# Fine WoodWorking

July/August 1983, No. 41, $3.50

*Giant Turnings*

• POWERMATIC • ROCKWELL • HEGNER • INCA • PORTER-CABLE • HITACHI • BLACK & DECKER •

*Cover: Ed Moulthrop turns a tulip magnolia log into a bowl 30 in. in diameter. To understand Moulthrop's special tools and techniques, woodturning expert Dale Nish visited him at his Atlanta shop. Beginning on p. 48, Nish tells what he learned. Cover photo by Louie Favorite,* Atlanta Journal.



# Fine WoodWorking®

JULY/AUGUST 1983, NUMBER 41

*DEPARTMENTS*



*ARTICLES*



*Fine Woodworking* (ISSN 0361-3453) is published bimonthly, January, March, May, July, September and November, by The Taunton Press, Inc., Newtown, CT 06470. Telephone (203) 426-8171. Second-class postage paid at Newtown, CT 06470, and additional mailing offices.  Fine Woodworking® is a registered trademark of The Taunton Press, Inc. Subscription rates: United States and possessions, $16 for one year, $30 for two years; Canada, $19 for one year, $36 for two years (in U.S. dollars, please); other countries, $20 for one year, $38 for two years (in U.S. dollars, please). Single copy, $3.50. Single copies outside U.S. and possessions, $4.00. Send to Subscription Dept., The Taunton Press, PO Box 355, Newtown, CT 06470. Address all correspondence to the appropriate department (Subscription, Editorial, or Advertising), The Taunton Press, 52 Church Hill Road, PO Box 355, Newtown, CT 06470. U.S. newsstand distribution by Eastern News Distributors, Inc., 111 Eighth Ave., New York, N.Y. 10011.

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

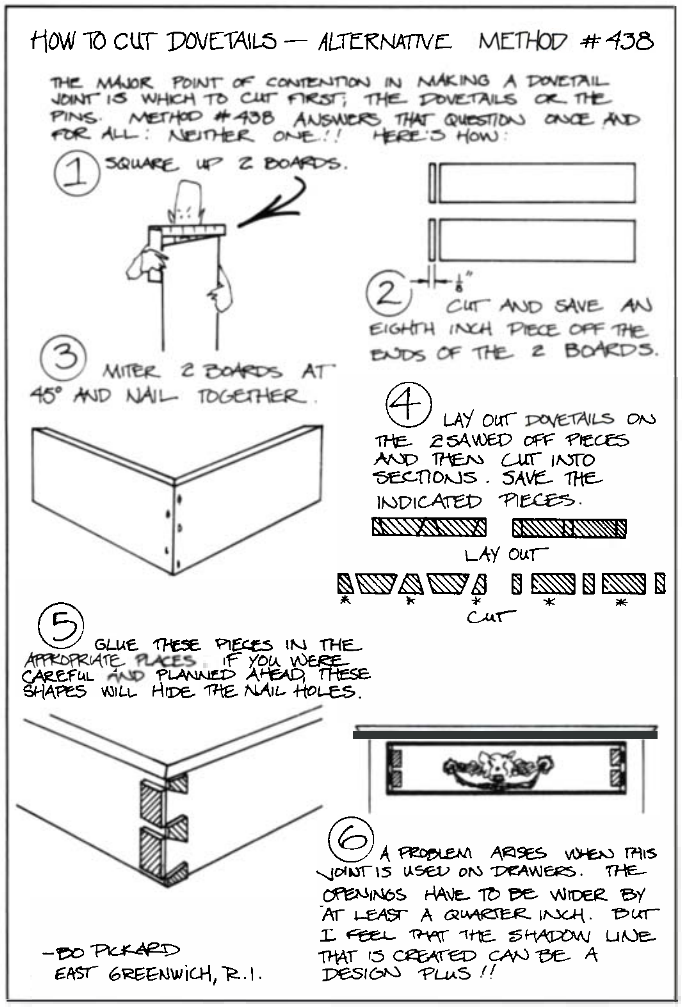
I am glad to see that the stain-versus-gloss controversy, which had raged in earlier issues, has been revived by Don Newell's well-taken comments regarding the appropriateness of each (*FWW* #37, p. 102). Charles Dickens, that master of the spirit of descriptive prose, expressed his own mid-nineteenth-century opinion on the subject in chapter three of *Martin Chuzzlewitt:*

> It was none of your frivolous and preposterously bright bedrooms, where nobody can close an eye with any kind of propriety or decent regard to the association of ideas; but it was a good, dull, leaden, drowsy place, where every article of furniture reminded you that you came there to sleep, and that you were expected to sleep. There was no wakeful reflection of the fire there, as in your modern chambers, which upon the darkest nights have a watchful consciousness of French polish; the old Spanish mahogany winked at it now and then, as a dozing cat or dog might, nothing more. The very size and shape, and hopeless immovability of the bedstead, and wardrobe, and in a minor degree of even the chairs and tables, provoked sleep; they were plainly apoplectic and disposed to snore.

*—Wesley Kobylak, Tuscarora, N.Y.*

Craig Brown's comment in *FWW* #40 (p. 10) on the use of fans to ventilate fumes from a workshop is 100% wrong. The motors of bathroom and kitchen ventilating fans are shaded pole motors and have no spark-producing mechanisms. Split phase, capacitor-start and repulsion-induction motors all have starting windings which are disconnected by a spark-producing switch when the motor gets up to speed. These motors must be modified to be explosion-proof. Small pumps and fans. . .are not included in the codes as explosion-proof because the codes are written for large industrial motors.

In 40 years in the chemical industry, I never saw a blower or fan with non-sparking blades, except for plastic blades used to avoid corrosion. The fan switch can spark unless it's a mercury switch. The garden-variety mercury switch won't meet industrial explosion-proof standards, but it can't spark in normal operation. *—David Carnell, Wilmington, N.C.*




Stan Wellborn's letter in *FWW* #39 about the woodturner wearing a necktie brought to mind a recent experience I had. I've adapted a Sony Walkman to fit inside my hearing protectors. . .a super way to make hours spent at droning machines more enjoyable. But watch out for those loose earphone wires. While whistling along at the flap sander, I brushed a little too close and before I knew it the Walkman was thrown to the floor and the wires were torn from the headphones. Whew!

There's good reason why OSHA demands that all drive shafts and belts be enclosed. Even if you think you're too clever, it's easy to slip up just once (or twice).

*—Nick Nicholson, Wellfleet, Mass.*

In Rick Mastelli's article in *FWW* #39 (p. 78), he quotes John Economaki as claiming that Sam Maloof said "industrial arts teachers didn't know anything."

After teaching industrial education for 26 years to some 3,000 students, I really resent being told that I know nothing. I realize I've never created a large, one-of-a-kind table or special chairs, but in talking to past students, I have a sense that they have learned to love the feel, beauty, strength and functions of wood. Many are working in wood-related industries, carpentry, or avocationally in their own workshops.

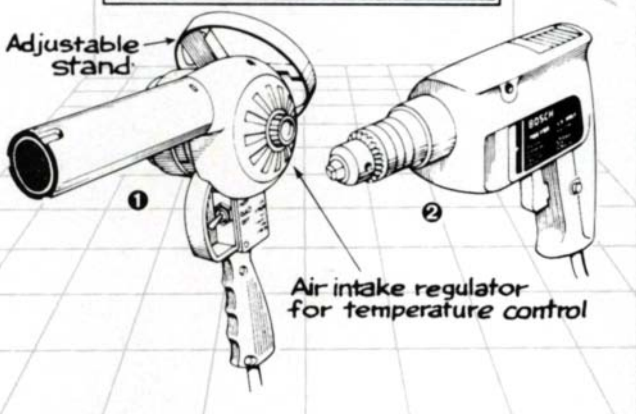
I believe that Economaki, or Maloof, has done industrial education a great disservice and should apologize for this statement. The shaping of young lives is as important as the shaping of wood and just as rewarding. I will continue to think of Maloof as one of the world's greatest craftsmen, but with reservations. *—Paul J. Hooker, Zeeland, Mich.*

RICK MASTELLI REPLIES: We received a number of such letters from offended I-A teachers, and all deserve an apology. The point was to emphasize the transition in Economaki's own career, not to insult anyone. Maloof has said that many industrial arts teachers are doing archaic things. He has also said that many are doing outstanding work. In recalling his self-image at the time—a time when he was himself an industrial arts teacher—Economaki meant to communicate how radically Maloof had affected him. The sentence unfortunately pulled on the wrong lever to move a large idea.

I enjoyed Kevin Kelly's article on making bee boxes (*FWW* #39, pp. 86-89) and thought your readers might be interested in an experience of mine. While working for a CARE-sponsored beekeeping extension and research project in Belize, it was my duty to procure equipment and bees for the Mayan Indians I was training to become beekeepers. White pine boxes imported from the U.S. would either rot in two years or be devoured immediately by the local termites, who found the imported wood particularly appetizing.

The answer was simple. In northern Belize, the Mennonites had for years been turning out household furniture in their woodworking shops using abundant, cheap mahogany. On contract with local beekeeping cooperatives, they were soon producing a full line of well-built bee equipment inexpensively made from solid mahogany.

Before returning to the U.S., I asked a local woodworker to build a shipping trunk for me. I gave him the rough dimensions and asked that it be made from clear mahogany that I could reuse after I returned home. He selected some


Adjustable stand
❶
❷
Air intake regulator for temperature control

beautiful boards; the smallest was not less than 1 in. by 16 in. by 48 in. He also cleverly patterned the trunk with end-nailed boards so as not to mar their faces. Disassembled, the mahogany is now stacked in my shop waiting for the spirit to move me. I guarantee that it won't become beehives.

*—David Papke, Amesville, Ohio*

*Roger DuPont's reborn bombé.*

Before I decided to build the bombé secretary shown in *FWW* #13, p. 62, I had had a little experience in putting together a few pieces of furniture. But I had never tackled a project like this outstanding museum piece. All I had to go by was the photo and the three specified dimensions. So I applied the principles of my trade (I am a footwear designer-patternmaker), working over the picture with a proportional compass to get the right measurements and design of the parts. Then I made cardboard patterns for the body outlines and glued them together to see how it would look.

I used mahogany. It is light, and easy to cut and carve. To be true to the ancient way of furnituremaking, I built the whole body in solid wood. I cut all the curves on the bandsaw, carved the legs, and shaped the bombé sides from 2-in. lumber. I carved the cylinder from two solid pieces. Then I put everything together with dowels and glue—all 256 pieces.

Upon returning from vacation in the fall of 1980, I was ready to use up my film and send you a picture of the completed project. But when I went down the basement steps, I was greeted with a distressing sight. Amongst various pieces of wood, my masterpiece was floating in 3 ft. of water, like the ark during the flood. All that carefully laid veneer, all that marquetry—all peeling off. The body was swollen and cracked. The desk was ruined.

But the rainbow came, and I started again with what I could salvage. Now, finally, I am happy to be able to show you the rebirth of a project (above).

*—Roger DuPont, Thorold, Ont.*

The article on repairing bandsaw blades in the May/June issue is an excellent contribution, but there is one error. The statement that work-hardening causes brittleness that leads to fracture of the blades is not correct. Work-hardening occurs only when the strains are in the plastic region of deformation... the slight flexing of the blade going over the saw's wheels will not produce strains in excess of the metal's elastic limit.

In 40 years of experience with my own saws and those of others...I've never seen a blade fracture at a location other than the joint. A jam will always throw the blade off the wheels rather than break it.

*—Harold J. Read, Grove City, Fla.*

Bob Johnson's babbitt bearing article in your January '83 issue brings me back to 1943. I was stationed at Pearl Harbor and I bought a 1932 Studebaker for $65, plates and all. I took it for a ride and burned a connecting rod bearing. I was about 10 miles from the base, so I jacked up the front end, dropped the oil pan, soaked my wide leather belt in the oil and cut a piece to fit the bearing. It worked fine. About a month later, I got a mechanic at the Honolulu Rapid Transit Bus lines to pour a new babbitt for me. Since it was quite oversized, I ground down files and shaped two scrapers, and with a little Prussian blue, I got it to fit perfectly. I finally sold the Studebaker for the same price and the new owner swore by it. After the war I went back to woodworking and now, in my retirement, I make violins as a hobby. Please thank Bob Johnson for sending his story to you.

*—Morris Schulter, Brooklyn, N.Y.*

A few years ago my wife requested that I make an oak toilet seat. We had seen a number of them in various bathroom supply outlets, but I always felt that they had one flaw that seemed certain to cause problems—all these seats were made by simply cutting a hole out of a single, edge-glued slab of oak. Because of the short grain, these seats seemed almost certain to crack at the front or back. To avoid this, I glued up a triangular blank with tongue-and-groove joints, which not only uses the strength of the long grain, but also results in a very attractive grain pattern.

Several hours of rasping and sanding gives the seat its characteristic shape and comfortable contours. We seal the oak with Watco oil and apply polyurethane. I suggest using four seat bumpers on the bottom to distribute the weight evenly and reduce the pressure on the hinge and the front joint.

Though I don't particularly wish to become known as "the best darn toilet seat builder in these here parts," I have found them to be a fun, and surprisingly challenging, spare-time project. I gave a seat to some close friends and they have mentioned several times that they really like it and they think of me regularly. What more could a craftsman ask?

*—Timothy B. Fields, Colorado Springs, Colo.*

Re Rick Mastelli's article "Art Carpenter" (*FWW* #37), I was fascinated with Carpenter's doggedness. My ultimate view was of a man who has taken his battering from life, survived it, turned some of it around to work for him however imperfectly, and now has some of it his way. I do wish there could be more of this in your magazine. More about people, their ideas, ideas that deal with their involvement in their work. This is what sustains us.

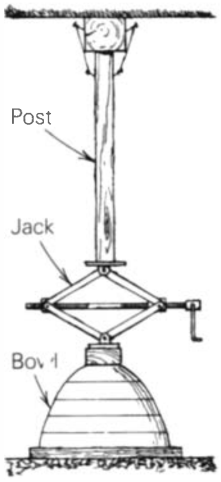
...I remember the first time I saw Wharton Esherick's work. Like Carpenter, I had never heard of him, when on a visit to the Brooklyn Museum I walked into a room full of his furniture. What impressed me most was his relaxed technique. When he put down a piece as being finished, he hadn't removed every tool mark and caused the furniture to look as though it hadn't been touched by human hands holding a tool. Woodworkers who take Esherick as a role model often emulate his sweeping curvilinear shapes, but they try to

cram them into an exacting and rigid technique, and in so doing they wipe out the stamp of their character. Unfortunately, the seriousness of a craftsperson's intent is too often judged by how successfully he or she has removed all signs of the struggle with the hands and the tools. . . .

*—John Marcoux, Providence, R.I.*

In *FWW* #39, p. 84, Peter Petrochko is shown demonstrating the construction of a dangerous device. A trapper might call it a deadfall. I recently needed to make a press which would be much more suited to the job than the pile of blocks and stones he is using. The only trouble with this device is the potential of the jack to kick out if any one of the surfaces is not square. The use of an adjustable cellar support post would eliminate this problem.

*—Joseph Macialek, Moscow, Pa.*




As the Director of Clinical Services in the Department of Opthalmology at Yale-New Haven Hospital . . . I've removed everything from metallic foreign bodies chipped up from a screwdriver to, most recently, a 19mm finishing nail from the eye of an unfortunate woodworker making one last tablesaw cut through a wooden box already nailed together.

Eye injuries are all too common and are usually preventable by the wearing of safety glasses. For older woodworkers, the problem is less acute because many already wear glasses for close work. It's the 20- to 40-year-olds to whom I appeal to use eye protection. The eye is a complex and beautiful organ which allows the appreciation of fine art, the figure in wood, the accurate making of joints. A simple pair of $12 to $14 polycarbonate safety glasses will withstand direct blows and prevent serious injury. This is a small price to pay to prevent the potential loss of vision.

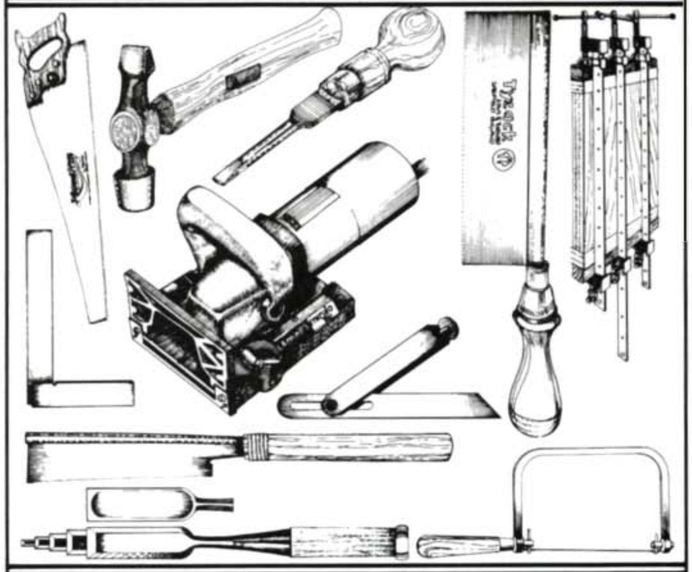
*—Scott M. Soloway, M.D., New Haven, Conn.*

## Eight California Guilds Unite

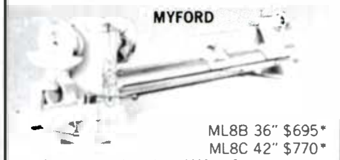
Eight county-wide woodworking groups have banded together to create the Northern California Woodworkers Association. The new group plans to encourage communication and possibly job-sharing by publishing a directory of member shops and a newsletter encompassing the bulletins already issued by the member organizations. According to the new group's chairman, C. Stuart Welch, "The eight guilds together have a membership of five hundred or more, a number that can carry some real clout." For more information, write to Welch at PO Box 776, Marshall, Calif. 94940.

The NCWWA organizational meeting was held the weekend of April 22-24 during the "Working with Wood" trade and consumer show at Fort Mason pier in San Francisco. Besides more than 300 commercial exhibits (and 15,000 paying customers), the trade show featured a large exhibition of furniture by NCWWA members, a carving display by members of the California Woodcarver's Guild, and a number of individual craftsmen who demonstrated their art. The trade show organizers plan a repeat performance next April at the Cow Palace in San Francisco, and they are looking for an East Coast site for May 1984.







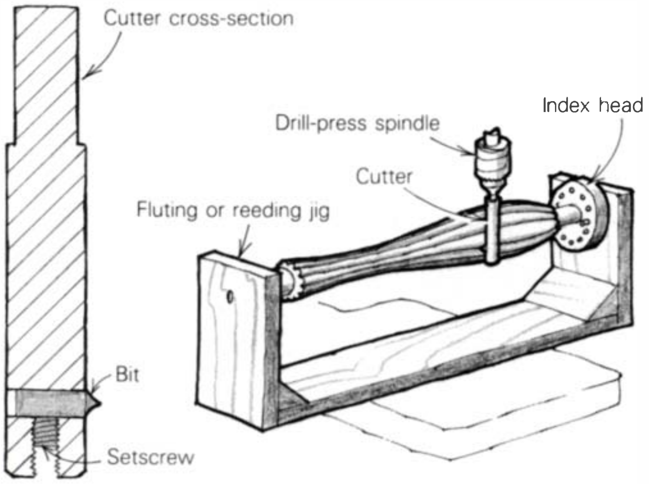







## Cutting flutes on curved turnings

For cutting reeds and flutes in curved and tapered turnings, I use a cutter mounted in a drill press, and a special indexing jig to hold the workpiece. Although making the cutter requires some time and moderate metalworking skills (or machine-shop expense), once it is done you can cut reeds and flutes on any shape with minimal set-up and excellent results.




Make the cutter from a short length of ⅝-in. cold-rolled steel. Turn the top 1 in. of the cutter down to ½ in. so it can be chucked in the drill press. Drill a ¼-in. hole through the cutter ½ in. from its bottom, and file the hole square to accept a short length of ¼-in. tool steel for the bit. In the bottom of the cutter, drill and tap a hole for a setscrew, which holds the bit in place. Grind the bit to the shape of the profile desired for the reed or flute.

When the cutter is complete, you will also need a jig to hold the turning and to index the work as the flutes are cut. The jig can be either a simple one-time affair or of a more elaborate, permanent design incorporating an adjustable tailstock. In either case, lay out the round indexing head carefully by dividing the circle into a number of equal angles according to the number of flutes required. For example, if 24 flutes are desired, then the pin holes on the index head will be 15° apart. On a permanent jig, you can use one indexing head for many combinations by laying out several concentric circles of pin holes, each with a different number of holes.

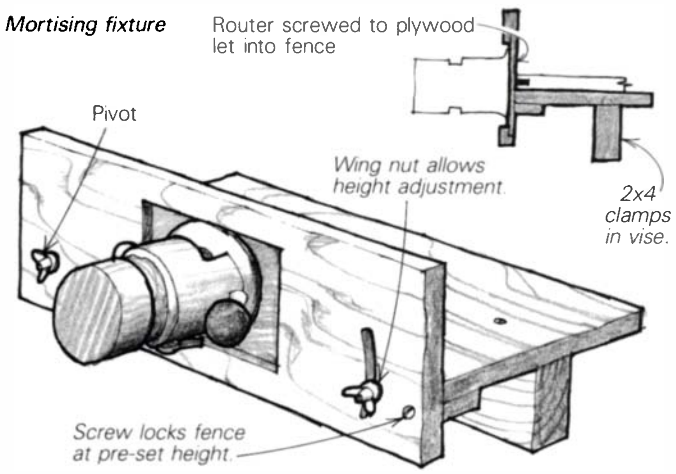
To cut the flutes, first turn and sand the workpiece, then fasten it in place between centers in the jig. With the jig in place on the drill-press table, lower the drill-press quill until the cutter bit is on the centerline of the turning. Lock the quill at this setting. With the drill press running at its highest speed, move the turning into the bit and across the table. The bit cuts the profile of the flute while the cutter body rubs along the turning, regulating the depth of cut. After the first cut, index the turning to the next hole and repeat the process until all flutes have been cut.

*—Kenneth Weidinger, Erlanger, Ky.*

## Improved horizontal mortiser

This horizontal mortising router jig, shown above right, is a more versatile adaptation of G.R. Livingston's (*FWW* #22). The jig can be clamped in a vise, but is fully portable and could be clamped to a sawhorse, for example.

The fence is adjustable by means of two bolts and wing nuts, which lets you center the mortise in stock of different thickness. The fence can be locked in pre-set positions (for mortising ¾-in. stock, for example) with a screw through the fence into the frame behind. My version of the jig is made from plastic-laminate-covered particleboard sold for shelving. I mounted the router on a piece of ¼-in. birch plywood recessed into the face of the fence.

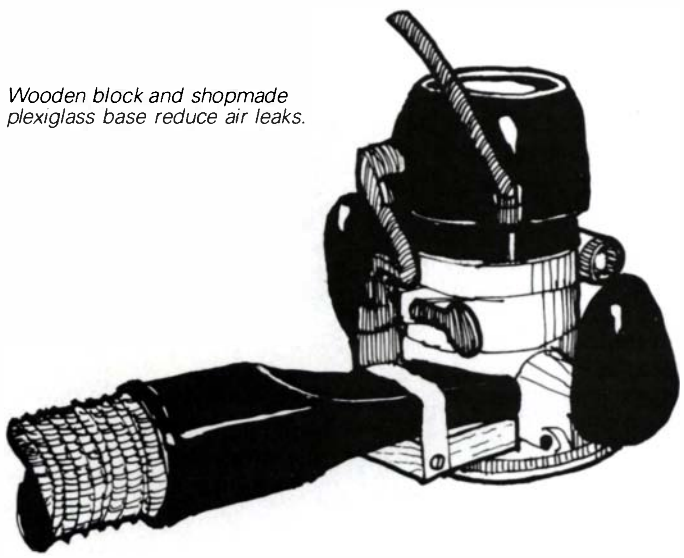



*—Charles W. Milburn, Weston, Ont.*

## Vacuum attachment for the router

Routing produces a lot of dust and chips. It is much more efficient to collect this messy waste as it is produced rather than to sweep it up later. The sketch below shows how I adapted my Sears router to hold my shop vacuum nozzle.

I positioned the nozzle so that it filled the gap near the router's work light. It's supported in place with a wooden block (screwed to the base) and a steel band. To reduce air leakage through the holes in the router base, I added a solid base plate made from ¼-in. clear plexiglass.




*—Harry M. McCully, Allegany, N.Y.*

## Installing jointer knives

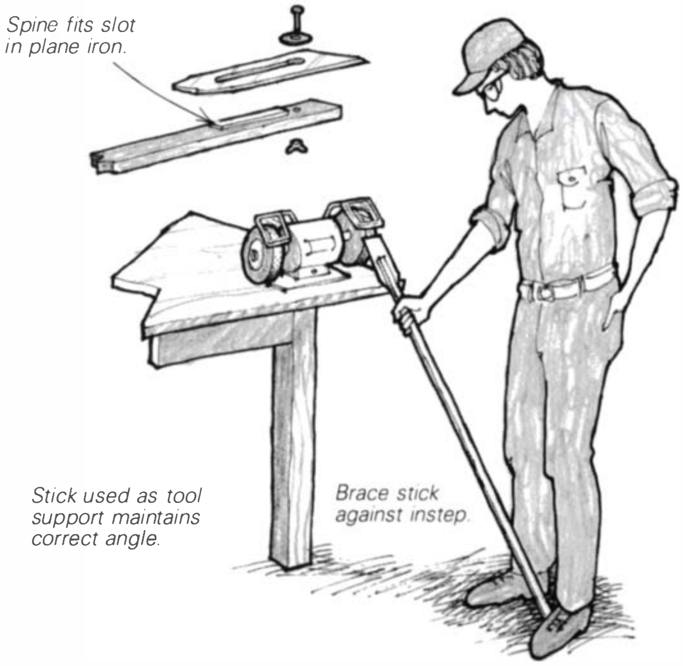
Here's how to replace reground knives in a jointer quickly and accurately. First crank the infeed table all the way down so it's out of the way. Place a knife and a gib in the cutterhead slot, with the screws tight enough to hold the knife in place but loose enough so that it can be moved. The knife should project about ⅛ in. above the outfeed table.

Now place a piece of heavy plate glass on the outfeed table so that it projects over the cutterhead. Manually roll the cutterhead backwards until the projecting knife lifts the glass at the top of its turning circle. Hold the cutterhead in place and gently press the glass down on the outfeed table, pushing the

knife down into the cutterhead slot. If the knife was not exactly at the highest point of its arc, it will still be slightly too high. Rocking the cutterhead back and forth under the glass will level the knife with the outfeed table. Now tighten the gibs, then repeat the sequence with the other knives.

*—Joe Robson, Trumansburg, N.Y.*

## Regrinding plane irons

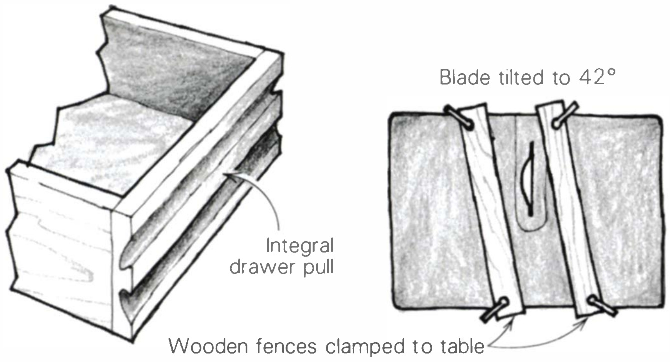



With a simple stick jig you can quickly, easily and accurately regrind plane irons on a bench grinder, and it's more fun than you can imagine. Select a good, stiff hardwood stick—mine is 44 in. long. Add a short wooden spine (to fit the iron's screw slot) and a stove-bolt/washer arrangement to hold the iron in place. Now, keeping the stick in line with the wheel, brace the stick against the inside of your left foot and lightly arc the iron across the wheel. The stick can be picked up to check the progress of the grind, then—as long as you don't move your foot—returned to the same spot against your shoe.

The resulting blade grind won't be perfectly straight but crowned ever so slightly. This convex profile will prove superior to a straight profile for most hand-planing applications, and is tricky to achieve any other way.

*—Paul D. Frank, Fond du Lac, Wis.*

## Integral drawer pull




This flush, integral drawer pull can be made on the tablesaw. The profile seems to mirror gripping fingers, making it well suited to its task.

To make the grip, tilt the blade to 42° and undercut the stock, running it 10° off line with the blade. Make several passes, raising the blade ⅛ in. or so each time, until you reach the final depth. As with all undercutting operations, the stock must remain flat on the table. To keep the board in place, I use two fences (straight pieces of wood clamped to the tabletop on either side of the workpiece) and a hold-down.

*—Ronald Neurath, Louisville, Ky.*

## Bicycle-tire sharpening wheel

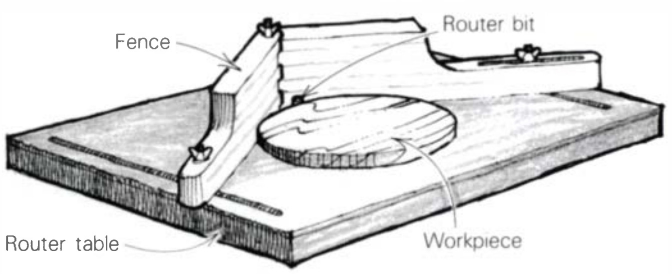
During my seventy-two years, mainly through trial and error I've found certain methods that work well for me. One example is this sharpening setup made from a bicycle wheel.

Start with the complete front wheel and fork. I used a 26-in. by 2.125-in. tire. Mount the wheel assembly on a base so that its tire contacts the pulley (1½-in.) of a ¼-HP, 1725-RPM motor. Your wheel should revolve at about 100 RPM, with a surface speed of 650 ft. per minute. Now glue a strip of abrasive cloth to the tire surface, and you have a very efficient, low-cost grinding wheel. Use it so the sparks fly away from the tool. Because the speed is slow and the wheel is large, there is little heat buildup to burn a tool and ruin the temper. If you place the whole assembly on a bench, the work area will be at eye level.

As a companion tool I use a belt-driven mandrel fitted with five side-by-side, 6-in. muslin buffing wheels. I charge this thick buffing sandwich with 1000-grit abrasive, which gunsmiths use to polish gun barrels prior to bluing. I then polish all edge tools to a mirror-sheen, razor-sharp edge. The whole system is inexpensive and can be mastered by any flub-dub.

