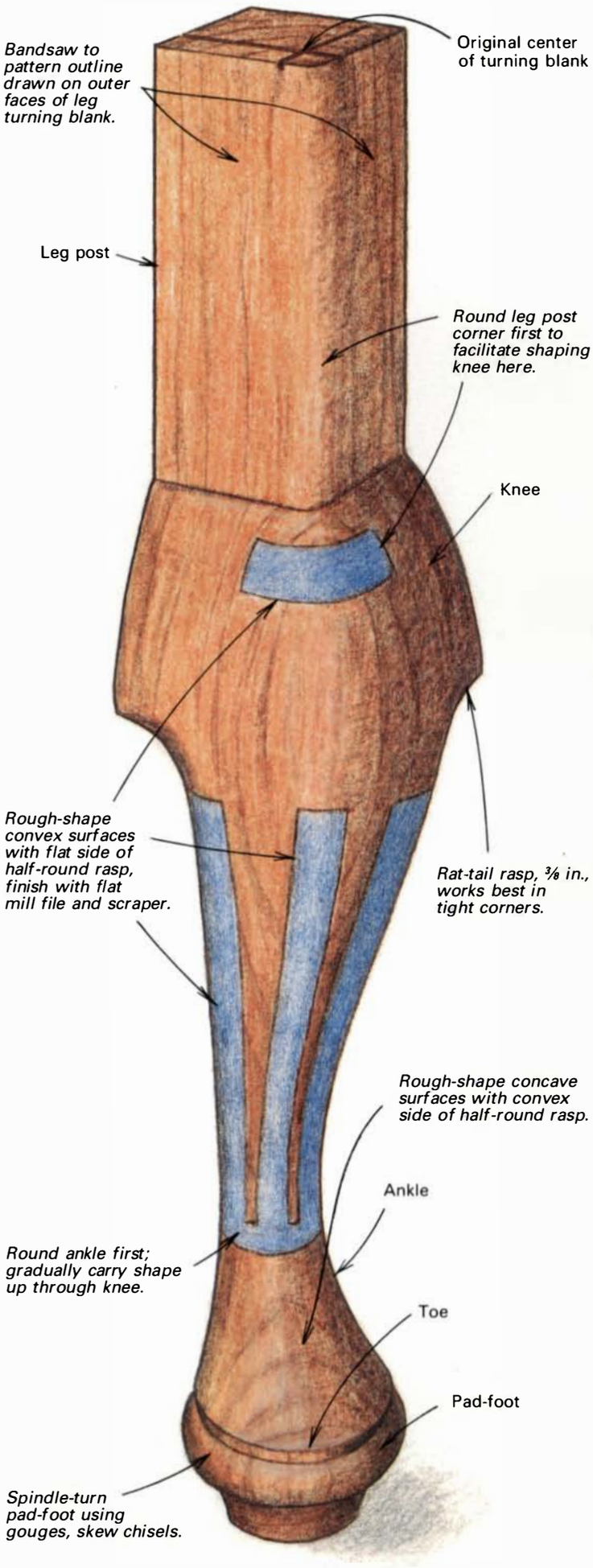
*Paul Levine is a cabinetmaker and furniture designer in New Milford, Conn. This article has been adapted with permission from the new Taunton Press book "Making Kitchen Cabinets,"*  *Photos are by the author.*

Drawing, Lee Hoy

**Fig. 1: Cabriole leg anatomy and shaping overview**




# Shaping a Cabriole Leg

## *An easy job with files and rasps*

by Eugene E. Landon

Many woodworkers are afraid of cabriole legs. There's something intimidating about all those graceful interconnecting lines. And making matching pairs seems to require a touch of genius. In point of fact, however, cabriole legs are a breeze. I had my young helper, Joel Crabtree, feeling guilty for awhile thinking I must have worked incessantly through the night to produce sets of legs for six chairs. Each morning he would find yet another completed set. When he finally discovered I was doing a leg in 20 minutes or so, he felt more sheepish than guilty.

I'm sure craftsmen of the period (1730-1795) worked as quickly. The simultaneous existence of plain and ornately carved styles reflected the European origin and local taste more so than the skill of the woodworker. Economics sometimes dictated the extent of carving; each carved area was charged for separately. Shaping the plain legs for a Queen Anne or Chippendale chair, which I'll describe later, requires only rudimentary skills in spindle-turning and in the use of files, rasps and scrapers. Figure 1 identifies the parts of the leg and will give you an overall idea of how it is made. The dimensions are for the late Queen Anne, early Chippendale chair shown on p. 86, but the legs can be adapted to different chairs, tables and other furniture pieces.

If you have doubts about your ability to make cabriole legs, I invite you to glue up a blank from a cheap, soft wood, such as pine, then go at the job with abandon. There really are not any subtleties or secrets.

**Preparing the blank**—The leg blanks are 17½ in. long (to allow some excess at both ends for later trimming) and 2⅝ in. square. To ensure strength, choose wood without much grain runout. The leg I'm shown making in the photographs is cherry of the worst-working sort—rock hard and brittle. It probably came from a leaning tree. Even so, the job isn't difficult.

Make a leg template according to the dimensions in figure 2 on p. 87, and trace it onto what will become the two outside surfaces of the leg. Mark the center of the ends of the blank at this time, as a reference for mounting it on the lathe later. Then, carefully bandsaw to the outlines on both sides, using the offcuts from the first cuts to support the leg for the second cuts. You'll get the



Drawings: Lee Hov

*The development of a cabriole leg: First, the template at bottom is traced onto two sides of the squared stock. In his right hand, the author holds a blank that has been bandsawn following the template lines. Next, the foot is turned on the lathe. The top surface of the square section just above the turned foot forms the toe. In his left hand, Landon holds a finished leg that has been rasped, filed and scraped. An experienced worker can do the whole job in 20 minutes.*

most precise cuts if you tape the offcuts in place using shims of paper or veneer to fill the bandsaw kerf. After bandsawing, what was the center point in the leg-post end of the leg is now offset. The leg axis extends from this point down through the center of the foot (see figure 2). This clever axis alignment is what allows the leg to be conveniently shaped on the lathe.

Your leg should now look like the template shown at the bottom of the photo above and like the leg I'm holding in my right hand. Chuck this in the lathe with the foot at the tailstock and turn the foot according to the dimensions given in figure 2. Note that the top surface of the square section (just above the turned foot) forms the toe. You should just nick this as shown; if you try to turn any higher up the ankle, you'll ruin the lines of the leg. Your sample should now look like the second leg from the top in the photo.

**Rasping and filing**—The easiest way to shape cabriole legs is with rasps and files. The initial cuts are heavy ones and are made using a half-round rasp: the convex side for concave curves, the flat side for convex curves. I also use a ⅜-in. rat-tail rasp on occasion; it's particularly good for removing small high spots on the top concave surface of the foot (just back from the toe) and underneath the knee. These areas are mostly endgrain, and the wider rasp is more difficult to control through the transition to the long-grain areas.

A 10-in. or 12-in. flat mill file and a round file will remove the rasp and bandsaw marks. A scraper, made from a length of old power-hacksaw blade, will then remove the file marks. The trick to rasping and filing is to smoothly push or pull the tool in a gentle arc to gradually develop the desired shape. If you hold the handle of the rasp in your right hand and its tip in your left, it will cut on the push stroke. Reverse the rasp in your hands and it will cut on the pull, or "draw," stroke (hence the name: drawfiling). Keep the teeth clean, and don't let the rasps and files rub against each other, as this will dull them quickly.

Position the work in a bar clamp held in a vise, as shown in the photos. Since the narrowest part of the leg is at the top of the foot, establish the basic shape here first. Use this as a reference to gauge your progress in developing the shape for the rest of the

*The leg is clamped in a vise, above. Landon has already shaped the top surface of the foot and is shown here using the convex side of a half-round rasp to round the corners of the leg. The goal is to remove enough wood from each of the four corners to make the ankle round. The profile of the curve at the ankle should extend up the full length of the leg.*

*After establishing the basic shape with rasps, the author quickly removes the tool marks with fine files. The key to successful filing is to move the tool smoothly in a gentle arc and gradually develop the final shape. Drawfiling works well here: If the file's handle is in your right hand, you push; if it's in your left hand, you pull. Rotate the leg gradually as you refine the shape, and work in whatever direction that's necessary to avoid tearout.*

*Above: Bandsaw marks remaining on the flat surfaces at the upper part of the leg are removed with a flat mill file. Rounding the post corner first creates a step in the top of the knee and gives you enough room to shape the knee properly. Below: Landon's favorite scraper, made from a length of power-hacksaw blade, polishes the fine file marks away. A light touch with supermarket-variety green Scotch-Brite, which traditional-minded Landon refers to as 'sharkskin,' will yield a uniform surface ready for finishing. The occasional tiny scraper chatter marks on the final surface resemble those found on 18th-century work.*

leg. Begin by rasping the top of the foot down into a fair curve that blends into the ankle. At the ankle itself, the goal is to remove each of the four corners in turn until the ankle is round. The profile of the curve at the ankle extends through the length of the leg. It is easy to check the width and uniformity of the curve by eye as you proceed.

Begin the shaping by rotating the leg by 90°, working each corner in turn. It may take several complete revolutions before you are satisfied with the rough shape. Continue this procedure, but reduce the rotation angle to first 45°, then 22 1/2°, and so on until the profile is shaped fair. Orient the leg as you wish, working in whatever direction that's necessary to avoid tearout.

At the outer corner of the top of the knee, it will seem at first that there is not enough wood to allow a curve; rasping one would lower the front of the post. This problem, however, takes care of itself if you round the outer corner of the post first, which creates a step in the top of the knee. Because the area is endgrain, I generally shave it with a chisel for better control, but rasps and files will work here, too.

I finish the legs using a scraper, as mentioned, followed by green Scotch-Brite (available in your local supermarket). The final surface, with its occasional tiny scraper chatter marks, looks just like the surface I frequently find on 18th-century work. Set the legs aside for the moment; you'll have to do some fine-tuning later, after the legs are assembled into the chair frame. □

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*Eugene Landon builds reproductions of period furniture in Montoursville, Pa. You may find additional suggestions for chair construction in his article in* FWW *#60. Mack Headley's instructions for carving the shell in* FWW *#61 should also be helpful.*

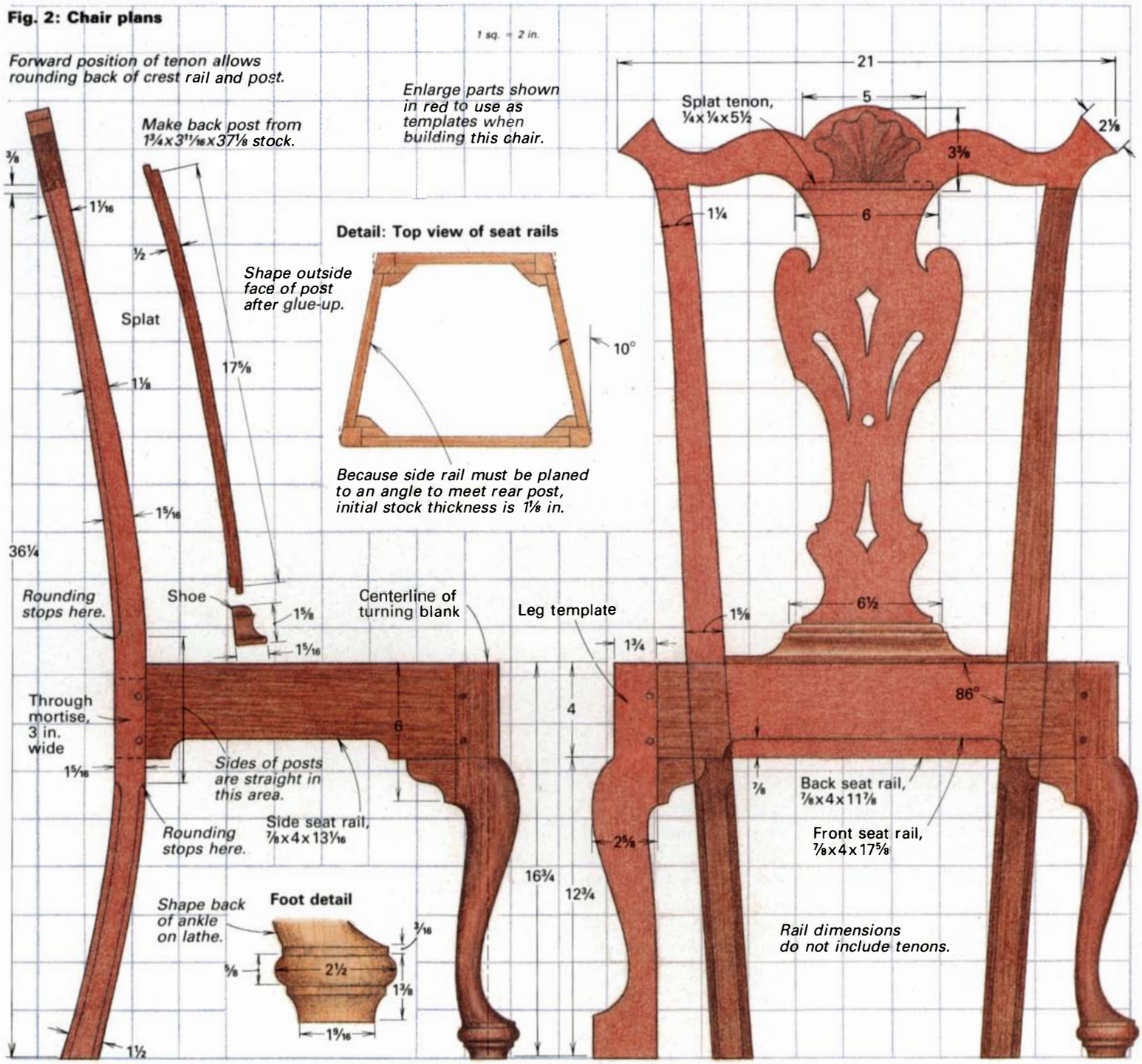
Photo below: Terry Wild

*Above is the original chair from which the templates and dimensions were taken for the drawing on the facing page.*

# *Building a Chippendale chair*

**Now that you know how easy it really is to make a cabriole leg, you may be itching to give it a try. On the facing page are the measured drawings you'll need to make the chair shown in the photo above. The first step is to scale the templates up to full-size and cut them out. Because chairs are almost always built in sets, make the templates from a durable material. Label them clearly, as in years hence, you may want to use them again. Write down angles, thicknesses and other technical notes on the templates as well.**

**After cutting the joints, assemble the chair in sections, which will ease the problem of getting it square. If you try to glue up a whole chair at once, the job may get out of hand. Begin by gluing up the rear posts, the crest rail and the rear seat rail. Take care that everything is plumb, flat**




and square. Note that the shoe, or saddle, which is mortised to receive the tenon on the bottom of the splat, is not glued in place until the back is assembled. You want the splat tenon to fit tightly into the shoe. If the splat were glued in place, it would most likely split because of seasonal wood movement. Therefore, cut its tenons after the rest of the back has been glued up solid. As a last resort for a splat that turns out too short, you can modify the shoe's height to compensate. Also, before fitting the shoe, it's easiest to glue the back glue blocks in place against the back rail, then plane them flush with the front surface of the back posts after the glue has dried. If you see a chair with some other glue-block arrangement, chances are it isn't original.

When the back is dry, the remaining rails and the legs can be glued in place. Once you know the back is straight and square, you can devote your full attention to squaring the rails and legs. Dry-fit the pieces first, just in case you have to modify the shoulder lines or adjust the mortises and tenons. When all is correct, mark the bottoms of the legs, remove them, and then cut them to length. After the assembly is dry, saw off the excess length from the top of the front legs.

The final step in construction is to fine-tune things: Reshape the outsides of the leg posts so they angle back in line with the side seat rails. I use rasps and files for this job as well. At the same time, reshape the top of the knee to follow suit. Lastly, you'll need to chisel a notch in the top of the post for the corner of the seat frame, which should be cut and planed to fit. —*E.L.*

# Pepper Mills and Saltshakers

## *A seasoned approach to multiples*

by Sven Hanson

***The tops of this saltshaker and pepper-mill set feature the author's 'theme stripe,' a layer of padauk between layers of walnut. This stripe adds a decorative touch and identifies the set as one item in his line of kitchen accessories.***

Making multiples, instead of one-of-a-kind pieces, is like converting your old stereo to play digital compact discs. The highs are higher; the lows are lower. The clinkers are as painful as a child's first violin lesson, while the winners feature the sounds of contented craftsmen, appreciative words from customers and the crisp sound of currency as it's tucked into the cash box. Even if money isn't your object, wouldn't it be great to make 20 Christmas gifts in the time it normally takes to make just a few? Or wouldn't it be great to increase the potential of your tools, while improving your accuracy through the use of well-designed jigs?

My goal in making these salt-and-pepper sets was to make money, so my first consideration was the economics of the project. A few years of selling small salt-and-pepper sets for $29.99 at craft fairs proved to me that people would pay a premium price for quality kitchen accessories. I thought I could get $49 for a taller set that included a pepper mill. A visit to some local shopkeepers with a sample set supported this assumption. But the real proof came when I sold 24 sets at a craft fair at the $49 price. Forty-nine dollars seems like an easy price to meet, but...that's the retail price. To make money, I have to produce a set for $25. The grinder mechanism and the #6 XXXX cork, together cost $4 per set. The wood costs about $3. That leaves $18 for labor and overhead, so to make a profit, I have to produce more than one set per hour. To get this kind of efficiency, there are some things you should do before you ever touch the wood.

**Organizing**—A full-scale drawing will let you finalize your design and help you visualize and organize each step of the process. If you make notes at this planning stage and add to them as you work, you won't have to resolve problems when you do your second run, weeks or months later. Think through the order of procedures; each operation will affect future ones. For example, on this project, the salt escape holes are drilled *after* the finish is applied to avoid filling the holes with oil and steel wool while finishing. Also, the dowel stems that join the tops to the bases are glued in and drilled after most of the other drilling so they won't get in the way during the roundover operation and make sanding and finishing more difficult.

An important piece in the puzzle of organizing your procedures is the designing of jigs to execute repetitive processes with precision. For this project, my jigs are very simple: I use one jig for sawing, three different jigs for drilling and some special boards for holding parts while finishing.

For crosscutting and ripping, I use a sliding-cradle jig on my tablesaw. On the back fence, I mark the lengths for the various pieces with a drafting triangle and a fine-line mechanical pencil for maximum accuracy. I clamp a stop block at these lines when making multiple cuts, but if one or two extra cuts need to be made after the initial run, I just slide the piece up to the line and cut. I always make a couple extra of each part to test setups or to replace damaged or defective parts.

Most of the drilling is done on the drill press using the L-shaped jig shown on the facing page to locate and support the wooden blanks. On a run of 18 salt-and-pepper sets, I will drill more than 100 holes with this jig, so I make sure the upright supports are square to the base and each other.

The second drilling jig is simply a piece of ¾-in. plywood roughly the same size as the drill-press table. The jig is clamped to the table, and a 1-in.-dia. hole, ⅝ in. deep, is bored near its center. The stems of the pepper-mill tops are placed in this hole



Photo: Michele Russell Slavinsky; drawings: Roland Wolf

so they are automatically centered under the chuck when drilling for the grinder shaft.

The third drilling jig is a piece of ¼-in.-thick aluminum plate, 2⅛ in. sq., which fits over top of the saltshaker as a guide for drilling the salt escape holes (see figure 1).

To hold the pieces during finishing, I adapt the ¾-in.-thick plywood trays that I use to hold and carry the parts between tools during the machining processes. For the tops, I drill a grid of ¾-in. holes, 2½ in. apart, an even number in both directions, and tap a 1½-in.-long dowel into each hole. For the bodies, I drill ⅜-in. holes and drive pine sticks, ⅜ in. by ⅜ in., 7 in. long, into them. I drop 1-in.-long pieces of 1¼-in. dowel with a ⅝-in. hole drilled in the center over these sticks. These dowel "donuts" fit into the hole in the bottoms of the bodies and keep the bodies off the board during finishing. Because these shakers and mills are used in the kitchen, they should be neat and clean, even on the bottom.

**Cutting and drilling**—After I've planned my procedures, designed my jigs and determined how much wood I'm going to need (an 8-ft. 2x6 will make 18 sets), I head to the lumber store to get the cleanest 8/4 walnut I can find. Forget scraps from the floor, you'll do better getting the best of the best.

Back at the shop, I begin by laminating blanks for the tops. I use what I call my "theme stripe": a layer of padauk between two layers of walnut. The theme stripe works two ways for me. Since I make a line of kitchen items, shoppers can put together an ensemble of pieces. And, items made of very different shades of walnut, or even of different woods, clearly bear a family resemblance. Center the stripe and glue up seven 12-in.-long and 2-in.-sq. blocks. This will give you four extra tops in case anything goes wrong later. While my laminations are drying, I begin cutting the bodies to length with my sliding-cradle jig on the tablesaw.

I do all my ripping and crosscutting on the tablesaw with a 24-tooth Freud rip blade. With a sharp blade and a slow, steady feed, I get as many cuts to the inch and as clean a cut as with a crosscut blade, and I don't have to change blades. By taking great pains to see that all my sawcuts are extremely smooth, I get by with only one step on the belt sander (150 grit). This saves a good deal of time at one of the most tedious parts of the job and reduces the chances of missing a side while sanding, only to have it show up like a sore thumb after the first coat of finish is applied.

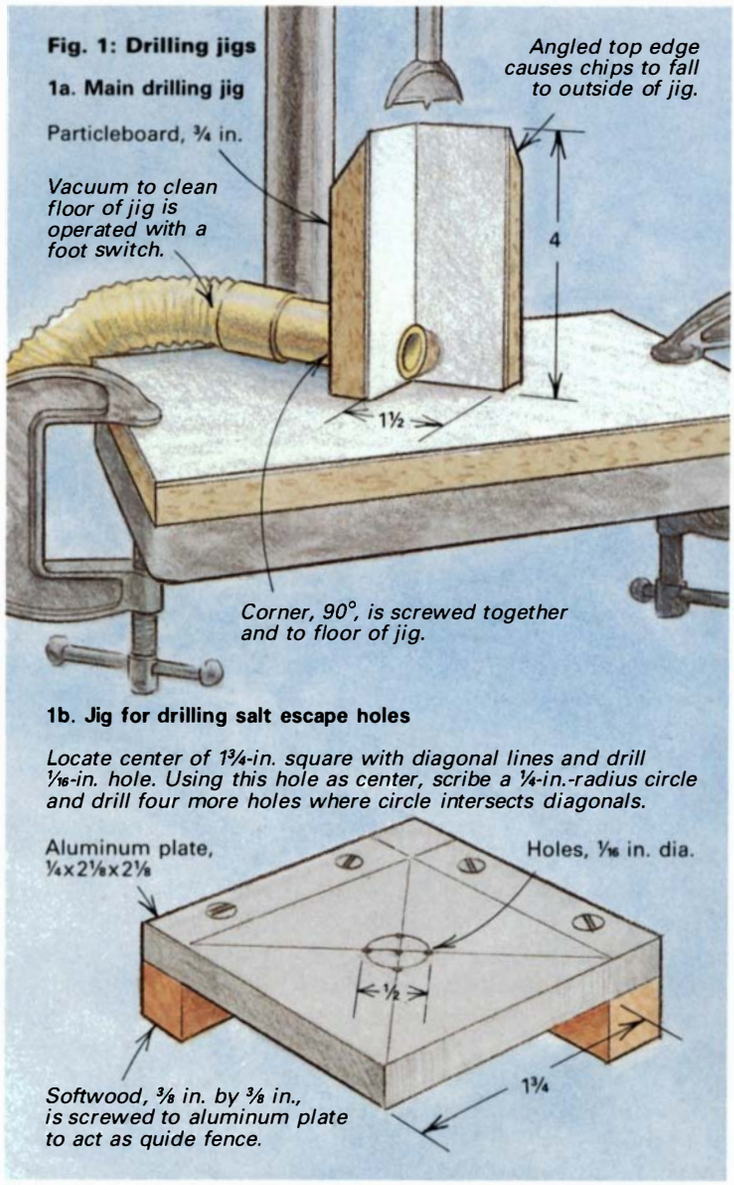
After I've crosscut enough stock to make 36 bodies (18 sets), I rip them as wide as the stock is thick (my original stock was 1¾ in. thick) by placing the endgrain of the pieces against the fence of the sliding-cradle jig and butting them to a stop block clamped to the fence. Here's where the sharp rip blade and the steady jig create perfectly sized, easily sanded pieces. I move them off the jig onto plywood trays, keeping them in pairs. The careful placement of the pieces before and during an operation ensures that each piece gets completed in its proper turn.

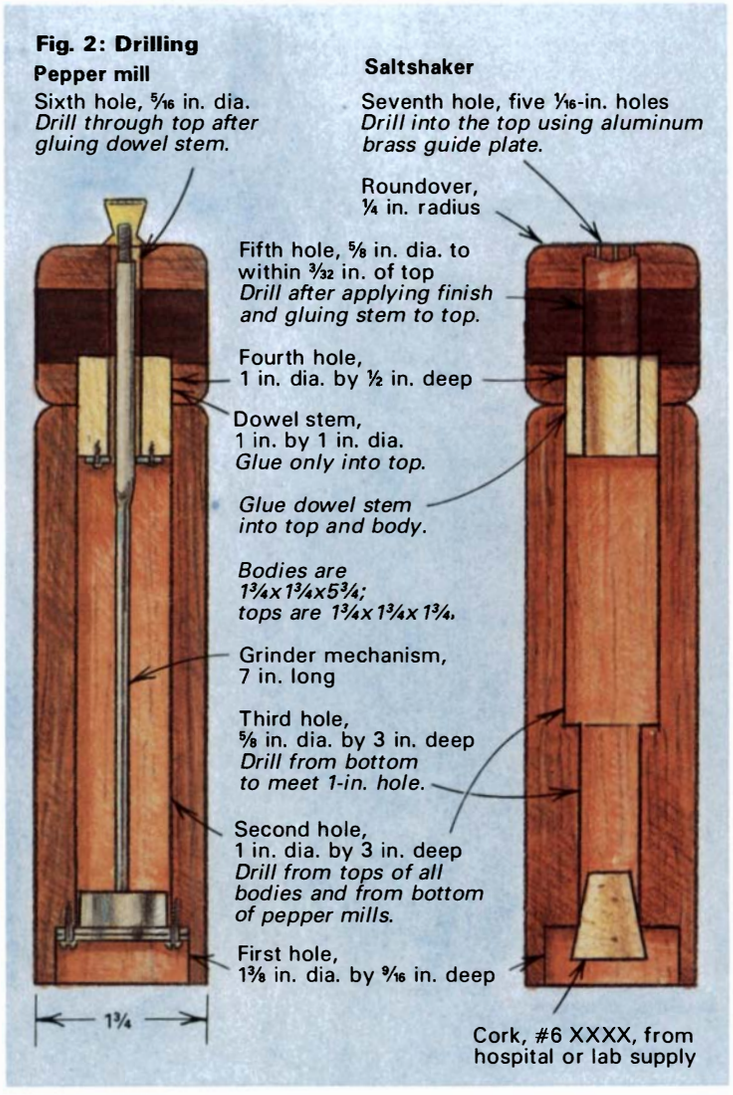
By this time, the blanks I laminated for the tops are ready to work. I scrape off the glue, lightly joint one side and lightly surface the other on the tablesaw. Leave the pieces slightly larger than the thickness of your original stock or they'll end up small after they're routed and sanded. The mark for crosscutting the cuboid tops is the same one used for ripping the bottoms to width. Before I leave the tablesaw, I cut the lengths of 1-in. dowel for the stems. Mark 1 in. on the tablesaw jig and cut 36 pieces. Caution! Don't use a stop block, or you'll be asking for a kickback. I use an ice pick to keep the 1-in. cutoff from flying away, and when the dowel gets short, I start a new one.

After the tops and bodies have been cut to size, I carry them over to the drill press on the plywood trays. I clamp my drilling jig to the drill-press table and start with the largest hole. Figure 2 on the next page shows the steps for drilling. Keep the bodies in pairs and replace them in the same position on the tray, but turned, so you can tell at a glance that each operation has been completed.

**Routing and sanding**—Next, I round the edges on a router table with a ¼-in. roundover bit. I do the tops first, pushing them only halfway through, then turning them and completing the cut by feeding from the opposite corner. All 12 edges are done in this way so the bit can't tear out the corner at the end of a cut. Roundover the edges of the bodies in the same way, leaving the bottom four edges square to provide a stable base. I do the short edges at the top first and then the long edges. I try to push fast enough not to burn and slow enough not to tear out. The routing is one of the most tedious jobs, and if you don't do it in an orderly fashion, you'll miss edges. I actually count out loud, like musicians count: one, two, three, four; two, two, three, four; and so on. Once a groove is established, I let my mind relax. I just keep an eye on my fingertips and take short breaks as necessary to relieve the "highway hypnosis."

Now we're in the middle of the ocean of work. One noisy, dusty, boring job is behind us, one ahead of us: sanding. I smooth the flat surfaces first on a 6-in. by 48-in. Shopsmith stationary belt sander with a brand new 150-grit belt. To get the most from my






belts, I use a rubber belt cleaner often. I sand the flat surfaces first on all 72 pieces, then the roundovers, long edges first, and then the endgrain. Just like in the routing, I develop a pattern and count as I go. Each edge gets three swipes: the first is pressed hard, the second medium and the last pass is light. This way, when I switch to the 220-grit orbital sanding, the scratches are relatively shallow and only the corners need much work. Before the orbital sanding, I wipe each part with a wet sponge. This not only raises the grain to allow the sandpaper to do its job more easily, but later on, when the salt-and-pepper sets are used in the kitchen, they'll be far less likely to water-spot. I load four sheets of paper at a time on the orbital sander and slice them off one at a time with a thin ruler as they wear out.

After the final sanding, I use a narrow foam brush to apply Armor-All (available at most auto-parts stores) over the padauk to preserve its red-orange color. Twenty-four hours later, the raised grain is smoothed with steel wool. (Even after the water treatment, the grain will raise a little.) At this point, I convert the plywood trays to hold the parts for finishing.

**Finishing and final drilling**—My clients seem to prefer a thick, glossy finish, so I apply a light coat of sanding sealer to help the finish build faster. The parts are placed one at a time on a piece of plywood that sits on a 3-in.-dia. lazy-Susan bearing, and I rotate the board with my gloved left hand while I spray the sealer. After this coat is dry, I scrub on a coat of Waterlox (see sources of supply at right) with 0000 steel wool and place the parts on the trays for a few minutes before wiping off the excess with a cloth. If the finish is generally smooth, I apply the second and subsequent coats with soft cotton cloth instead of steel wool, to allow the finish to build faster. I apply three to five coats of Waterlox, depending on the gloss desired: Three coats will give a satin finish; Five coats will give a fairly glossy finish. Allow at least six hours between coats, longer if the temperature is below 70° or if the humidity is high. Waterlox is similar to Danish oil, but it builds much faster and is much more water-resistant. It sets up so fast that you should put finish on only four pieces before coming back to wipe them off.

After the finishing is complete, I glue the dowel stems in place by spreading glue in the hole in each top and firmly pressing the stem into place. Keep squeeze-out to a minimum by experimenting with the amount of glue on the first few you do.

Now it's back to the drill press to complete the tops. First drill all the saltshaker tops. Place them upside down in the drilling jig, and with a 5/8-in. Forstner bit, with the point shortened, drill to within 3/32 in. of the top. Make sure your depth stop is accurately and firmly set. I use a layer of paper towels to cover the jig bottom and protect the finish from dents and scratches.

To drill the pepper-mill tops for the shaft of the grinder mechanism, you'll use the jig with the 1-in.-dia. hole in its center. With a 1/4-in. brad-point bit in the chuck, align the center of the hole with the point of the bit before clamping the board in place. Then, place each pepper-mill top with its stem in the 1-in.-dia. hole, and drill all the way through.

To complete the pepper mills, I vacuum the sawdust from the holes in both the tops and bottoms and then install the grinder mechanisms. To complete the saltshakers, I put all the tops onto the bodies, and using my aluminum guide, drill the five 1/16-in. holes, which are just right for lightly salting food. The drill press is run at top speed, and a sharp bit is used for this job only. The tiny bit of roughness I get, even with a slow and steady entry, is buffed off with a piece of old blue-jean fabric wetted with the tiniest bit of oil. After the holes are drilled, I pull the tops off and vacuum them out. Then, I apply glue to the sides of the hole in the top of the body with a pipe cleaner and press the top into place, turning until the top's sides line up with the body. I set the corks in place, making sure they go in far enough to clear the bottom.

All you need now is a label with a tale about the love and care you put into their construction, how to care for them and how to load the peppercorns. I use a lightweight freezer bag around one of the pair to keep it from rubbing the other, then I seal the pair in a well-fitted ZipLock polybag from my local packaging store to complete the thoroughly professional presentation.