*—Ray "Pappy" Holt, Tampa, Fla.*

## Router-table fence for edging discs




I developed the fence shown above to shape the edges of round rings, such as clock bezels, on the router table. The fence can shape both outside and inside edges of circular blanks. When shaping the outside edge, some part of the profile must remain uncut to provide a bearing surface against the fence, otherwise the disc would just keep spiraling smaller. The fence is made by laminating 2-in. wide, ½-in. thick plywood strips into two arms that fit together in a finger joint that pivots on a ¼-in. bolt. The other ends of the fence arms fasten to the router table with wing nuts. Slots in both sides of the router-table top and in one arm of the fence allow adjustment for different size circles and different width rings.

The dimensions of the fence don't really matter, but I've found that the angle between arms cannot be less than 90° for safety and should not be more than 135°. At angles greater

• POWERMATIC • ROCKWELL • HEGNER • INCA • PORTER-CABLE • HITACHI • BLACK & DECKER •

BIESEMEYER • JORGENSEN CLAMPS • POOTATUCK • AIR TOOLS •

MAKITA • DEWALT • U.S.A. CUTTING TOOLS • GREENLEE

## ROCKWELL'S LEGENDARY UNISAW WITH A RECORD BRATTON PRICE $1450.

AFTER REBATE PRICE

Motor Cover Extra

34-763

Complete, ready to run with 1 ph., 3 h.p., magnetic controls, extension wings, "see-thru" splitter-mounted guard, rip fence, combination blade, miter gauge, guide bars, table insert, motor pulley and V-belts.

***The World Famous UNISAW ...Imitated But Never Equalled!***

#34-763 LIST $1850.

**SALE $1650 — $200 mfg. rebate = $1450. FOB**

SALE PRICES ARE CASH PRICES

### BUY A PIECE OF AMERICA

If you're planning to buy a UNISAW or *ever* thought about buying one, don't delay. This is a once in a lifetime offer!

Additional telephones have been installed to take your order. Call Monday thru Friday, 8 a.m. - 10 p.m., Saturdays, 9 a.m. - 5 p.m.

**1-800-874-8160**

**In Florida: (904) 222-4842**

***CALL TODAY FOR THIS OFFER YOU CAN'T AFFORD TO REFUSE!***

#34-764
3 ph., 3 h.p.,
magnetic controls
List ............ $1,850.
**SALE .......... $1,650.**
**mfg. rebate - $200.**

#34-761
1½ h.p.,
p.b. switch only
List $1,560.
**SALE .......... $1,420.**
**mfg. rebate - $200.**

*See our full page ad in this same issue*

*Write for catalogs. Enclose $3 for postage & handling.*

**BRATTON MACHINERY & SUPPLY, INC.**
Attn: Dept. FWW
1015 Commercial Street
P.O. Box 20408
Tallahassee, FL 32316
**Call toll free: 1-800-874-8160**
**In Florida: (904) 222-4842**

REBATE CONDITIONS: All orders must be received and paid no later than **July 31, 1983.** Customer's rebate request to Rockwell must be made by **August 31st, 1983.** CALL NOW!

• MAKITA • DEWALT • BIESEMEYER • JORGENSEN CLAMPS • AIR TOOLS • NORTON ABRASIVES •

---

# RECORD QUALITY AT GREAT PRICES....

## Marples Chisels

We guarantee these are the same fine Marples bevel-edged bench chisels made famous by the Blue Chip trademark, now offered here with a straight-grained ash handle especially suited for hand paring, as well as light mallet work.

**Set of 4** ¼", ½", ¾", and 1". An exceptional value.

**$19.95 POSTPAID**

TOLL FREE (800) 241-6748
ORDERS ONLY
ALL PRICES INCLUDE FREIGHT IN U.S.

04½

07

04½ .. $44.50 Postpaid
07 ... $72.50 Postpaid

**PAIR $110**

## Record Bench Planes

OUR TWO MOST POPULAR PLANES. The choice of professionals. 04½" is 10¼" long for smoothing, polishing, and finishing surfaces. 07 is 22" long for producing straighter edges, stronger joints, and smoother surfaces than any rotary planer. Cutting irons are 2-3/8" wide.

WOOD NEWS. If you order from our ads or send $1.00 for our catalog, you will receive FREE a subscription to Wood News, which contains woodworking seminar information, tool analysis, and news of interest to all woodworkers.

## Record 52E Vise

**$59.95 POSTPAID**

THE MOST AFFORDABLE PROFESSIONAL VISE.
Quick release for instant set-up. Jaws toe-in slightly for certain grip. Larger sizes also available below.
INQUIRE ABOUT OUR WORKBENCH TOPS.

| VISE | Quick Action | Dog | Jaw Width | Jaw Opening | Clearance Required | Weight | POSTPAID PRICE |
|---|---|---|---|---|---|---|---|
| 52E | Yes | No | 7" | 8" | 13" | 19 lbs. | $59.95 |
| 52½D | Yes | Yes | 9" | 13" | 15½" | 36 lbs. | $99.50 |
| 53E | Yes | No | 10½" | 15" | 17" | 38 lbs. | $99.50 |

NOW'S THE TIME TO GO FOR QUALITY
Offers are valid while current inventories last, or until Oct. 31, 1983. To order, send check, money order, or MC/Visa info to:

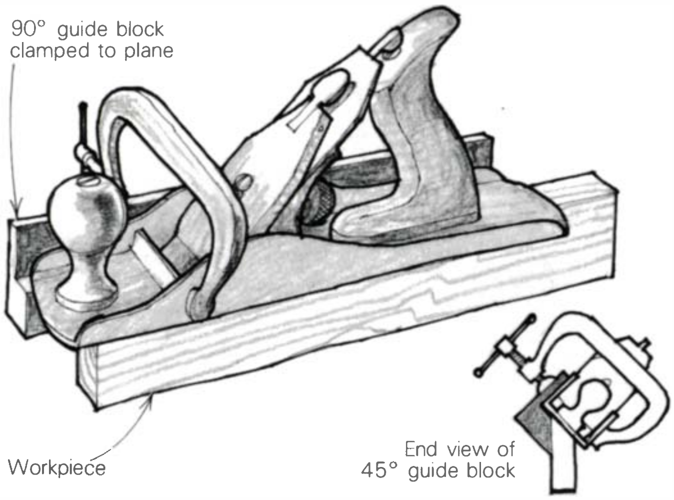
**highland hardware**
1034 N. Highland Ave., NE Dept. F41
Atlanta, GA 30306 (404) 872-4466

**CATALOG $1.00** (Free with order).

than 135°, the workpiece rolls away from the router bit. These two extremes, therefore, dictate the spread between the two slots in the router table and the length of the adjustment slot in the fence arm. With the setup shown here, the work should be rotated counterclockwise, into the bit's rotation.

*—Robert Warren, Camarillo, Calif.*

## Guide blocks for accurate hand-planing




Because I don't own a jointer, I rely on my bench planes for truing up my lumber. To maintain a consistent angle, I cut guide blocks from scrap pieces of hardwood and clamp them to the plane.

I make a few passes, check the angle, then make final adjustments using the plane's lever arm to tilt the blade.

*—Jack Gabon, Missoula, Mont.*

## Drilling compound angles

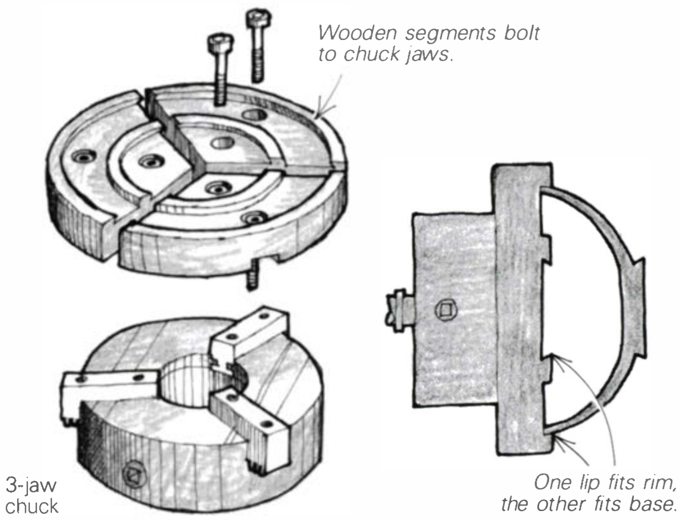
Here's a simple method for drilling accurately through irregular workpieces, or for drilling tricky compound angles and having the hole exit where you want it. First clamp a board to the drill-press table and drill the board to match a dowel on hand. Point a short length of dowel and insert it in the hole.

Now mark the workpiece for the entry and exit holes, and center-punch the marks. Make the exit punch fairly deep. Place the workpiece's exit punch on the dowel point and drill on the opposite punch mark.

*—George Kasdorf, Ft. Wayne, Ind.*

## Three-jaw "overshoes" for bowlturning

Like many avid woodturners, I use a three-jaw chuck for bowlturning and other faceplate work. With it you can avoid screw holes in the bottom of the bowl or skip the step of gluing on a waste bottom with paper between. But the three-jaw chuck is limited in the size range it can hold, and it contacts the workpiece at only three points, limiting the strength of its grip—if you overtighten it you will mar the work. I overcome these problems by adding wooden "overshoes" to the chuck. The overshoes, shown above right, are simply three 2-in. thick, wooden circle segments. I cut a groove in the back of each segment and bolt the piece to the jaw with two countersunk Allen bolts. Annealed chuck jaws, which can be drilled and tapped for the bolts, are available



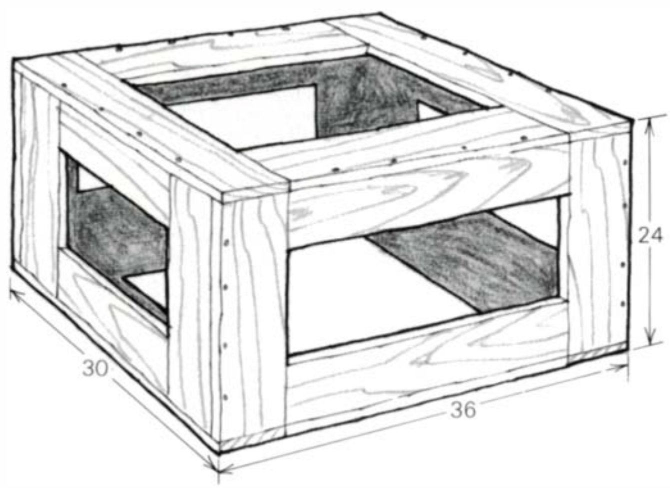

for most chucks; it's handy to have more than one set.

In the face of the wooden overshoes I turn two recesses, slightly dovetailed, to fit the rim and the base of a bowl. I mark both the overshoe segments and their matching jaws—if removed, each overshoe must go back on the same steel jaw it came off.

To use the overshoe chuck, I first mount the bowl blank on a large screw center and turn the outside to rough dimensions, taking care to size the base within a range that will fit the overshoe chuck. Then I reverse the blank, remount with the overshoe chuck gripping the base, and turn the inside of the bowl. When the inside is complete, I reverse the bowl in the chuck, gripping it by the rim to complete the outside. This technique is particularly useful when working green wood, which must be turned rough, dried, then remounted for turning to final shape and finishing.

*—A.R. Hundt, Blackmans Bay, Tasmania*

## Sawing and assembly work station




Here's a shop aid that let me put three different sets of sawhorses out to pasture. It makes a strong, portable work station for sawing, sanding, assembly and other operations. Simply flop the box to position the work 24 in., 30 in. or 36 in. off the floor, whichever is convenient. Construct the unit by screwing together six dowel-joined frames.

*—Bill Nolan, Munising, Mich.*

*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.*

Fine WoodWorking

Books and Back Issues

A professional cabinetmaker, Jere Cary has been teaching his craft to high school and college students for over 15 years. *Below*, three of the 220 illustrations in the book.

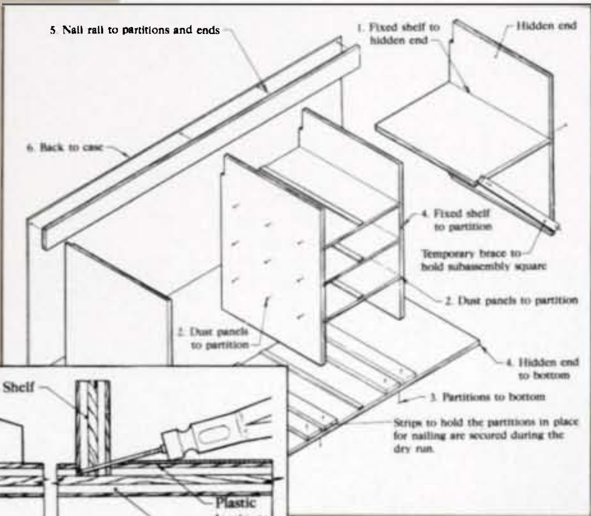
# Kitchen Cabinets: Step-by-Step

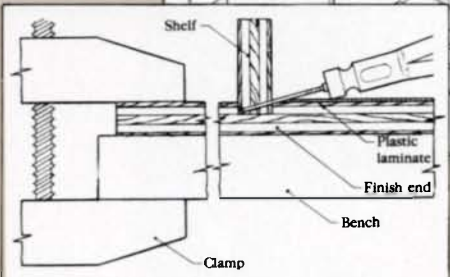
Jere Cary learned cabinetmaking for the same reason many of us do: he had to furnish a new apartment. Unlike most of us, he was lucky enough to have a friend, "Sag" Anderson, who was a master cabinetmaker and, says Cary, a master teacher. "Sag knew when to encourage, when to criticize, how to explain and when to throw down his cap."

Cary came away from his "apprenticeship" with an apartment full of furniture and a desire to teach others what Sag had taught him. To help his students, Cary started writing classroom handouts. Over the years, he refined and added to these until finally a student suggested he expand them into a book.

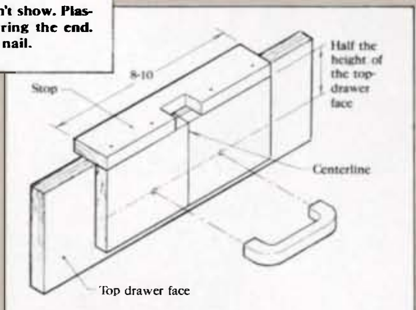
The result, *Building Your Own Kitchen Cabinets* (softcover, 152 pages, $12) is what one editor here called a "*tour de force* on cabinetmaking." Filled with facts, shop tricks and techniques that are missing from other books on the subject, Cary's book follows a "plan of procedure" which takes the reader through every step of the cabinetmaking process. The book begins with a chapter on laying out cabinets, then goes on to explain how to select materials, rough-cut the parts, lay out and cut the joints, assemble the case, etc. There's even a final chapter on "Jigs and Fixtures" to help make the work go easier and faster, and some valuable advice about how to handle common mistakes.

The book is filled with the kind of details that experienced craftsmen appreciate, yet the text and illustrations are clear enough for beginners. In fact, one of the book's chief virtues is that its step-by-step approach helps build confidence in first-time cabinetmakers. So, if you're thinking about redoing your kitchen—or building cabinets for your shop—Cary's book should help you get started. It will certainly help you get the job done right.




Toenail a shelf to a finish end so the nails won't show. Plastic laminate prevents the hammer from marring the end. Use a nail set to drive in the last ¼ in. of the nail.




To use the drawer-pull jig, place the jig on the face of the drawer, aligning its centerline with the centerline on the top end of the face.


**To order: Use the insert that follows, or send your order and $12 to The Taunton Press, 52 Church Hill Road, Newtown, CT 06470. Or call toll-free 1-800-243-7252 and use your credit card.**

# Behind the scenes of our new Index

**Last spring, Harriet Hodges** of Rural Retreat, Virginia, took on the challenge of indexing our back issues. Hodges was an editor and English teacher before becoming a woodworker and sheep farmer. Unhappy with the indexes we ran in issues 7, 13, 21 and 30, and agreeing with us that good information never goes out of date, she set out to do the job right.

Hodges produced thousands of index cards, and we fed them to our typesetting computer. The result: 36 pages of listings (small type, but very readable)—some 15,000 entries covering every article, letter, method of work, question & answer and photo of finished work published in the first 39 issues of the magazine. (An extract of this listing, covering the nine issues since our last *Index*, appeared in *FWW* #40.)

Realizing there would be times when less detail might be more helpful, editor John Kelsey added to Hodges' work a three-page listing of article titles by key word. Each title here appears just as it did in the magazine, except the word that best describes its contents is set in boldface type. (If a relevant word was not part of the original title, Kelsey put one in.) The benefit of this listing is that it allows you to see at a glance the major articles on a given, relatively broad, subject. It also tells you whether a particular article appears in one of the first four *Fine Woodworking Techniques* books. (A final one-page listing of back issue contents uses the same key words, so you can go back and forth between specific articles and the issues they appear in.)

All of this information has been bound into a 44-page, softcover booklet, so for $2.50 you can now have a comprehensive index to all your back issues.

**To order the *Index* or back issues, use the insert, or send your order and payment to: The Taunton Press, 52 Church Hill Road, Newtown, CT 06470. Or call toll-free, 1-800-243-7252, and use your credit card.**

## In Progress: Building A Houseful of Furniture
by Simon Watts

**Simon Watts likes to build things—** fine furniture, houses, boats, timber bridges. He also likes to find out all he can about the history of the things he builds and to tell others what he's learned. A professional cabinetmaker for over 20 years, Watts has written articles for *Fine Woodworking* on everything from drop-leaf tables to lapstrake boats. He's also written articles and recorded nautical folk stories for other magazines, taught classes in woodworking, calculus, architectural design, sailing and boatbuilding.

The reason we're telling you about Watts is that we're in the midst of editing his first book, which we'll be publishing this Fall. It will be called *Building A Houseful of Furniture*, and will include complete plans for 43 of Watts' most successful pieces—beds, sofas, chairs, tables, etc. As you'd expect, the book will also include a lot of information about the construction of the furniture, and some interesting essays on furniture design and history. Watts doesn't cover basic cabinetmaking tools or techniques—he assumes readers are familiar with these (or have copies of Tage Frid's books). He does explain the knotty technical problems in each piece, and talks about the methods he's used to solve them.

**The book will be available at the end of October.** In the meantime, you can read some of Watts' articles in our back issues. The *Index* listing for Watts shows he's written an even dozen.

# ...and a look inside

## A quick demonstration of how you can use the new index

### 1. Subject/Author Index.

Use this marvelously detailed, 34-page listing to locate specific information. For instance, say you're planning to edge-join two rosewood boards, and want to know which glue to use on such an oily wood. Check this listing and you'll find two issues (6 and 10) with information that may be helpful.



### 2. Article Titles by KeyWord.

Issue 10 had the answer you were looking for—a suggestion by consulting editor Andy Marlow—but you're still not happy with your gluing work. What you're looking for are in-depth articles on the subject. A quick glance at the three-page listing of article titles reveals two possibilities, one in issue 7 and one in issue 31.



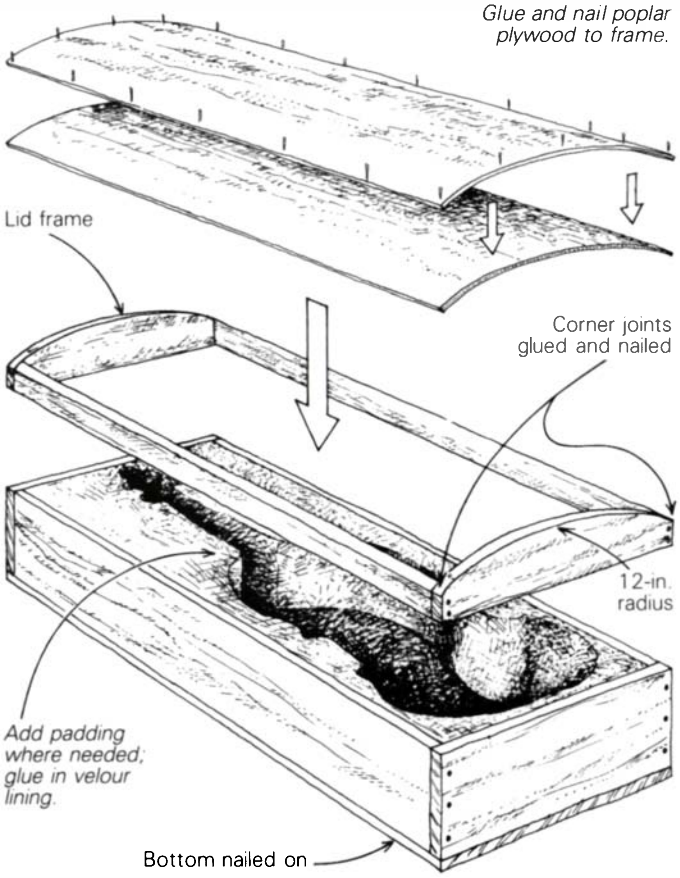
### 3. Back Issue Contents.

You've read the article in issue 7, but have discovered that you're missing issue 31. Should you go ahead and buy it? Before you decide, turn to the last page of the *Index* and check the *Back Issue Contents* to see what else is in the issue.

**Building a violin case**—*I'm building a violin case with an arched lid. I'd like to use plywood for the top panel, but I'm not sure how I can bend it. Do I have to glue up veneers on a form, or can I simply bend a piece of Baltic birch plywood? Also, what's the best way to attach the arch to a solid wood frame?*

—*David Pinals, Belmont, Mass.*

ROBERT MEADOW REPLIES: I recommend that you use ⅛-in. Italian poplar bending plywood for the top, rather than the birch. The birch is too stiff, and the poplar will give you a better surface on which to glue the leatherette covering. To avoid the chore of mold-building, we use bending irons, but if your case is a one-shot job and you don't want to buy an iron, the poplar can be bent cold over a gentle radius—say, 12 in. If the ⅛-in. thickness doesn't seem strong enough, use two layers with glue in between.




I suggest that you make the top frame and box out of poplar as well, as in the drawing. Cases can be built quick and dirty, with glued and nailed butt joints. Attach the top to its frame with nails, screws or staples, to be covered later by the leatherette, which you can buy at local fabric or upholstery stores. A block of foam rubber cut out to match the violin's shape, with ½-in. clearance on all sides, will pad the instrument. Or you can cut the shape into a block of wood and then pad it with foam or cotton batting. Either way, line the padding with velour, yellow-glued in place. Bending poplar can be ordered from Allied Plywood, 1635 Poplar St., New York, N.Y. 10461.

**Camphor hazards**—*Camphor tablets are sold as a rust preventative for tools, but a pamphlet I've seen on hazardous chemicals says that this material can irritate the eyes and skin, and cause nausea, vomiting, headaches and other discomforts. Are these symptoms significant enough to rule out camphor? I don't want to expose my students or myself to unnecessary hazards, but neither do I want to see my grandfather's tools rust before my eyes.*

—*C. Roy Blackwood, Hammond, La.*

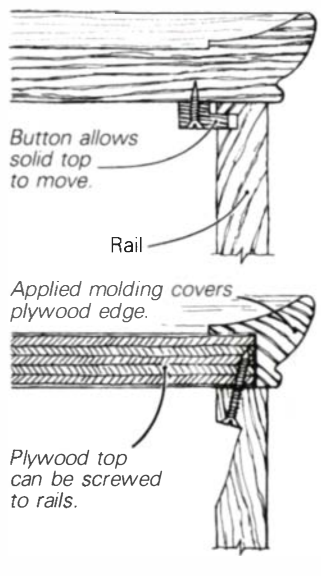
MICHAEL MCCANN REPLIES: Camphor is mainly a local irritant that affects the eyes, nose, throat and skin. But overexposure can affect the central nervous system, causing the symptoms you mention, and very high levels of camphor vapors can kill the sense of smell.

If the tablets are put in the container or cabinet where the tools are stored, the camphor produces a constant level of vapors in the closed area. When you go to get the tools, you could inhale the vapors, thus exposing yourself to irritation, though the risk from this level of exposure is probably quite low. If camphor is spread directly on the tools, skin irritation is likely, particularly in the summer when the camphor is dissolved by sweat on the hands. By using machine oil as a rust preventative, you avoid this hazard entirely. Another rust inhibitor available in tablet form is sold by Cortec Corp., 310 Chester St., St. Paul, Minn. 55107. I don't know how well this product works, but the manufacturer claims that it contains no hazardous materials and is FDA-approved.

**Tea table tops**—*In Volume I of his* Furniture Treasury, *Wallace Nutting illustrated tea tables with delicately molded tray tops. How were these tops constructed, and were they always attached to the table rails, or could they be removed for use as a serving tray? Was the tabletop ever protected with a sheet of glass?*

—*Earl M. Wintermoyer, Niceville, Fla.*

CARLYLE LYNCH REPLIES: The tops of the rectangular Queen Anne tea tables you refer to invite being picked up, but I've never seen such a table with a removable tray top. The wide rails sometimes housed a wide drawer or pullouts—one table I saw recently had pullouts that showed signs of a hot teapot having been set on them. Though some of these tables appear to have been rabbeted for glass, I don't think it was used. The tops were usually made of a single, wide board, thick enough to allow the table surface to be dished out and its edges molded. There was good reason to make the tops in one piece: if the molding were applied cross-grain, seasonal comings and goings would have warped or cracked the top.




In the traditional cabinet shop, a hand router plane and chisels would have been used to scoop out the table surface, followed by a scratch stock, molding planes and perhaps gouges for the molding. We have an option not available to our forebears, however. We can make the top of plywood faced with the veneer of our choice. I know that purists cringe at the thought of plywood, but our cabinet-grade is a good product that adequately replaces the large slabs of hardwood which are becoming scarce and expensive. If early cabinetmakers had had plywood, I don't think they would have scorned its use. With stable plywood for the tabletop, the molding can be applied with no worry about grain direction. To hide the edges of the plywood, the

molding should have a rabbeted skirt, as shown in the drawing. It can be joined by splined miters at the corners. You can attach the top to the rails with the traditional buttons in mortises, or, since seasonal wood movement isn't a problem, with screws driven through the rails and into the top at an angle.

**Stenciling chairs**—*I need to redo the stenciling on a set of Hitchcock dining chairs. The rubbed floral design on the back slat is in good shape, but the design on the back posts needs restoration. I'd like to respray the black background and restencil, but I don't know how to go about it. Also, where can I buy stenciling supplies?*

—*Arthur R. Hocker, Fayetteville, Ark.*

FLORENCE E. WRIGHT REPLIES: The stenciling on the uprights is nothing more than metallic powders polished onto a coat of tacky varnish, so it shouldn't be too hard to repair. On the uprights, the pattern was almost always yellow-gold on a dark background. By taping a piece of tracing paper over the designs you wish to restore, you can reproduce the pattern from parts of the design that remain, or from other chairs. Then make a stencil by transferring the tracing and cutting out the design in architects' linen or a similar type of plastic paper. Fine-pointed scissors or an X-acto knife will work well for this job. Make a palette from a piece of fine velour and use silk-backed velvet or a chamois as a polishing cloth. Stitch or glue the edges of the cloth to prevent raveling. To prepare your palette, rub the gold powder into it.

Touch up or repaint the chair, then apply one or two coats of varnish. You can pad on the varnish with a lintless cloth, wiping most of it off. You're ready to begin stenciling as soon as the last coat of varnish is tacky enough that a finger pressed into it won't leave a mark but comes away with a slight click.

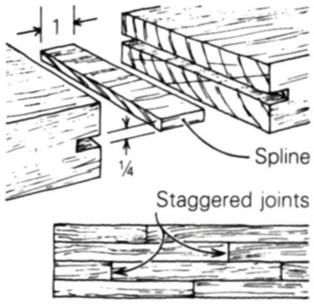
Lay the chair on its back with the work area toward you. Hold the stencil in place, and with your polishing cloth wrapped smoothly over the pad of your first finger, dip it into the powder on the velour and tap off any excess. Use a circular motion to polish the powder onto the tacky varnish. Let this dry thoroughly. If striping around the pattern is needed, use a fine striping brush and a paint color that matches the old chairs. You can mix this paint yourself by adding yellow ochre and raw and burnt umber coloring to a chrome-yellow base. The color should look like mustard or khaki. Mix in a little varnish to get the right consistency. Finish your new work with two coats of varnish tinted with raw or burnt umber to mellow the bright gold color, followed by two coats of clear varnish, sanded between coats.

Stenciling supplies are sometimes sold by local paint shops or sign-writing suppliers, and by mail-order from Crafts Manufacturing Co., 72 Massachusetts Ave., Lunenburg, Mass. 01462.

**End-to-end gluing up**—*I'm planning to build an 11-ft. counter out of 6/4 white oak, but I don't have boards long enough. Is it acceptable to glue up random-length lumber end to end to make a counter that's 11 ft. long, 25 in. wide and 1⁷⁄₁₆ in. thick?*

—*Patrick Warner, Escondido, Calif.*

TAGE FRID REPLIES: Yes, you can glue up your boards end to end to make them long enough. First square the ends of the boards and cut ¼-in. grooves in the end grain with a slotting cutter in a router, if you have one. So the splines will be strong and to keep seasonal movement from cracking the boards at the joint, run the grain in the splines in the same direction as the grain in the boards. Glue your boards lengthwise before you rip them to final width. If you don't have




clamps long enough, just nail blocks to the floor at each end of the stock and apply pressure to the joint with wedges against the blocks. When you edge-glue your lengthened boards into the finished counter, stagger the joints to lessen the stress on each one. I'd suggest you use a hard film finish such as polyurethane; otherwise the tannic acids in oak may react with metal that comes in contact with the counter, staining it.

**Truing up a level**—*I have a 4-ft. wooden level with fixed vials that seems to be about ¼ in. out of plumb. How I can true it?* —*Bruce Dichter, Minneapolis, Minn.*

KAREN TYNE REPLIES: First, test your level by placing it against a vertical surface, say, a wall or a door jamb. Test one edge of the level first, then flip it around and try the other edge. An accurate level will yield the same bubble reading off both edges, whether the surface is plumb or not. Repeat this test on a horizontal surface.

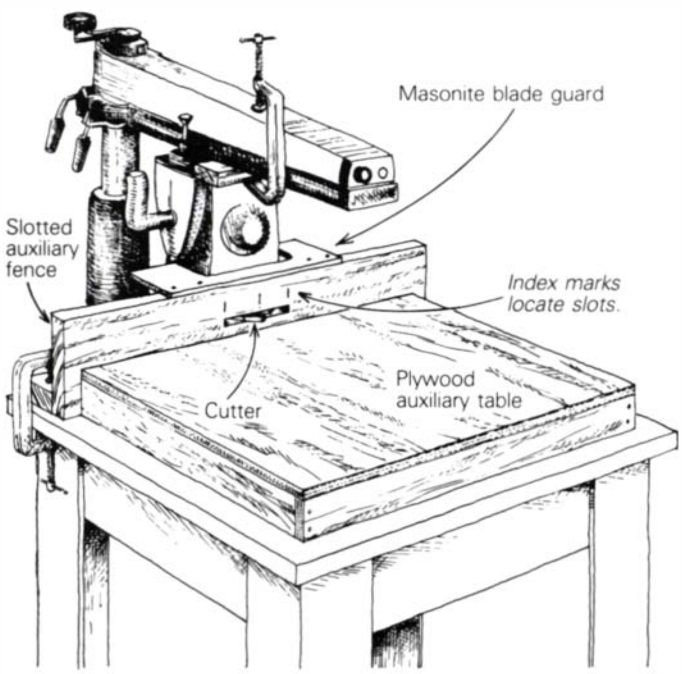
Wooden levels usually become inaccurate for two reasons: the wood warps, or the vials get knocked out of alignment. Sight down the level to check for warpage. It doesn't matter if the face of the wood is bowed, but if the edges are crowned, you'll need to straighten them with a hand plane or a jointer. If your level is edged with brass strips, as many are, you may be able to remove them to plane the edges. Otherwise, it's best to sand the brass flat with a long sanding block, or to have a machine shop take a light cut with a grinder. Just make sure the edges are kept parallel.

Skewed vials can sometimes be pried out and reset, but more often it's easier to just knock out the old ones with a hammer and buy replacement vials and glass windows (crystals) from the level's manufacturer. To install them, set the end of each vial in a dollop of painters' crack filler, adjusting the vials in the unhardened filler until they test accurately from both edges, plumb and level. A little vinegar added to the crack filler will retard curing, giving you plenty of time to get the vials right. Let the crack filler dry overnight, then seal it with a coat of white latex paint. The crystals, which fit into a small groove, can be mounted in a bead of putty or semi-hardening caulking compound.

## Follow-up:

**Re plate joinery** (*FWW* #34, p. 95). Here's another method for cutting the slots for the plates without having to buy the expensive hand power tool. We simply bought one of the carbide-tipped replacement blades and mounted it on our radial-arm saw. The blade's arbor hole is ⅞ in., so we machined a bushing out of a steel washer to match it to the ⅝-in. saw arbor. We tilt the motor to the vertical position and cut the slots using the jig shown on p. 24.

The jig includes a slotted fence that clamps in place of the saw's regular fence, and an auxiliary table that raises the work high enough so that the arbor nut will clear. The slot is positioned by referring to index marks on the fence; a stop block clamped in the saw track controls its depth. Make sure the blade arc is parallel to the table, or your finished parts will have a twist. To slot the end of a rail or a stile, we clamp another fence at right angles to the slotted fence and make the usual cuts. This method can't match a hand-held plate joiner's ability to edge-join one panel to the middle of another large panel, nor will it match miters as handily. For




those jobs, you might try making a similar setup for the tablesaw. *—Bernard Theiss and Linda Fisher, Sharon, Pa.*

## Sources of supply:

Articles about making machines and tools often suggest that you have a local machinist fabricate parts. If there aren't any where you live, or if they can't help you, here are three shops that will do custom work by mail-order:

C.A. Street and Sons, Strawberry Hill, PO Box 98, Advance, N.C. 27006
Roger L. Frick, c/o Precision Grinding and Machine, 844 W. 14th St., Eureka, Calif. 95501
Breezewood Enterprises, PO Box 266, Reynoldsville, Pa. 55851

## Readers can't find:

. . . information, plans or a book on carving Dutch wooden shoes. *—John P. Anton, Moorhead, Minn.*

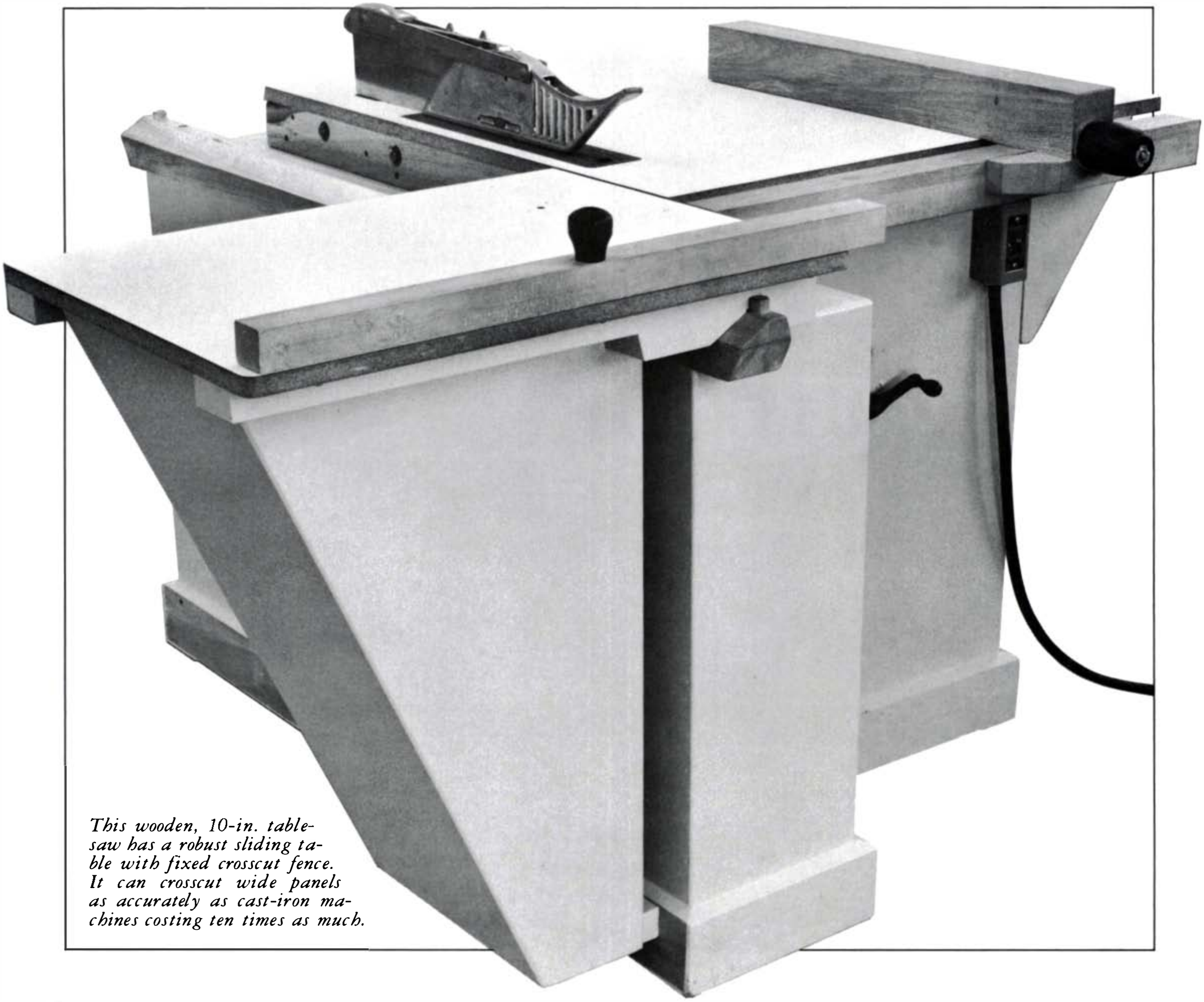
. . . plans for a Hoosier-style kitchen cabinet with flour bins and a flour sifter. *—David Pilon, Flushing, Mich.*

. . . a source for the APSEE electronic air purifier that was mentioned in *FWW* #25, p. 59. *—Joe Tracy, Mt. Desert, Maine*

## About our answer people:

**Robert Meadow** teaches luthiery and makes stringed instruments in Saugerties, N.Y. **Michael McCann** heads the Center for Occupational Hazards in New York. **Carlyle Lynch** is a retired furniture designer and maker who lives in Broadway, Va. **Florence E. Wright** wrote *Stenciling Chairs*, a book published by Media Services at Cornell University, 7 Research Park, Ithaca, N.Y. 14850. **Tage Frid** is a retired cabinetmaker and professor at the Rhode Island School of Design. He has authored two books on woodworking. **Karen Tyne** works at the Peerless Level and Tool Co. in Walnut, Ill.

*Send queries, comments and sources of supply to Q & A,* Fine Woodworking, *Box 355, Newtown, Conn. 06470.*



*This wooden, 10-in. tablesaw has a robust sliding table with fixed crosscut fence. It can crosscut wide panels as accurately as cast-iron machines costing ten times as much.*

# A Wooden Tablesaw

## An attractive, shopmade alternative to cast iron

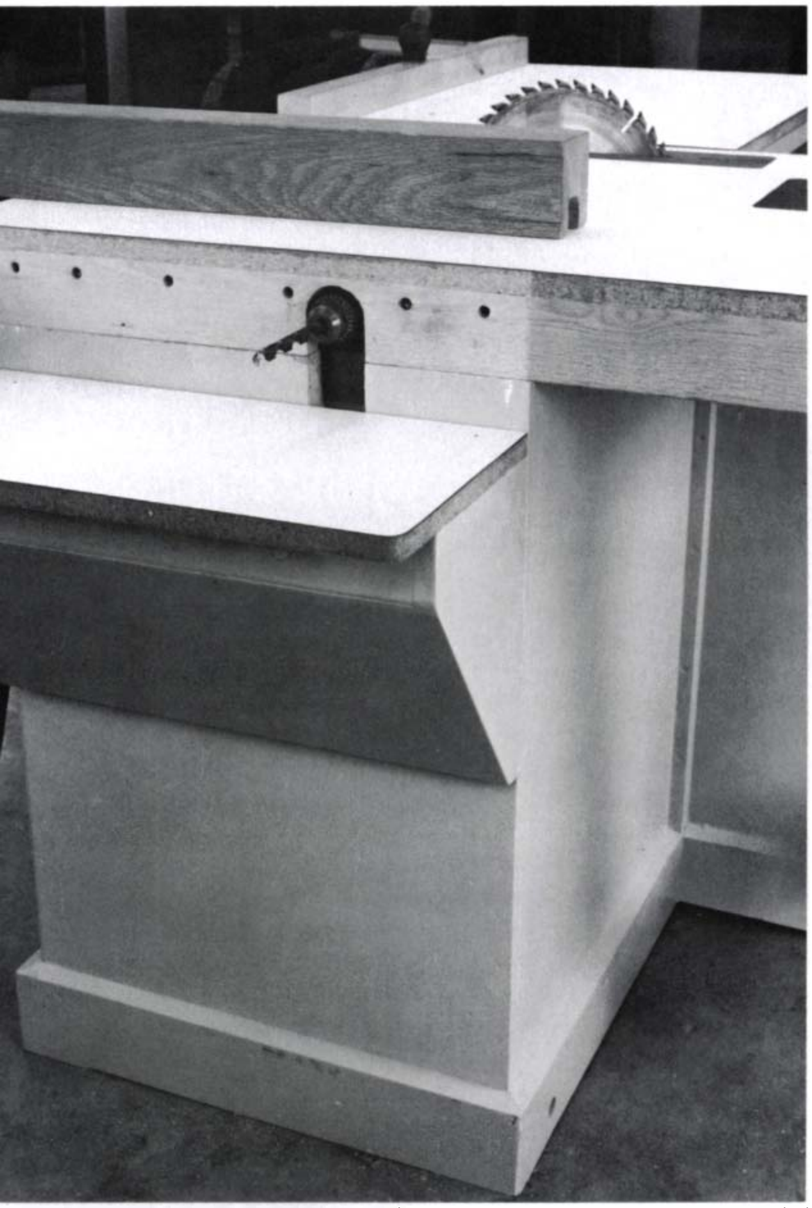
*by Galen Winchip*

Early in my woodworking career, I remember arranging to use a friend's big radial-arm saw to make critical crosscuts on wide panels for cabinets I was building. We spent hours fussing with the saw's adjustments, only to have it cut each panel frustratingly out of square. I longed for a sliding crosscut table—standard equipment on the heavy, industrial tablesaws that were way beyond my price range.

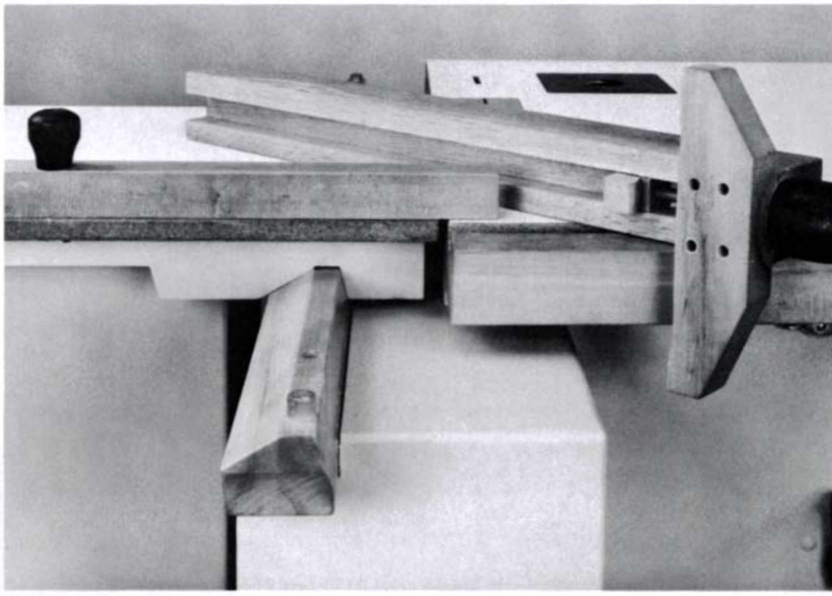
I had looked at the sliding tables then appearing as options on medium-duty saws, but they seemed flimsy and certain to sag when crosscutting heavy boards. Worst of all, these devices were fitted with as many adjustment knobs, screws and levers as a radial-arm saw has, making them far from the set-it-and-forget-it crosscut machine I wanted.

I decided that the only way I'd own a sliding table was if I designed and built one myself out of wood. I had already constructed a half-dozen wooden woodworking machines, including panel saws, jointers (*FWW* #28, pp. 44-50) and lathes. I've found them to be well up to the rigors of daily use and, like a vintage wooden hand plane, they have the friendly feel that's absent from their cast-iron counterparts.

Photos: Pete Krumhardt



*For horizontal boring and slot-mortising, a chuck can be threaded onto the saw's extended arbor. The auxiliary table can be set in two positions: flush with the main table, or 5 in. below it.*



*The saw's sliding table mechanism is self-centering and self-adjusting, and it won't bind or loosen as the wooden rail swells and shrinks. The guide rail and rip fence are laminated from thinner stock for stability.*

I built two tablesaws with complicated tilting-arbor mechanisms, but because I wanted my third saw, described in this article, to be easier to build, I opted for a fixed arbor. I didn't include an adjustable miter gauge either, relying instead on jigs fastened to the sliding table. Most of the adjustments on this machine are achieved by planing or jointing a small amount of wood from a critical surface, or by inserting paper shims. Because I didn't have mortising machinery at the time, I extended the saw's arbor and added a table for horizontal boring and mortising. Of course, you can modify the design to suit your own needs. After I'd built my saw, alternatives and modifications kept coming to mind, and because I've included these changes in the drawings, the photos and drawings don't correspond exactly. If you do modify, keep in mind some basic wooden-machine-building principles, which I've outlined below.

**Wood vs. cast-iron**—If you set out to build a wooden chair, you wouldn't look to one made of plastic as your structural model, so it follows that cast-iron woodworking machine mechanisms shouldn't serve as models for wooden ones. Cast-iron is an unyielding, predictable material which can be machined into parts that will maintain close tolerances. Wood expands and contracts with the seasons, so you must design mechanisms that won't swell and seize up in summer, then shrink out of precision in winter.

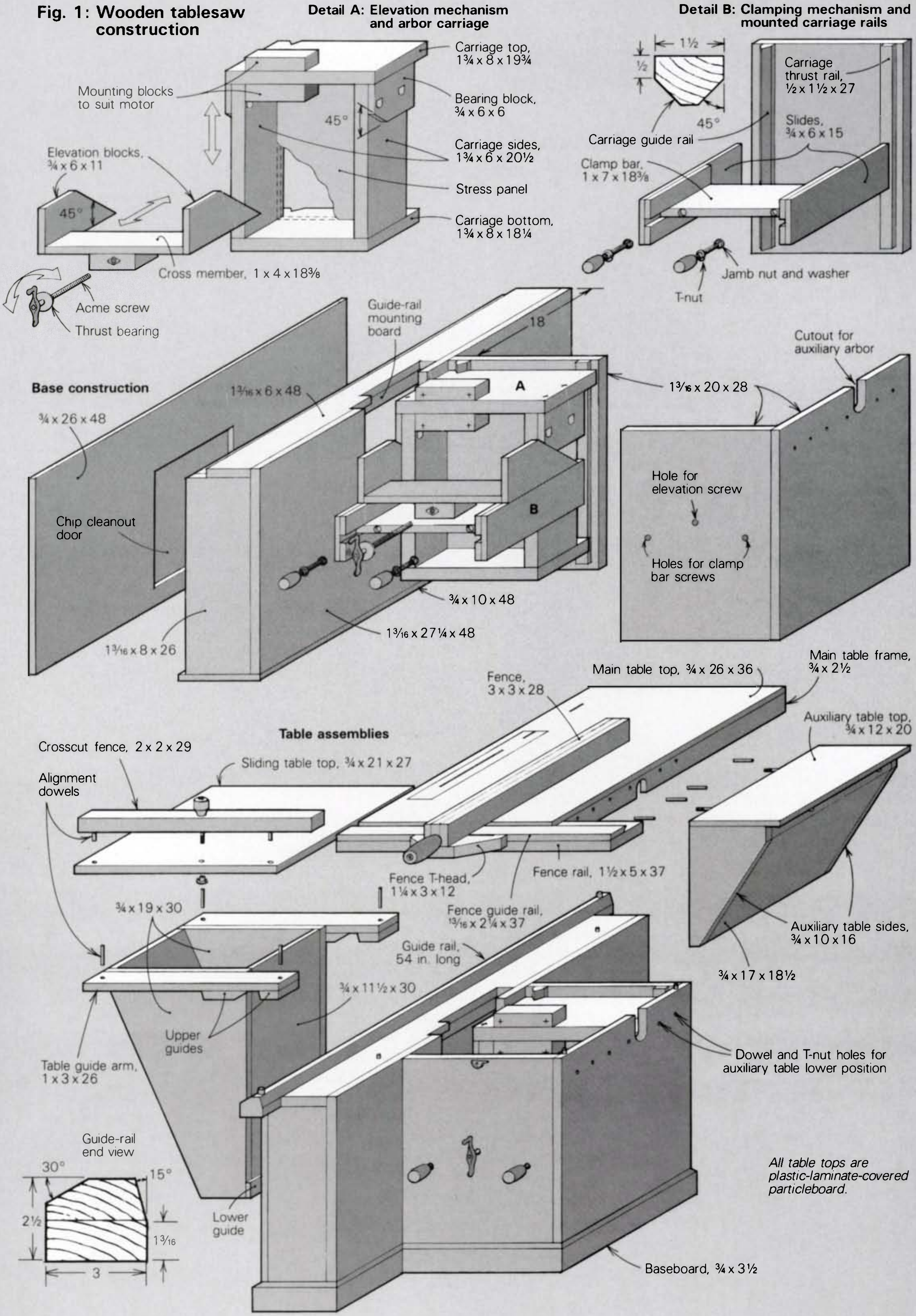
The rail I devised for my sliding table is an example of one such mechanism. As the photo above shows, it's an angled-section member which supports guides shaped so that the table's weight keeps them accurately centered, regardless of dimensional changes caused by moisture or wear. There's no play in this mechanism, but the compromise is friction. The table doesn't move as freely as do commercial models that roll on steel bearings.

For a given cross-section, cast iron is about ten times as rigid as wood, thus wooden members must have larger cross-sections for equivalent stiffness. Obviously, cast iron is harder and denser too, so it can bear concentrated loads that would crush wood. The best way to achieve rigidity in wooden machines while avoiding crushing is to distribute loads widely. In a cast-iron saw, the arbor bearings might be mounted 2 in. or 3 in. apart, but in my wooden saw, they are about 19 in. apart. Spreading out these mounting points also masks minor construction inaccuracies and distortions caused by uneven movement of wooden components.

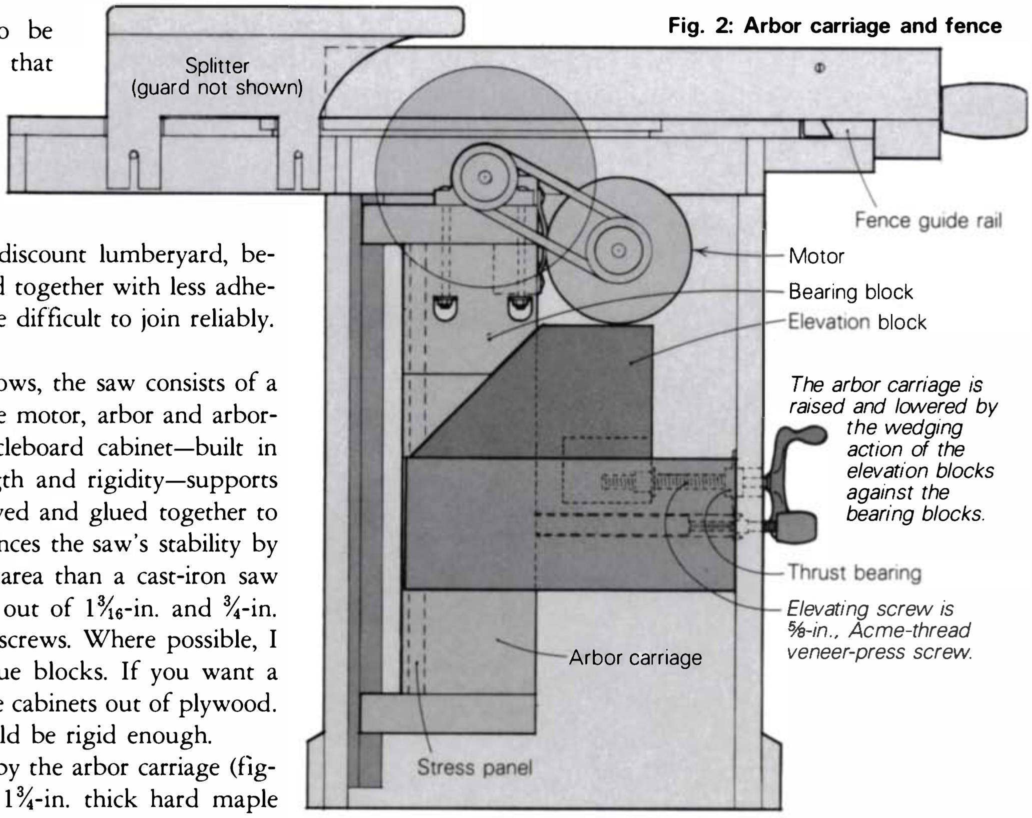
My favorite wood for machines is well-seasoned, straight-grained hard maple, though I've had good luck with cherry, beech and oak. Whichever wood you pick, it's a good idea to let it live in the shop for a few months so it can reach equilibrium moisture content before you work it. I always cull out the highly figured pieces because they are more likely to twist, bow or cup. You can further counterbalance some of the wood's inherent instability by laminating several thin pieces into one larger one, as I did for the saw's sliding-table guide rail and rip fence.

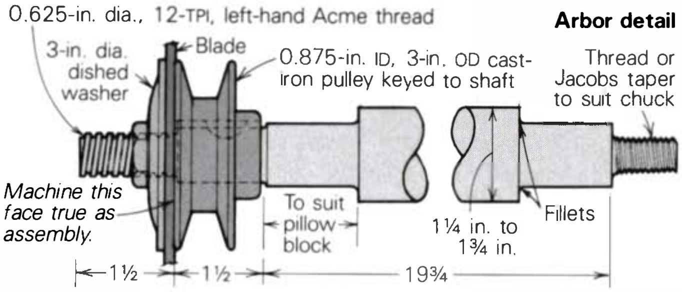
For sheet stock, I prefer particleboard with a density of at least 45 lb./cu. ft. It's cheap and strong, and can be finished nicely with paint or covered with plastic laminate. Fiber-

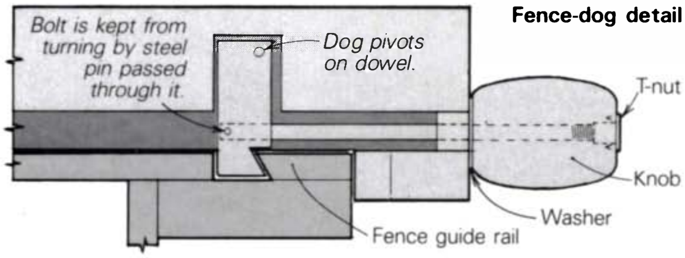
**Fig. 1: Wooden tablesaw construction**



boards such as MD44 could also be used. Particleboard has one quality that cast iron can't match: it muffles the piercing, high-frequency whines that are rough on the ears. I don't recommend the lower-density particleboards sold for a song as shelving at the local discount lumberyard, because their larger particles are bound together with less adhesive, making them weaker and more difficult to join reliably.



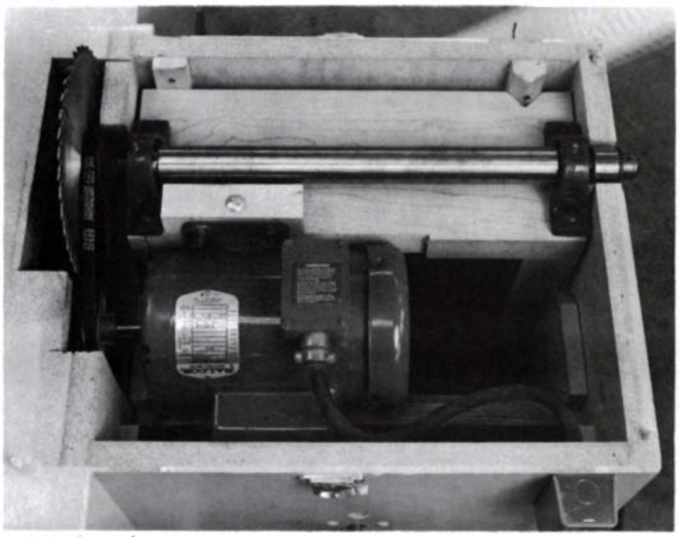

**Building the saw**—As figure 1 shows, the saw consists of a particleboard cabinet that houses the motor, arbor and arbor-raising mechanism. A second particleboard cabinet—built in the form of a box-beam for strength and rigidity—supports the sliding table. The two are screwed and glued together to form a T-shaped pedestal that enhances the saw's stability by spreading its 400 lb. over a wider area than a cast-iron saw would occupy. I built my cabinets out of 1$\frac{3}{16}$-in. and ¾-in. particleboard joined with glue and screws. Where possible, I reinforced the corner joints with glue blocks. If you want a lighter, more portable saw, build the cabinets out of plywood. Five-eighths to ¾-in. plywood should be rigid enough.

The blade is lowered and raised by the arbor carriage (figure 2), a box-like frame made of 1¾-in. thick hard maple glued and doweled together. Both the motor and the arbor bearings are bolted to the carriage, whose vertical travel is guided by two rails—one V-shaped guide rail and one flat thrust rail—screwed to the back of the saw cabinet. It's raised by two wedge-shaped elevation blocks that bear against similarly shaped blocks glued to the sides of the carriage. To operate the elevation mechanism, I chose a ⅝-in. Acme-thread veneer-press screw. I discarded the swivel end and bought a flange-mounted ball thrust bearing at the hardware store. A small shoulder made by filing down the diameter of the veneer screw transfers the thrust to the screw's threaded collar, which is mounted on the raising mechanism.

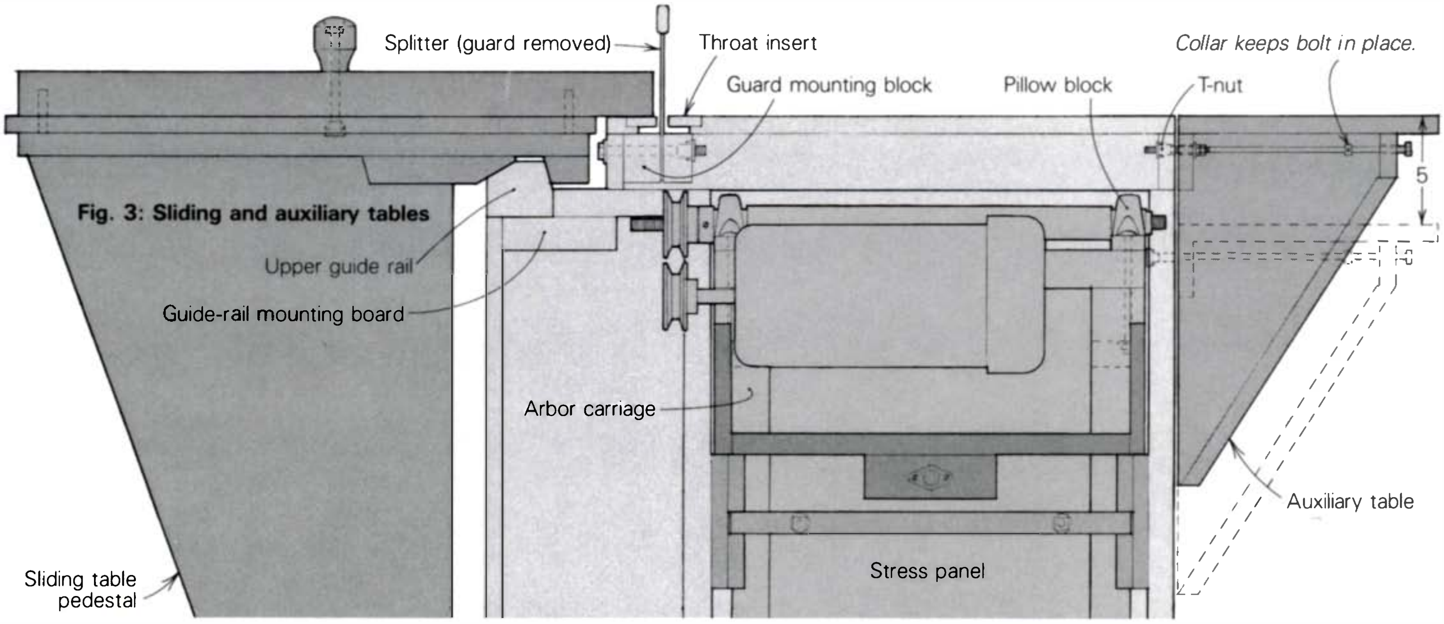
I mounted the vertical carriage guide-rails first, then built the carriage frame, installing a ¾-in. plywood stress panel inside it to keep it square. I lapped the V-rail into the guide by moving the carriage back and forth over a sheet of sandpaper taped to the rail, a method that also works for the sliding-table guides, as shown in the photo on p. 33. Thickness the flat carriage rail so that the edges of the top and bottom members of the carriage are about parallel to the back of the saw cabinet. If the carriage rocks on the guides, plane a bit of wood off the flat rail to correct the problem.