More than any other type of work, producing multiples requires careful planning and execution. A simple, beautiful item that works well *can* be profitable. If all the elements in the "score" are well written and well performed, you've got a symphony. □

*Sven Hanson builds custom furniture and teaches woodworking in Albuquerque, N.M.*

## Sources of supply

*Pepper-mill grinding mechanism:*
Craft Supplies USA, 1287 E. 1120 S., Provo, UT 84601; (801) 373-0917. (Type-A pepper mills in 4-in. through 18-in. lengths)

*Waterlox:*
Waterlox Chemical and Coating Corp., 9808 Meech Ave., Cleveland, OH 44105; (216) 641-4877.

*Aerosol sanding sealer:*
Standard Brands Paint Co., 4300 T.W. 190th St., Torrance, CA 90509-2956; (213) 542-5901.

# Carvings from the High Desert

## *Navajo magic inspires sculptor*

by John Boomer

I'm a woodcarver and work alone, carving sculptures with the simplest tools. I'm attracted to wood because it has such a special beauty and mystery, much the way people do. I believe this is because wood, unlike stone or metal, comes from a tree—a living, spiritual being. For me, sculpture is the noblest use for wood because it allows me to reflect on life experiences: birth, death, love, marriage, commitment and failure. It is the best medium for me to express my ideas, and it provides latitude to experiment with abstract and human forms. My carvings are heavily influenced by the Navajo Indian culture, and I often incorporate Navajo women in my work because they inspire me with a feeling of hope and nurturing strength. Women are traditional symbols of these virtues in the Navajo culture.

I began carving in 1968, shortly after I left California to take up a teaching position in the tiny community of Rough Rock on the immense Navajo reservation in Arizona. The community was more than 100 miles from town and 20 miles from the nearest paved road. Teaching in Rough Rock for four years changed my life; its isolaton and culture slowly pulled me into another world. While living in a log cabin there, hauling precious water, using kerosene lamps and cooking with a wood fire, I developed a different outlook on life and discovered that teaching was no longer important to me.

I decided then to dedicate my life to carving and sculpture even though I had no formal training in art. At the same time, I married a beautiful Navajo woman, Lorraine Dodge, a bilingual teacher in Rough Rock. We moved to her family ranch near Crystal, N.M, and started out in a 300-sq.-ft., 100-year-old hogan. A traditional six-sided Navajo structure made from logs and mud, the hogan served as both home and shop. I began to carve full-time.

At this stage, my main source of material was a 10-ton pile of walnut I had trucked out from California. I had accumulated the wood while working for a small sawmill in Chico, Calif. Like many woodworkers, I was obsessed with wood, especially Claro walnut. I owned only a handful of tools: chisels, a router, a drill, oscillating and belt sanders, plus a few files, rasps and scrapers. I expanded my tool kit by buying a 12-piece Marple carving set. These were all the tools I would need for several years.

I've always been driven by a sense of quality; I want my carvings to be something my grandfather (a cabinetmaker) and my father would have been proud of. It's important to me that people find

**"First Woman," a 17-in.-tall work, is my interpretation of the Navajo Indian's belief in Earth's first woman as the creator of the basket (ceremonial altar) and as the symbol of their religion.**

**"Plateau Woman," left, was inspired by the Twin Buttes visible from my hogan studio. The simple forms, small faces and beautiful wood seem to make their own statement, neither dominating or competing with each other. "Struck by Sunlight II," below, celebrates the gift of life to Earth. It shows something of my love for walnut and Navajo spiritualness. Mounted on a wenge base, it's unlike my earlier works, where the carving and base are made from a single piece. Carved from ironwood, the 24-in.-tall "Desert Dance" at right illustrates how I allow the wood's starting shape and character to dictate the sculpture's "flow," form and finish.**

relevance and beauty in my work. I strive to create something simple and serene—something that reflects the harmony that ideally should exist between nature and the human spirit.

Wood excites me and stimulates my imagination. I listen to it. A dialogue results as I work to unite my view of it with what it's best suited for. I believe each piece of wood has a special use, with a spirited form waiting just under the surface. Examining the wood, I visualize a finished sculpture within it. The sculpture is affected by the wood's character, because the vision that it takes shape from is inspired by the wood itself.

This is often a slow and difficult process; I've studied some blocks for months. The sculpture's design is the difficult part for me; execution, even for the most technically challenging ideas, is not a problem. As I carve, I play with the wood's features: The pattern, texture and color of the wood are the points integral to each composition, and each piece is unique in shape, size, color and grain features. It would be much easier, perhaps, to work repetitiously or to copy someone else's ideas, but I feel strongly about my work being unique. I feel each artist is responsible for, and is measured by the uniqueness of his combination of choices.

Working with a router, chisels, gouges and files, I can rough out a small piece in several days, but it can take weeks of careful sanding to polish the piece. Final sanding is with 600-grit paper. Each piece is brushed with up to four coats of a mixture of linseed oil, Watco oil and wax, and dry-rubbed with a cloth between coats.

After several years of carving sculptures in walnut, I began

**"Man on an Uneven Plane," left, is my expression of concern for the fragile relationship between man and his environment, illustrated by the imbalance represented by the figure on the plane and contrasted against "natural" man, the figure at the bottom in a stable position. The 40-in.-tall sculpture is made from walnut, ebony and marble. I've expressed the physical and spiritual relationship between man and woman as a voyage in "Intimate Journey," below, a work in walnut, maple, wenge and rawhide. Like many of my more recent works, this 40-in.-long sculpture is a balance between literal and abstract expression.**

Photo: Bill McLemore Photography

**In recent years, I have increased the complexity of my work by incorporating a variety of materials in a piece. The sculpture above, for example, utilizes walnut, ebony, piano wire and maple. Entitled "Bird with Two Fish," this 78-in.-tall piece is a sound sculpture: The strings make a very low sound. The sculpture also reflects my interest in the ceremonial use of music and folk instruments, which are prevalent in the Navajo Indians' culture.**

using several of the local woods, such as cedar and oak, leaving them unsanded. These "sketches in wood" are a great way to develop forms with hand tools. And because they take less time to do, I can afford to sell them at lower prices. I continue, however, to work my walnut pieces in the polished, modern style typical of my earlier work.

My work has become increasingly abstract in recent years. Although I continue to use walnut, I now often combine it with other materials into assemblies that reflect my interest and involvement with the Navajo culture. I watched the rituals of medicine men as they attended the spirits and bodies of their patients, and through these and other Navajo ceremonies, I learned how artifacts, symbols and song prayers were combined. I incorporate in my work Navajo artifact forms, such as a tied-stone ax head, a fetish or a grind stone, as well as symbols of their culture, such as the basket form or the taut line of the bow. The pieces are intended to be mysterious, only half understood by the viewer. I want to present symbols of man's predicament and get people to think about their meanings.

The cultural experience of living among the Navajo people for 20 years has challenged my concepts and influenced my perspective. I want my art to reflect that experience—to give back life and meaning to my wood for the meaning and direction it has given my life. □

*John Boomer carves sculpture in Navajo, N.M.*

Photos: Peter Bloomer, Horizons West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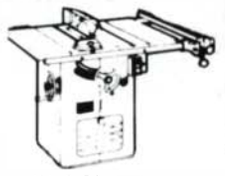

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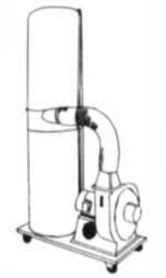

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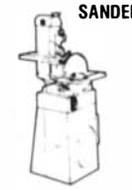

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**34-444:** 10" contractor saw: ***$595***
**28-283S:** 14" bandsaw: ***$598***
**28-243:** 14" bandsaw: ***$478***
**40-601:** scroll saw: ***$656***
**17-900:** 16½" drill press: ***$325***
**43-122:** shaper: ***$499***
**33-990:** 10" radial arm saw: ***$565***
**34-985:** stock feeder: ***$539***

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**TS251U 10" Mitre Saw**
**List 392—Sale 169**

**AP10 10" Surface Planner**
**List 820—Sale 358**

| Model | ●●●ROUTERS●●● | List | Sale |
|---|---|---|---|
| R150K | 1 H.P. Plunge w/cse | 206 | 95 |
| R151 | 1 H.P. Plunge w/switch in hdle | 210 | 105 |
| R230 | 1½ H.P. 9.5 amp. 2-hdle | 257 | 129 |
| R330 | 2 H.P. D-handle | 249 | 145 |
| R331 | 2 H.P. D-handle | 304 | 129 |
| R500 | 2¼ H.P. Plunge | 326 | 159 |
| R501 | 2¼ H.P. Plunge w/switch in hdle | 326 | 159 |
| R30 | ¾ H.P. 3.8 amp. 29,000 rpm | 163 | 85 |
| TR30U | Laminate trimmer 3.8 amp. | 163 | 79 |

| ●●●GAS POWERED TOOLS●●● | | | |
|---|---|---|---|
| EJ100 | 0-2000 strokes/min recip saw | 518 | 298 |
| ER160 | ⅝" 0-1500 rpm rot. ham drill | 660 | 389 |
| EH1930 | 0-700 & 0-1400 rpm ham drill | 518 | 298 |

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|---|---|---|---|
| L120UK | 3⅝" 3.7 amp w/cse | 206 | 95 |
| L150K | 3⅝" H.D. 3.7 amp w/cse | 234 | 99 |
| L1323ALSK | 3¼" 6.2 amp w/cse | 299 | 139 |
| L580A | 6⅛" 10.5 amp | 548 | 249 |

| ●●●STATIONARY TOOLS●●● | | | |
|---|---|---|---|
| AP125 | 12½" 15 amp. planer | 2350 | 995 |
| BS50N | 7" Band saw 15 amp 500 rpm accepts ¼"-2" blades | 1475 | 695 |
| BS360NR | 12 3/16" Band saw 15 amp 1000 rpm accepts ¼"-3" blades | 2475 | 1049 |

| ●●●SANDERS●●● | | | |
|---|---|---|---|
| S500A | ⅛ Sht. finish 12,000 opm | 70 | 36 |
| S600A | ¼ Sht. finish 12,000 opm | 88 | 53 |
| B7075K | 3x21 Belt w/bag/cse | 237 | 117 |
| B7100 | 3x24 Belt w/bag | 281 | 129 |
| B7200A | 4x24 Belt w/bag | 351 | 169 |
| SU6200 | ½ Sht. finish 10,000 opm | 210 | 115 |
| LS35 | ⅓ Sht. finish 10,000 opm | 94 | 59 |

| ●●●DRILLS●●● | | | |
|---|---|---|---|
| D10PVR | 0-1200 rpm 3.2 amp. ⅜" rev | 102 | 49 |
| D100AVR | 0-1200 rpm h.d. ⅜" rev | 146 | 67 |
| 8D101R | 7.2v cdls. 600 rpm | 93 | 49 |
| 8D1020AR | 7.2v cdls. 300-600 rpm | 182 | 69 |
| 8D1020ARK | 7.2v cdls. 300-600 rpm w/cse | 193 | 79 |
| 8D1025RK | 9.6v cdls. 350/1100 rpm w/cse | 234 | 99 |

| ●●●RECIPRO SAWS●●● | | | |
|---|---|---|---|
| RJ100VK | V/spd. 6 amp w/cse | 234 | 115 |
| RJ102K | 2-spd. 6 amp. w/cse | 218 | 89 |

| ●●●JIG SAWS●●● | | | |
|---|---|---|---|
| J60VK | V/spd. w/cse 3.5A | 210 | 119 |
| JSE60K | V/spd. orb. action 3.5A w/cse | 257 | 135 |
| JSE60 | V/spd. orb. action 3.5A | 234 | 119 |

| ●●●CIRCULAR SAWS●●● | | | |
|---|---|---|---|
| W620 | 7¼" 13 amp dbl. insul. | 187 | 95 |
| W640 | 7¼" AC/DC dbl. insul. | 210 | 99 |
| W740 | 8¼" AC/DC dbl. insul. | 234 | 115 |

| ●●●X-TRA SPECIALS●●● | | | |
|---|---|---|---|
| TS251US | 10" Mitre w/acc. kit & 60 tooth carb. blade | 438 | 199 |
| RA200 | 8¼" Portable radial arm saw | 515 | 225 |
| BE321 | 3x21 V/spd. belt sander | 244 | 119 |
| TS200 | 8¼" Compound mitre saw | 299 | 149 |
| TS380 | 14" Mitre saw | 773 | 339 |
| RE600 | 3 H.P. Plunge router v/spd 10,000-22,000 rpm | 398 | 198 |
| SG1000K | 4" Grinder 4.3 amp. w/cse | 117 | 55 |

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| SENCO LS-1 PIN-NAILER | $247.00 |
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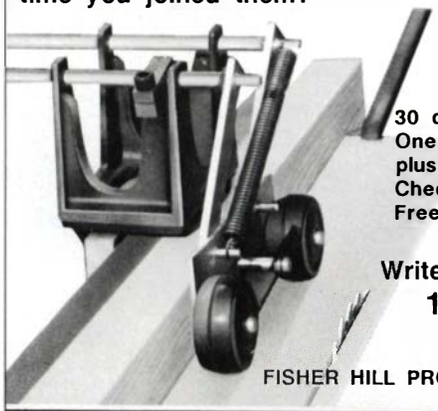

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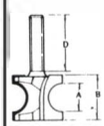

| PART NO. | A | PRICE |
|---|---|---|
| SY9-1 | 1/4 | $12 |
| SY9-1½ | 1/4 | $12 |
| SY-9-3 | 3/8 | $14 |
| SY9-3½ | 3/8 | $14 |
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| SY9-4½ | 1/2 | $14 |
| SY9-5 | 5/8 | $15 |
| SY9-5½ | 5/8 | $15 |
| SY9-6 | 3/4 | $15 |
| SY9-6½ | 3/4 | $15 |
| SY9-8½ | 1 | $17 |
| SY9-9½ | 1-1/8 | $25 |
| SY9-10½ | 1-1/4 | $30 |
| SY9-11½ | 1-1/2 | $38 |

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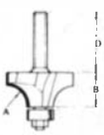

| PART NO. | A | PRICE |
|---|---|---|
| S502Y | 1/16R | $11 |
| S504Y | 1/8R | $11 |
| S506Y | 3/16R | $11 |
| S508Y | 1/4R | $11 |
| S510Y | 5/16R | $12 |
| S512Y | 3/8R | $14 |
| S516Y | 1/2R | $16 |
| S516Y½ | 1/2R | $16 |
| S520Y½ | 5/8R | $20 |
| S524Y½ | 3/4R | $20 |
| S528Y½ | 7/8R | $34 |
| S532Y½ | 1R | $34 |
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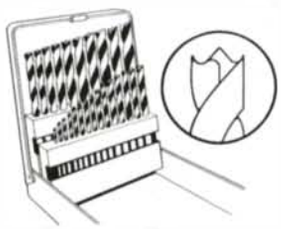

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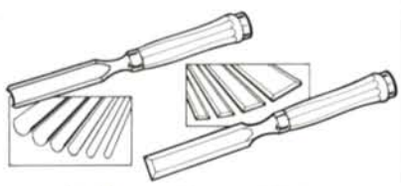

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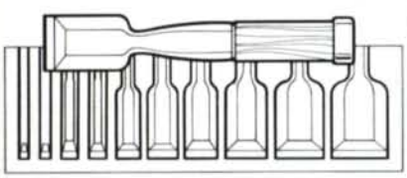

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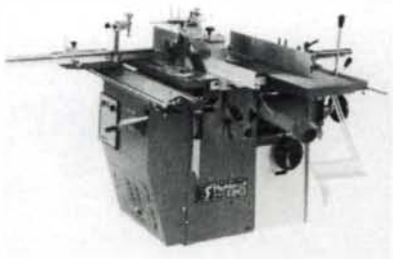

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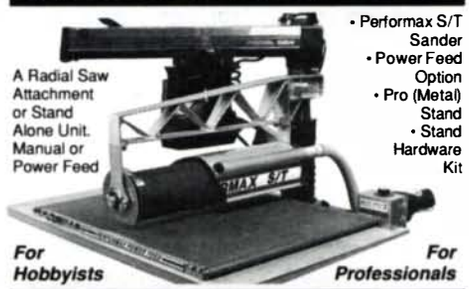


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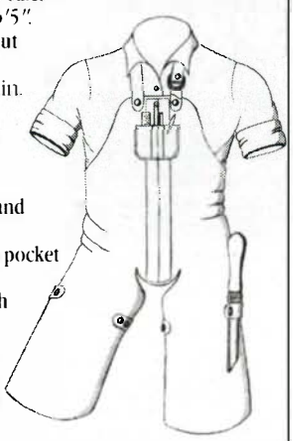

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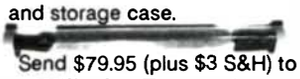

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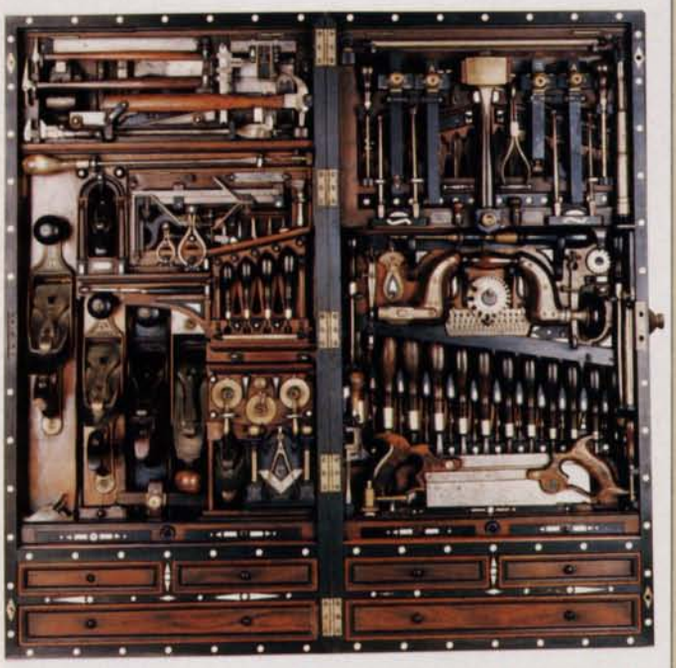

**TOOL CHEST LEGACY**

If the workmanship in a tool chest is any indication of the maker's talent, then the craftsmanship of master carpenter and stonemason H.O. Studley must have been awe-inspiring. In an oak clamshell box adorned with rosewood, ebony, pearl and ivory, Studley kept both tools he made and a collection of the finest hand tools made prior to 1908, including a complete set of woodworking tools as well as cabinet and stonemasonry tools. To pack the 300-plus tools into a case only 19½ in. wide, 39 in. long and 9½ in. deep, Studley devised a jigsaw-puzzle arrangement of flip-up trays, fold-out layers and hidden compartments. Maine native Pete Hardwick now owns the chest, which has been in his family since it was bequeathed to his grandfather by Studley. Hardwick acquired the chest from his brother by trading a 1934 Ford sedan for it. A good trade? It would seem so. Just one tool—the Stanley #1 plane housed in the ebony archway in the upper-left part of the chest—was appraised at $700. Hardwick, a nonwoodworker, plans to sell the chest.

# Now available from *Fine Woodworking* magazine

The response to *Fine Woodworking*'s July/August back cover was overwhelming. So many of you called or wrote asking for a poster reproduction of the exquisite tool chest by H.O. Studley, that we decided to go ahead and print one up.

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| 1609K | 3 IN 1 Trimmer Kit | 163 |
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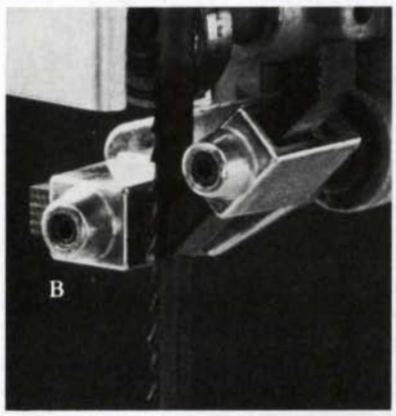


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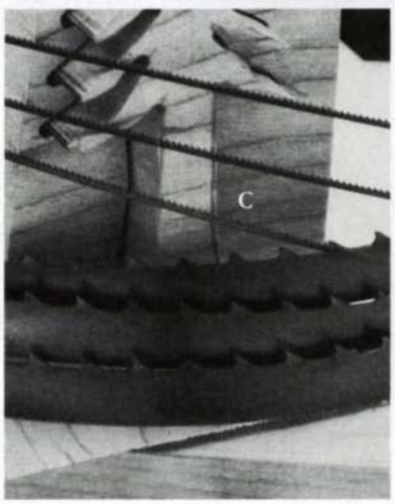


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| 33K11.02 | ¼" Cabinet. | $11.65 |
| 33K11.03 | ½" Cabinet. | $11.95 |
| 80" Blades (Sears) | | |
| 33K12.01 | 1/16" Scroll | $11.95 |
| 33K12.02 | ¼" Cabinet. | $11.30 |
| 33K12.03 | ½" Cabinet. | $11.50 |
| 72" Blades (Shopsmith) | | |
| 33K13.01 | 1/16" Scroll | $11.25 |
| 33K13.02 | ¼" Cabinet. | $10.20 |
| 33K13.03 | ½" Cabinet. | $10.50 |
| 73½" Blades (Inca 10½") | | |
| 310.160 | 1/16" Scroll | $11.25 |
| 310.161 | ¼" Cabinet. | $10.20 |
| 310.162 | ½" Cabinet. | $10.50 |
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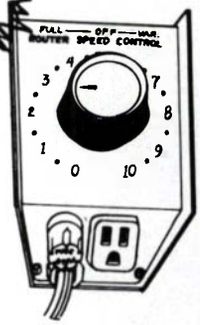


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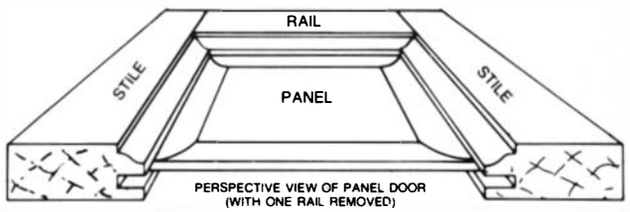


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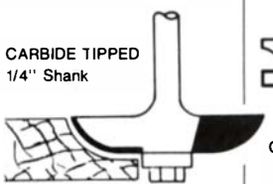

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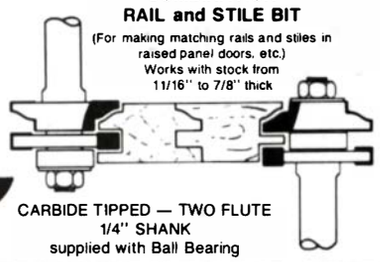

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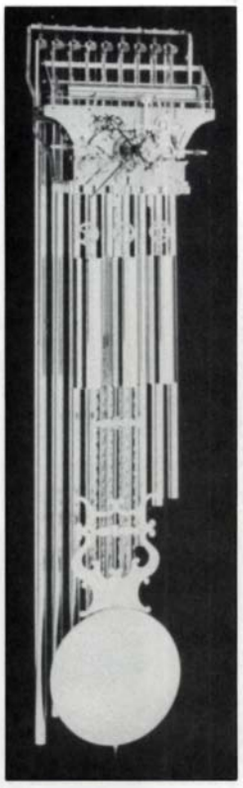

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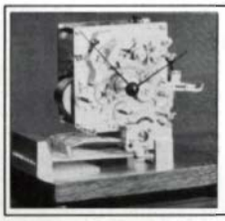

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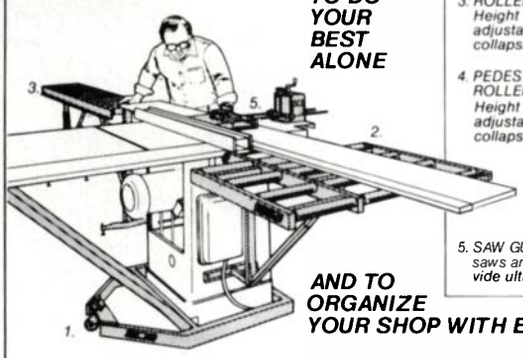


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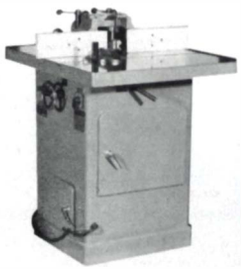

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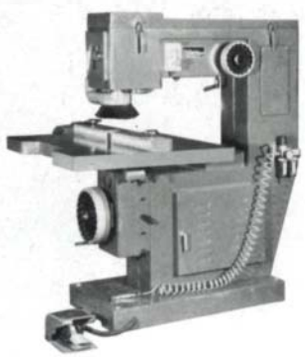

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# Holiday Catalog

From the publishers of
*Fine Woodworking, Fine Homebuilding, Threads,* and *Fine Gardening*

NEW BOOK AND VIDEO SET


## Introducing a foolproof system for making Eurostyle kitchen cabinets.

Now you can make high-quality Eurostyle cabinets simply and economically in your own shop. Paul Levine's book and video will show you how.

**The book** introduces Levine's incredibly flexible and forgiving adaptation of the 32-mm system. Levine covers everything from planning your kitchen to installing the finished cabinets, with detailed photos and instructions every step of the way.

**The tape** brings you into Levine's shop to see firsthand how you can use the system to build a single cabinet or a whole kitchenful. Page references to the book appear on the screen, so you can quickly refer back for detailed information. Together, the set offers a wonderfully complete way to master Levine's methods.

**Book:** *Softcover, color, 192 pages, 100 illustrations, $17.95 #67*
**Video:** *60 minutes, $29.95 (Rental $14.95) #633 (VHS), #634 (Beta)*
**Save 16% on the set:** *$39.95, #100 (VHS), #101 (Beta)*

NEW AND CLASSIC VIDEOS


## Give your furniture the attention it deserves.

**NEW:** *Refinishing Furniture with Bob Flexner.* Expert furniture restorer Bob Flexner gives you an in-depth understanding of the entire refinishing process. You'll learn how to determine which finish is right for you, and how to control the color, texture, and sheen of a finish so you can achieve the look you want for every piece of furniture you work on. Flexner also details the role of wax in refinishing, shows how to strip a finish without sanding, and gives tips for spot-repairing damages. *60 minutes, $29.95 (Rental: $14.95) #619 (VHS), #620 (Beta)*

**PRIZE WINNER:** *Repairing Furniture with Bob Flexner.* Winner of *The American Video Conference Award* for best craft video in 1987, this tape shows you a vast repertoire of straightforward techniques you can use to repair your furniture without sacrificing its character or introducing new problems. Flexner demonstrates each method and tells you how to decide which one is right for the job at hand. *70 minutes, $29.95 (Rental: $14.95) #623 (VHS), #624 (Beta)*

## Welcome to our new catalog

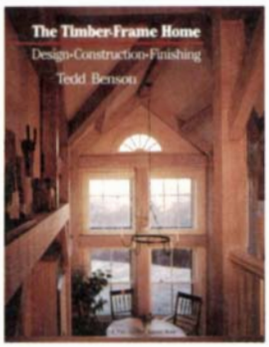
You'll find the next eight pages filled with high-quality magazines, books, and videos created specifically for you and your friends, people who relish the challenge and satisfaction of woodworking, home building, knitting, sewing, and gardening. New titles and established bestsellers—all are the work of talented pros and practiced amateurs eager to share their best ideas and discoveries.

So take some time and enjoy our holiday catalog. You'll find title after title brimming with ideas and information that will answer your questions, spark your curiosity, and heighten your skills.

I hope you'll also find the time you spend with our catalog to be some of the nicest shopping you do this holiday season. To order, just use the accompanying form.

*—Paul Roman*
*Publisher*

## NEW BOOK

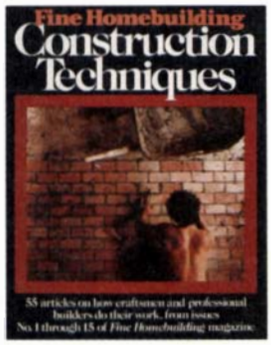



### The Timber-Frame Home
*by Tedd Benson*

A world-renowned timber framer shows how the age-old elegance of timber-frame construction can meet modern needs. *Hardcover, 240 pages, 97 color photos, 140 drawings, $24.95*
***#62***

***"For a person researching the world of timber-frame homes, this book is a gold mine of answers, questions, and photographs of finished timber-frame homes."***
***—THE POST***

## *Fine Homebuilding* Books




### *Fine Homebuilding* Construction Techniques
Fifty-five articles from *Fine Homebuilding* cover construction, masonry, tools and materials, timber framing, and finish and woodwork. Indexed. *Hardcover, color, 240 pages, 250 photos, 286 drawings, $24.95*
***#28***

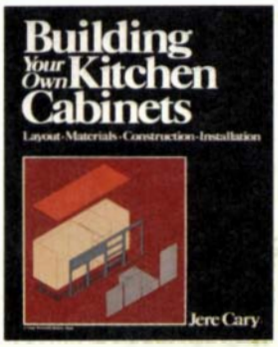
### *Fine Homebuilding* Construction Techniques 2
Here's detailed information about making window sash, building with stress-skin panels, insulating and parging foundations, and more. Indexed. *Hardcover, color, 240 pages, 332 photos, 160 drawings, $24.95*
***#44***

### Stone, Log and Earth Houses
*by Magnus Berglund*

An enticing introduction to the modern world of stone, log, and earth construction. Some methods have evolved slowly over the centuries. Others, involving recent technologies and power tools, are newcomers. Berglund describes each in detail, taking you through the construction of nine solid, yet surprisingly economical homes, complete with photos, drawings, and floor plans. *Softcover, color, 160 pages, 150 photos/106 drawings, $15.95*
***#54***

### What it's Like To Build a House: The Diary of a Builder
*by Bob Syvanen*

Thinking about building a house? Here's the kind of straight-from-the-jobsite information that will help you prepare for the reality ahead. Using drawings and photos, Syvanen shares his experiences designing and building a solar-heated Cape Cod style house. You'll come away with plenty of practical tips and techniques you can put right to use. *Softcover, color, 112 pages, 216 drawings, $7.95*
***#40***




### Building Your Own Kitchen Cabinets
*by Jere Cary*

One of our best-sellers. This book is the ideal introduction to custom-building your own traditional cabinets. Written by a skilled cabinetmaker and teacher. *Softcover, 152 pages, 283 drawings, $14.95*
***#23***

### *Fine Homebuilding* Remodeling Ideas
Forty-three detailed, full-color articles from *Fine Homebuilding* offer first-hand accounts of particularly interesting restorations, additions, and renovations. *Softcover, color, 192 pages, 258 photos, $21.95*
***#56***

## NEW TILESETTING SERIES


Note: All tapes are keyed to Byrne's book with page references right on the screen.

### *THE BOOK*
**Setting Ceramic Tile** *by Michael Byrne*

Master tilesetter Michael Byrne guides you step-by-step through a series of actual home installations—floors, walls, and countertops. He demonstrates both the popular thinset method and the traditional thick mortar-bed technique. He also provides information on repairs, sources of supply, and problem installations. *Softcover, color, 115 color photos/drawings, $17.95*
***#53***

### *THE VIDEOS*

**Tiling Countertops** *with Michael Byrne*

Michael Byrne shows you how to use traditional techniques and modern materials to tile attractive countertops. You'll learn how to work with backer-board and mortar-bed substrates, lay tile around a sink, and detail your countertop. *60 minutes, $29.95 (Rental: $14.95)*
***#627 (VHS), #628 (Beta)***

**Tiling Walls** *with Michael Byrne*

Once you learn what Byrne has to show you, you'll be able to tile any wall in your house. Byrne demonstrates all the techniques you need, including how to handle out-of-plumb walls, maneuver around plumbing, and more. *75 minutes, $29.95 (Rental: $14.95)*
***#629 (VHS), #630 (Beta)***

**Tiling Floors** *with Michael Byrne*

From basic procedures to special techniques, Byrne shows you how to tile a floor that lasts. Learn how a border can simplify a diagonal layout, how to mix and float mortar for a flat substrate, and how to keep your floor from cracking. *60 minutes, $29.95 (Rental: $14.95)*
***#631 (VHS), #632 (Beta)***

**Save $5 on each tape that you buy with Michael Byrne's book.**

Just write the discounted price ($24.95) on your order form.