I originally designed the arbor carriage to include the clamp bar shown in the drawings but not in the saw photographed for this article. The bar will lock the carriage firmly in place, but I never installed it. The machine works fine for sawing and drilling, but the carriage assembly vibrates when slot-mortising. The clamp would probably cure this. One other variation between the drawings and photos: I've drawn the V-shaped carriage rail on the sliding-table side of the saw rather than the other way around, as shown in the photos. Due to the motor location, the carriage's center of gravity is on the sliding-table side, and positioning the rails this way should give the carriage better balance and smoother action.

The arbor spins in two 1-in. ID, self-aligning, cast-iron pillow blocks bolted to the top of the arbor carriage, as shown in the photo at right. I turned my arbor shaft according to



*A V-shaped guide rail and a flat thrust rail steady vertical travel of the arbor carriage. For better balance, the V- and thrust rails should be reversed, as in figure 1.*




the detail in figure 2. Machine the arbor out of stress-proof steel rather than mild steel. To keep stress risers from developing at the inside corners where the shaft diameter is turned down, have the machinist leave small fillets at these points. The auxiliary end of my arbor is machined to take a screw-on chuck, but if you do much slot-mortising, I suggest that you install a collet instead.

Once the arbor shaft has been machined so that the bearings and pulley are a light press fit, these parts can be installed, and the face of the pulley remachined to serve as the blade flange. The pulley must be either cast iron or solid machined steel, not stamped steel or die-cast white metal.

When it's time to calibrate the saw, you can shift the pillow blocks in their slotted holes to align the blade parallel to the sliding table's travel. Insert sheet-metal shims under one of the pillow blocks to square the blade to the table surface.

The motor is bolted to two blocks glued and doweled to the arbor carriage. I used a 1½-HP, fully-enclosed, fan-cooled motor. Since my saw is connected to a large dust-collection system, there's plenty of air swirling around to cool the motor. If dust collection isn't used, cut some cooling slots in the side of the saw cabinet.

**The sliding table**—The most critical assembly is the sliding table and its guide rails. The table consists of a triangular particleboard pedestal to which the two guide arms are attached. As the photo on p. 29 shows, the sliding table simply hangs on the upper guide rail, and it can be lifted off when it's not needed. The upper rail should be laminated, sawn to the cross-sectional shape shown in figure 1, and jointed true. The upper-rail mounting board, a 1½-in. thick maple plank glued beneath the top of the sliding-table cabinet, should also be machined true so that it won't bow the rail when it's attached. I glued the upper rail to the saw with a "paper joint" like that used in bowlturning, so it can be removed for remachining or for replacement. It's also bolted, since that was the most convenient way to clamp the glueline.

The sliding table's upper guides are glued and doweled to the arms, and positioned so that the guides rest on the inclined surfaces of the rail, leaving a small clearance gap between the underside of the arm and the top surface of the rail, as shown in the drawing above. This space is important—it ensures that the guides will ride on the angled surfaces of the rail and it allows for wear. To make two identical arms and guides, I fabricated them as one assembly 6 in. wide, then ripped them in half to make two pieces 3 in. wide.

With the arms glued and screwed to the sliding-table pedestal, the assembly can be hung on the machine. The table's lower guide rides against the saw's baseboard (thrust rail), a member whose thickness must be adjusted so that the top of the sliding table will remain in the same plane as the main table throughout its travel. True up the table travel by trial and error, planing a taper on the baseboard if necessary. Lap the table guides to the rail, one at a time, using the sandpaper method described earlier and pictured on the facing page. Fit properly, the guides will push sawdust in front of them rather than packing it up into clods that will hinder smooth travel of the table.

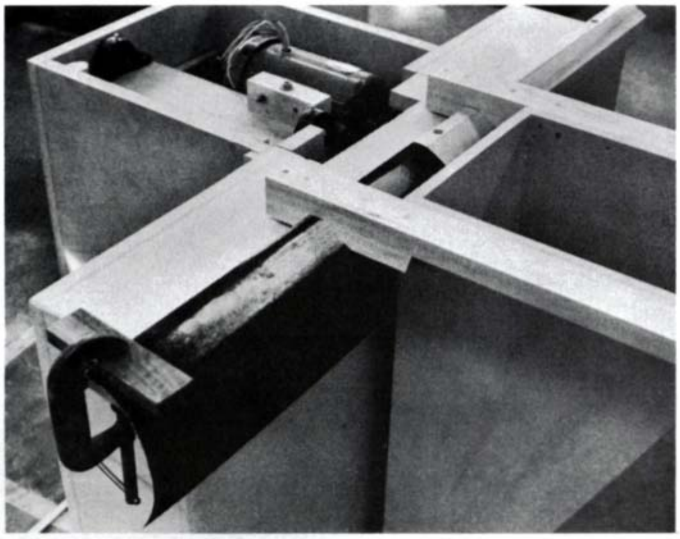
**Final assembly**—The saw's main table is made of ¾-in. particleboard screwed to a frame that sits atop the saw cabinet, aligned by dowels and held fast by two draw latches. With the latches popped open, the saw table can be lifted off and the arbor carriage removed for maintenance and cleaning, an operation that requires no tools. To keep the sliding and main tables in vertical alignment, I equalized the effects of seasonal movement by orienting the annual rings in the guide rail horizontally and those in the main table frame vertically.

The auxiliary table, attached to the saw with dowels and bolts threaded into T-nuts (figure 3), has only two positions: flush with the main table (where it supports extra-long or wide stock), and 5 in. below the main table (for drilling or mortising). To create a smooth, durable surface, I covered all three tables with white plastic laminate. Make sure that the tables are in proper alignment before you cover them.

I strongly recommend that this and any tablesaw be equipped with a blade guard, a splitter or riving knife, and anti-kickback pawls. My guard assembly is from an old Rockwell Unisaw. It's bolted to a block glued to the inside of the main table frame. To adjust the knife in line with the blade, I inserted thin metal shims between the guard and the mounting block.

I prefer a fence whose length ends just before the splitter. This type of fence is less likely to cause a kickback, because

G. Winchip



*With sandpaper taped to the guide rail, the table guides can be lapped to a perfect fit.*

once the wood has been pushed past the blade's cutting edge, it won't bind against the back of the blade. For stability and ease of fabrication, I made the fence out of three pieces of oak laminated to the 3-in. finished thickness. The fence is glued and doweled to a T-head, and it's locked in place with the wooden dog mechanism shown in the detail in figure 2. I relieved the T-head so that it bears against the fence guide rail on just two points. By planing a small amount of material from one of these contact points, I can make coarse adjustments in the fence so that it's parallel to the blade. Finer adjustments can be made by planing a slight taper on the fence guide rail.

The crosscut fence is fastened to the sliding table by dowels and a bolt threaded into a T-nut. Make some test cuts with the fence clamped in place, and once you've got a perfect 90° cut, drill for the dowels and bolt the fence down. Adjust it later by planing a taper on its front side.

With the saw built and calibrated, you can paint the particleboard with an oil-based primer, followed by a coat or two of enamel paint. I finished the solid wood parts with Watco oil and then paste-waxed the sliding parts.

Aside from the lower cost (about $300 for this saw), I've found that the greatest advantage to building my own machines has been scaling their features to meet my needs. On this saw, for example, the tables could be made larger, or the crosscut capacity made greater, by lengthening the guide rails and supporting pedestal. My machine accommodates a 10-in. blade, but the design could be modified to accept a 12-in. blade and perhaps a 3-HP motor.

The machine described here has been in use now for 2½ years at the Iowa State University woodworking shop, a high-abuse place if there ever was one. So far, it has required only routine cleaning and lubrication, plus an occasional tightening of the arbor mounting bolts. In our shop we have two other saws, a 10-in. Rockwell Unisaw and a 14-in., 5-HP Oliver. Often these two machines sit idle while students wait in line to use the wooden saw. They tell me that its smoothness of operation, its adaptability to jig-work and its amiable disposition make it a more pleasant tool to use. □

*Galen Winchip teaches woodworking and computer-aided manufacturing at Iowa State University at Ames.*

# Testing the wooden saw

When I flew out to Iowa this spring to try Winchip's wooden tablesaw, I had in mind comparing it to the sliding-table-equipped Rockwell Unisaw I've owned for three years. Having heard student raves about the wooden saw, I wasn't surprised to find it nicer on a couple of counts.

I did some ripping first, immediately discovering that the fence on Winchip's saw works better than the Unisaw's does. It's easier to position and clamp without the opposite end hopping out of alignment, as a lot of factory metal fences always seem to do, even on relatively expensive saws.

Apart from their size and construction material, I discovered the major difference between these two saws when I tried some crosscuts. With a couple of 8-ft. long, 15-in. wide panels on the sliding table, it took some muscle to make the cut—about the same effort you'd exert opening a heavy door. By contrast, the Unisaw table will slide one-handed. Although it's stiffer, the wooden table has no play and seemed more predictable than its steel counterpart, passing over the guide rail with an even swish instead of the clatter of steel on steel. A half-dozen crosscuts I checked were about 0.003 in. out of square across a 15-in. wide board. That's okay by my standards; slicing it finer calls for hunting down the renegade mils with a hand plane, a task that I suspect is no less frustrating than tickling the many adjusters on a steel table. I think Winchip is right about the guides' self-adjusting aspect, so the wooden saw should need less attention than a steel one.

The arbor carriage works as effortlessly as any I've used. Not having it tilt is a shortcoming I can live with, if only because it costs a thousand bucks less. The guard on this saw is a gem. It pivots handily out of the way for fence-setting, and it can be removed and, most importantly, reinstalled in seconds. I didn't much like the horizontal boring/mortising feature, though. For boring, 4500 RPM is too fast, and without a fence to guide it, impaling a chunk of wood on the bit is scary. Adding the clamp bar and a larger auxiliary table to accommodate fences and clamp jigs would help, especially for slot-mortising. I'd make two other changes: the sliding-table guide rail needs to be 2 in. longer, so that a full 24-in. wide panel can be crosscut, and a 3-HP motor would provide the extra power the saw needs to rip thick stock quickly, something it can't do with the smaller motor. *—Paul Bertorelli*

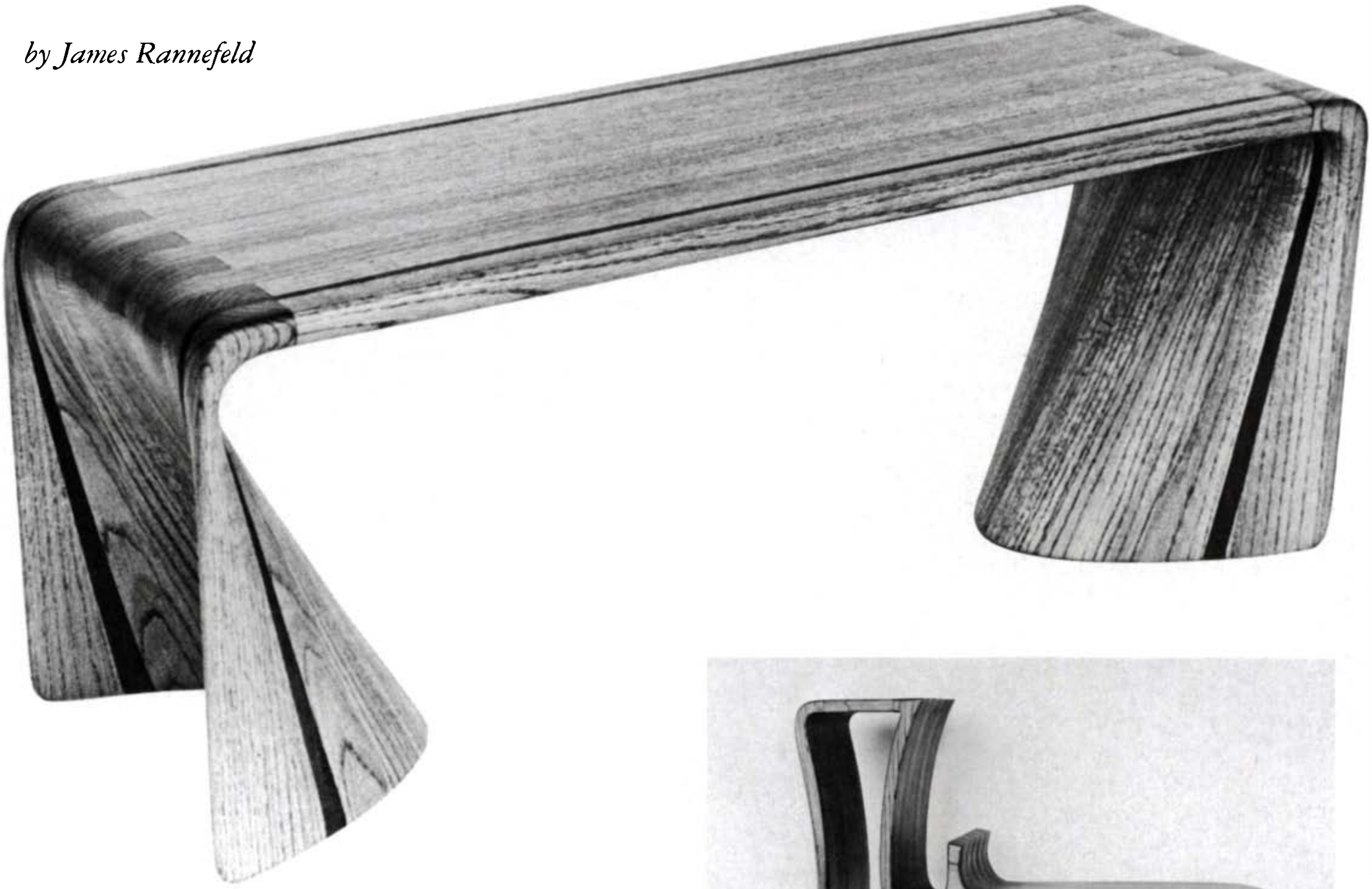
*Winchip crosscuts two 15-in. wide panels on his wooden tablesaw.*

P. Krumhardt

# The Laminated Wood Ribbon

## A built-up joint with sculptural possibilities

*by James Rannefeld*

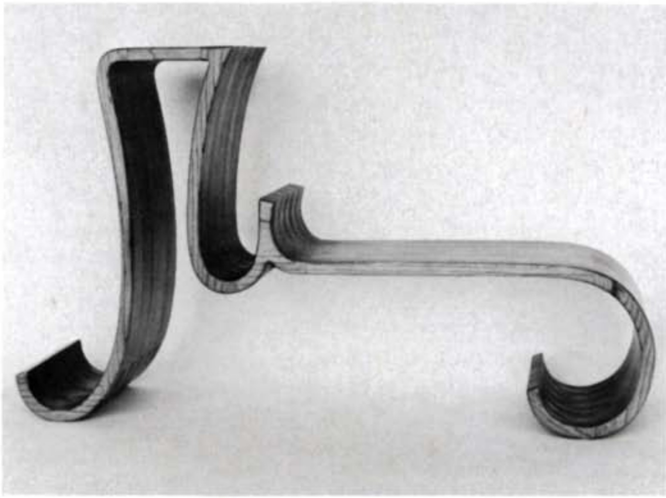


A great deal has been said about the vanishing line between sculpture and furniture, part of a larger dialogue about the indistinction between art and craft. The stack lamination techniques pioneered by Wendell Castle have contributed substantially to this discussion, resulting in forms more closely related to sculpture than to traditional furniture.

The laminated joint I'll describe here (actually a finger or box joint) is a natural outgrowth of Castle's early bricklay lamination techniques. It differs from traditional joinery in that the joint is made *during* the lamination process, rather than being cut into prepared stock. This joint makes the solid wood ribbon possible, freeing the contemporary woodworker from many of the constraints imposed by traditional rectilinear furniture construction.

The laminated wood ribbon has the assets of mass, without being massive—a common criticism of stack-laminated furniture. It can also be light and delicate, without seeming weak or fragile. As an alternative to bent plywood, the laminated-joint technique requires less initial setup time, with little or no specialized tooling or forms, and allows better use of lower grades of wood. And it's truly versatile—as easily used to wrap a set of drawers, doors or tambours as to define a spare, flowing table form or a bench.

The laminated ribbon is made by face-gluing many individual strips of wood that have been roughly bandsawn to shape. It's not unusual for a small, relatively simple bench to involve 33 or more bandsawn pieces, and a complicated project such as the "Signature" bench/console (above) might require more than a hundred.

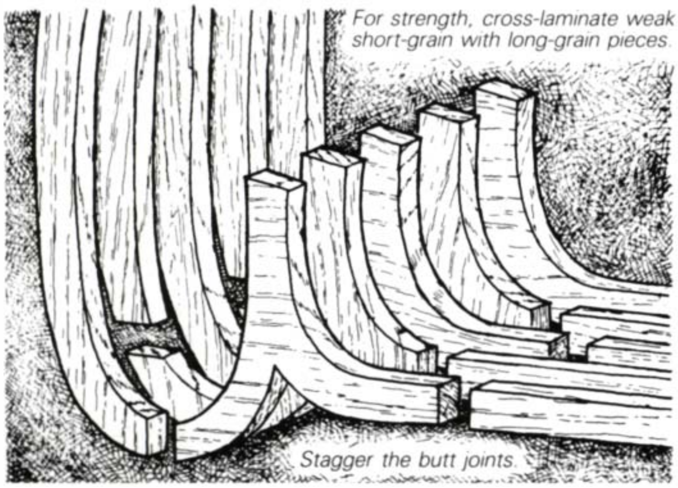


*Visual lightness and the illusion of mass without weight make the laminated wood ribbon a compelling method for sculptural furniture. 'Inspiration Bench' (top of page) is made of 33 pieces of oak accented with padauk. 'Signature' (above) illustrates another application of this method. The drawing (facing page) shows how short-grain is cross-laminated for strength.*

Construction begins with two templates—one for each alternating layer. I make my templates out of Masonite from a full-size sketch of the profile, taking care to fair their shape as close to the finished profile of the piece as I can, to conserve wood and to minimize shaping work later. For a recurved foot, such as that of "Inspiration Bench" (top of page), I make a series of templates, one for each layer, from a full-size drawing of the parabola.

Bandsawing curves from flat, straight-grained boards (usually 1 in. or $1\frac{1}{4}$ in. thick) inevitably leaves weak, short-grain areas. Templates must be arranged so that any short grain is cross-laminated by long grain in the next layer. This usually

*Hardly a surface goes unclamped when a wood ribbon is glued up. Rannefeld assembles at a pace that allows the glue's natural tack to keep parts from sliding. Particleboard cauls spread clamping pressure and align the faces of the outermost laminae. Once the ribbon has cured, Rannefeld works it over with body grinders, sculpting by hand and eye to the final shape. He uses a small drum sander to get inside the tight spots.*




results in an odd number of laminations in the finished piece, much as a sheet of plywood is made up of an odd number of veneers. In New Mexico's arid climate, such cross-grain constructions have held up well, but in areas where the seasonal moisture gradient is higher, they might crack. To avoid this problem, orient the layers so that the grain runs at a slight bias instead of at right angles.

When laying out pieces to be bandsawn, the shapes can be nested and ganged on individual boards to best utilize random width and length stock. Often I am able to use lower grades of lumber, at considerable savings, by working around natural flaws in the wood. Wood for lamination must be of uniform thickness, and should be free from obvious ridges from the planer. Flat surfaces, where the laminae butt together, for example, or where a table's legs meet the floor, are best cut square on a radial-arm saw.

Before laminating, it's a good idea to make cauls the shape of the finished project. This speeds glue-up and aligns the layers. Wax or varnish the cauls so that they won't stick to the work. Obviously, glue-up is the most critical operation, and the most difficult, since the glue (I use Titebond) acts as a lubricant, encouraging the laminae to slip out of alignment. You could use dowels or tacks to hold the layers in place, but I prefer to lay up the stack one by one, working as quickly as possible but at a rate that allows the glue to grab, holding one layer in place before the next one goes on. Timing is important here. As the glue slowly cures, it becomes increasingly tacky, and with a little bit of care you get a feel for the speed at which layers can be stacked without causing lower layers to slip. In cold weather I sometimes bring in a small electric heater to expedite things.

Spare no clamps—especially in complex, staggered layering. Spacing clamps closely will straighten out slightly bowed or wound pieces and will flatten minute irregularities between boards.

When the clamps are removed 24 hours later, the piece can be attacked with a variety of sculpting and sanding tools to shape it to the desired form and surface. My favorite tools for removing wood quickly are 7-in. and 4-in. body grinders. I also have a pneumatic sculptors' gouge that comes in handy for wasting large amounts of wood quickly.

I use a drum sander on a flexible shaft to give shape and clarity to the form, followed by electric and pneumatic finish sanders, and then a smaller drum sander for hard-to-reach places such as tight inside curves.

I finish my laminated work with a 3:1 mixture of Watco exterior Danish oil and polyurethane. This mixture gives a satiny finish, looks and repairs like an oil finish, yet resists water and alcohol like polyurethane.

My most recent explorations of the ribbon have shown me that these forms have even wider applications than I had first imagined. It is the laminated joint that gives us the ability to realize complex, even convoluted forms in solid wood, without the intimidating technology associated with laminated veneer construction. And it is the ribbon that sets our imaginations free. □

---

*James Rannefeld sculpts fanciful ribbons and contemporary furniture in Taos, New Mexico. Photos by the author.*

# Respiratory Hazards
## Choosing the right protection

*by George Mustoe*

When the first woodworker whittled a stick with a sharp rock, millions of years of evolution had already provided safety devices to protect him against the occupational hazards of shaping wood. Living in a landscape sculpted by windstorms and volcanic ash eruptions favored the development of physiological defenses against airborne irritants. Nasal hair filters large particles, while the cilia-lined and mucus-coated respiratory tract keeps all but the smallest dust from reaching the lungs. Unfortunately, nature's defenses are meant to counter occasional dust storms and pollen outbreaks, not the dust and vapors encountered by present-day woodworkers. Though woodworking is relatively clean compared with other manufacturing, woodworkers face two hazards: wood dust produced by sawing and sanding, and toxic vapors emitted by adhesives and finishing agents.

*If you have a beard, no mask will seal adequately against your face. Instead of shaving, you can wear an air helmet, which blows filtered air over your face. The helmet shown above is 3M's model #W316 ($400), available from Direct Safety Co., PO Box 8018, Phoenix, Ariz. 85040.*

**How dangerous is wood dust?**—The dust problem has usually been considered to be an unpleasant but unavoidable aspect of the craft. Vacuum filters are often connected to power saws and sanders, but most woodworkers still find themselves breathing more wood than they like, producing the familiar symptoms of sneezing, coughing, runny nose and phlegm. To some degree these are natural reactions, as the body traps and moves dust up and out of the respiratory tract. But the defenses can be overloaded. Just how hazardous is this dust? Inorganic dusts from coal, silica and asbestos have long been known to provoke serious lung damage. Recent research strongly suggests that the relatively larger-sized particles generated by sawing or sanding wood also pose a threat, not to the lungs but to the upper respiratory tract. While some abrasive dust is generated by abrasives themselves, the concentrations are not regarded as hazardous.

A 1968 report in the *British Medical Journal* described an unusually high rate of nasal cancer, *adenocarcinoma,* among furnituremakers in the Oxford area. This disease occurs in only 6 out of 10,000,000 people among the general population each year, compared to 7 out of 10,000 among the furnituremakers, who typically worked with beech, oak and mahogany, often in factories lacking dust-collection systems. The figures suggest that about 2.5% of all woodworkers will develop nasal cancer within 50 years of entering the industry. The disease wasn't found in wood finishers, who typically work in separate shops, suggesting that nasal cancer is linked to dust rather than to chemical exposure. Neither were high cancer rates found among carpenters, who worked mostly outdoors where dust doesn't persist. A 1982 survey of medical records from 12 countries found that 78.5% of nasal adenocarcinoma victims were woodworkers, further indicating the potential hazards associated with dust exposure.

Current data on the relationship between cancer and wood is confusing because woodworkers commonly work with other materials as well. For example, several 1980 reports indicate greater than expected rates of colon, rectal and salivary-gland cancers among woodworkers employed as patternmakers in the U.S. auto industry, but these workers are exposed to plywood, treated lumber, and plastics as well as to solid wood.

Though the relationship between cancer and wood products is just beginning to be explored, particular wood species are definitely known to cause allergenic reactions among many people (*FWW* #9 pp. 54-57). Rosewood, yew, boxwood, cashew, satinwood, teak, ebony and mahogany are among the well noted examples. Western red cedar is particularly notorious because not only is the dust irritating, but the wood contains irritating volatile oils that can evade dust-collection systems. The most detailed descriptions of its effects come from Japan, where occupational asthma was first reported among woodworkers in 1926 after large quantities of cedar were imported from the United States to repair damage done by the Tokyo earthquake. Since 1965, Japanese mill workers and carpenters have again evidenced allergic reactions, as furniture factories have greatly expanded their use of Western red cedar. A 1973 investigation of 1,300 furniture workers revealed that 24.5% suffered some kind of allergic response to red cedar, sometimes developing symptoms within 30 minutes of contact. These symptoms include dermatitis, conjunctivitis, rhinitis and asthma attacks. Sawmill workers are particularly likely to suffer from eye inflammation (conjunctivitis). In Japan, saws are by law equipped with dust collectors, suggesting that irritation comes from exposure to volatile oils. These oils eventually evaporate from the sawn lumber, and respiratory ailments experienced in later processing are more likely dust-induced. In the United States, respiratory irritation has also been linked to inhalation of redwood dust, leading to a form of *pneumonitis* known as "sequoisis." British furniture-makers use the term "mahogany cough" to describe the medical condition *coryza,* an acute inflammation of the nasal membranes accompanied by profuse discharge.

**What to do about dust**—There are three ways to reduce your exposure to dust. In some situations you can choose another tool that produces less dust; a plane, for example, can substitute for a belt sander. Second, you can trap the dust at its source, using vacuum collection (*FWW* #12, pp. 76-78, and #25, pp. 58-59). Adequate ventilation is the best defense against respiratory dangers, but for those who won't or can't spend the money for a dust-collection and ventilation system, there is a third alternative: you can wear a mask.

Dust masks have been used since Roman times, and simple respirators are described by Pliny the Elder in his *Natural History,* written during the first century AD. Early masks consisted of animal bladders or rags worn over the nose and mouth. During the 1800s, major advances in mask design were aimed primarily at protecting firefighters: masks were developed to filter toxic gases as well as particulates. Chemical warfare during World War I led to further developments. In the United States, this research was led by the Bureau of Mines, which later set performance standards for civilian-use respirators. At present, the National Institute of Occupational Safety and Health (NIOSH) evaluates respirator performance, and specifies acceptability for specific models.

Many woodworkers use "nuisance-dust" masks, which are designed to trap large-diameter, non-toxic particulates. These devices offer fairly good protection for general woodworking, but they are inadequate for dusts released from home insulation, chemically treated lumber or allergenic species. Nuisance-dust masks, though they are light, comfortable and inexpensive, are not manufactured to meet NIOSH standards. The 3M company's popular model #8500 disposable paper mask is available at hardware stores for about 30¢. Another common nuisance-dust mask design, the Norton Bantam model #7200 ($3.50) or the Willson "Dustite" ($3.00), for instance, uses a replaceable filter element.

Given the new-found dangers of wood dust, it is better to use what NIOSH approves as a "toxic-dust" mask, which provides about twice the filtration efficiency of nuisance-dust masks. Disposable types such as those shown below can be purchased locally or from mail-order safety-equipment suppliers. For a permanent facepiece with disposable filter elements, a toxic-vapor mask (to be discussed shortly) can be fitted with NIOSH-approved toxic-dust filters.

*NIOSH-approved disposable toxic-dust masks include 3M's model #8710 ($1.25), left, and Norton's model 7170 ($3.75), both available from Edcor, Box 768, Kansas City, Mo. 64141.*

While a mask can offer significant protection, its effectiveness may be reduced by 90% or more if you wear it over a beard. One alternative to shaving is a positive-pressure air-purifying respirator, which fits like a helmet and blows filtered air over your face. These are expensive; 3M's air helmet, model #W316 (facing page), runs about $400. It includes a face shield and a rechargeable battery, and weighs about 3½ lb.

**Solvent vapors**—While the body's respiratory defense mechanisms can filter moderate amounts of dust, toxic vapors present a more serious threat. Hydrocarbons seldom occur in nature, thus we have developed only a limited ability to trap and detoxify these compounds. Unlike inhaled particles, vapors from paints, glues and solvents are readily absorbed into the bloodstream, often causing toxic reactions in organs other than the lungs. The liver and kidneys are particularly vulnerable.

Volatile compounds are widely used in wood finishes and adhesives, and there is no easy way for a worker to judge their hazards. Odor alone is not reliable. For example, highly-odoriferous acetone ranks relatively low on the toxicity scale, while mild-smelling epoxy gives off very toxic vapors. People all too often assume that the mere presence of products on store shelves indicates their safety, a mistake that is compounded by the tendency to ignore warning labels.

The hazards in using synthetic organic compounds are best known from cases where large numbers of industrial workers developed similar symptoms. The home worker, unprotected by expensive ventilation systems, may be at even higher risk. In 1969, ninety-three Japanese workers were found to be suffering from polyneuropathy resulting from exposure to hexane-based glue, used in home manufacture of sandals. Symptoms included muscle weakness, impairment of sensation, and temporary paralysis in the arms and legs. Reactions continued long after contact with the glue ceased, and four years later eleven of the workers still showed some ill effects.

Understanding the toxic properties of solvents is difficult because of the complex biochemical processes that occur once the solvents enter the body. For example, methylene chloride (a major ingredient in paint remover) metabolizes to form carbon monoxide, and methyl alcohol is converted to formaldehyde. In both cases, the toxic effects are partly due to these intermediate metabolites rather than to the original solvent. Many new products reach the market before their health hazards are well understood. When epoxies were introduced to industry in the late 1940s, numerous incidents occurred. A 1947 study revealed that 47% to 100% of workers at various electrical assembly plants suffered skin ailments from epoxy exposure. Many people become sensitized after repeated contact, but the full range of risks remains unknown. Animal studies suggest that at least some epoxy resins are carcinogenic.