**Or save $15 when you buy the three-tape set.**

*Set price: $74.95*
***#690 (VHS), #691 (Beta)***

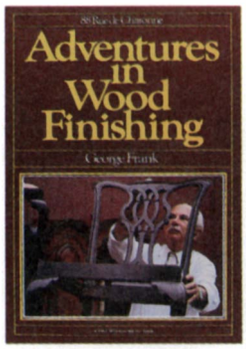
## Finishing


*Video*

### Wood Finishing
*with Frank Klausz*

Learn finishing directly from a skilled professional. Klausz shows you how to prepare an ideal surface for finishing, how to choose stains, and how to apply tung oil or spar varnish. You'll also learn how to spray lacquer and French-polish your work to an exquisitely glossy finish. *110 minutes, $39.95*
*(Rental: $14.95)*
***#603 (VHS), #604 (Beta)***

***"By the end of the video, you have a good understanding of not only what to do, but why."***
***—VIDEO CHOICE MAGAZINE***



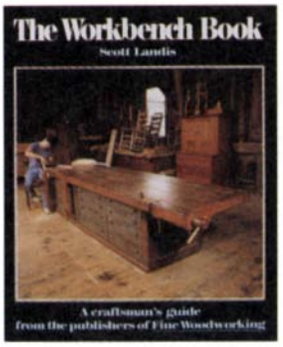

### Adventures in Wood Finishing
*by George Frank*

A master wood finisher shares the secrets and stories of a lifetime in the trade. You'll learn about everything from how old-timers brewed dyes from plant extracts and chemicals to the culmination of Frank's search for the perfect wax; and from a mirror finish that shines to an "antique" finish that fools the experts. *Hardcover, 128 pages, $10.95*
***#14***

### *Fine Woodworking* on Finishing and Refinishing

How can you control the shine of varnish on wood, capture the glossy black finish of a fine piano, or produce the soft sheen of an oil finish? In this collection of 34 articles from *Fine Woodworking*, experts explain their formulas and methods, and reveal the secrets of their craft. *Softcover, 112 pages, 83 photos/10 drawings, $7.95*
***#48***

## Projects




### The Workbench Book
*by Scott Landis*

Explore the strengths and traditions of the world's great workbenches. Scott Landis calls on the insights and discoveries of dozens of skilled craftsmen as he examines benches for all kinds of woodworking. Landis shows you how each one works and leads you through the tough spots in its construction. *Hardcover, color, 256 pages, 278 photos/185 drawings, 4 bench plans, $24.95*
***#61***

***"A first-class book full of careful observations, scholarship, and honest speculation."***
***—Charles F. Hummel, Deputy Director for Collections Winterthur Museum and Gardens***

### *Fine Woodworking* on Things to Make

Intriguing ideas and practical advice about making everything from simple toys to elegant furniture. These 35 articles from *Fine Woodworking* show you how to make trays, chairs, sleds, music boxes, banjos, a world globe—even wooden eyeglass frames. *Softcover, 112 pages, 115 photos/217 drawings, $7.95*
***#49***

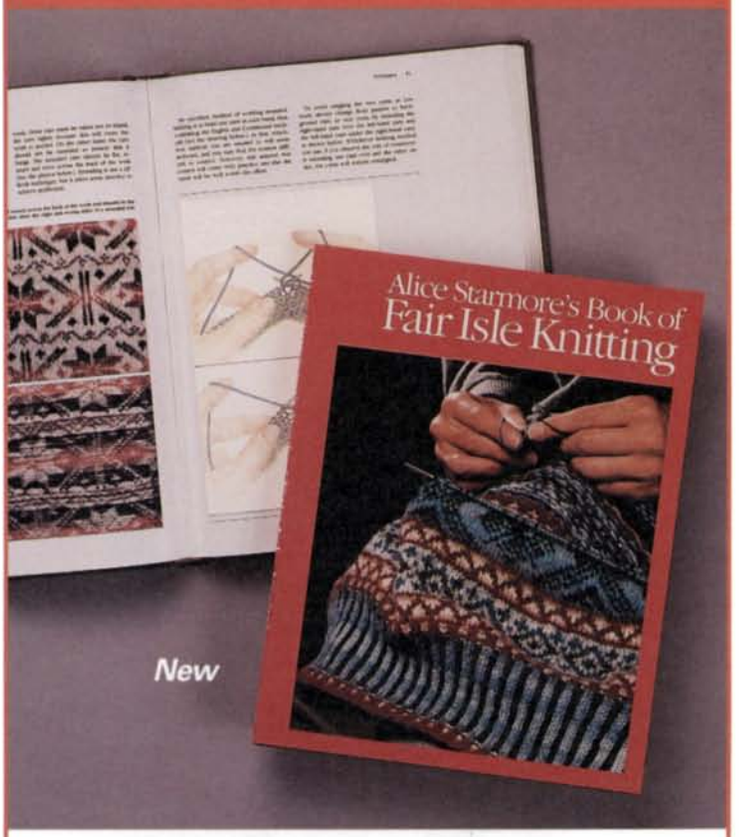
### *Fine Woodworking* on Woodshop Specialties

Looking for a different kind of project? Try these 27 *Fine Woodworking* articles. You'll learn how to make a microscope out of wood, create wooden clockworks, fashion marionettes, and more—all with photos and illustrations. *Softcover, 128 pages, 121 photos/ 194 drawings, $7.95*
***#60***

### Woodworking with Kids
*by Richard Starr*

Help your children to make what they want out of wood, and they'll learn to love the craft. Teacher and woodworker Richard Starr shows you how with plans for toy airplanes, tables, boxes, and more. *Hardcover, 216 pages, 359 photos/ 169 drawings, $19.95*
***#21***

## NEW! OUR FIRST *THREADS* BOOK




# Now you can learn the art of Fair Isle Knitting.

A tiny speck in the North Sea far off mainland Scotland, Fair Isle is known the world over for its traditional stranded knitting. Rich in pattern and sumptuous in color, this style of knitting has become enormously popular in America. Much of the credit goes to Alice Starmore, a talented Scottish knitter, author, and teacher.

In *Alice Starmore's Book of Fair Isle Knitting,* Starmore gives you the most comprehensive account of the craft yet written. She begins with its fascinating history, then goes on to examine the three key aspects of Fair Isle knitting.

In the chapter on pattern, you'll learn what constitutes a true Fair Isle pattern and how to produce it. You'll also discover how to create new patterns by working variations on a basic design.

Next, Starmore unveils the secrets of working with color, the hallmark of Fair Isle knitting. (You can get ideas for color and patterns anywhere—from trucks on a city street or flowers in a meadow.)

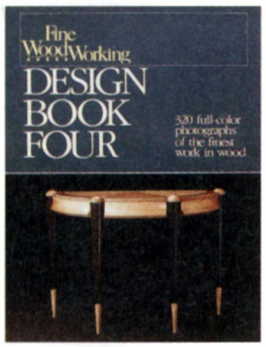
To illustrate the traditional techniques of her craft, Starmore uses over 100 color photos and 145 charts and drawings. These visuals make the techniques easy to understand and to perfect.

Starmore also offers a whole wardrobe of patterns to make sweaters, hats, gloves, mittens, and vests. There's even a chapter on creating original designs, so you can go beyond her patterns and use what you've learned to make your own stunning Fair Isle pieces.

*Hardcover, color, 208 pages, 110 photos/137 drawings, $24.95*
***#66***

*Alice Starmore's Book of Fair Isle Knitting* is the first in our line of *Threads* books. We'll soon be bringing you information about other new knitting, sewing, and fiber-arts titles.

## Woodworking Design




### *Fine Woodworking* Design Book Four

The best in contemporary woodworking. Selected from some 10,000 photos submitted by *Fine Woodworking* readers, the 320 objects pictured here show just how far the craft has come since we published our first *Biennial Design Book* in 1977. Woodworking like this takes your breath away, whether it's a beautifully crafted period piece or some playfully painted art furniture. There's a new sense of mastery among woodworkers, and a new fascination with color and materials other than wood. *Design Book Four* captures this excitement with stunning photos, compelling essays, and a 15-page woodworkers directory. *Softcover, color, 176 pages, 349 photos, $16.95*
***#65***

### *Fine Woodworking* Design Book Three

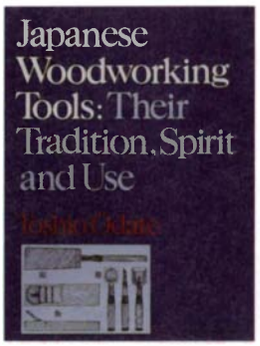
There's no end to the things talented woodworkers can make out of wood. Presenting the best in woodworking as of 1983, *Design Book Three* is filled with hundreds of photographs of beautifully crafted furniture, sculpture, carving, musical instruments, tools, and toys. All of the pieces were selected by the editors of *Fine Woodworking* magazine for their beauty, craftsmanship, and individuality. *Softcover, color, 216 pages, 557 photos, $12.55*
***#25***

### *Fine Woodworking* Biennial Design Book

You'll treasure this superb collection of the best designs in wood from 1977. These photographs show the highly creative and incredibly varied work done by professional and skilled amateurs—from antique interpretations to ultramodern fantasies. *Softcover, 176 pages, 588 photos, $10.75*
***#02***

***"What these books portray in abundance is the astonishing imagination and technique of modern craftsmen in wood."***
***—UPI***

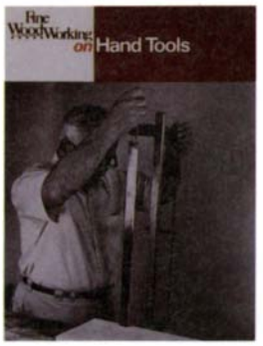
## Hand Tools




### Japanese Woodworking Tools: Their Tradition, Spirit and Use
***by Toshio Ōdate***

A complete guide to Japanese saws, chisels, planes, and more—from a master Oriental craftsman. Ōdate introduces a variety of tools and explains how each one works, how it should be cared for, and how it is meant to be used. He also shares stories that help define the traditions associated with each tool. *Hardcover, 200 pages, 102 photos/500 drawings, $23.95*
***#26***

***"...a fascinating book describing the ways of Japanese woodworkers and the tools they use...for anyone interested in exploring this field, the book is a must."***
***—PUBLISHERS WEEKLY***



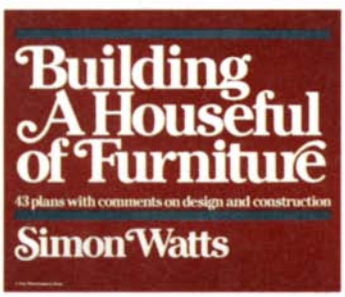

### *Fine Woodworking* on Hand Tools

All you need to know about about choosing, using, and making hand tools. Thirty-eight articles from *Fine Woodworking* give you practical advice about saws, edge tools, and more. *Softcover, 112 pages, 174 photos/105 drawings, $7.95*
***#51***

### *Fine Woodworking* on Planes and Chisels

Twenty-nine *Fine Woodworking* articles tell you what you want to know about the most important tools in your shop. Expert craftsmen explain how they choose, sharpen, and use almost every kind of plane and chisel. *Softcover, 96 pages, 149 photos/118 drawings, $7.95*
***#34***

## Furnituremaking




### Building a Houseful of Furniture
***by Simon Watts***

Now you can build furniture for any room in your home. Skilled cabinetmaker Simon Watts gives you complete plans for 43 of his favorite pieces: sturdy bed frames, handsome chests, a variety of tables, desks, bureaus, comfortable sofas, chairs, and more. Some projects are perfect for beginners, others will challenge even the most experienced woodworker. Throughout the book, Watts examines the difficult spots in construction and explains his own techniques for overcoming them. He also offers some fascinating information about the history, uses, and design of household furniture, and talks about how he develops his own design ideas. *Softcover, 224 pages, 157 photos/115 drawings, $19.95*
***#22***

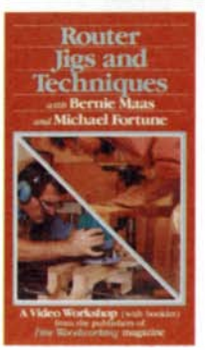
### *Fine Woodworking* on Chairs and Beds

Expert chairmakers share their techniques for designing and making furniture that fits the human body. There are no quick-and-easy shortcuts, but there's plenty to learn from craftsmen who have mastered this difficult art. Chairs, stools, sofas, cribs, and beds—all are covered in these 33 articles from the pages of *Fine Woodworking* magazine. There are even plans for making everybody's favorite, the rocking chair. *Softcover, 112 pages, 124 photos/106 drawings, $7.95*
***#45***

### *Fine Woodworking* on Tables and Desks

How big should a dining table be? How do drop-leaves work, and are there better ways to make the top expand? How about plans for interesting coffee tables, a lion's-paw pedestal table, and trestle tables? How does a table become a desk, with pigeonholes or a roll-top? In 32 articles from *Fine Woodworking* magazine, skilled craftsmen reveal their methods for making and designing every kind of table and desk for virtually every purpose. *Softcover, 112 pages, 169 photos/124 drawings, $7.95*
***#46***

## Machines

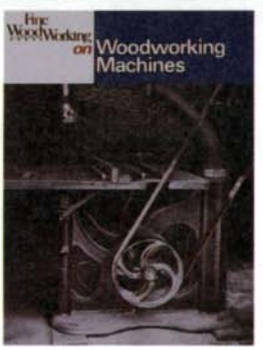



***Video***

### Router Jigs and Techniques
***with Bernie Maas and Michael Fortune***

Experts Bernie Maas and Michael Fortune show you what your router can really do. Maas focuses on basic router joinery, covering mortise-and-tenon joints, sliding dovetails, and splines. Fortune shows how the router can work with a series of ingenious jigs to produce the subtle shapes required to create a handsome hand mirror. Plans for the jigs and the hand mirror are in the booklet. *60 minutes, $29.95, (Rental: $14.95)*
***#615 (VHS), #616 (Beta)***

***"Here's a tape you can go back to many times for efficient, well demonstrated technique."***
***—PRACTICAL HOMEOWNER***




### *Fine Woodworking* on Woodworking Machines

Which machines do you really need? How can you get the most out of your router? These and a host of other questions are addressed by craftsmen in 40 *Fine Woodworking* articles. *Softcover, 112 pages, 149 photos/126 drawings, $7.95*
***#37***

### *Fine Woodworking* on Making and Modifying Machines

Yes, you can make your own woodworking machines and improve your old favorites. This collection of 29 *Fine Woodworking* articles shows you how. *Softcover, 112 pages, 121 photos/150 drawings, $7.95*
***#47***

New

## Beautiful gardens start here.

In *Fine Gardening* magazine, experienced gardeners take you into their gardens to show you how they've worked their magic—and how you can put their knowledge to work in your own home gardening. You'll learn about fundamentals and practical design ideas, as well as how to care for specific plants, build garden structures, handle trouble spots in your garden, and keep your lawn healthy. In each issue you'll find inspiring full-color photographs and concise, accurate drawings. We'll answer your gardening questions, tell you where to find equipment you need, pass along useful gardening tips, review books and videos, and more.

*Six issues, $20/year*

***#40***



## Creative ideas and professional secrets from today's best fiber artists.

Each colorful issue of *Threads* magazine is filled with practical articles by talented craftspeople eager to help you make beautiful things to wear and use. *Threads* focuses primarily on sewing and knitting, and on the design, construction, and detailing of fine clothing. But the world of *Threads* extends beyond what you wear—it covers every facet of the textile arts and needlecrafts, including embroidery, quilting, weaving, and more. And *Threads* backs up each informative article with crystal clear graphics that help detail the "how-to" process. Technical drawings and brilliant photographs of finished pieces give you plenty of design ideas and inspiration. *Six issues, $20/year*

***#30***

## Learn from fellow builders as they share their hands-on knowledge.

*Fine Homebuilding* is the magazine builders use to swap ideas and information. Whether you're remodeling a bath, building a greenhouse, putting down a brick floor, or renovating a staircase, you'll find in-depth articles from today's best builders that will help you get the job done right. Every step is shown in full color, with photographs and technical drawings that let you see just what's going on. And each spring there's a special issue, *Houses*, that showcases a variety of well-constructed and beautifully designed homes.

*Seven issues, $24/year*

***#20***

***Fine Homebuilding*** **Index,** *issues 1-42, softcover,* ***$4.95, #72***



## The single most important source of woodworking information.

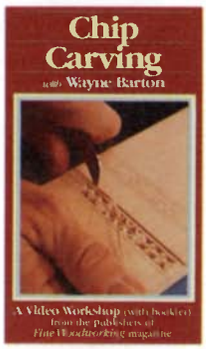
If you love working with wood, *Fine Woodworking* is your magazine. A year's subscription brings you practical, hands-on information about joinery, turning, finishing, design, hand tools, and a host of other woodworking specialties. You'll find demonstrations of tools and techniques, projects that teach new skills, shop tests, tips, and some breathtaking examples of the woodworker's art.

*Six issues, $22/year*

***#10***

***Fine Woodworking*** **Index,** *issues 1-50, softcover,* ***$3.95, #71***
**Supplementary Index,** *issues 51-65, softcover,* ***$1.95, #75***
**Complete Set,** ***$4.95, #76***

## Carving

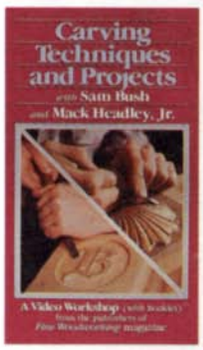



Video

### Chip Carving
*with Wayne Barton*

Using just a compass, a ruler, and two knives, you can chip carve a dazzling array of incised borders, rosettes, letters, and graceful free-form designs. Award-winning chip carver Wayne Barton shows you how. Barton starts with the basics, and then zeros in on common questions and problems, including how to maintain a sharp edge on swirl and other large chip designs and how to chip-carve monograms. An illustrated booklet includes plans, technical highlights, and sources of supply. *60 minutes, $29.95 (Rental: $14.95)*
***#613 (VHS), #614 (Beta)***

***"It's a breakthrough...reassuring to the beginner...."***
***—SACRAMENTO BEE***

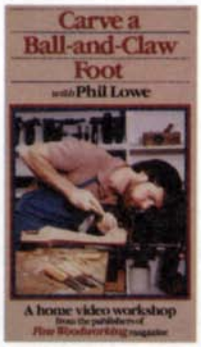



Video

### Carving Techniques and Projects
*with Sam Bush and Mack Headley, Jr.*

Learn the basics of woodcarving from two noted craftsmen. Sam Bush uses lettering to demonstrate gouge and chisel techniques. You'll find out about selecting tools, developing designs, bordering, modeling, and more. Mack Headley shows you how to carve an 18th-century scallop shell and shares his insights into the production techniques of the era. Booklet included. *90 minutes, $29.95, (Rental: $14.95)*
***#617 (VHS), #618 (Beta)***

***"It's like getting two tapes in one. It's well paced, well thought out and easy to follow."***
***—WOODENBOAT***



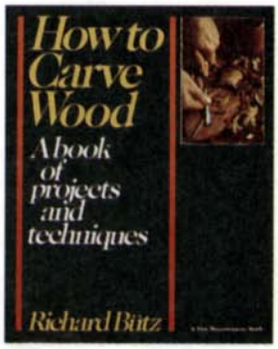

Video

### Carve a Ball-and-Claw Foot
*with Phil Lowe*

Period-furniture specialist Phil Lowe shows you how to design and make that intriguing hallmark of 18th-century furniture, the cabriole leg with a ball-and-claw foot. *115 minutes, $39.95, (Rental: $14.95)*
***#605 (VHS), #606 (Beta)***

### *Fine Woodworking* on Carving

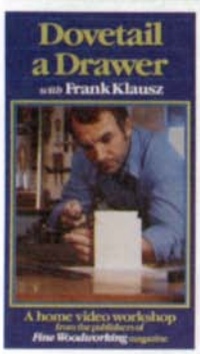
A marvelous collection of 40 carving articles from *Fine Woodworking*—all written by practicing carvers. Learn about everything from selecting tools to creating raised panels. *Softcover, 112 pages, 249 photos/63 drawings, $7.95*
***#50***




### How to Carve Wood
*by Richard Bütz*

Richard Bütz is a well-known woodworker with his own TV show. In this book he calls upon his past experience to teach you whittling, chip carving, wildlife carving, relief carving, lettering, and architectural carving. In each case you learn by doing, working your way through carefully illustrated and progressively more challenging exercises and 37 projects. Bütz even gives scaled patterns for the projects he presents and ends each chapter with a gallery of additional projects you can make using the techniques you've learned. This bestseller is ideal for beginners and advanced carvers alike. *Softcover, 224 pages, 288 photos, 169 drawings, $15.95*
***#30***

## Joinery

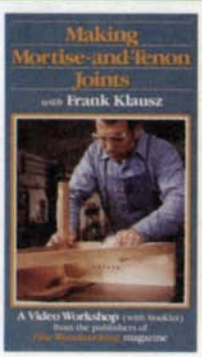



Video

### Dovetail a Drawer
*with Frank Klausz*

Cabinetmaker Frank Klausz shows you how to make crisp, clean, properly fitting drawers by hand. After sizing the stock and running the grooves for the drawer bottom, Klausz cuts quick, precise dovetails without using jigs or templates, then glues-up and fits the finished drawer. You'll also learn about tools and techniques that will come in handy in other projects: how to use a backsaw, chisel, and smoothing plane confidently and how to rip, crosscut, and dado on power machinery. *60 minutes, $29.95 (Rental: $14.95)*
***#601 (VHS), #602 (Beta)***

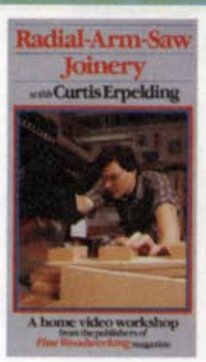
***"A beautiful and fascinating experience...I strongly recommend the tape."***
***—POPULAR WOODWORKING***




Video

### Making Mortise-and-Tenon Joints
*with Frank Klausz*

Master the mortise-and-tenon, furnituremaking's fundamental joint. Frank Klausz brings his 20-plus years of experience before the camera to show you three different techniques for making three variations on the mortise-and-tenon. You'll learn how to make a haunched mortise-and-tenon joint for a table, a through/wedged mortise-and-tenon joint as part of a door, and an angled mortise-and-tenon joint for a chair. Klausz also explains how to determine which joint is best for which application. Included with the tape is an illustrated booklet that outlines all the procedures covered. *60 minutes, $29.95 (Rental: $14.95)*
***#621 (VHS), #622 (Beta)***




Video

### Radial-Arm-Saw Joinery
*with Curtis Erpelding*

By watching Curtis Erpelding at the radial-arm saw, you'll learn how to cut impeccably precise joints time after time. Erpelding shows how to set up and fine tune your machine, lay out and cut a series of identical slip joints, make a frame composed of such joints, and see this frame as a design building block. He also shows you how you can think through your own joinery, both structurally and aesthetically. Best of all, the video format lets you see the work repeated as often as you like. *110 minutes, $39.95 (Rental: $14.95)*
***#609 (VHS), #610 (Beta)***

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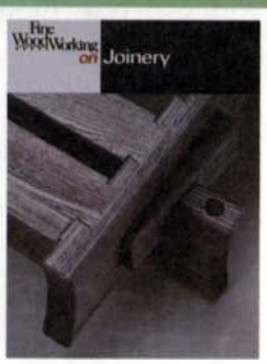
***—WORKBENCH***



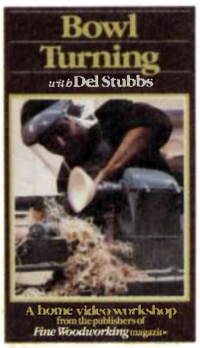

### *Fine Woodworking* on Joinery

Experienced craftsmen explain their techniques for making strong, functional frames. Thirty-six articles from *Fine Woodworking* cover the numerous forms of the mortise-and-tenon joint, as well as other joints. *Softcover, 128 pages, 174 photos/362 drawings, $7.95*
***#31***

### *Fine Woodworking* on Boxes, Carcases, and Drawers

These 41 articles from *Fine Woodworking* show you how to choose, make, and use every kind of carcase joint, with emphasis on the dovetail. *Softcover, 112 pages, 155 photos/331 drawings, $7.95*
***#32***

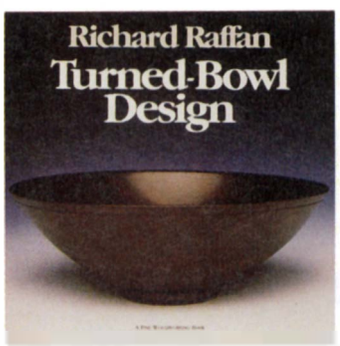
## Turning




*Video*

### Bowl Turning
*with Del Stubbs*

Virtuoso turner Del Stubbs shows you the basic techniques of bowl turning, and then some. Stubbs slows down his lathe so you can see exactly what's happening when a tool cuts well, or not so well. You'll learn the different ways to lay out and mount a bowl blank and how to use different gouges and tools to shape the outside and excavate the inside of a bowl. *120 minutes, $39.95, (Rental: $14.95)*
***#607 (VHS), #608 (Beta)***




### Turned-Bowl Design
*by Richard Raffan*

The first in-depth examination of bowl design from a master turner. Raffan takes you beyond the skills he taught in his first book and video, and shows you how to design bowls that remain beautiful after the color and grain have faded.
*Softcover, color, 176 pages, 248 photos/137 drawings, $17.95*
***#63***

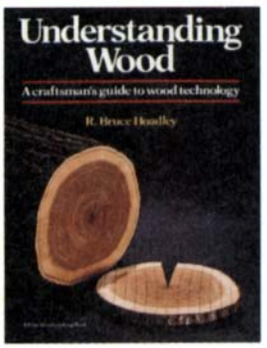
### *Fine Woodworking* on Faceplate Turning

A rare look at how the best turners create everything from drinking goblets to giant bowls.
*Softcover, 112 pages, 248 photos/165 drawings, $7.95*
***#58***

### *Fine Woodworking* on Spindle Turning

In 39 articles from *Fine Woodworking*, some of the world's most inventive turners show you how to master the turner's gouge, how to tame the skew chisel, and more. *Softcover, 96 pages, 153 photos/120 drawings, $7.95*
***#57***

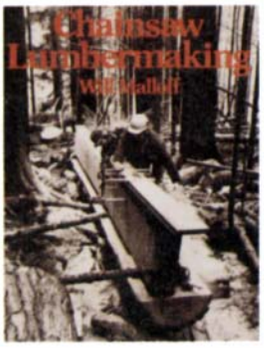
## Wood




### Understanding Wood
*by R. Bruce Hoadley*

A noted wood scientist and woodworker tells you everything you need to know about wood: why it behaves and misbehaves as it does and how you can learn to work with it instead of against it. In his book, Hoadley shows you how best to cut, season, machine, join, bend, fasten, and finish wood. He also uses photographs, drawings, and charts to explain how a tree's life and growth influences the wood's figure, how you can identify 54 common domestic and imported species, and more. If you enjoy working with wood, you'll find this book an invaluable resource.
*Hardcover, 256 pages, 294 photos/132 drawings, $24.95*
***#11***

***"Clearly the best book available on the subject."***
***—WOODENBOAT***




### Chainsaw Lumbermaking
*by Will Malloff*

Turn your chainsaw into a lumbermill. Malloff shows you how to modify and maintain your chainsaw, grind a smooth-cutting ripping chain, make an existing mill work better, and make your own mill from scraps and 2x4s.
*Hardcover, 224 pages, 427 photos/22 drawings, $23.95*
***#20***

### *Fine Woodworking* on Wood and How to Dry It

Forty-one articles from *Fine Woodworking* tell you how to buy, dry, store, and mill lumber. You'll find out which species are good for which jobs, and how you can design joints that accommodate wood's seasonal swelling and shrinking. *Softcover, 112 pages, 134 photos/68 drawings, $7.95*
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## Period Furniture

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***#27***

### Federal Furniture
*by Michael Dunbar*

A complete workshop in the design and construction of selected Federal-period pieces, written by a craftsman who knows the subject as few others do. You'll learn how to make 20 pieces, in particular: a card table, candlestand, Pembroke table, Hepplewhite and Windsor chairs, chest of drawers, and more.
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***#41***

### *Fine Woodworking* on Making Period Furniture

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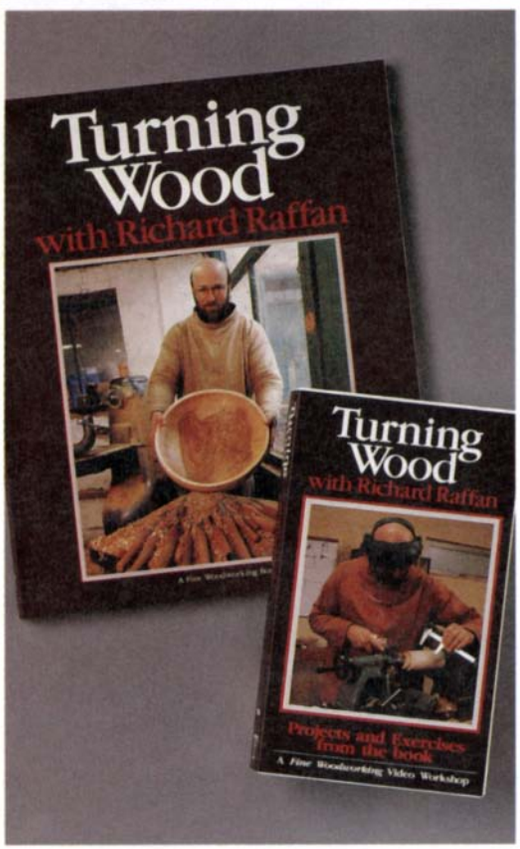
***#36***

## RAFFAN BOOK AND VIDEO SET




**The Book: Master woodturner Richard Raffan provides an extensive introduction to his craft.** At the heart of the book are his chapters on centerwork and faceplate turning, but you'll also learn about your work area, lathe, tools, stock, abrasives and finishes, and how to angle a tool to get the cut and surface you want. There are exercises and a number of projects to help you develop the skills you've learned, and a 16-page color gallery of Raffan's work will inspire you to take your skills to new heights. *Softcover, 176 pages, 266 photos/166 drawings, $17.95*
***#39***

**The video: Produced to capture the book's dynamic details,** this video lets you watch Raffan from a variety of perspectives. Raffan demonstrates his tool-sharpening techniques and a series of useful gouge and skew exercises. He then takes you through six complete projects: a tool handle, light-pull knob, scoop, box, bowl, and breadboard. *117 minutes, $39.95 (Rental: $14.95)*
***#611 (VHS), #612 (Beta)***

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## TAGE FRID SERIES


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**Book 2: Shaping, Veneering, Finishing.** A step-by-step guidebook to essential woodworking techniques. Frid covers bending, turning, veneering, carving, finishing, and the intricacies of inlaying—all in the inimitable Frid way. *Hardcover, 224 pages, 656 photos/80 drawings, $21.95*
***#19***

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### *Fine Woodworking* on Bending Wood

Learn all about the three methods of bending wood. Thirty-five articles from *Fine Woodworking*, explain steam, green-wood, and laminate bending methods. *Softcover, 128 pages, 122 photos/154 drawings, $7.95*
***#35***

### Make a Chair from a Tree: An Introduction to Working with Green Wood

***by John D. Alexander, Jr.***

A wonderfully readable look at how to "bust a chair out of a tree." Alexander tells you how to fell the tree, and split, shape, and assemble the pieces. *Softcover, 128 pages, 193 photos/89 drawings, $12.95*
***#04***

## Techniques


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## Small Shop

### *Fine Woodworking* on The Small Workshop

A book full of ideas culled from ten years of *Fine Woodworking* magazine. You'll find suggestions about building and improving workbenches and on setting up shop. There are also tips on storing tools and shop safety. *Softcover, 96 pages, 104 photos/120 drawings, $7.95*
***#33***

### *Fine Woodworking* on Proven Shop Tips

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***#38***

### From Back Cover to Poster

The response to our July/August 1988 back cover of *Fine Woodworking* magazine was overwhelming. So many of you called or wrote asking for a poster reproduction of the exquisite toolchest by H.O. Studley, that we decided to go ahead and print one.

We rephotographed the chest and enlarged the photo to fill the 18" x 26" poster shown above. When you see it at that size, Studley's ingenuity is even more apparent.

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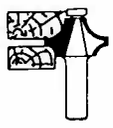

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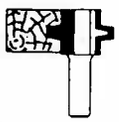

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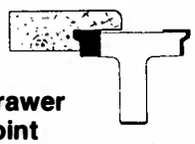

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*Listings of gallery shows, major craft fairs, lectures, workshops and exhibitions are free, but restricted to happenings of direct interest to woodworkers. We'll list events (including entry deadlines for future juried shows) that are current with the months printed on the cover of the magazine, with a little overlap when space permits. We go to press two months before the issue date of the magazine and must be notified well in advance. For example, the deadline for events to be held in March or April is January 1; for July and August, it's May 1, and so on.*

***ALABAMA:*** **Juried exhibit**–"Magic City Art Connection," Apr. 7–8, 1989. For prospectus, write Magic City Art Connection, Eileen Kunzman, 1128 Glen View Rd., Birmingham, 35222. (205) 595-3563.

***CALIFORNIA:*** **Crafts market**–6th Contemporary Crafts Market, Oct. 28–30. Santa Monica Civic Auditorium, Santa Monica. Admission for Sat. & Sun. $3; children under 12 free. For more info., call (213) 829-2724.
**Show**–"Furniture '88," a multi-media group show featuring contemporary furniture, lighting and floor coverings, Sept. 17–Nov. 16. Ghirardelli Square, 900 Northpoint, San Francisco. (415) 771-1919.
**Class**–Tool clinic, to sharpen and adjust own tools, Nov. 5. National Maritime Museum Assoc., Bldg. 275, San Francisco, 94109. (415) 929-0202.
**Class**–Building a traditional Norwegian pram, "Original Sin," (a 2-weekend class), Nov. 12–13 and 19–20. National Maritime Museum Assoc., Bldg. 275, San Francisco, 94109. (415) 929-0202.
**Classes**–Traditional Japanese woodworking, Shoji screen, Tansu chest, joinery & hand sharpening. Contact Hida Tool Inc., 1333 San Pablo Ave., Berkeley, 94702. (415) 524-3700.

***COLORADO:*** **Juried show**–4th annual exhibit by Colo. woodworkers, Nov. 19–Dec. 25. Colo. Springs Pioneer Museum, Colo. Springs. Contact the Woodworkers Guild, Box 9594, Colo. Springs, 80932. (719) 632-8548.