Organic vapors are tissue irritants and central nervous system depressants. Workers are most likely to notice irritation of the eyes, skin and respiratory tract, as well as headache, dizziness, confusion, loss of appetite, nausea, malaise and fatigue. Though these symptoms usually disappear within hours or days, the long-term effects may pose different risks. Kidney and liver damage may result from chronic exposure to many solvents, particularly the chlorinated hydrocarbons (methylene chloride, perchloroethylene, etc.) and the aromatic compounds (toluene, xylene, benzene). A 1981 study by Swedish investi-

*Several companies make twin-cartridge organic-vapor respirators, usually available in small, medium and large sizes. American Optical Corp.'s 'Sureguard' model #R5051P (shown being worn at right) is priced at about $17, and has an optional hemispherical fiber pre-filter to trap mists and dust. The Norton 'Protex' model #7531 (held at right) is similar, but uses a flat pre-filter pad. It sells for about $26. The 3M model #8712, worn and held at left, does not have a replaceable filter, but costs only about $8. The mask's wide, soft plastic facepiece is unusually comfortable.*

gators revealed that painters with more than 25 years' experience showed a 15% greater than expected death rate from cancer. These deaths included unusually high incidences of cancers of the esophagus, larynx and bile ducts. The study also showed abnormally high rates of fatal diseases of the respiratory tract and upper gastrointestinal tract.

**What to do about toxic vapors**—Though exposure to vapors can be minimized by providing good ventilation, this remedy is not always feasible for woodworkers. Open doors and windows that vent fumes also invite airborne debris and insects to land on wet surfaces, and in winter one may be loathe to allow heat to escape. Most frustrating is the prospect of stripping floors or painting walls in a room that has inadequate ventilation. The danger level is not known for many compounds, and harmful exposure may not produce immediately noticeable effects. Concentrations of methylene chloride vapor as low as 300 parts per million (PPM) can cause drowsiness and reduced coordination after 3 to 4 hours of exposure. This concentration can easily be reached when paint remover is used with poor ventilation. Other compounds are much more toxic; the wood preservative pentachlorophenol, suspected of causing cancer and chromosome damage, is considered hazardous at vapor levels of only a few PPM. Allowing 2 teaspoonfuls to evaporate in an 8x10 room would exceed the danger level.

Besides working with adequate ventilation, wearing an appropriate mask will provide additional protection against even small concentrations of many of these vapors. The modern organic vapor respirator is a direct descendant of the World War I gas mask, with several modifications. The glass-windowed, full-face mask is still used when eye-irritating vapors or gases are encountered, but the half-mask style is most common. This consists of a soft rubber facepiece containing one or two vapor-absorbing cartridges. These typically contain about half a cup of activated carbon or charcoal granules, though silica gel and synthetic molecular-sieve resins are sometimes used. The vapor-absorbing property of these compounds comes from the extremely large surface area of their porous particles. Cartridges are available to protect against a variety of toxic substances. They are made by impregnating the cartridge material with reactive compounds: a filter treated with iodine will absorb mercury vapor, while one impregnated with metal oxides will absorb acid fumes. The standard "organic vapor" cartridges have been found to provide protection against all but 18 of the 197 substances tested. These filters absorb the most common vapors emitted by wood finishes and adhesives. One exception is methyl alcohol. For this reason, when alcohol is needed as a solvent for shellac or other materials, it is safest to substitute denatured ethyl alcohol.

Respirator performance is evaluated by NIOSH. Testing is performed using carbon tetrachloride at vapor concentrations of 1,000 PPM. A cartridge is considered spent when the vapor concentration of air passing through it reaches 10 PPM. Under these conditions, cartridge life must be at least 50 minutes. As vapor levels during wood finishing are likely to be much under 1,000 PPM, the actual lifespan of a cartridge is usually 4 to 16 hours.

In addition to the vapor-absorbing cartridge, the organic-vapor respirator usually comes equipped with a fiber-filter disc designed to remove particulates such as paint-spray mist. In particle-free environments, these filters can be removed to make breathing easier. Or the mask can be used with a filter alone, simply as a dust mask. Masks generally contain a low-resistance port for exhaled air to leave the mask. This exhalation valve prevents exhaled air from leaving through the filter, keeping moisture from saturating the absorbing medium. If the exhalation valve leaks, or if the mask does not seal against the face, the mask is ineffective, allowing unfiltered air to enter. Make certain that your mask fits tightly and that the exhaust port functions.

Respirators have some drawbacks. They restrict your field of vision and make talking difficult. Breathing requires more effort than normal, and some people suffer claustrophobia. These problems tend to become less noticeable as you become accustomed to wearing a respirator. The benefits of both dust and organic-vapor masks are most apparent at the end of the day. Gone are the clogged nostrils, gummy throat and rasping cough. Solvents no longer produce headaches, respiratory irritation or that vague hung-over feeling, and you no longer have to rush through the application of a finish just to get away from the smell.

As a woodworker, I try to produce items that will last for many years, and it seems only an extension of that goal to expect my own components to hold up equally well. Though I sometimes feel like a giant anteater as I wander around the shop wearing my bulbous black proboscis, the health benefits seem well worth the minor inconvenience. □

*George Mustoe, of Bellingham, Wash., has worked as an analytic chemist. He also makes harps.*

# What's in a label: common solvents in the woodshop

***Aliphatic hydrocarbons:*** Also known as "paraffins," these petroleum derivatives consist of chains of carbon and hydrogen atoms. Gaseous forms include *methane, butane* and *propane;* molecules containing five or more carbon atoms are liquid at room temperature. *Pentane, hexane, heptane* and *octane* are major constituents of gasoline, kerosene, mineral spirits and VM&P (varnishmakers' and painters') naphtha. Hexane is widely used in rubber-based liquids such as contact cement and rubber cement. Isobutane and propane serve as propellants in some spray cans.

Aliphatic solvents are generally less toxic than other classes of organic liquids, though they are not risk-free. Common symptoms resulting from excessive exposure include skin and respiratory irritation and central nervous system (CNS) depression.

***Aromatic hydrocarbons:*** These compounds are ring-shaped molecules distilled from coal tar. These liquids are powerful solvents, but their use is limited by low flash-points, high volatility and high toxicity. Three compounds are common: *Toluene* (*toluol*) and *xylene* (*xylol*) are often added to aliphatic solvents to increase their effectiveness. *Benzene* is not used in most areas, owing to its high toxicity and carcinogenic properties, but it is commonly present in small amounts as a contaminant in commercial-grade solvents. Benzene is commonly confused with benzine, an alternate name for VM&P naphtha, a variety of mineral spirits.

***Alcohols:*** *Denatured ethyl alcohol* (*ethanol*) is widely used as a solvent for shellac, and consists of grain alcohol made poisonous to drink by the addition of methyl alcohol or some other toxic liquid. *Methyl alcohol* (*methanol,* "wood alcohol") is used in lacquer thinner, paint remover, shellac, and aniline-based wood stains. Methyl alcohol can be absorbed through the skin and its vapors are much more toxic than those of denatured alcohol, so the latter product should be employed for general shop use.

***Ketones and esters:*** This group includes a number of compounds which contain oxygen as well as carbon and hydrogen. *Ethyl acetate, butyl acetate* and *amyl acetate* are esters used in nitrocellulose lacquer. Common ketones include *acetone, methyl ethyl ketone* and *methyl isobutyl ketone.* Esters and ketones typically have strong odors and high flammability. They are particularly likely to irritate the skin because of their ability to dissolve natural oils, and they may produce respiratory irritation and symptoms of CNS depression. A ketone derivative, *methyl ethyl ketone peroxide,* is used as a catalyst for polyester resins. This strong oxidizing agent will cause serious damage to the skin and eyes, and demands careful handling.

***Glycol ethers:*** These are another type of oxygenated organic compound used in solvents, most commonly in slow-drying lacquer. Glycol ethers are highly toxic, and can cause liver, kidney and CNS damage. In addition, they may adversely affect reproductive organs, causing birth defects and miscarriages.

***Halogenated hydrocarbons:*** This group of compounds contains fluorine, chlorine, and less commonly iodine and bromine. Gaseous forms such as *freon* have been widely used as spray-can propellants, but these are now restricted because of evidence that their use is destructive to the earth's protective ozone layer. Though some of the fluorocarbons have low toxicity, the chlorinated hydrocarbons rank high on the list of hazardous solvents. Degreasers and dry-cleaning agents such as *dichloroethane, trichloroethane* and *perchloroethylene* are generally weak solvents, being most effective for removing wax, grease and oil. (Mineral spirits is a safer solvent for removing oil and wax residues.) *Carbon tetrachloride* is no longer widely used because of its toxicity, but *methylene chloride* remains a common ingredient of paint remover and spray finishes. These volatile solvents produce hazardous vapors, and liquids can be absorbed through the skin. In addition, air-supplied respirators, not air-purifying organic-vapor (charcoal cartridge) respirators, should be used to protect against methylene chloride, as air-purifying cartridges will not adequately remove this essentially odorless material. Health risks include liver and kidney damage, CNS depression, narcosis and possibly cancer. Unlike most other solvents, halogenated hydrocarbons are not flammable, but when heated they break down to produce phosgene and other poison gases. The solvent vapors commonly have anaesthetic properties, and *chloroform* and *halothane* (*bromochlorotrifluoroethane*) have been widely used in medicine for this purpose.

***Mineral spirits (VM&P naphtha, white spirits):*** These are distilled from petroleum, and consist mostly of the aliphatic hydrocarbons *hexane, heptane* and *octane.* Composition varies according to the source of the crude oil and manufacturing differences from batch to batch, and chemical analysis reveals the presence of as many as 100 separate compounds in some samples. Mineral spirits are grouped into three categories. Low-boiling-point (140° to 180°F), "odorless" spirits consist mostly of aliphatic compounds with fast evaporation rates and relatively weak solvency. Medium-boiling-point (200° to 300°F), "low odor" spirits are predominantly *heptane* and *octane* fortified with small amounts of *xylene* and *toluene.* High-boiling-point (300° to 400°F), "regular odor" mineral spirits comprise about 75% of all solvents used in the paint industry. They consist of 15% to 25% aromatic hydrocarbons. Mineral spirits are less toxic than most other solvents, but vapors can cause skin and respiratory irritation and CNS depression. Toxicity increases in proportion to the aromatic hydrocarbon content, so odorless spirits are best for general use.

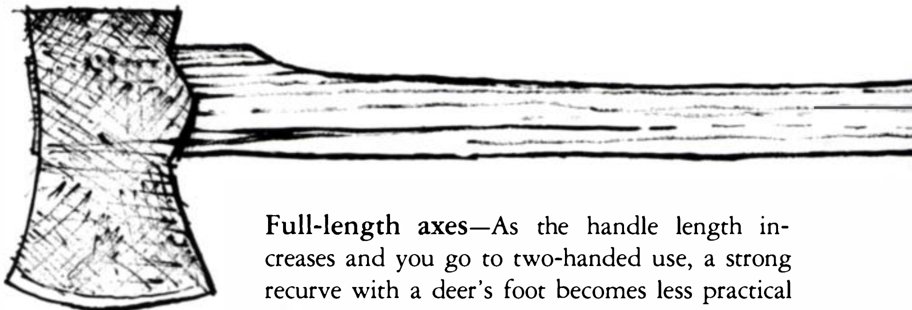
***Turpentine:*** This is produced by steam distillation of pine gum, and consists mostly of carbon-ring compounds called *turpenes.* Pine gum contains about 68% solid rosin, 20% turpentine and 12% water. Turpentine has a strong, characteristic odor, but its physical properties are very similar to mineral spirits, which has largely replaced it as a solvent. Turpentine is more chemically reactive, and will discolor upon long exposure to light or to air. Its vapors can cause respiratory irritation as well as dizziness, headache and other signs of CNS depression. It is a strong skin irritant, and can cause severe allergic reactions after repeated contact.

***Lacquer thinner:*** Lacquers are usually made by dissolving a cellulose derivative in a suitable solvent, though modern formulations may include alkyd resin, natural rosin or other dissolved solids. Lacquer thinner usually consists of about 30% esters and ketones as the active solvent, diluted with aromatic and aliphatic hydrocarbons. The ester, ketone and aromatic content makes these solvents very volatile and relatively toxic, so they should be used only when needed and not as a general substitute for mineral spirits when thinning liquids or cleaning brushes. *—G.M.*

# Making Ax Handles

## A good handle fits at both ends

*by Delbert Greear*



The ax has been around since civilization began and is likely to be with us for the duration. In a popular witticism, an old-timer claims to have had the same ax for forty years, only it's had twelve new handles and four new heads. This joke actually harks back to the frugal days when the ax head was regularly reforged and retempered after it had become blunt and misshapen from much use and sharpening. The old-timer's ax head could be made "new" by reforging, but a new handle, then as now, is a new handle.

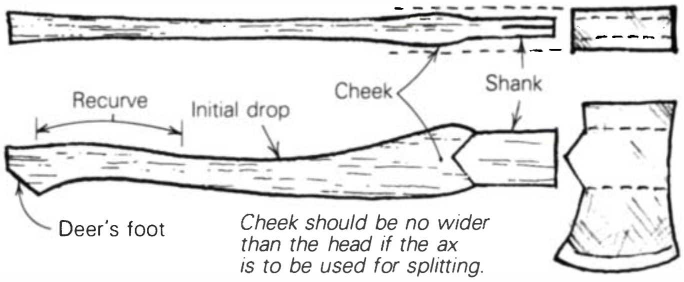
While good manufactured handles are readily available at the hardware store, many woodsmen prefer a handle custom-made to suit the type of ax and the job to be done. A good ax handle will fit the ax head at one end and the ax wielder at the other.

The handle is an extension of the arm, and its main purpose is to give leverage. Too long an ax is unwieldy; one too short can result in extra work, bent posture and danger from a short stroke. Full-size axes average just under 3 ft. long. A hatchet handle may be as short as 1 ft. A camp ax, balanced for either one-handed or two-handed use, is usually about 2 ft. long, as are the small double-bit cruising ax and the light Hudson's Bay ax.

**Parts of a handle**—Except for broad-hatchets and broad-axes, which call for offset handles to protect the wielder's knuckles (see "Hewing," *FWW* #21, pp. 64-67), the ax handle, from top view, needs to be straight in line with the head so that the blade will strike true. An initial drop, as shown in the drawing below, puts the center of weight of the ax head a little behind the line of the handle. This helps aim the blow, reduces the tendency of the ax to twist when it strikes the wood, and somewhat reduces shock.

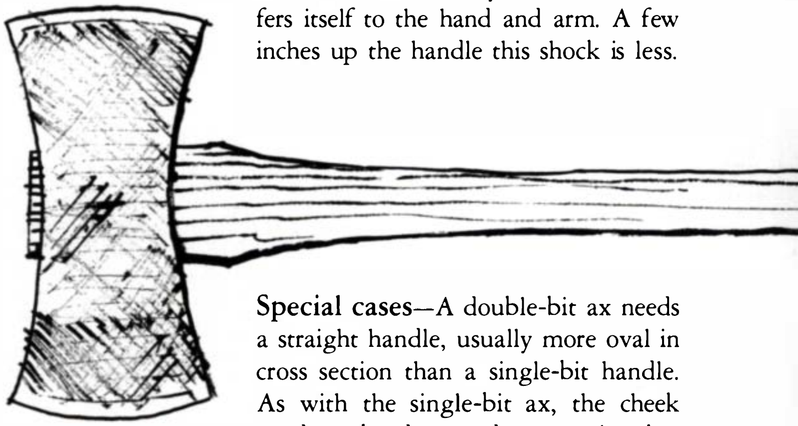
In side view, single-bit handles frequently have a slight S shape, and often there is a pronounced recurve and a fat knob at the end, sometimes resembling a deer's foot. The deer's-foot pattern is a good one for short handles. It provides a firm grip for the hand, and the recurve lets the wrist work at a comfortable angle, especially in one-handed work, where the elbow is held close to the body for control and the arm is never fully extended.

**Parts of an ax handle**




**Full-length axes**—As the handle length increases and you go to two-handed use, a strong recurve with a deer's foot becomes less practical (though the initial drop is still a good design). Most experienced woodchoppers say the deer's-foot pattern interferes with their aim and presents the blade at the wrong angle to the work when their arms are fully outstretched.

Deer's foot or no, it is good practice to extend the handle back beyond the grip for a few inches and to end it with a flare or a knob. Many axmen of the old school rely on a pull at the end of their stroke to shorten the radius of the ax head's arc, thus increasing its final velocity. A flare or a knob gives the hand a stopping place, and also dampens shock. Most people when using an ax, a hammer or any such striking tool for very long tend to choke up a little on the handle because with every blow a shock wave travels down the handle, focuses at the very butt, and transfers itself to the hand and arm. A few inches up the handle this shock is less.



**Special cases**—A double-bit ax needs a straight handle, usually more oval in cross section than a single-bit handle. As with the single-bit ax, the cheek needs to be deep and strong—it takes the most abuse from overshooting and other mislicks. It shouldn't be thicker than the head, however, or it is liable to fray and splinter, especially when the ax is used for splitting. Also, for a splitting ax, the main length of the handle should be as skinny as is commensurate with strength and a good grip. This gives the ax more whip and speed. A wood splitter accommodates the increased vibration by relaxing his grip as the blade meets the wood. A hewing ax needs a stiffer handle, since whip and vibration can quickly tire the hewer. And it also needs a flare or a knob. Axes and hatchets used for carving and trimming call for a comfortable handle shape for special one-handed grips, such as right behind the head, or where the ax balances best for short chopping strokes.

**Handle wood**—Oak, ash, maple and birch are often used, but where it is available, hickory is the woodsman's choice. All the hickories I've tried have made good handles: pignut, bitternut, mockernut, shellbark and shagbark. The shagbark enjoys a reputation for exceptional strength and good grain.

Unless a marked offset is needed, as for a broadax handle, straight, clear wood is best. A tree about 9 in. in diameter is likely to be nearly all sapwood, better than heartwood for a handle. And even for a long ax handle, the bolt needs to be only about 42 in. long, to allow for seasoning checks and waste. Thus a tree that might be culled in a managed timber lot may produce six or eight handle blanks.

Quarter the log right away, and if it's large enough, take it to eighths. This will relieve much of the stress in the wood and prevent deep seasoning checks. Blanks that won't be used immediately should be leaned up in a sheltered place to season. Leave the bark and heartwood on to slow seasoning and prevent, to some extent, the blanks from bowing as they dry. If you orient the blank as in the drawing at right, a slight bow will actually work to your advantage.

**Removing the old handle**—Drilling the old handle out can be a chore if the handle is full of metal wedges. I usually burn the old handle out. This won't damage the blade if you bury the cutting edge in dirt (both edges on a double-bit ax) and keep the fire very small. You need to char the handle stub just enough so that you can punch it out. Keep the fire close around the eye, and don't remove the ax head from the dirt too soon, or residual heat may run out to the edge and spoil its temper.

**Roughing out and shaping**—Green hickory splits fairly easily, and it splits straight with the grain. Once it has been seasoned, however, it becomes difficult to split and is prone to run out.

Before the blank dries completely, I like to rough out a handle with a hatchet, then go to a shaving horse and a drawknife to skinny it down and refine its shape. I do most of the finish work with a knife, making the final touches after the head has been mounted. One difficulty in carving hickory is unwanted riving of the grain. Reverse directions before the riving gets out of control, work slightly across the grain, and keep the knife sharp.

A rasp works well when the wood gets hard from seasoning and the knife no longer cuts freely. The rasp leaves a rough surface that can be smoothed by scraping with broken glass or by sanding.

Sometimes when an ax is needed right away, you can make the handle and install it green, but it is almost sure to need resetting within a week or two. For a more lasting fit, allow the handle to season until it is dry and hard, and "sounds" when struck with another piece of wood.

**Fitting the shank**—Be sure that the shank of the handle completely fills the eye of the head in length, depth and thickness. Slip the ax head gently on the handle to check the fit, remove it, and cut away the tight spots with a knife or a rasp until the handle beds firmly in the eye of the head and protrudes a little beyond. After the handle has been wedged, the extra length should be trimmed off flush with the head.

Sometimes the handle needs to be tapped in and the head knocked back off to find the thick spots on the shank. The best way to drive the handle into the eye is to hang the ax by its handle in one hand and strike its grip end with a maul. The handle is thus driven against the inertia of the head. Don't get the head stuck on too tight before you are ready to wedge it—it can be a real bear to remove.

Before final-fitting and wedging, woodsmen of the old school heat the end of the handle in an open flame until it is nearly smoking, but not charred. This drives out the moisture through the end grain, and shrinks and hardens the hickory. The wood later swells a little as it absorbs moisture again, tightening the fit.

**Wedging**—I used to saw the slot for the wedge, but an old-timer set me straight. It's easier to split the shank. Both the wedge and the split should be about two-thirds the depth of the eye. With care, the split won't run down the handle and ruin it.

A fat wedge will loosen from compression due to moisture changes, thus it tends to work out easily. The slimmer the wedge the better. In fact, if the handle fits the eye of the blade to perfection, the wedge can be dispensed with. Needless to say, this is not usually the case.

A soft but tough wood makes the best wedge—pine, spruce, cedar and gum are often used. A fibrous wood, such as honey locust, grips well. A hard wood such as oak or maple is a poor choice, as such wedges work loose. Some people apply white glue to the wedge first. This lubricates the wedge as it is driven in, and sets it firmly in place.

Laying a flat piece of steel on the end of the wedge while hammering will keep the wedge from breaking into pieces. Metal wedges are best saved for tightening up later, should the ax head start working loose. Don't hesitate to drive in a metal wedge at the first sign of movement—once an ax head begins to rock, it's surely on its way off.

**Finishing**—Final-sanding and finishing are best done after the handle has been fit onto the head. I like to use mutton tallow or similar heavy grease to seal the wood. Rub the grease in well and polish it dry with a cloth, for initially it makes the handle too slick to use safely. Tallow is good protection for the wood, and, incidentally, for the steel. Linseed oil will also do nicely. Many commercial handles are varnished, but varnish tends to blister the hands and soon wears off, whereas grease or oil wears in, and is gentle on the hands.

Keep any frayed wood at the cheek trimmed off, to reduce splintering. If a handle splinters badly, a roll of tape may get you through the day's work, but the handle is starting to go. The tape merely hides the extent of the damage and traps moisture, accelerating decay. A failing handle is dangerous. Before your ax handle gives out completely, go look for a hickory tree and treat yourself to some peace of mind. □

---

*Delbert Greear, a country woodworker from Sautee, Ga., wrote on making dough trays in* FWW *#35.*

# Kitchen on a Stick

## A pencil and a few 1x2s tell the whole story

*by Jere Cary*

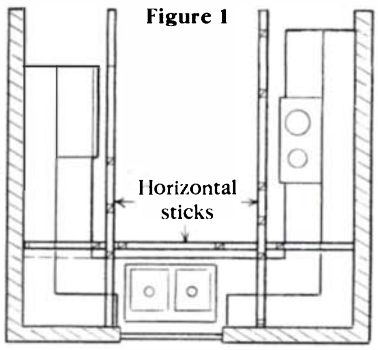
Story sticks are one of the kitchen cabinetmaker's most valuable tools: on these long, narrow pieces of wood, an entire kitchenful of cabinets can be laid out full-size. The locations of the doors and windows, electrical and plumbing services, and other details are recorded on the sticks first. Then the details of the cabinets and the fixed appliances are added. Because all the cabinet parts and joints are marked out full-size, it's easier and more accurate to build from story sticks than from scaled-down drawings.

Using the sticks may seem awkward at first, but I often find that even people who are apprehensive when they start come to rely heavily on story sticks once they have seen how much help the sticks can be. For example, the room details on the sticks let you determine exactly how the cabinets should be placed within the kitchen. A sink cabinet can be laid out so that the sink is centered beneath a window; an upper unit can be made so that it won't interfere with an existing switch or light fixture. The sticks also serve as guides when building the cabinets. Lengths, widths and positions of the joints can all be marked on the material directly from the story sticks—no measurements are necessary, so fewer errors are made. And if you add to the kitchen later, the sticks are a detailed record of the existing cabinets.

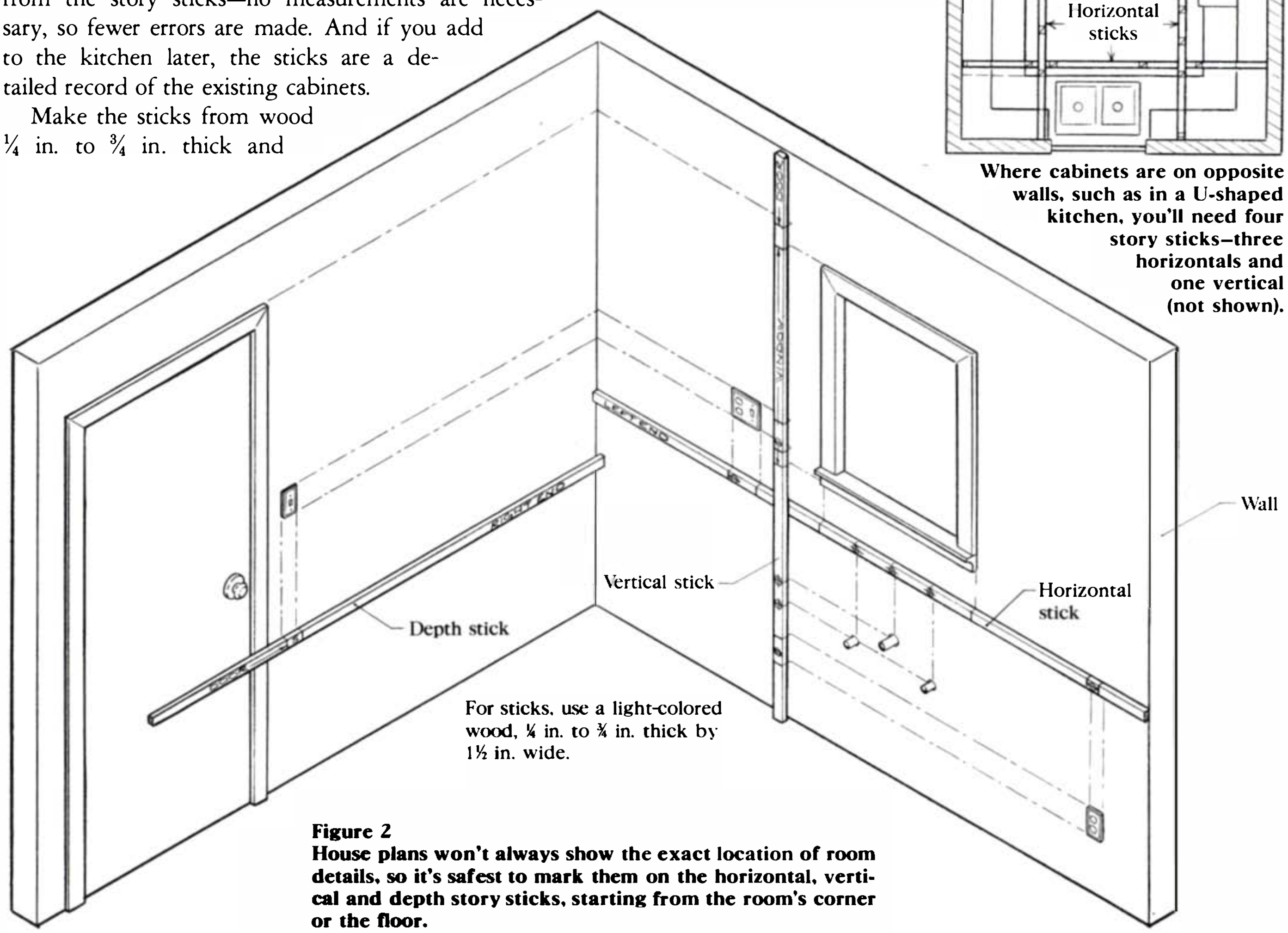
Make the sticks from wood ¼ in. to ¾ in. thick and 1½ in. wide. Light-colored woods are best because pencil marks show up better. You'll need three sticks for strip and L-shaped kitchens: one each for the horizontal, vertical and depth dimensions. In a Pullman kitchen, which has cabinets on opposite walls, you'll need four sticks: two horizontals (one for each wall), a vertical stick and a depth stick. A U-shaped kitchen requires three horizontals and a vertical—the horizontals show the depths of the units on adjacent walls (figure 1). Mark the upper units on one side of each horizontal stick, the lowers on the other side. Use a different colored pencil for uppers, so you can identify them quickly.

**Laying out the sticks**—The importance of accuracy in stick layout cannot be overemphasized. Think of the story stick as a ruler having only the marks you need. If the marks are inaccurate, problems will plague you all along the way, from cutting out the

**Figure 1**




**Where cabinets are on opposite walls, such as in a U-shaped kitchen, you'll need four story sticks–three horizontals and one vertical (not shown).**




For sticks, use a light-colored wood, ¼ in. to ¾ in. thick by 1½ in. wide.