***CONNECTICUT:*** **Exhibit**–The Wesleyan Potters 33rd annual exhibit and sale, Nov. 26–Dec. 11. For more info., contact the Wesleyan Potters, 350 S. Main St., Middletown, 06457. (203) 347-5925.
**Craft sale**–10th annual Holiday Craft Sale, Nov. 25–Dec. 24. Unique one-of-a-kind "contemporary artifacts." For more info., call Brookfield Craft Center at (203) 775-4526; The Brookfield/SoNo Craft Center at (203) 853-6155; or write Box 122, Brookfield, 06804.
**Juried exhibit**–53rd Annual Exhibit of the Society of Conn. Craftsmen, Oct. 22–Nov. 20. Farmington Art Guild. For more info., contact The Society of CT Craftsmen, Box 615, Hartford, 06142-0615. (203) 263-3908.

***FLORIDA:*** **Juried exhibit**–5th Annual Rain Barrel Woodworkers Exhibit, Jan. 21–22. For more info., contact the Rain Barrel Woodworkers Exhibit, 86700 Overseas Hwy., Islamorada, 33036. (305) 852-3084.

***GEORGIA:*** **Exhibit**–Handmade furniture and fanciful whirly gigs by Craig Nutt, Oct. 19–Nov. 19. For info., contact the Great American Gallery, 1925 Peachtree Rd., Atlanta, 30309. (404) 351-8210.
**Show**–Nat'l Assoc. of Home Builders 45th Annual Convention and Exposition, Jan. 20–23. World Congress Center, Atlanta. For registration info., contact Betty Christy, Public Affairs Division, NAHB, 15th and M Streets, N.W., Washington, DC 20005. (202) 822-0200.

***HAWAII:*** **Show**–Invitational show hosted by the Arts & Antiques Market, May 5–7. Blaisdell Exhibit Hall, Honolulu. Application deadline Nov. 10: 5 slides, $10 fee, $50 booth deposit. For application/info., send self-addressed mailing label to Roy Helms & Assoc., 777 Kapiolani Blvd., Suite 2820, Honolulu, 96813.

***MARYLAND:*** **Juried show**–11th annual Winter Crafts Festival, Dec. 9–11. Montgomery County Fairgrounds, Gaithersburg. For more info., contact Deann Verdier, Sugarloaf Mountain Works, Inc., 20251 Century Blvd., Germantown, 20874. (301) 540-0900.

***MASSACHUSETTS:*** **Show**–9th annual fair of traditional crafts, Dec. 3–4. 10 A.M. to 5 P.M. Old Sturbridge Village. For more info., contact Frank White, Old Sturbridge Village, 1 Old Sturbridge Village Rd., Sturbridge, 01566. (617) 347-3362, ext. 236.
**Show**–3rd annual Crafts at the Castle, Dec. 2–4. Park Plaza Castle, Arlington St. & Columbus Ave., Boston's Back Bay. Admission: $5. For info., call (617) 523-6400, ext. 504.
**Exhibit**–"North Bennet Street School: An Education in Craftsmanship," Oct. 25–Nov. 17. Featuring work of the school's students in lobby of 99 Summer St., Boston. For more info., contact Sally Miller at (617) 227-0155.

***MISSOURI:*** **Seminar**–"Hand Tools & Techniques," by Ian Kirby, Nov. 12. 8:30 A.M. to 5 P.M. Allen Center, Old Westport, Kansas City. For tickets and info., contact John Kriegshauser at (816) 474-4618.

***NEW JERSEY:*** **Juried exhibit**–"Fiber, Metal & Wood," part of series of exhibits of work by artists living or working in NJ, Sept. 25–Dec. 11. Noyes Museum, Lily Lake Road, Oceanville, 08231. (609) 652-8848.
**Show**–3rd annual Fall Woodcarving Show, Nov. 19. Lenape High School Gym, Medford; 10 A.M. to 5 P.M. For info., call Jack or Connie Raleigh at (609) 829-8731.

***NEW YORK:*** **Workshops**–Hand tool workshops by Robert Meadow, Nov. 4–5, 19–20, Dec. 3–4, 17–18. Contact The Luthierie, 2449 W. Saugerties Road, Saugerties, 12477. (914) 246-5207.
**Auction**–"Bewitched by Craft," American Craft Museum's 8th annual benefit auction, Oct. 31. Contributing patron $2,500; contributing sponsor $1,000; gallery sponsor $350; individual $175. Contact Lynn Millinger at (212) 956-3535.
**Workshop**–Intro. to furniture design, Nov. 12–13, 19–20. 10 A.M. to 4 P.M.; $190. Crafts Students League, 610 Lexington Ave. at 53rd St., New York, 10022. (212) 735-9730.
**Classes**–Annual woodworking classes, Sept. 10 thru Dec. 17. Constantine's, 2050 Eastchester Road, Bronx, 10461. Two sessions–Sat. and Wed.; $10 per person for the two sessions. Call (212) 792-1600 for registration form.

***NORTH CAROLINA:*** **Workshops**–Woodcarving, Oct. 21–23, Oct. 30–Nov. 5, Nov. 13–19, 18–20, Dec. 4–10. Contact John C. Campbell Folk School, Brasstown, 28902. (704) 837-2775.
**Juried show**–High Country Christmas Art & Craft Show, Nov. 25–27. Asheville Civic Center, Asheville. Contact Gail Gomez, High Country Crafters, 29 Haywood St., Asheville, 28801. (704) 254-0070.

***OREGON:*** **Workshop**–Stool design and construction by Gary Rogowski, Nov. 5–6. $76. Call (503) 297-5544 for a free schedule. Oregon School of Arts & Crafts, 8245 S.W. Barnes Road, Portland, 97225.
**Show/sale**–"Having It Made," Oct. 21–23. The Guild of Oregon Woodworkers' annual exhibit, including "2x4m Design Challenge." Miller Hall, World Forestry Ctr., 4033 S.W. Canyon Rd., Portland, 97221. Contact Charles Groves at (503) 233-2559.

***PENNSYLVANIA:*** **Juried show**–7th annual PA Nat'l Arts & Crafts Show, Mar. 24–26. Entry deadline: Jan. 15. PA State Farm Show Complex, Harrisburg. Send SASE to PA Nat'l Arts & Crafts Show, Box 11469, Harrisburg, 17108-1469. (717) 763-1254.

**Juried exhibit**–"1987 Craft Fellowship Recipients," Sept. 16–Nov. 6. The Society for Art in Crafts, 2100 Smallman St., Pittsburgh, 15222. (412) 261-7003.
**Show**–1988 Woodworking Show, Dec. 3–4. Featuring machinery, power and hand tools, supplies, demos, seminars, free workshops. Valley Forge Convention Center, PA Room, 1200 1st Ave., King of Prussia, 19406. For info., contact (213) 477-8521 (in CA); (800) 826-8257.
**Juried exhibit**–Holiday Craft Market, Nov. 5–6. 10 A.M. to 6 P.M.; Pucillo Gym, Millersville Univ., Millersville. Contact Terri Lioman, 437 Lombard St., Dallastown, 17313.
**Workshops**–Numerous workshops, exhibits and shows through Dec. 4. For information, contact Penn. Guild of Craftsmen, Box 820, Richboro, 18954. (215) 860-0731.
**Symposium**–The Use of the Lathe: Ideas for the Classroom, Nov. 11–13. Bucks County Community College, Newtown. Contact The Wood Turning Center, Albert LeCoff, executive director, Box 25706, Philadelphia, 19144. (215) 844-0151.

***TEXAS:*** **Juried exposition**–Applications now being accepted for 1989 Juried Arts & Crafts Expo., and Festival's 3 open-air markets, the Kramu, Latin and Gypsy, Apr. 13–23. Deadlines: Dec. 15 (expo); Feb. 15 (markets). Write the production director, The Houston Int'l Festival, 909 Fannin, Suite 890, Houston, 77010. (713) 654-8808.

***VIRGINIA:*** **Show**–"Artistry in Wood," 14th annual woodcarving show, Nov. 25–26. Marymount Univ., Arlington. Contact Show Coordinator, Northern Virginia Carvers, Box 524, Oakton, 22124. (703) 941-7064.

***WASHINGTON:*** **Workshops**–Rigging seminar, Nov. 14–18; lapstrake construction workshop, Nov. 19; half model carving, Dec. 3; ship carving workshop, Dec. 10. Contact Northwest School of Wooden Boatbuilding, 251 Otto St., Port Townsend, 98368. (206) 385-4948.
**Exhibit**–Works of fine furniture, textiles, glass, ceramics and paintings. Artist demo third Saturday of every month. Artwood, a Gallery of Woodworking, 1000 Harris Ave., Bellingham, 98225. (206) 647-1628.
**Juried show**–Box competition and container show, Nov. 17–Dec. 31. Contact Cheryl Peterson, Northwest Gallery, 202 First Ave. S., Seattle, 98104. (206) 625-0542.
**Class**–Building the petaluma, Oct. 22–29. Center for Wooden Boats, 1010 Valley St., Seattle, 98109. (206) 382-2628.

***WEST VIRGINIA:*** **Workshop**–Basic joinery with David Kister, Oct. 21–23. Crafts Center, Cedar Lakes, Ripley, 25271. (304) 372-6263.

***WISCONSIN:*** **Festival**–17th annual Festival of the Arts, Apr. 2. Univ. of Wisc.-Stevens Point. Applications due Jan. 6. 5 slides representative of work to be sold, brief resume and SASE to John Morser, Festival of the Arts, Box 872, Stevens Point, 54481. (715) 341-4655.
**Competition**–Dremel/Ducks Unlimited MASTERS Carving Competition, Feb. 24–26. Racine Festival Site, Racine. For entry info., write Dremel, MASTERS Carving Competition, 4915 21st St., Racine, 53406-9989.

***CHINA:*** **Study tour**–Visits to famous woodworking factories, Imperial Palace Museum, the Shanghai Furniture Factory, Xian Raw Lacquer Research Institute, June 3–19, 1989. $3,505 includes air fare. Contact Eva Frank, 3504 Beneva Road, Sarasota, FL 34232. (813) 923-3377.

***ENGLAND:*** **Exhibit**–John King's chairs, Dec. 15–17. London Contemporary Design Fair, Chelsea Old Town Hall, London. For more info., contact John or Geraldine King on (Oakford) 03985-422.

***IRELAND:*** **Tour**–Guided tour by Liam O'Neill for woodworkers, turners and carvers, May 9–23. Departure points: Boston or New York. Deadline: Feb. 28. Contact the Woodworking Assoc. of N. America at (603) 536-3876.

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**200 Original Shop Aids & Jigs for Woodworkers** by Rosario Capotosto. ***Popular Science Books; distributed by Sterling Publishing Co., Inc., 2 Park Ave., New York, N.Y. 10016; 1987. $14.95, paperback; 358 pp.***

There's a rule, from statistics I think, that says any large collection of woodworking methods will have a few gems, a few clunkers and a bunch of useful, but average, stuff in the middle. *200 Original Shop Aids* proves to be no exception to the rule. The book was originally published in 1983 under the title *Capotosto's Woodworking Wisdom.* The author, Rosario Capotosto, is a long-time contributor to *Popular Mechanics*, from which some of the material for the book was taken. Even if your exposure to *Popular Mechanics* has been limited to thumbing through back issues in the local barber shop, it is likely that you will recognize Capotosto's style from his distinctive photographs and clear drawings, which are actually done by his son Michael.

The book is divided into three main sections: jigs, tips and projects. The first two sections, which are the real meat of the book, contain a couple hundred jigs and methods distributed among the various power tools. It's true that many of these methods are old standards that have appeared in print before, but I found several that were new to me. For example, there are several good tips that are centered around the scroll saw, a tool that's not particularly inspirational to other authors but seems to be one of Capotosto's favorites. And, judging by the small number of router fixtures, Capotosto may feel just the opposite about the router.

Of the 50 or so jigs, the tenoning jig, which takes up six full pages, is probably the centerpiece of the book. It is a complicated, heavy-duty fixture that would compete favorably with many of the commercial tenoning jigs. Capotosto's tablesaw mitering jig also caught my eye. The fixture itself, which is a plywood base that tracks in the miter-gauge slots, is not unusual, but it makes use of an interesting glued-up flexible wedge to hold the work against the fence.

The third section of the book contains instructions for building several small projects, such as a sculptured dolphin clock and a wall-hung wine rack. The project segment gives you the feeling that it really doesn't belong with the rest of the book but was tacked on to beef up the book's thickness. Perhaps it is best to think of this third section as a sort of bonus you get with the rest of the material. ***–Jim Richey***

**Better Than New: A Practical Guide to Renovating Furniture** by Albert Jackson and David Day. ***Sterling Publishing Co., 2 Park Ave., New York, N.Y. 10016; 1983. $8.95, paperback; 144 pp.***

If you have an old (that's old, not olde!) chair or chest of drawers that is beat up but reasonably sound, this is the book for you. *Better Than New,* the companion text for a BBC television series first aired in Great Britain in 1982, has a clarity and directness of approach that makes it one of the best books in the field. Rarely have I seen so much useful information jammed into such a small space: Finishes, structural repairs and upholstery are all covered to a degree that with a reasonable aptitude for this sort of work, the amateur woodworker can really accomplish something. Tools, techniques and materials are all covered, and there is even a glossary of British terminology for those who have not yet sorted out the differences. (My favorite will always be "G cramp = C clamp.")

Discussing the ethics of their treatments in the introduction, the authors clearly draw the line between furniture that has historic significance or other acquired value and the kind of stuff that has been mass-produced from, say, the turn of the century. They strongly caution the reader not to overreach his or her capabilities when dealing with what might be an important object. So long as the reader appreciates that there is intrinsic integrity to an historic piece of furniture, and accepts that perhaps a trained professional could better preserve that integrity, not much damage will be done. Unfortunately, randomly distributed amongst other reasonably safe and appropriate treatments, one finds techniques that are not only aggressive, but seriously threatening to any piece of furniture.

For example, to treat a split case-piece side, the authors, apparently unaware of the basics of wood technology, resubmit the age-old method of fitting a wood spline to the open crack. This problem is caused by compression shrinkage. Filling in the crack the way they recommend will only make the problem worse.

Another general area of concern is the authors' propensity to cut away some original material from the furniture piece in order to fit new, preshaped repair pieces. Whether it is lost veneer chips or broken decorative elements, the rule of thumb is to shape the new piece to fit the original components, rather than the other way around.

Despite my caveats, if you keep in mind that this is not a serious textbook of furniture conservation as practiced in leading museums and historic institutions, you will, nonetheless, have more than enough information to put damaged, average household furniture back into a good state of repair.

***–Michael Podmaniczky***

**Japanese Woodworking: A Handbook of Japanese Tool Use and Woodworking Techniques** by Hideo Sato. ***Harley & Marks, Inc., Publishers, P.O. Box 147, Point Roberts, Wash. 98281; 1987. $12.95, paperback; 196 pp.***

As its subtitle states, *Japanese Woodworking* is a handbook for working craftsmen. Translated from a Japanese text, it is a concise how-to manual offering useful information on tools, the laying out and cutting of joints, the functions of these joints and the properties of wood. This book is a welcome addition to the limited but growing body of books in English on Japanese carpentry.

Most of the information is fresh and not available in other books in English. It is most helpful when you are faced with a specific problem and are looking for a specific answer. The book is especially strong in its detailing of tool care and use. The section on joint layout is helpful but confusing: This is a hard subject to present on a flat page. And the section on structural members is almost superfluous. The structure of a Japanese house is extremely intricate, and in this handbook, the individual members are described out of context, without giving the reader a broad picture first. There is no way for the reader to finish this section and be able to visualize the complete house.