**Figure 2**
**House plans won't always show the exact location of room details, so it's safest to mark them on the horizontal, vertical and depth story sticks, starting from the room's corner or the floor.**

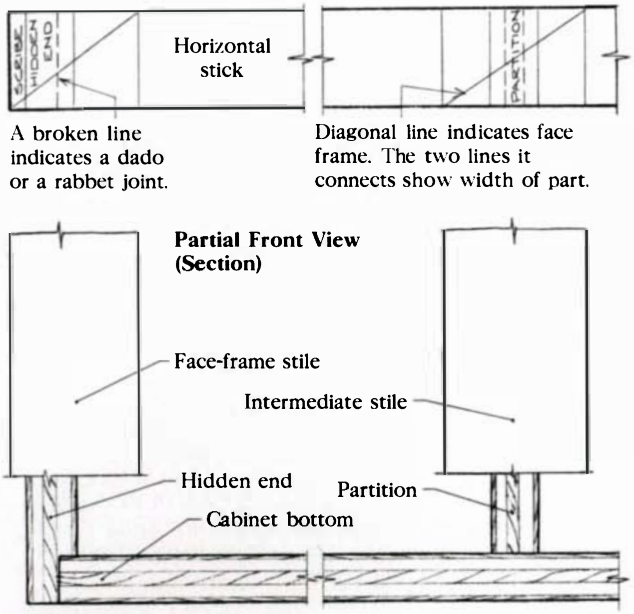



**Figure 3**
**This drawing shows how cabinet parts are represented by marks on the horizontal story stick.**

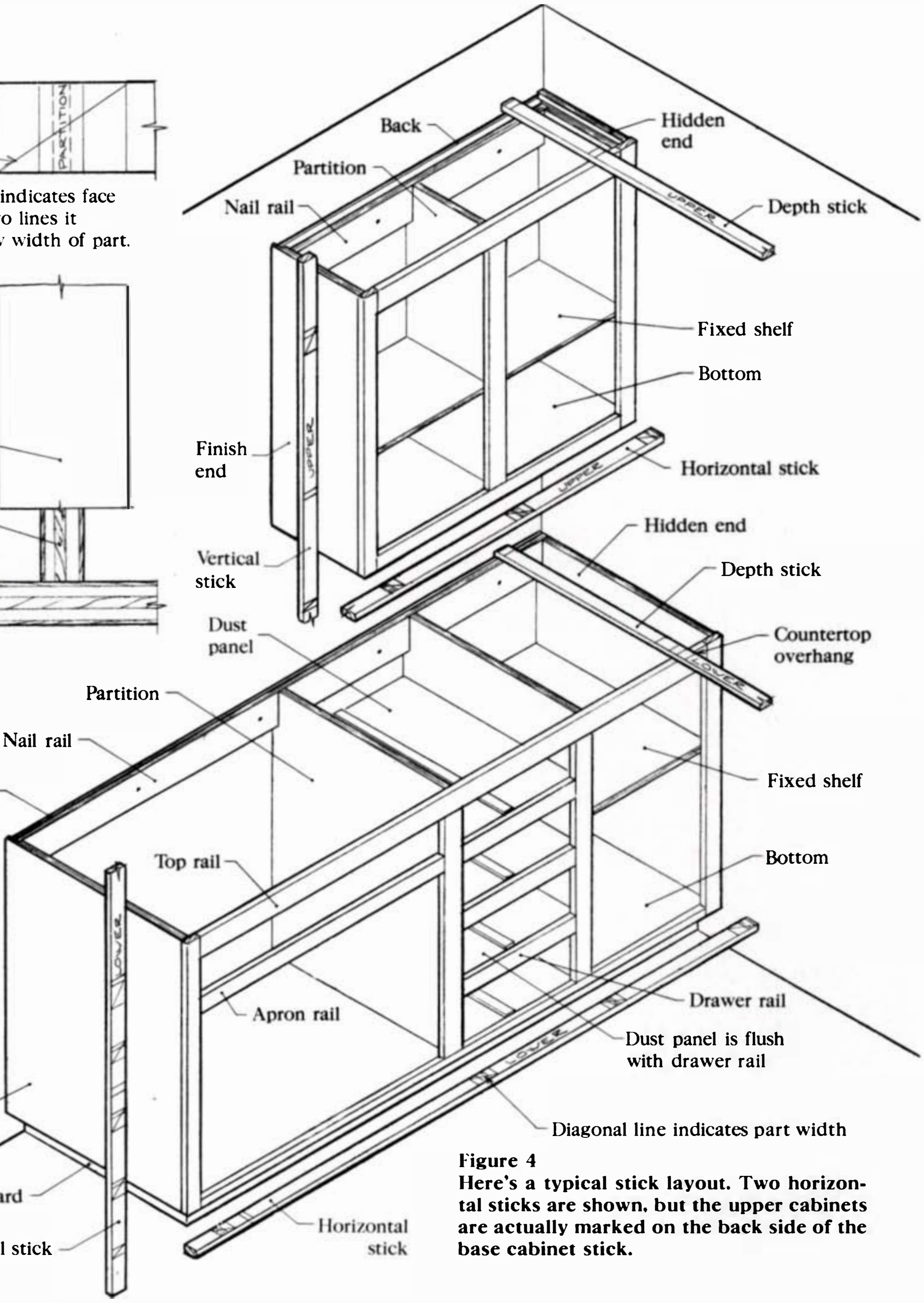



**Figure 4**
**Here's a typical stick layout. Two horizontal sticks are shown, but the upper cabinets are actually marked on the back side of the base cabinet stick.**

parts to installing the cabinet. A sharp pencil is a must for stick layout. It will help you make accurate marks, and if you don't, the line will be easy to erase.

Start layout with the architectural details of the kitchen, as shown in figure 2. It's safer to rely on the sticks than on the house plans for this information, because actual construction may differ from what's on the plans. Label each stick as a horizontal, vertical or depth stick. Begin layout of the vertical stick at the floor. For the horizontal and depth sticks, begin at the end or the corner of the walls.

Marking the cabinets on the story sticks is the part of layout that most people find difficult to grasp at first. Here are a couple of general rules to help you get started.

Cabinet parts should be identified by name or by symbol, as shown in figure 3. When marking out the parts, hook the tape measure on the floor or wall end of the stick. This way, small errors won't multiply as layout progresses from one end of the stick to the other.

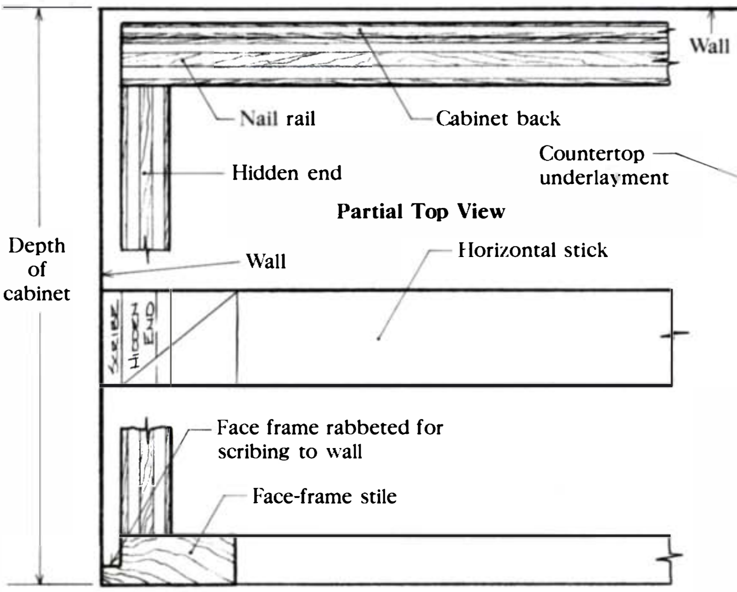
It's best to go through the layout process for each stick separately. I'll use the two cabinets shown above (figure 4) as models. It doesn't matter which stick you do first, but the horizontal stick requires more decisions than the other two, so I'll discuss that one first.

**The horizontal stick**—Begin by marking the allowance for scribing at the hidden end of the cabinet. Scribe is the allowance necessary so that the face frame of the cabinet can be fit to the irregularities in the wall during installation. I generally allow about ¼ in., but if you find that the wall is really lumpy or out of plumb, allow a bit more.

Next mark the hidden end and the depth of the dadoes or the rabbets for the shelves, dust panels and cabinet bottom.

Now mark the partitions. If you're using metal slides for the drawers, they must be mounted so they're flush with the edge of the face-frame stile. If you can't move the partition so that it's flush with the stile's edge, you will have to fasten a filler strip to the partition later on. Try to arrange the stile and partition so that a single piece of plywood or a combination of thicknesses you have on hand can be used as a filler.

The finish end is next. The countertop usually overhangs



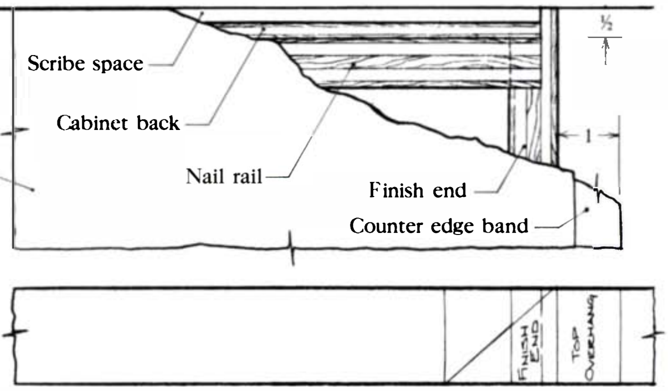




**Figure 5**
**The first mark on the horizontal story stick is the ¼-in. allowance for scribing at the hidden end of the cabinet. During installation, this allowance will be planed to fit the face frame to the wall. Cut a ½-in. by ½-in. rabbet on the back edge of the finish end; the resulting ¼-in. allowance for scribing allows a close fit to an irregular wall.**

the finish end by about 1 in., but if the end is next to a freestanding appliance, make the countertop flush with the end's outside face. A rabbet, cut ½ in. deep and wide on the back edge of the finish end, holds the ¼-in. plywood back. Mark it on the stick as a broken line, as shown in figure 5.

I usually mark the face-frame stiles last. Their width depends on the style of cabinet you choose. In general, the stiles for flush-face cabinets are between 1¼ in. and 1½ in. wide. Lip and overlay door and drawer faces will hide part of the stile, so if you want equal amounts to show at the end as over a partition, make the stiles over the partitions wider to compensate. Lip-face and overlay-face doors require a stile at least 2 in. wide if two doors hinge on the same stile, so that the stile can accommodate both hinges.

**The vertical stick**—Start the layout of the vertical stick at the floor. Begin by marking the 4-in. high toe space on the stick, and then mark the thickness of the cabinet bottom. If you will be using a bottom rail more than ¾ in. wide, however, you will have to make the toeboard wider to provide adequate toe space between the bottom rail and the floor.

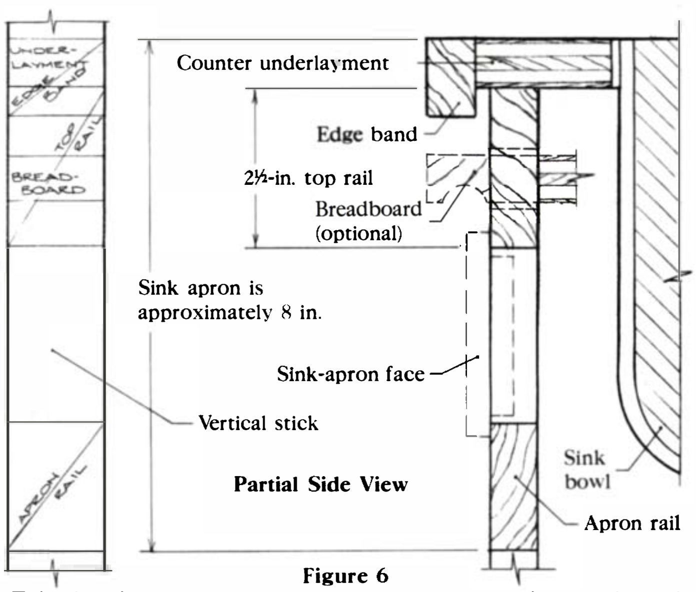



**Figure 6**
**This drawing shows how the countertop, top rail, breadboard and sink apron are marked on the vertical story stick.**

Mark the counter (figure 6). A kitchen cabinet will have an overall height of 36 in. (including the counter); a bathroom vanity, 32 in.—though these can vary to suit individual preferences. Below the counter is the top rail of the face frame, usually 2½ in. wide. It's wider than the stiles because the countertop underlayment is often banded with a strip of wood 1¼ in. wide, which covers part of the top rail. If a breadboard pullout is to fit in the rail, the rail should be at least 2½ in. wide and extend a minimum of 1¾ in. below the band.

In sink and countertop-range cabinets, an apron hides the sink or range workings from view when the doors are open. The apron and counter should measure about 8 in. wide. Incorporate the apron rail into the face frame; fill the space between it and the top rail with a false drawer face. The drawer rails should be the same width as the apron rail.

Consider drawer sizes next. The top face is usually the same height as the false face in the sink apron. Our sense of proportion requires that the depth of each face in a stack be the same or slightly greater than the face above it, and that rails between drawers be the same width or narrower than the stiles. A ¾-in. to 1¼-in. drawer rail works well for lip faces; a 2-in. rail is best for overlay faces. The top edge of the rail and the top surface of the dust panel should be flush.

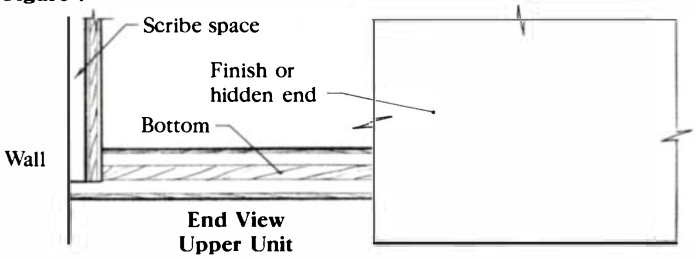
Now locate the fixed shelf, if you have one. Place it slightly above the center of the door opening, so that taller items can be placed in the bottom of the cabinet. An upper cabinet that has fixed shelves usually has two of them; the top space is greatest, so more things will be within easy reach. Avoid shelf spans longer than 32 in., and don't mark adjustable shelving on the stick.

If the cabinet has different shelf and drawer layouts at each end, divide the stick in half along its length and mark an end on each half.

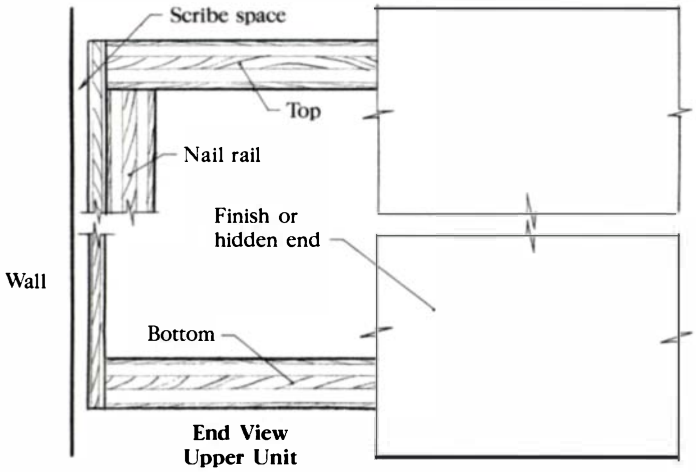
Mark out the upper cabinets. A 16-in. clearance between upper and lower cabinets used to be standard, but with the increased use of portable countertop appliances, an 18-in. clearance is better.

In upper units, I dado the bottoms into the sides, because a dado is stronger than a rabbet. The dado is cut ½ in. to ¾ in. above the ends of the sides, and a bottom rail wider than ¾ in. is used. If no bottom rail is used, the door overhanging the bottom will serve as a pull. I dado the top of an

**Figure 7**




**If the bottom is above eye level, join the back to it with a deep rabbet, so you can scribe the bottom to fit the wall.**




**If a cabinet is below eye level, use a butt joint to fasten the bottom and back.**

upper cabinet as well, so the face frame and finish end can be scribed to the ceiling. If the top is lowered the same amount that the bottom is raised, you'll save a machine setup when cutting the joints.

For good visual balance, the top rail of the upper cabinet is usually the widest member of the face frame—3 in. to 4 in. is quite common.

The cabinet back is housed in a rabbet in the finish end, and is butt-jointed over the back edge of the cabinet top and the hidden end. On lower cabinets, the back should be flush with the nail rail so that it will be out of the way when you scribe the counter. The joint between the back and the bottom of an upper cabinet may be made in two ways, depending on the unit's height. If the bottom of the cabinet is above eye level, you'll want to fit the bottom to the wall to hide the gap between the wall and the back. Do this by making the bottom the same width as the finish end, and then setting the back in a deep rabbet. Mark the rabbet on the vertical and depth sticks. If the bottom of the cabinet is below eye level, fasten the back to the bottom with a butt joint; mark the butt joint on the depth stick. Don't let the back hang lower than the underside of the bottom, as this makes squaring the cabinet during assembly difficult. This rule applies for lower cabinets, too.

**The depth stick**—Start the depth stick at the wall. Use both sides of the stick (one for upper cabinets, one for lower), or show both uppers and lowers on one side.

The overall depth of an upper cabinet should be 12¼ in. When you subtract the allowance for scribing and the thickness of the back and face frame, you'll be able to fit an 11-in. deep shelf inside the cabinet—just deep enough for a large dinner plate. Building the upper cabinet deeper would bring it too near the front edge of the countertop, making it difficult to work at the counter.

The overall depth of a lower cabinet, not including the counter, is 24 in. (the countertop usually overhangs the cabinet by 1 in., but you can vary this dimension). A built-in broom closet or pantry is usually made slightly deeper than the lower cabinets it fits into because joining cabinets together in the same plane is difficult.

A bathroom vanity is sometimes made shallower because of the smaller sink and room size. At times, these units may be as shallow as 20 in. Be sure to check on the sink size, to be certain the sink will fit the cabinet. □

## Before the stick layout

You should consider the following details before beginning a stick layout.

How will the cabinets be broken into units? Obviously, a complete set of cabinets can't be constructed in the shop as one unit, transported to the kitchen and installed. A good place to break is at a corner or at a tall, deep unit, such as a pantry or a broom clôset.

Will the cabinets have a face frame or not? A face frame hides the raw edge of the plywood case parts and can be scribed to fit the contours of an irregular wall. Cabinets without face frames are sleeker-looking, but you'll have to live with the rough plywood edge, or band it with thin strips of wood.

You must also decide how the drawers will slide, and what style drawer and door faces you want. Drawers can be supported and guided in many ways, but I usually run them on side-hung metal slides or on wooden center guides, fastened to a shelf called a dust panel. Door and drawer faces can lie flush with the face frame (flush face), protrude half the thickness of the face beyond the face frame (lip face), or protrude the full thickness of the face (overlay face). Select all hardware before you lay out the sticks—it's frustrating to get a cabinet built, then find you can't get the hinges.

Most cabinet parts are ¾ in. thick. The exceptions are the cabinet back and drawer bottoms (¼ in.), drawer sides and drawer backs (all ½ in.). Dadoes and rabbets are ¼ in. deep, except the rabbet at the back edge of a finish end, which is cut ½ in. by ½ in. Dadoes and rabbets are cut only in the vertical members.

Make sure you know the actual sizes of the major appliances to be used. The only safe way to design around them is by referring to the manufacturer's specification sheet for each one. *—J.C.*

---

*Jere Cary has been a professional cabinetmaker for 28 years, and for the past 15 years has taught the vocation to high school and community college students in Edmonds, Wash., where he lives. He has just completed his book,* Building Your Own Kitchen Cabinets, *from which this article is excerpted. Besides story stick layout, Cary writes about all the steps required to build a set of kitchen cabinets, including materials list preparation, the cutting and fitting of parts, and the installation of the finished cabinets. His 152-page book is available in softcover from The Taunton Press for $12.00.*

# The Legendary Norris Plane

## A hard-to-find tool that's worth the search

*by Edward C. Smith*

The London firm of Thomas Norris and Sons made exceptionally fine woodworking planes from about 1860 to 1940. Their products, especially the smooth plane which is the subject of this article, are arguably the finest planes ever manufactured. Although expensive, they are prized by cabinetmakers and tool collectors. For the worker who handplanes regularly, and who appreciates fine tools, the Norrises are worth knowing about.

I have owned a Norris smooth plane for about three years, and have used it on timbers ranging from docile cherry to hard, contrary ebony, cocobolo and bird's-eye maple. It invariably performs better than other metal or wooden planes I've used, producing a fine finish even against the grain and adjusting easily for the finest shavings.

In concept the Norris is simple. It's a metal box—mild steel plates dovetailed together, or a single-piece iron or bronze casting—stuffed with rosewood, beech or occasionally ebony. The plane's virtues accrue from this construction. Any Norris is about 1½ times heavier than the equivalent Stanley, so it hugs the work with an inertial force that makes planing easier. The cutter is twice as thick (3/16 in.) as that in a comparable Stanley-type plane and is firmly bedded on a large wooden frog, a combination that virtually eliminates chatter. The adjuster is precise, moving the iron horizontally and vertically with little of the play that plagues other planes.

The Norris has a further virtue: it's beautiful, particularly the early, rosewood-filled versions. Most models are graceful and fit the hand well, and the contrasting colors of steel, bronze and rosewood attract the eye. Since few of us would regularly work a Norris to the limits of its capability, the ultimate justification for ownership must be somewhat subjective, the feeling that comes from owning the best. One more reason for owning a Norris is as an investment. Demand from workmen and collectors has pushed Norris prices steadily upward, and this trend shows no sign of change.

If you buy a Norris, there are important caveats to note. The Norris was produced in four product lines, each with a range of models. Only some of these are worth considering. The costliest Norris planes were made of bronze with steel soles and rosewood or ebony infill. They are heavier than other Norris planes and striking in appearance. But the slight advantage of their greater weight is counterbalanced by their extreme rarity and high price, about double that of the comparable steel or iron versions.

The dovetailed steel models filled with rosewood are much more common. These are the "classic" Norris planes most prized by workmen, and the ones generally thought of when the marque is mentioned. These were made with either curved or straight sides, with open or closed handles, and in a curved-sided version without a handle.

Next in price were some annealed cast-iron planes, cheaper because they required less skilled handwork and preferred by some because they are heavier than the joined steel planes. Except for the model A15, which I own and consider quite attractive, I find most of these planes a bit homely.

*The Norris adjuster mechanism consists of a steel eyelet with an attached rod threaded into the adjuster shaft. The eyelet engages the cap-iron screw to raise or lower the iron. To align the cutting edge, the shaft pivots on a cylindrical knuckle.*

There is a subgroup of cast-iron planes worth noting. During its later decades, Norris made iron planes in a curved-sided model similar in appearance to the steel planes and filled with stained beechwood. Though not as attractive as the classic-period planes, they retain all the practical virtues of the Norris, including—except as noted below—the adjuster. These planes are relatively common and often available in good condition at half or two-thirds the price of a rosewood model. Unfortunately, some of these later planes have a cheapened version of the adjuster. The better adjuster consists of a threaded rod within a threaded sleeve, permitting precise turning. The cheaper model has no sleeve, resulting in an adjuster with more play. There's generally no difference in price so avoid those with the poorer adjuster.

Least expensive in the Norris line were cast-iron planes with model numbers 49 to 61. These are of much lower quality than the general line, and were meant to compete with Stanley-type planes, which were becoming very popular by the turn of the century. They are Norris in name only, like a downsized Cadillac, and may be of interest only to collectors.

My choice of planes today would be the curved-sided models A2 (open handle), A5 (closed handle) and A4 (no handle), which are all of the classic dovetailed steel type; the cast-iron A15; and, only if available at a much lower price, the beech-filled iron model.

With model numbers in mind, check the following points when examining a plane for purchase, or when instructing a dealer regarding a mail-order purchase.

***The plane body:*** This is crucial. I know of no way to repair a cracked casting or battered and bent steel plates. Such damage has likely forced the sole out of truth. Rust, if superficial,

## Where to look for a Norris

Besides smoothers, Norris made panel and jointer planes; shoulder planes; miter, rabbet and bullnose rabbet planes; and chariot and thumb planes. For a survey that includes two Norris catalog reprints ($6), write Ken Roberts Publishing Inc., Box 151, Fitzwilliam, N.H. 03447. Below is a list of dealers who may have Norris planes for sale, or who will accept a standing order.

The Mechanick's Workbench
PO Box 544, Front St.
Marion, Mass. 02738.

Iron Horse Antiques, RD 2
Poultney, Vt. 05764.

Tom Witte, Box 35
Mattawan, Mich. 49071.

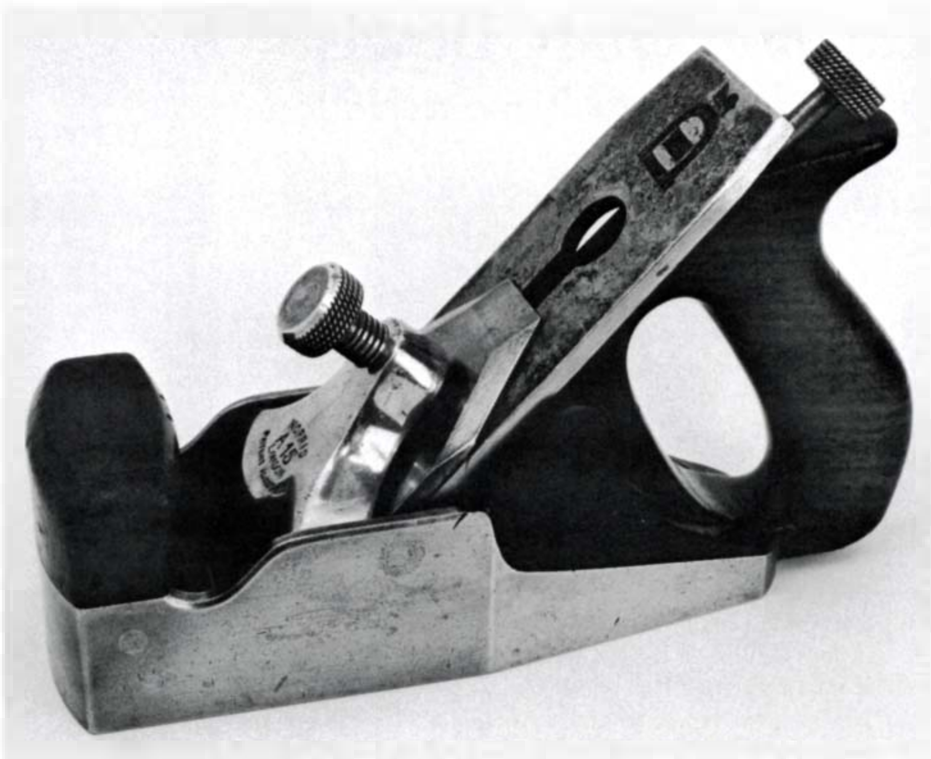
Roy Arnold, 77 High St., Needham Market, Suffolk IP6 8AN, England.

Philip Walker, Beck Barn
The Causeway, Needham Market
Suffolk IP6 8BD, England.

***Sources for Norris cutters:***

Henley Plane Company, 13 New Rd., Reading, Berkshire, England, will make irons to fit pre-war Norrises in the 2⅛-in. to 2⅝-in. sizes (£34 ppd.).

London Auction House occasionally has second-hand irons: Tyrone Roberts, Watton Rd., Swaffham, Norfolk, England.



*The Norris plane is considered by many to be the Rolls-Royce of hand edge-tools. This model A15 smoother has a one-piece cast-iron body and rosewood infill and handle, a construction that makes it 1½ times heavier than an equivalent Stanley-type plane.*

can be removed with steel wool or fine emery. If the metal is pitted, the plane's market value may be lowered, as will its utility if the sole is scarred. Offer a lower price for a plane with pitting on the sides. The sole can be resurfaced by a machine shop or by laborious hand-lapping.

***Wood parts:*** The condition of the wood parts is more important in fixing price than in determining utility. In fact, some look-alike Norris competitors sold just the plane body, leaving the customer to make his own infill and handle. The workman willing to repair or replace damaged or missing wood parts may be able to acquire a perfectly serviceable plane well below the usual price.

***The adjuster:*** This mechanism is simple, quite heavily constructed and not likely to be damaged. And a damaged or missing adjuster can be reproduced by any competent machinist. Many adjusters are fastened to the plane frog with special screws requiring a custom-made screwdriver. Further, it appears that the screws were driven home before the lever cap was installed, so their removal requires a right-angle driver even if the screw heads are common.

***The cutter:*** The back of the cutter, opposite the bevel, must be free of all but the mildest rust. It should be perfectly flat and highly polished. Pitting will require grinding and lapping, or machine-shop services. Remember, the Norris has no provision for frog adjustment; making the cutter thinner by surface-grinding may open the mouth more than you want. The frog can be shimmed, but this isn't good practice because the iron's firm bedding is at the heart of the Norris' performance.

Plane irons, of course, wear away as they are sharpened, so most Norrises are likely to have partly used-up irons. When new, a typical Norris cutter would have had about 2¼ in. of usable blade below the cap-iron screw cutout. I would try to get a cutter with at least 1 in. of usable blade. When I needed replacement irons a couple of years ago, I discovered that they are scarce and quite expensive. I purchased mine from Roy Arnold for £15 (about $22) each plus shipping from England. Except for collectors, it is not important that the cutter be stamped with the Norris name, but it should be the right width and it must be a "gauged" or "parallel" iron. This means that it is the same thickness throughout its length rather than tapered like irons in most wooden planes. In a pinch, a tapered iron can serve, but as the iron wears through sharpening, the mouth of the plane will widen. The cap iron should be original, since the adjuster works by receiving the cap-iron screw. Check that the cap iron mates properly with the iron—no light should show between it and the cutter when they are tightly fitted.

Against this background, the question is: where to find a Norris and how much to pay? Norris planes were imported to America, but they aren't likely to be found at a garage sale, an antiques shop, or even an old-tool shop. American buyers should contact dealers who specialize in British tools. I know of only two, both mail-order, who have had more than one or two Norris planes over the past three years (see box). You may need to place a standing order with a dealer for a specific model. Specify the condition of the plane you want, including what sort of damage you consider acceptable.

Prices for antique tools are fairly volatile, but you can make an educated guess after perusing a recent auction catalog. I would expect to pay about $300 to $350 for a rosewood-filled smoother in one of the desirable models, and about $200 to $225 for a beech-filled model. Though expensive compared with other hand planes, Norrises are a bargain measured against the labor it costs to buy one: about a week's pay, both in the 1920s and today. □

---

*Edward C. Smith lives in Marshfield, Vt., where he makes furniture and tools.*

# Turning Giant Bowls

## Ed Moulthrop's tools and techniques

*by Dale Nish*

*Says Moulthrop, 'Each bowl already exists in the tree trunk, and my job is simply to uncover it and take it out. I love the heft and the solidness of these huge blocks. I love to feel their weight as they resist the leverage of a big cant-hook, or to sense the tug of gravity as the hoist slowly separates a fifteen-hundred-pound block from the ground.'*

When I first saw one of Ed Moulthrop's 36-in. diameter bowls, I was intimidated at the thought of turning it. It had evidently required a tree trunk for a blank, about a half-ton of green wood. I have since visited Moulthrop in his Atlanta shop, to learn about his monster lathes, harpoon-size tools and sophisticated techniques for controlling moisture-related wood movement in such hefty treen.

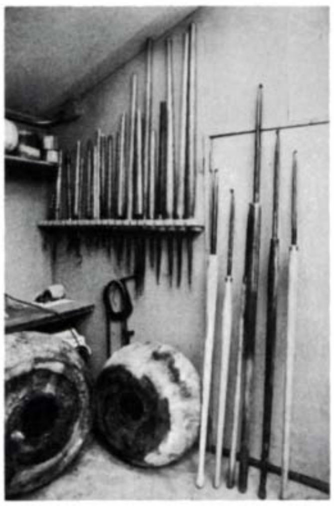
Moulthrop produces about 250 of these bowls each year, marketing them in craft galleries in New York, Atlanta, Scottsdale (Ariz.) and San Francisco. Although he's been turning since he was 14 years old, it was 10 years ago that he quit his thriving architecture practice of 30 years to do it full-time. His work has been exhibited in more than 40 art museums, including the Smithsonian's Renwick Gallery and the Vatican Museum, as well as being part of the permanent collections of New York's Museum of Modern Art and Metropolitan Museum of Art.

Moulthrop uses only southeastern woods, exceptional pieces of tulip magnolia (yellow-poplar, *Liriodendron tulipifera*), wild cherry, sweet gum, white pine, black walnut and orangewood, magnolia, and persimmon. He feels that native woods are amply exotic, if you find the right logs. His bowls are limited mainly to a few basic shapes: hollow globes, for which he is best known, lotus forms, and chunky donuts. The simplicity of his designs serves to enhance the elaborate, colorful figure of the wood.

**Moulthrop builds his lathes** (he's built five in an improving series) specifically for large faceplate turning. For rough turning, he uses the one drawn on the facing page (and pictured on p. 51); for finish turning he uses a similar design, but of lighter structure (p. 53). In the former, the base is ¾-in. plywood glued to 2x4 supports in the corners. The top is a 24-in. by 35-in. section of a 1¾-in. thick exterior solid-core door reinforced with angle irons along its top edges. Moulthrop metal-turned the headstock from a scavenged, 3½-in. diameter steel shaft mounted in giant pillow blocks 18 in. apart. The centerline of the shaft is 38 in. from the floor, a comfortable height for Moulthrop, who's about 6 ft. tall. The tool rest, positioned a little below shaft center, is attached to a 5x7 solid cherry beam. The beam slides in and out from under the table, and is held in position by two large clamps.

Inside the base, a 2½-HP gear motor, controlled by a foot switch, is mounted on a hinged table, with the weight of the motor providing tension on a heavy ¾-in. wide V-belt. The motor output is 80 RPM. With four 9-in. pulleys on the motor, and four pulleys on the headstock shaft approximately 15 in., 10 in., 8 in. and 6 in. in diameter, speeds range from 50 RPM to 120 RPM. This may seem slow, but on a 30-in. diameter bowl, 80 RPM means a rim speed of 628 ft. per minute, about the same as a 6-in. bowl turning 400 RPM.

Moulthrop's tool rest is made from a 16-in. long piece of ½-in. by 3-in. by 4-in. angle iron, bandsawn to shape. A steel connector bar (⅞ in. by 2 in. by 16 in.) pivots from the cherry beam, cantilevering the tool rest in various positions. The top edge of the rest is drilled with a series of holes that take an 8d tempered nail, which serves as an adjustable stop to lever tools against, similar to the way tools are used on a metal-spinning lathe. A pin projecting from the bottom of the rest locates a suppott, which braces the rest against the floor when it's extended far from the beam.

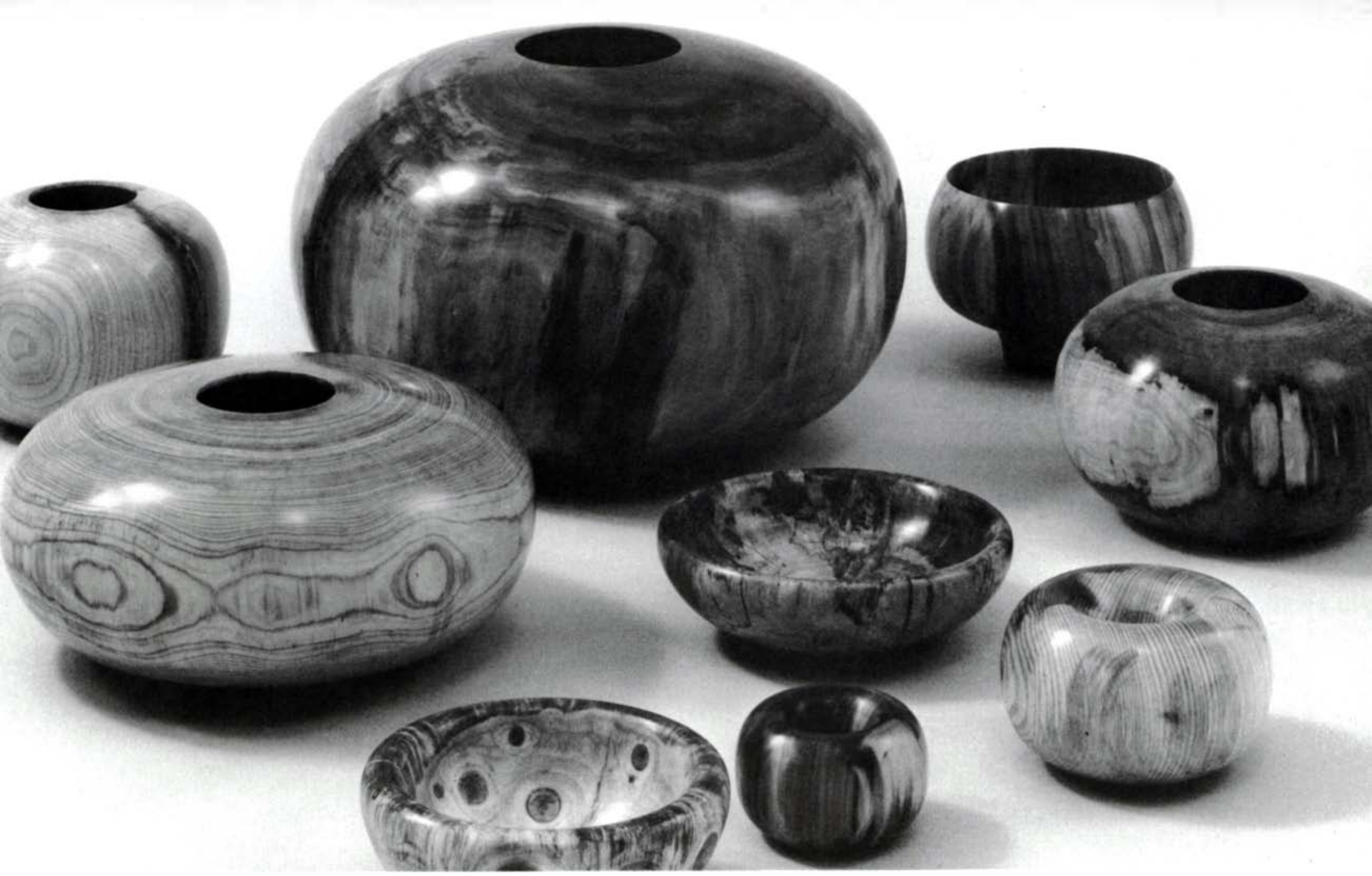


*Moulthrop's tools include hooks and lances up to 96 in. long.*

**The three basic tools** Moulthrop has designed and developed for his work are the lance, the loop and the cut-off tool. All are forged from either salvaged tapered-reamer stock or hex-bar tool steel,

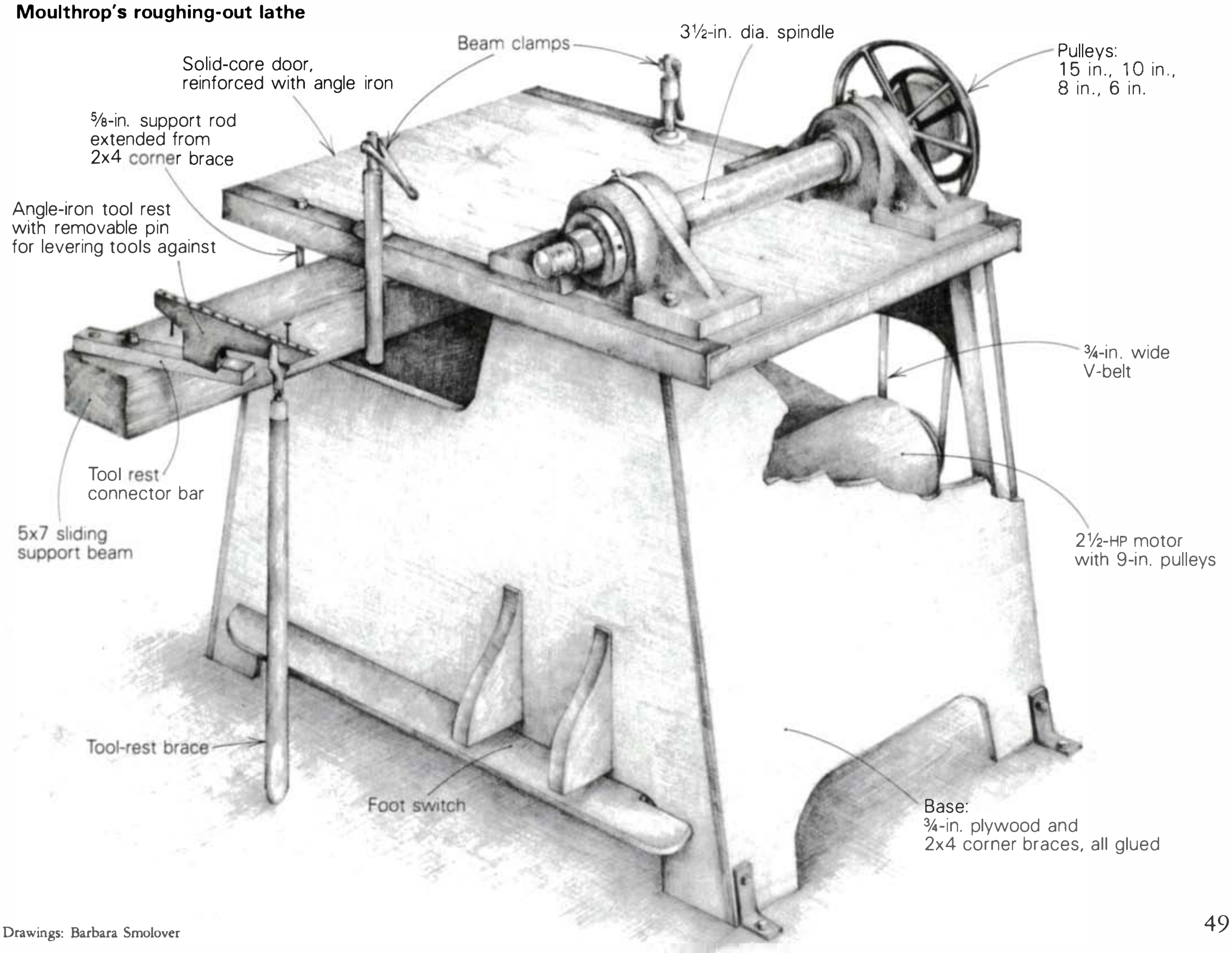
---

*Dale Nish teaches industrial education at Brigham Young University in Provo, Utah. He is the author of* Creative Woodturning *and* Artistic Woodturning, *both published by the Brigham Young University Press, and is working on a book tentatively titled* Masters of Woodturning.

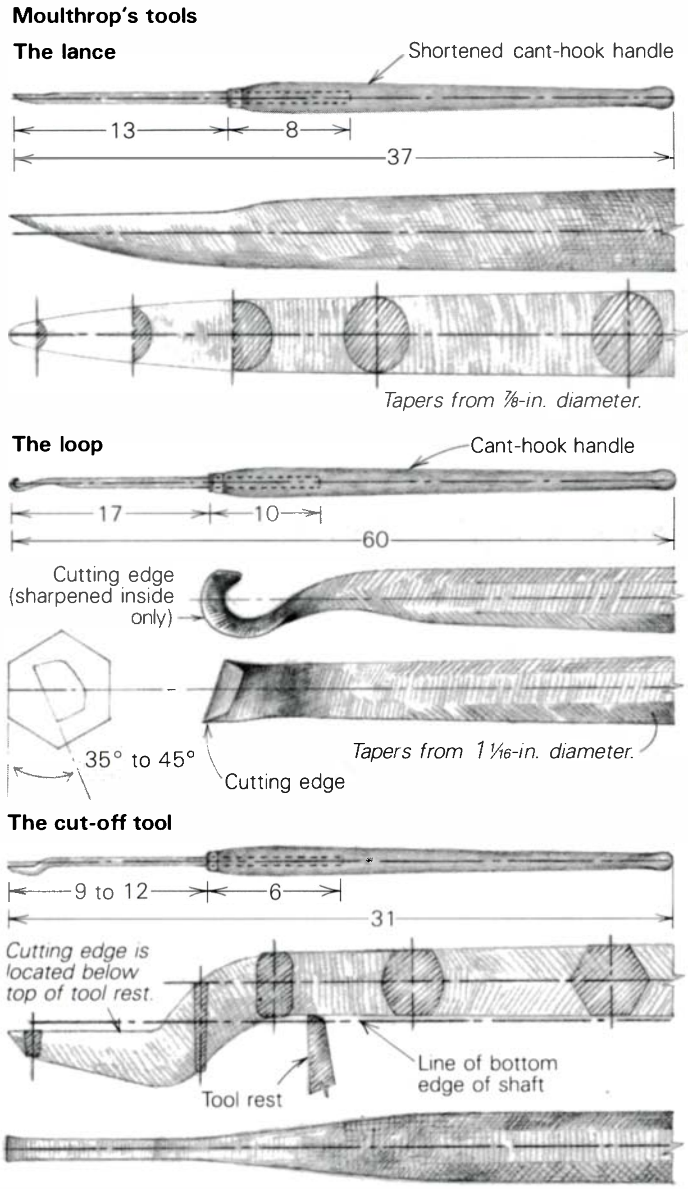


*Moulthrop's production includes bowls up to 40 in. in diameter.*

**Moulthrop's roughing-out lathe**




Drawings: Barbara Smolover




*The wood yard, a grove filled with turning blanks.*

*Attaching the faceplate with lag bolts.*

⅞ in. to 1¼ in. in diameter. The lance is Moulthrop's dream tool, replacing skews, gouges and round-nose chisels for all exterior work. The tool-steel shaft is epoxied deep into a shortened cant-hook handle, so the two become one continuous piece, free from vibration. The lance is a model of cutting efficiency, never used flat as for scraping, but always with the edge at 45° to nearly vertical, levered against the tool-rest stop.

For inside work, Moulthrop uses a loop not unlike the turning hooks used by turners of old (*FWW* #40, pp. 93-94). After forging, the loop is tempered and then sharpened on the inside only, using a high-speed tool grinder and cone-shaped stone. Like the lance, it's used to cut, not scrape, always levered against the tool-rest stop.

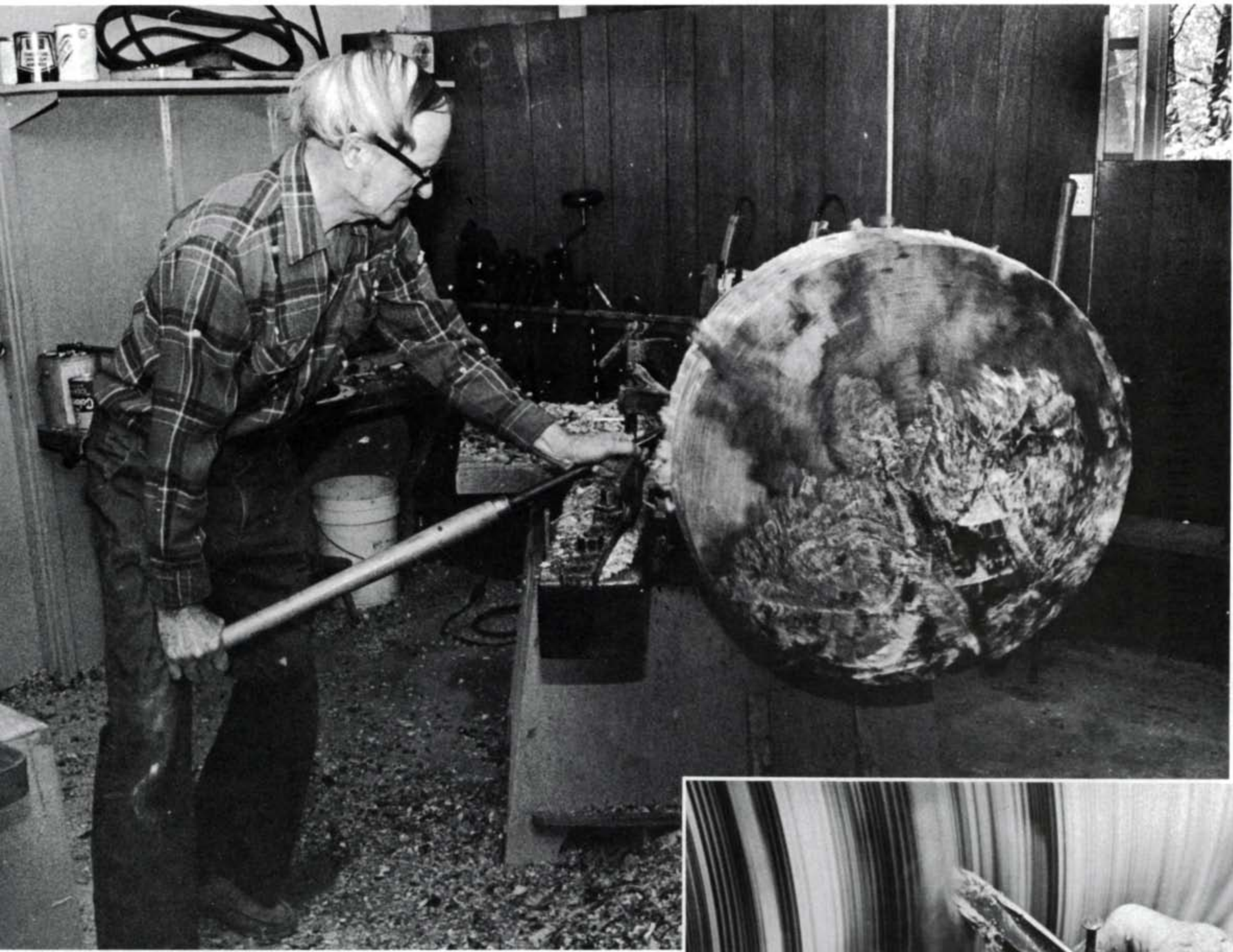
Moulthrop's cut-off tool, a giant parting tool, is unique because its cutting edge is located below the level of the tool rest. The force of the turning workpiece thus keeps the tool aligned in the cut, safe from flipping over.

**Moulthrop's wood storage yard** is a grove of trees shading open areas covered by plastic sheets. Log sections waiting to be turned are left standing on end on the plastic, their weight forming depressions in which rainwater accumulates. Shavings heaped on top of the bolts and generously scattered over the plastic retain moisture in the rainy Atlanta climate, helping to forestall checking. The aim is to keep the bolts as wet as possible for as long as possible.

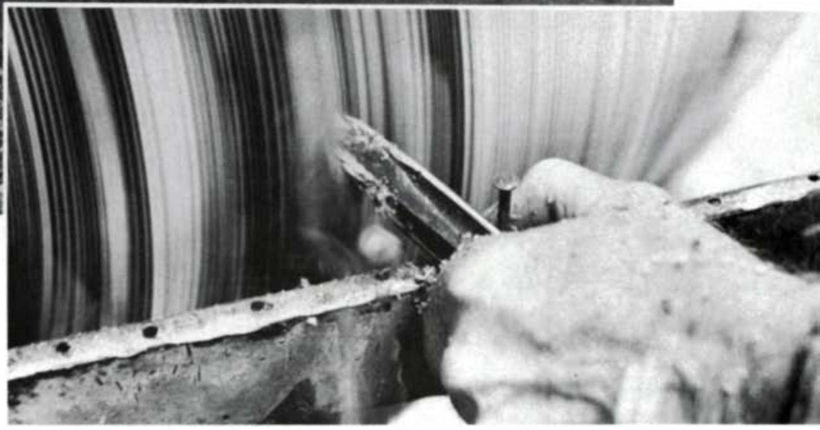
The damp climate also fosters staining and spalting of the wood. Colors seem to mature, sapwood darkens, and stains penetrate the bolt from both ends. All this adds an extra dimension of color and character to the pieces. Bolts may be turned fresh-cut, or kept for 6 to 24 months before they're rough-turned, still wet. In the interim, the older bolts may breed fungus, mold and even mushrooms. Before too long, however, these pieces will rot beyond usefulness.

Such large blanks require careful mounting. Moulthrop squares the ends of the bolt with an electric chainsaw, removing ½ in. of wood from each end so that he can see the color and figure. He lays out a circle on the end of the bolt delineating the best color and figure, not necessarily centered on the heart of the bolt. After chainsawing the bolt's diameter to its rough size, he rolls it into his shop, purposely located downhill from his storage area—a valuable feature, considering that some of the large bolts weigh 1500 lb.

The faceplate shown above was made from an old sprocket gear found in the salvage yard, Moulthrop's favorite shopping



*First cuts with the lance braced on the thigh.*

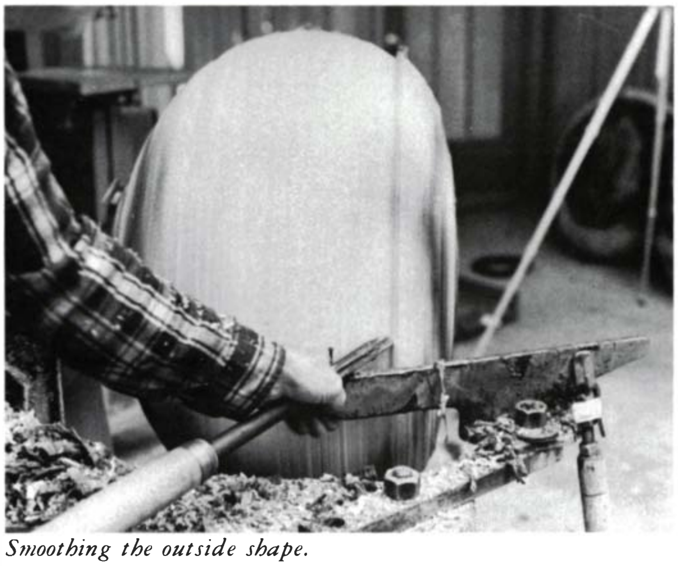


*Roughing the bowls in steps.*

place. It is 9 in. in diameter and ¾ in. thick. It has been threaded to fit the headstock shaft: 2-in. diameter, 8 threads per inch. The faceplate is carefully positioned in the center of the blank, and is mounted with heavy screws or ⅜-in. lag bolts, depending on the weight to be held. Moulthrop often drives additional lags between the teeth of the gear, as security against a massive mishap. After the bowl is finish-turned, the screw holes will be filled. Moulthrop uses epoxy mixed with wood dust to match the color of the surrounding wood.

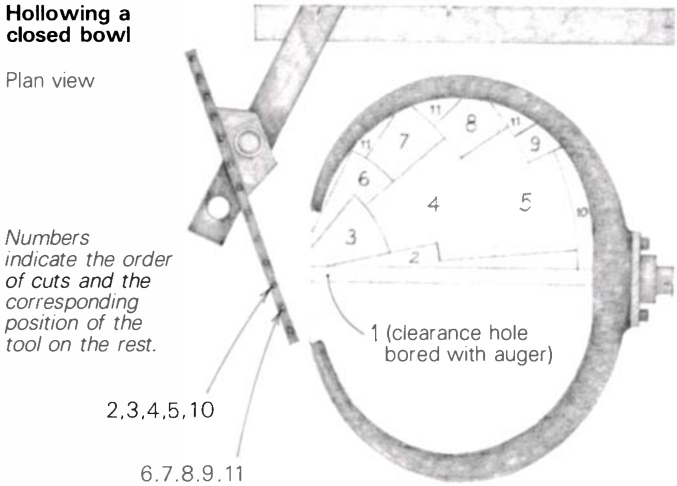
**In the typical roughing-out position** (pictured above), Moulthrop holds the butt of the lance handle against his thigh so that the tool cuts at about the center of the piece. His right hand and leg steady the handle and control the tool's movement, while his left hand holds the tool firmly on the rest and against the tool-rest stop. His two arms and the tool form a triangle, providing maximum control as the lathe turns at 50 to 120 RPM.

The lance shears. The shank is held against the tool-rest stop and the rounded portion rides the surface of the turning work as the point penetrates the wood. After roughing the blank round, Moulthrop shapes the contour in a series of steps which are then faired. He typically removes shavings up



*Smoothing the outside shape.*

A. *Boring the clearance hole.*



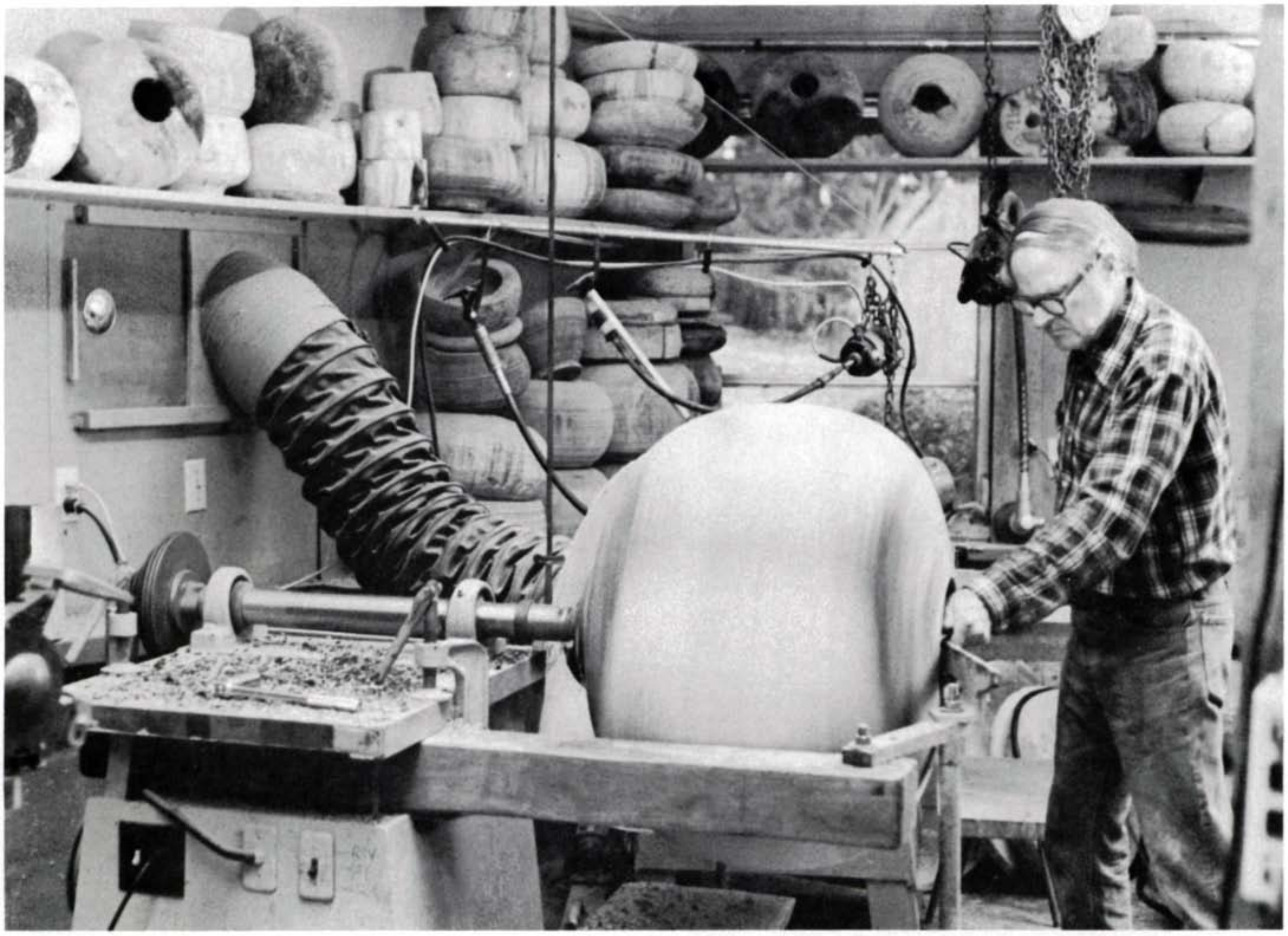

B. *The hook begins hollowing the bowl.*

C. *Undercutting the inside.*

D. *Several months in a solution of PEG stabilizes the wood.*

E. *After finish-turning (facing page), a flexible-shaft grinder smooths the outside. The dust pick-up cone, right, attaches to a 12-in. exhaust duct.*

F. *The flexible shaft also reaches the inside of the bowl.*



*Using lance and loop, Moulthrop refines the shape of his bowls after PEG treatment, but on a lighter-duty lathe.*

to 1½ in. wide and ½ in. thick. These peel off like long woolly caterpillars as water sprays from the moisture-laden log.

**To hollow the bowl** (facing page), Moulthrop first bores a 1¼-in. clearance hole with a brace and bit, held stationary while the lathe turns at slow speed. He marks the depth on the auger and drills to within 2 in. of the bottom.

The loop cuts from the center out, levering on the tool-rest stop, which must be repositioned periodically as the cut progresses. Wall thickness on small bowls is gauged by feel. On the larger bowls, where the reach is too long, Moulthrop drills $\frac{1}{32}$-in. gauge holes and measures the thickness directly with fine wire. The rough bowls have a wall thickness of about ¾ in. at the opening to 1 in. or 1½ in. at the base. Later the base of the bowl will be thinned, from the inside, to ¾ in.

**Polyethylene glycol 1000 (PEG)** is the key to being able to turn such large bowls taken from anywhere in the log, even including the pith and knots, without the bowl splitting or warping. The PEG replaces the moisture in the wood and stabilizes it (*FWW* #19, pp. 68-71). After green turning, Moulthrop dates the rough bowl and immerses it in a 40% solution, vats of which line his tank yard outside his shop. The 4-ft. diameter, 36-in. high aluminum vats are also from his favorite salvage yard. Soaking time varies with the temperature of the season: about 60 days in the summer (average temperature 80°), about 90 days in the fall, and about 120 days in the winter. Small bowls don't require as long a soak as large ones, but leaving them longer doesn't hurt. Because of the work invested in them, Moulthrop often allows more time for large bowls, just to be safe.

After soaking, the pieces are drained and set outside on a drying rack for a week in the sun. Final drying takes about two or three weeks, in a small room conditioned by a household dehumidifier.

**The finishing lathe** (above) is similar in design to the rough-turning lathe, except that it is lighter and has a smaller motor, since only light cuts are now made. The tools, however, are the same: the lance for outside work, the loop for inside.

Sanding begins with grits as coarse as 16 or 24. Both inside and outside are worked by hand or with discs on a flexible-shaft machine. Small holes and defects are usually patched with a mixture of sanding dust and hard-setting epoxy, just before final sanding with fine-grit paper.