One word of caution: While the information presented is useful and accurate, don't allow yourself to become "enslaved" to it. This book is written with a strong air of authority, and it is easy to believe that the techniques offered are the only correct ones for any given task. Not so. Use the techniques as a starting point, and then begin experimenting. To progress as a craftsman, it is necessary to try your own methods, observe your own mistakes and work out your own solutions. If you continually follow other's directions, then work becomes stale and growth cannot occur. *Japanese Woodworking* offers a solid foundation from which to begin. ***–Bruce Dichter***

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*Jim Richey edits the "Methods of Work" column for* Fine Woodworking. *Michael S. Podmaniczky is the associate furniture conservator at the Winterthur Museum, Winterthur, Del., and is a contributing editor for* FWW. *Bruce Dichter is a woodworker in Weaverville, Calif., and an apprentice for Japanese master carpenter Makoto Imai.*

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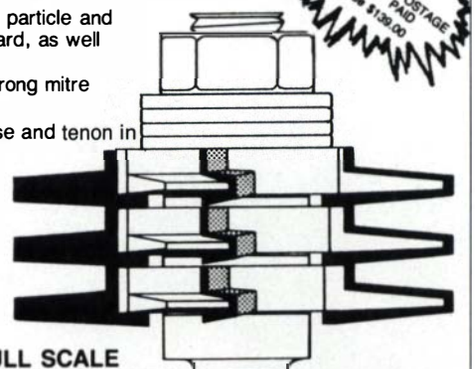

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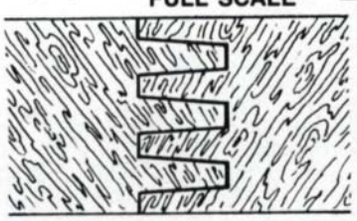

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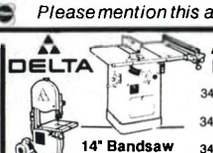

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Garrett Wade Co. Inc., 161 Ave of the Americas, New York, NY 10013.
Highland Hardware, 1034 N. Highland Ave N.E. Atlanta, GA 30306.
Lee Valley Tools Ltd, 1080 Morrison Dr, Ottawa, Ontario, Canada K2H 8K7.
Woodcraft Supply Corp, 41 Atlantic Ave, PO Box 4000, Woburn, Mass 01888.
Russ Zimmermans, House of Woodturning. RFD3, Box 242, Putney, VT 05346.
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Photo: Mark Sfirri

*Jeff Darkes made the top for this hall table from two pieces of book-matched walnut. The center gap adds to the table's overall feeling of lightness, while the curves defined by the relief carving on the rails and legs suggest an art-nouveau influence.*

# Two student shows

I always enjoy student shows, because young craftspeople often come up with refreshing ways to solve design problems. That ability was apparent at the high-school and community-college shows I saw in Bucks County, Pa., a few months ago.

The students at George School, a private Quaker high school in Newtown, Pa., take classes in the arts as part of their college preparatory program. One such class places them in a woodshop run by Carter Sio, an alumnus of the school. Sio encourages the students to explore design problems, as well as develop their craftsmanship. The chair at right is the result of such an assignment: to design and build a "seating unit" using only 20 sq. ft. of plywood. Tamara Zaroff, a third-year student, made this low-seat chair with a comfortable raked back. A delicate cherry arm chair with an upholstered leather seat, designed by Bridget Doyle, also caught my eye because of its fine sense of proportion.

Less than five miles away, I visited another student show at Bucks County Community College. They offer a two-year woodworking program co-headed by Mark Sfirri and Jon Alley. A wide range of interests and a sense of cross-fertilization were evident in this exhibit.

*This chair by Tamara Zaroff uses less than 20 sq. ft. of Baltic-birch plywood. The painted edges highlight the cutouts of the base frames and emphasize the trapezoids repeated throughout the piece.*

A hall table, pictured above, by Jeff Darkes stood out as one of the more traditional pieces, because of its lack of paint or applied ornamentation. A closer look, however, revealed some well-executed hand-carving on the rails and legs. Much of the other work leaned toward the modern, with painted surfaces combined with natural wood finishes or Formica. Levi S. Frusher attacked the top edge and legs of his cherry table with a spokeshave to create free-form edges, which he then painted. Rex Selheimer's whimsical three-leg cherry table stands daintily on two pink high heels. The single back leg wears a matching ponytail tie. Michael Whiffen's maple desk does away with legs entirely. His wall-hung piece, with its incised geometric lines and two-tier top, reflects his previous years of architecture studies. *—Jim Boesel*

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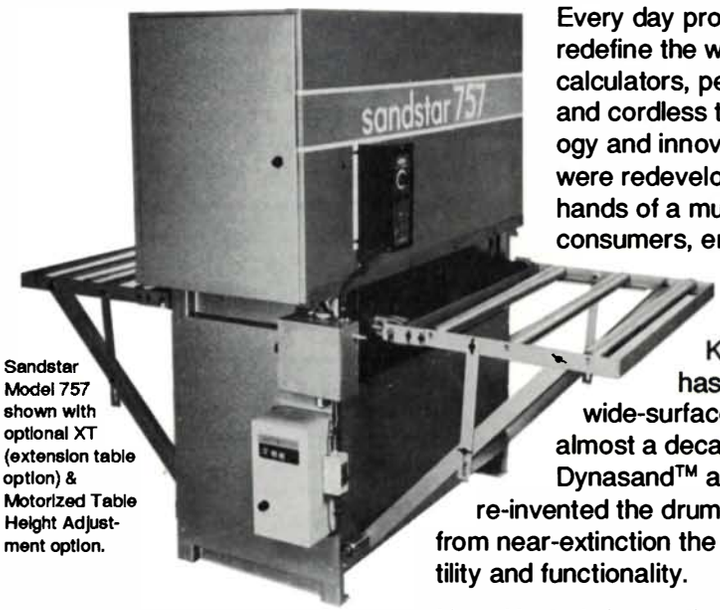


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Photo: Richard Herr

***Cabinetmaker Michael Smith crafted this unique corner china hutch from mahogany salvaged from a log that washed up on the shoreline of Southern Oregon. The wood, its riddled pattern formed by the drilling action of shipworms with voracious appetites, was damaged and weakened extensively. Smith cleaned and stabilized the mahogany to avert further degradation. He had to employ special construction techniques so the fragile wood could be worked.***

## From mainsail boom to corner hutch

Michael Smith's wormwood corner china hutch, pictured at left, was once part of a cigar-shape log resting on a beach along Oregon's southern coast. Sam Clausen, a local woodcutter, spotted the log and identified it as "lauan" or Philippine mahogany. Probably once the boom of a sailing ship, the log was covered with staples and white lettering, lots of barnacles and thousands of wormholes.

The holes Clausen noticed were caused by the drilling action of marine creatures called shipworms or teredos. Teredos aren't real worms but are actually clams of the family *Teredinidae*. Like most clams, the teredo has a shell, but in this case, the shell is located at the tip of the body. The shell or "pallette" is ribbed like a drill bit and is used to bore through wood. After digesting 80% of the wood's cellulose, the teredo exudes calcium-like deposits on the walls of its new home.

The worm-riddled condition of Clausen's log suggests that it had floated for a few years in the world's oceans while the shipworms drilled away. Whatever its history, the "boom stick" ended up on the Oregon shore. Clausen and his brother cut the log into four 8-ft. sections, winched the chunks off the beach and hauled them to a sawmill.

The boom stick produced 1,500 bd. ft. of rough lumber, about 300 bd. ft. with wormholes. Some of the lumber was sold to a boat yard, but Clausen held on to the damaged boards.

Word of this exotic wormwood spread through the Southern Oregon community of woodworkers, boatbuilders and craftspeople. Smith, a cabinetmaker for 17 years, took one look at the mahogany and knew he'd found the right stuff for a corner china hutch he had in mind.

Cleaning out the sand- and gravel-packed wormholes was a formidable task. Smith attacked it with an ice pick and an airhose blower. After the holes were scoured, he air-dried the boards for a year and then drum-sanded them to thickness. Smith lacquered each wormhole to seal the wood and arrest further degradation. He also faced the edges of each board with ⅛-in.-thick wormhole-free mahogany cut from the center of the log. The hutch's exterior drawer molding also came from the center boards. The wood, weakened by the wormholes, could not support dowels, so glue alone was used for assembly.

The hutch's glass panels are ¼-in. plate with a 1-in. bevel. All the hardware is handmade: The knobs are 1½-in.-sq. glass with a ½-in. bevel trimmed with brass-crowned lead cane; the ⅜-in. offset hinges and the spring-loaded latch are fashioned from brass plate.

Smith spent approximately 600 hours building his one-of-a-kind hutch. He modestly claims that it's the material, not his design and craftsmanship, that makes the cabinet a collector's item.

*—David A. Johnson, Bandon, Oreg.*

## Reflections of an aging woodbutcher

I imagine that many readers of *Fine Woodworking* are just like me, reading with open mouths about the unbelievably beautiful pieces turned out by professional woodworkers. But beyond the ranks of these well-equipped professionals are thousands of would-be furnituremakers and woodbutchers who buy tools they hardly use for projects they'll never finish. These are the eager amateurs, happily groping from mistake to mistake.

I too am an amateur woodworker, who came to the pastime in the 1940s as a treatment for my tension-related stomach ulcers. The usually prescribed hobby in the years immediately following World War II was golf. But after unsuccessfully trying for months to break 140, I stumbled across an old Army woodworking manual and a Sears catalog, and thus started a new hobby. I began this hobby without knowledge and without instruction. Now, decades later, as I spend more time with doctors and less time in my shop, I look back to reflect on the ups and downs of a woodworking amateur.

The story of the amateur is one of never-ending battles against dumb mistakes. The foremost problems are those disastrous measurement errors that can turn the beginner's workshop into a place of fury and blasphemy. Whenever I make a foolish mistake, I usually call on the gods to keep me from taking a sledge hammer to my tools—tools purchased with money that should have been used to send my firstborn to summer camp. I take some comfort in knowing, however, that despite all the stupid errors, I seem to make slightly fewer with each new woodworking experience.

The second category of mistakes usually is a result of faulty design or construction. The most devastating consequences usually occur when some project splits in the middle of the night, with a loud crack or pop that wakes everyone in the house. This inevitably involves a prized piece that took two years of weekends to finish. Most amateurs find it impossible to believe that even finished wood will continue to expand and contract.

The amateur, like a crazed anaconda, is always writhing around, groping for ideas for the next wood project. If there isn't a clear plan dictated by need, the amateur is liable to build just about anything. Such creations of the idle mind are usually distinguished by their weird appearances and by the impractical-to-cut joints used to hold them together. One of my own follies was a pair of Chinese Chippendale table lamps. Each lamp had over 300 joints in the intricate lattice work that makes Chinese Chippendale look Chinese. This lamp project took years of off-and-on work as each joint was carefully fitted and added to the assembly. It is hard to pretend that someone with practical knowledge would devote so much time and effort to something of such doubtful appearance. This establishes me as a true woodbutcher, however, impractical to the last.

Friends with some understanding of woodworking have expressed amazement at some of my projects. It is not clear whether they are amazed that I can make anything at all or whether they are amazed at the apparent complexity of whatever it is I'm making. With a sidewise glance, they say: "What patience you must have," indi-

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cating they know damn well I have almost no patience at all. The kind of woodworking I do requires neither patience nor skill, or else there would be a lot fewer amateur woodworkers around.

Amateur woodworkers usually believe that by making something themselves, they are saving money. However, any savings realized from making furniture, as opposed to having it made by somebody who knows what they're doing, is likely to be wholly illusionary. Those of us who enjoy the process of shaping wood with patience must accept the slowness and inefficiency of our underdeveloped skills. I can honestly say that it's hard to put any dollar value on my wood projects, because they often are the result of false starts, redone work and those long periods of contemplation at the chip-laden bench.

One quality that often distinguishes an amateur woodworker from a professional is the quality of tools in their shops. Back in the days before Taiwanese tools offered heavy-duty machines for light-duty prices, woodworkers had the choice of either buying professional tools at tremendous prices or buying from Sears. In those postwar days, Sears' affordable tool prices made a big difference when equipping an amateur's small shop. I still have my old Sears tablesaw, and although I'm weary of measuring the fence at each end with every setup and I've contemplated replacing it a hundred times, that $120 investment keeps humming along with the same 1-HP motor, bathed for decades in sawdust. The stains on the table from various spills are like old friends.

One of the many decried characteristics of the nonprofessional woodworker is his innocent gullibility in buying tools. I have a dozen tools I bought in the glorious belief I would find them infinitely useful—and have never used them once. This is partly because it's tough to break the old ways and use new tools. But it's mostly because woodworkers are connoisseurs of gadgets and love a clever device, however limited its usefulness. Part-time woodworkers (at least the affluent ones) are also often guilty of overequipping their shops with tools that are of much heavier duty than amateur needs warrant. Why buy a carbide bit to shape only a few feet of molding, for example, when a less-expensive high-speed steel bit will do the job just as well?

Despite our shortcomings, let the lofty professional remember that we who have struggled with dull tools and who have bathed our work in our own blood will always look to the workmanship of the professional with unabashed admiration. And occasionally, we'll even come up with a trick or two of our own to confound our betters. *—Cary Hall, Hampton, Ga.*

## Product review

**Stikit sanding systems**, *The 3M Co., Industrial Abrasives Division, 5698 Rising Sun Ave., Philadelphia, Pa. 19120-1686.*

I like the conversion kits for the Stickit sanding system developed by The 3M Co. so much that I've switched over all six of the palm sanders in my shop. The new kits are designed to utilize the sandpaper more fully and to make changing sheets faster and easier. The kits consist of an aluminum-backed ⅜-in.-thick foam pad covered with what appears to be double-knit polyester cloth, along with low-tack adhesive-backed sandpaper, which, while not strong enough to stick to much else, adheres quite well to the pad's surface yet peels off cleanly and easily when it's time to change sheets.

Most every shop that uses electric or air sanders has gotten into the habit of stacking paper—putting three or four sheets of paper into the holding clips at one time and tearing off the top one as it gets worn. Unfortunately, by the time you get to the last sheet (if it hasn't already torn), the vibration has worn half the life from the sheet.

With the Stikit pad system, the paper goes on one sheet at a time, and it is as easy to change grits as it is to change sheets. Because the paper sticks to the entire pad, there is no loss in the transference of vibration as there is with loosely clipped sheets, so the sander works more efficiently. If the paper tears, it doesn't lift off the pad; you can often continue using it until it is worn. Because there are no clips, all four edges are flat (on clip systems, two are rounded over into the holders) and 100% of the paper can be utilized. I've also noticed that it is easier with the Stikit systems to get into inside corners without banging up the adjacent side.

The replacement pads are generally easy to install and are available for a large number of sanders, among them the Makita, Porter-Cable, Milwaukee and Black & Decker. The pads last a long time and are quite inexpensive (from $3 to $6, depending on size and model). The biggest drawback to the system, however, is cost: Stickit sandpaper is five times more expensive than sheet paper. The 3M Co. claims that the increased efficiency in paper usage, coupled with the time saved in paper changing, offsets the cost difference. I'm not sure that is true, but I can tell you there is a definite improvement in the aggravation factor.

Paper is available in continuous 4½-in by 10-ft. rolls or in precut 5-in. and 6-in. discs. It also comes in 80 grit through 320 grit; 400-grit paper is available on special order in 10-roll lots (one case). With some variance for grit, the 10-ft. rolls cost approximately $10, and the precut discs cost about 13¢ each. *—Michael Dresdner*

Photo: Tom O'Neal

***This sculpture of a snowy egret graces the entryway of a Monterey, Calif., home.***

## Artistic welcome

The high-relief teak sculpture of a snowy egret landing on a tree branch makes a memorable entrance to a home on the Monterey, Calif., peninsula. William and Ronda Schnute of Carmel Valley, Calif., designed and carved the entryway to express the interests and aesthetics of the home's owners and to help the home fit in with the natural beauty of the area.

The overall size of the entryway is 60 in. by 80 in. The door is made from two 2½-in.-thick panels: One panel is 17 in. wide and the other is 23 in. wide. A welded steel frame is embedded in the largest panel to minimize warpage of the solid-wood doors. Although heavy—the large panel alone weighs 165 lbs.—the door can be opened with little effort.

Up to five additional layers of 1¾-in.-thick teak were laminated to the door to provide material for the high-relief sculpting of the Monterey cypress and the egret. Epoxy glue was used throughout, and a heated plastic oil finish was used to highlight the wood and protect and preserve its color.

### *Notes and Comment*

***Do you know something we don't about the woodworking scene in your area? Please take a moment to fill us in. Notes and Comment pays for stories, tidbits, commentary and reports on exhibits and events. Send manuscripts and color slides (or, black-and-white photos—preferably with negatives) to Notes and Comment,*** Fine Woodworking, ***Box 355, Newtown, Conn. 06470.***

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# CEREMONIAL MASKS

In the mid 1960s, Duane Pasco spent his time along the Seattle, Wash., waterfront, carving souvenirs for the tourist trade. Books on Northwest Coast Indian art convinced him that these carvings had lost much of the traditional work's form and intent. This inspired him to create new images in the traditional styles. Pasco, now of Poulsbo, Wash., is regarded as one of the most innovative artists within this genre. The 48-in.-dia. red-cedar mask above, "Herring Ball," shows a killer whale creating a ball of bubbles that rounds up progressively smaller fish and represents the feeding cycles and mutual dependency within the sea. "Para Carvers," below left, is made of alder and includes two articulated figures. The apprentice, on the right, swings his hammer, while the old carver, already finished with his work, looks side to side, patiently overseeing the project. The red-cedar mask below, "Feasts All Night," with its movable lower jaw and eyes that roll back in its head, represents gluttony.