The bowl's finish may be of several types; many are possible, but all finishes are sensitive to the moisture that PEG attracts. Moulthrop has been experimenting with his present finish for ten years now, but he feels it still needs further development. For those starting out with PEG, he recommends polyurethane as the easiest finish. It must be applied in conditions of low humidity. Moulthrop buffs with 0000 steel wool, followed by tripoli and rouge in oil applied with a cloth while the piece is rotating on the lathe. The last step is to remove the faceplate, patch the screw holes and hand-finish the bottom. □

# Making a Pencil-Post Bed

## How to shape tapered octagonal posts

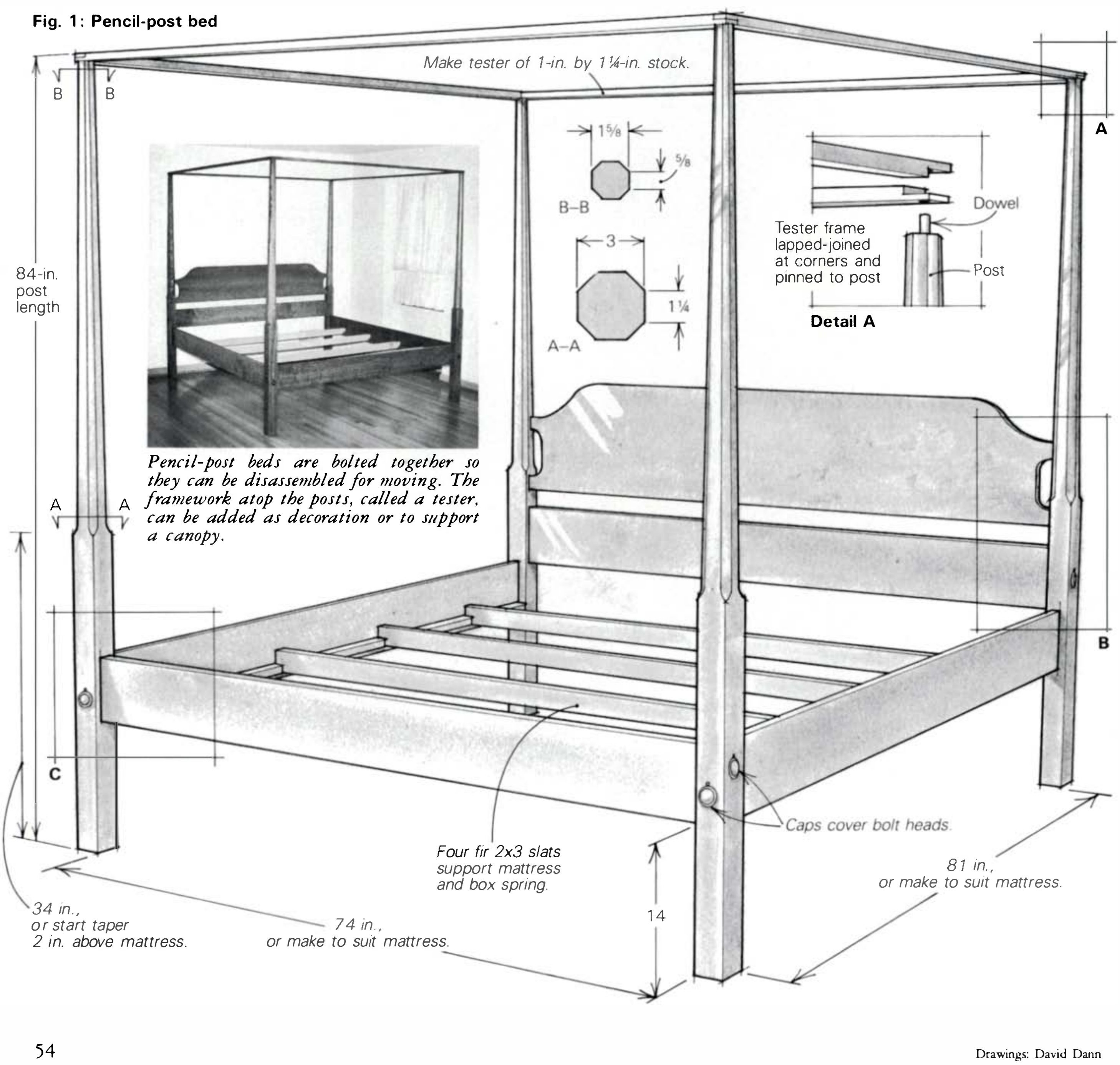
*by Herbert W. Akers*

I knew I was in trouble as soon as we walked out of the furniture store. We had just looked at several king-size pencil-post beds in solid cherry, all priced at about a thousand bucks. Then my wife asked me if I could make one. I took another look at the price tag and naively replied, "Sure." As I walked back to the car, I heard a little voice asking: How in the devil can you shape a 7-ft. long, 3-in. square post into an octagonal section with equal sides and a graceful taper? How do you even hold a post that size securely enough to plane it?

Before I was through making the bed shown here, I had answered those questions myself. Shaping the posts turned out to be easier than I'd thought—I planed them by hand, using a method similar to what boatbuilders employ to make masts and spars. Holding the posts was no problem either, once I had devised a vise made of pipe clamps and 2x4s.

Finding plans for the bed I wanted, however, wasn't so simple. Many country beds of the mid 18th century are called pencil-post because their posts are hexagonal in section, just like a wooden pencil. Others, however, are square posts ta-

**Fig. 1: Pencil-post bed**




*Pencil-post beds are bolted together so they can be disassembled for moving. The framework atop the posts, called a tester, can be added as decoration or to support a canopy.*



Drawings: David Dann

pering into eight sides. An exhaustive search at the local library turned up no plans, so in desperation I turned to a stack of old antiques magazines, and I got lucky: I found photos of several beds with octagonal posts.

By contemporary standards, pencil-post beds are quite lofty. Typically, the top of the mattress was 32 in. high, elevating the occupants well above the cold floor and leaving room for a trundle bed beneath. You can design the bed with a lower mattress, but if you do, consider also lowering the point where the taper begins on the posts, which is usually 2 in. above the mattress. Don't forget to measure the mattress and box spring you will actually use, and leave about a 1-in. clearance at the sides and ends for bedclothes. I found it essential to make a full-size drawing of the posts on taped-up sheets of graph paper.

**Shaping the posts**—Sixteen-quarter lumber is hard to find, and prone to checking anyway, so I laminated two pieces of 1½-in. thick cherry to make my 3x3s, taking care to match the color and grain. I made a quick-action vise consisting of two Sears pipe clamps threaded into flanges screwed to the benchtop, as shown in figure 2. With this setup, I could securely grip about 27 in. of the post either on its corners or on its flat sides. The rest of the post extended out over the end of the workbench, so I could plane in either direction, depending on the grain of the wood.

Lay out the posts as shown in figure 3. Try to arrange your layout so that you'll be planing with the grain toward the smaller end of the post. You may want to test-plane it first, as grain-reading can be tricky with some woods. You'll be using this method over and over again to determine how much wood to cut away. The idea is to draw the guidelines, cut away material from the adjacent surfaces and then draw more guidelines on the newly cut surfaces. You alternate your shaping work, cutting the post's four corners first, then the four flats, then the corners again and so on. As you progress, the octagon will slowly take shape until each surface measures ⅝ in. at the top and 1¼ in. where the tapers begin. It may be tempting to simply scribe the octagon's final shape on the end of the post and taper down to it, but this would require re-

**Detail B: Headboard and head rail**

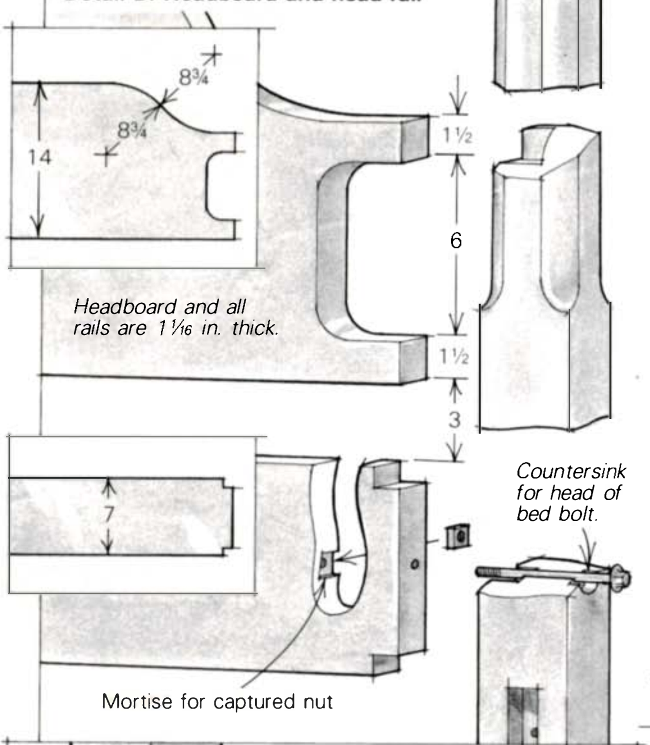
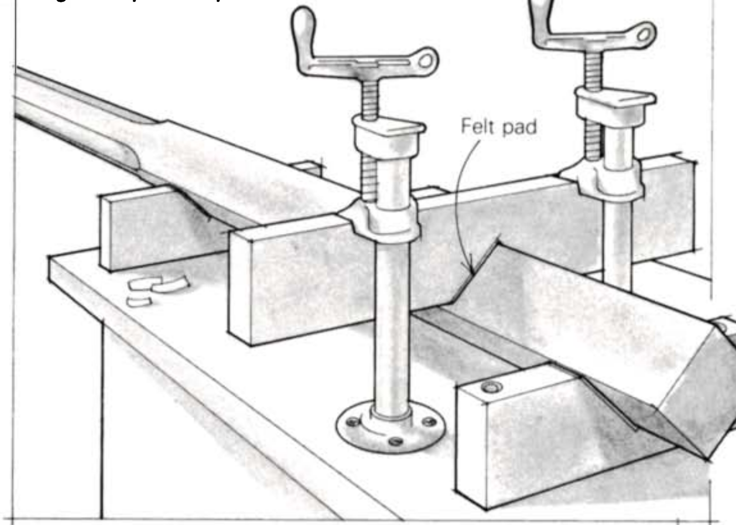



**Fig. 2: Pipe-clamp vise**




**Detail C: Foot rail**

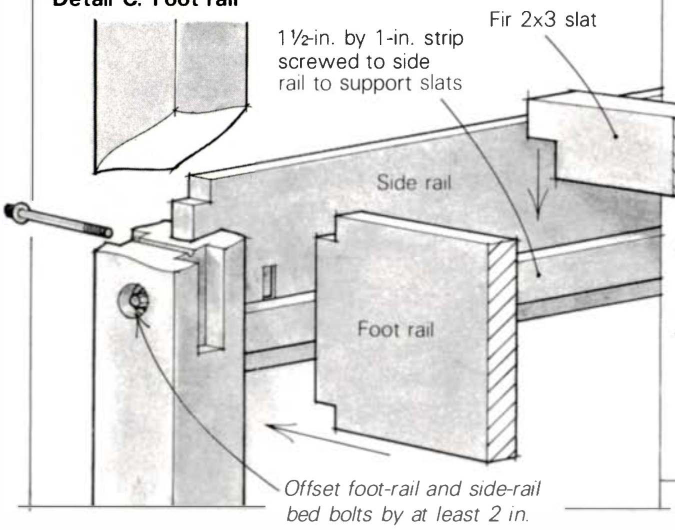
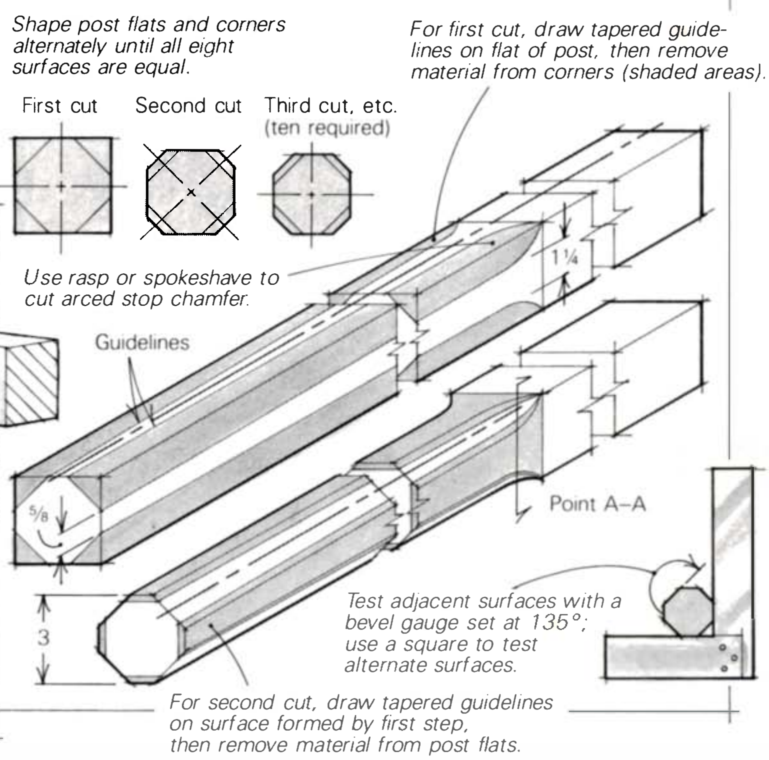



**Fig. 3: Shaping the posts**



moving too much material from one face at once, making it difficult to keep the taper uniform and the post straight.

I began shaping by cutting chamfers on the square post. Starting at the bottom of the tapers, I cut toward the top of the post with a sharp chisel until I could switch to a power plane which I'd used this project as an excuse to buy. A hand plane would be fine for this work, but a lot slower. Where the chamfers stop and arc into the square lower portion of the post, I used a ¾-in. rotary rasp chucked in an electric drill, although a spokeshave is the authentic solution. As you plane, keep a long metal straightedge handy to check for scooped-out spots in your tapered surface. Check the accuracy of your work with a square and a bevel gauge, as in figure 3.

As you near the final shape, check the dimensions of your post against the full-size drawing and sight down the post for straightness. On my post drawing, I struck perpendicular lines at 5-in. intervals, and then used dividers to make sure that all the faces were equal and that the width of my taper matched the drawing at these points.

If you end up planing against the grain and you tear out a chunk or two during the first few cuts, reverse your plane. You'll be cutting away enough wood to remove any blemishes as you approach the final shape. Just be sure to keep your plane extra sharp and to set the blade so that it takes a fine shaving.

**Assembling the bed**—I made a full-size drawing of the curved ends of the headboard and transferred this shape with carbon paper to the two glued-up boards that form the headboard. I mortised the posts first and then cut the headboard to fit. Since I wanted to be able to dismantle the bed for moving, I didn't glue the head-rail and foot-rail mortises and tenons. They are fastened with ⅜-in. by 7-in. bed bolts threaded into captured nuts, as in detail C (p. 55). A pivoting brass cap hides each bolt head. I got the bolts from Horton Brasses, Box 95, Cromwell, Conn. 06416. Get the wrench that goes with the bolts, or use a 12mm socket wrench. With no glue holding it together, I didn't want to risk an ill-fitting tenon shoulder where the headboard joins the posts, so I simply didn't cut shoulders, letting the full 1$\frac{1}{16}$-in. thickness of the headboard fit snugly into the mortises (detail B).

The side rails are stub mortise-and-tenoned into the posts and bolted. For strength, the two bolts that pass through each foot post should be a minimum of 2 in. apart. Most four-poster beds have the bolt for the side rail lower than the bolt for the foot rail, but it could be done either way.

Whether you plan to use a canopy or not, the bed looks better with the traditional bars that commonly join the tops of the posts. These are called the tester (pronounced "tee-ster") and they form the supports for a canopy. The laps that join the tester bars are not glued but are held together by dowels driven into the top of the posts.

I finished the bed with clear Watco oil, which darkened the wood just enough to enhance the grain of the cherry. A month later I followed up with a liberal application of Watco satin oil, and I think the final finish is exquisite.

This is not a small project, but because I drew my own plans and used techniques new to me, it's one of the most satisfying I've ever tackled. Trouble is, my daughter asked me if I could make one for her and I said "sure," again. I'll never learn. I wonder if she'll settle for pine. □

*Herb Akers lives in Rockville, Md., and makes reproduction furniture as a hobby. Photo by the author.*

# Layout tips from the boatyard

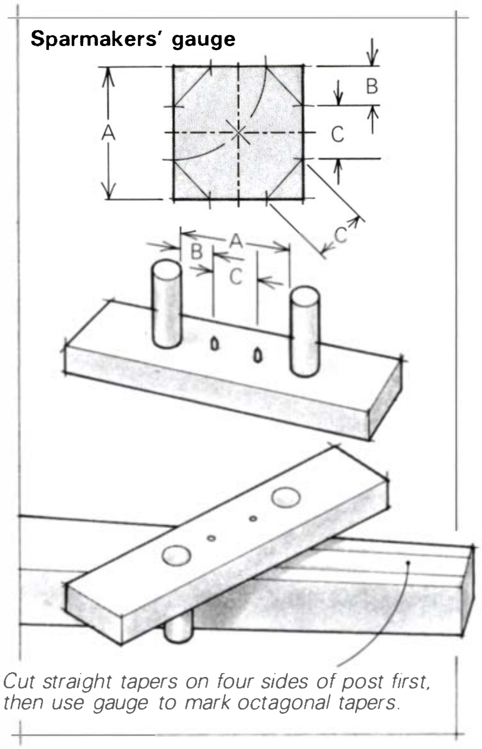
*by Michael Podmaniczky*

A long straightedge or a chalk line does well for laying out guidelines on square-sectioned stock to be worked into an octagon. But this old sparmakers' marking gauge speeds the job, and you can also use it to mark out a swelled taper, as for a round mast or a boom.

It's made of a scrap that's a few inches longer than the greatest thickness of the taper to be worked. The two dowels that guide the gauge and the nails that do the scribing are inserted according to this geometry: In a square slightly larger than the section of the work, lay out the octagon as shown in the drawing. Then locate the dowels so that the distance between their inside edges equals the length of a side of the square. Position the scribing nails as shown.

To use the gauge, saw or plane the taper "in the square" on four sides of your stock. Then, with the dowels held tightly against the edges of the stock, scribe the corners of the octagon by drawing the gauge down the length of the piece. Drawknife down close to the line and finish with a smooth plane. A boatbuilder making a mast or a spar would continue shaping by first eyeballing the octagonal post to 16 sides, eventually planing off all the corners to form a uniform, round section.

For strength and weight, spars have noticeably swelled tapers. I suggest adding a subtler swell to octagonal posts, whether tapered or not. This slight bulging, called entasis, is commonly found in classic Greek columns. Entasis imparts an appealing visual correctness. Adding it will also help you avoid inadvertently hollowing the tapers. □



Cut straight tapers on four sides of post first, then use gauge to mark octagonal tapers.

*Michael Podmaniczky is a boatbuilder and patternmaker who works in Camden, Maine.*

# Moldings

## Applying geometry with style

*by Victor J. Taylor*

Moldings dramatically affect the look of any piece of furniture. Their main purpose has always been to visually connect elements and to add richness, subtly controlling the viewer's appreciation of a design. They have several other functions, too. They frequently serve as placeholding keyways for separable parts of a piece of furniture. They may mask joints that would otherwise show, or conceal screw and nail heads, or cover end grain. And their style and proportions set the style for particular furniture periods.

Our knowledge of classical moldings comes from edge treatments used in ancient architecture. In the surviving examples that have come down to us, these were already a highly evolved form. Perhaps the first moldings were merely an effort to smooth off the arris (the edge) where two surfaces meet at an angle. It is possible to round off an arris in several ways, affecting the relationship between the planes. In figure 1, **A**, **B**, **C** and **D** represent cross sections through various tabletops. The equally distributed radius of **A** is neutral. The flattened curve of **B** makes the tabletop appear thinner, diminishing its bulk. Conversely, the curve shown in **C** accentuates the thickness of the tabletop. The bevel in **D** tends to reduce the bulk of the tabletop even more.

Fillets can be cut in to define the extent of each curve, adding to the emphasis. The bevel, as applied to panel or carcase rails, can add a decorative element in the way that it stops near a corner or where two rails meet. It is easy to imagine how attached moldings evolved from these edge treatments, and one very good reason was that the grain of moldings could be chosen so that they could be worked easily, whereas all too often the grain of a solid top, particularly the end grain, was difficult.

**Weight and transition**—In figure 2, **E**, **F** and **G** represent a bookcase/cupboard, a chest of drawers on a stand, and a long-case clock, respectively. In the first column, each has been reduced to its basic elements. As functional furniture, all three pieces could be constructed as I have drawn them, without embellishment, and, more significantly, without any visual transitions between the components.

Yet in **E**, the uppermost unit looks insignificant compared with the others, and the whole piece looks unfinished. The same can be said of the chest-on-stand shown at **F**. The long-case clock at **G** is more complicated. It comprises four disparate units—the plinth, surbase, trunk and hood. All three pieces of furniture will benefit from more visual weight at the top. In **E** and **F** a cornice immediately makes each piece look just a bit more imposing. In **G** a pediment counterbalances the bulky surbase and plinth.

But still the appearance of each piece is stark and unfinished until moldings are added to relate one unit to another. At this juncture we have two choices. We can employ a convex molding, which will accent the units, or we can use a concave molding, which will smooth the transition between the units.

It is obvious that the profile of the molding affects the outline of a piece of furniture. A subtler factor to be considered is how the molding surface reflects light and how its elements create shadow. Moldings above eye level, as for instance on a cornice, should be mounted so that the decorative elements face downward. The reverse applies to the moldings on a plinth or a base. In this way the interplay of light and shadow adds vitality and interest to what could otherwise be a lusterless object. Sharp curves generate brighter highlights than do gentle ones. A sprightly piece of furniture therefore calls for vigorous moldings. Conversely, a sedate piece is enhanced by broad, gentle curves.

The particular molding design we

**Fig. 1: Edge treatments**

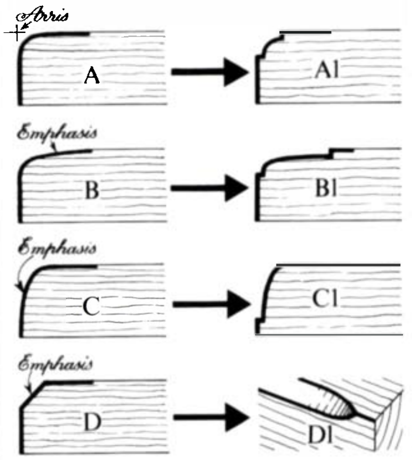



**Fig. 2: Weight and transition**

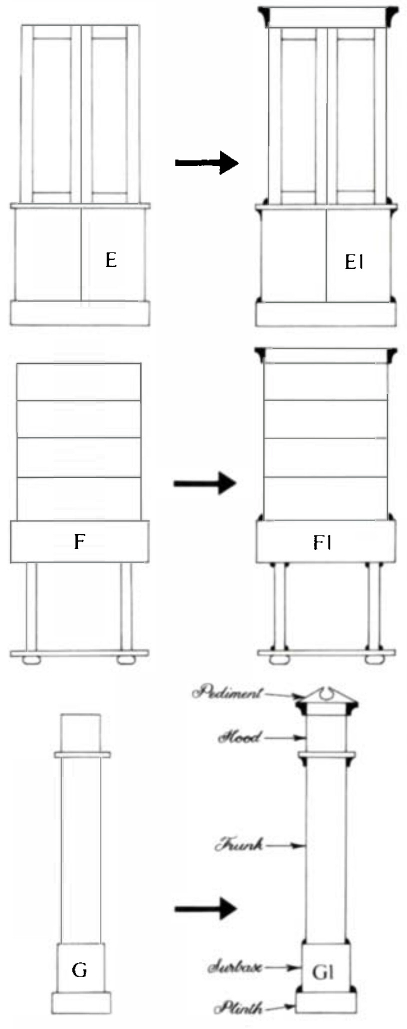
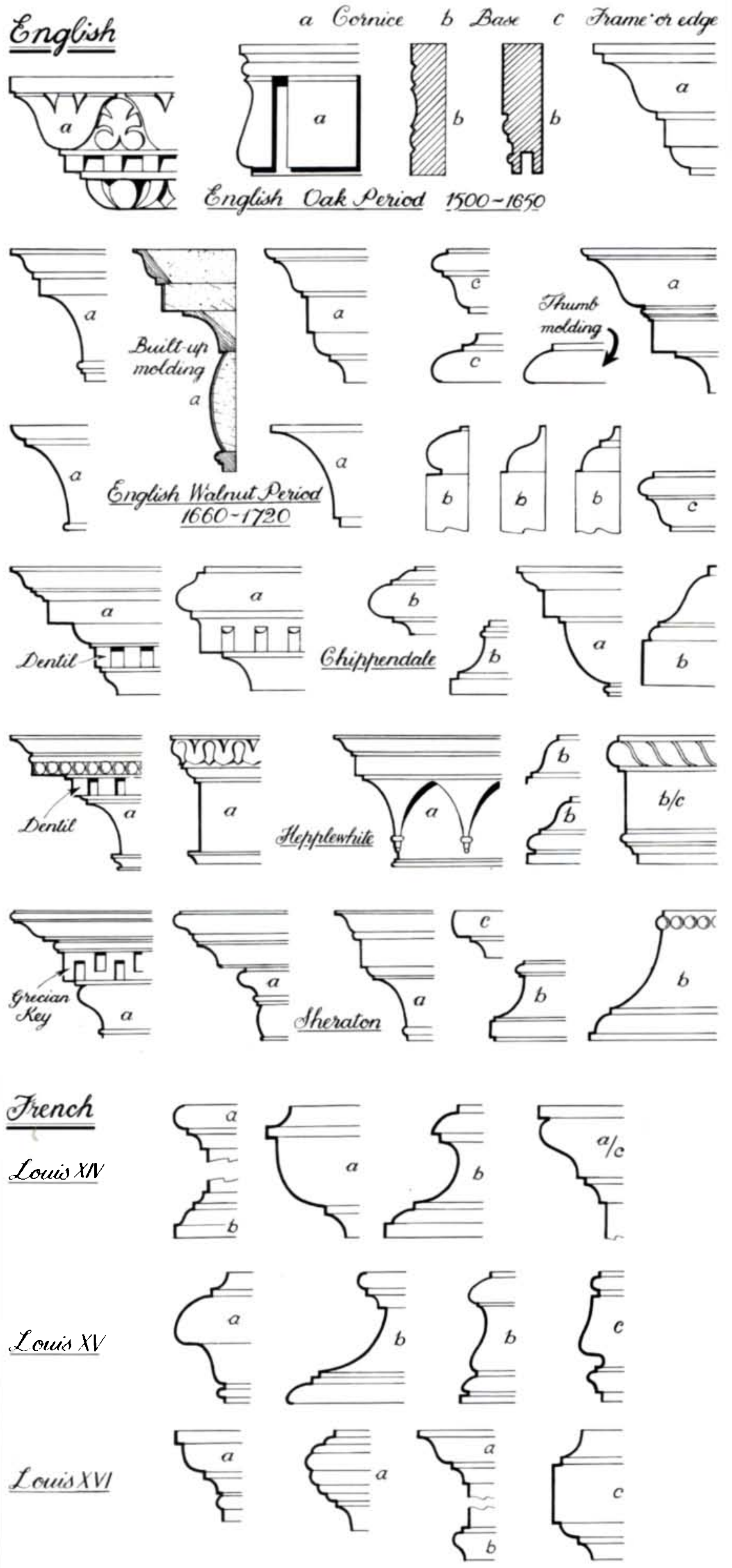


Fig. 3: Typical period moldings




apply depends on the nature of the furniture, on whether an individual unit needs to be given prominence because of the craftsmanship lavished upon it, or because the design is of a period which must carry the moldings appropriate to its age. Figure 3 shows a few typical moldings found on English and French furniture of various periods.

**Geometry**—The Greeks and the Romans had different approaches for designing moldings. Roman designs were based on segments of a circle; the Greeks began with conical sections—ellipse, hyperbola, parabola.

Some basic curves can be combined into any of hundreds of complex moldings. Starting with the Roman style, figure 4 shows how to draw the cyma recta (ogee), the cyma reversa (reverse ogee), the ovolo, the cavetto and the scotia. All of them use a square grid as the starting pattern.

To lay out the Greek equivalents, draw the size of the stock and divide each side into the same number of parts. The greater the number of divisions, the more accurate the profile. Then draw the radiating lines to the grid points, as shown. In the case of the Greek scotia and cavetto profiles, one of the centers for the plotting lines is found by extending the sides of the section.

**Making moldings**—Figure 5 shows how to make a backed cornice, based on the instructions in Sheraton's *Cabinet Maker and Upholsterer's Drawing Book.* You remove the bulk of the wood with rabbet planes, then shape the curves with appropriate molding planes (*FWW* #37, pp. 72-77). The first step (detail 1) is to draw out the section full-size, and then draw in the rectangle ***abcd*** to indicate the size of the mahogany show wood. Draw the size of the rabbets that can be planed square, and mark points ***e, f, g, h*** and ***i.***

Now prepare a piece of mahogany to the size ***abcd,*** and glue a piece of pine to the back of it, as shown in 2. Turn the assembly over (3), and scribe ***e, f, g, h*** and ***i*** along the full length of the molding. Next, set your gauge from ***a*** to ***y,*** and again from ***c*** to ***z,*** and mark them off along the full length.

Proceeding to 4, mark and plane off the corners to match the profile.

In 5, the rabbet plane has completed its work and the stock is ready for final shaping with the molding plane.

Fig. 4: Geometry

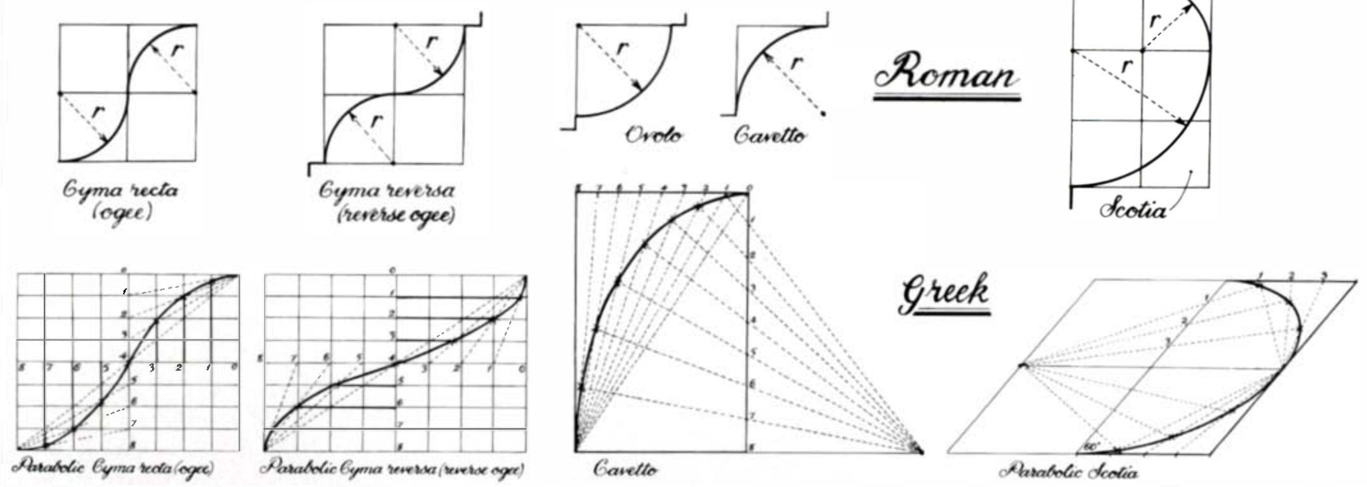



Fig. 5: Making a backed cornice

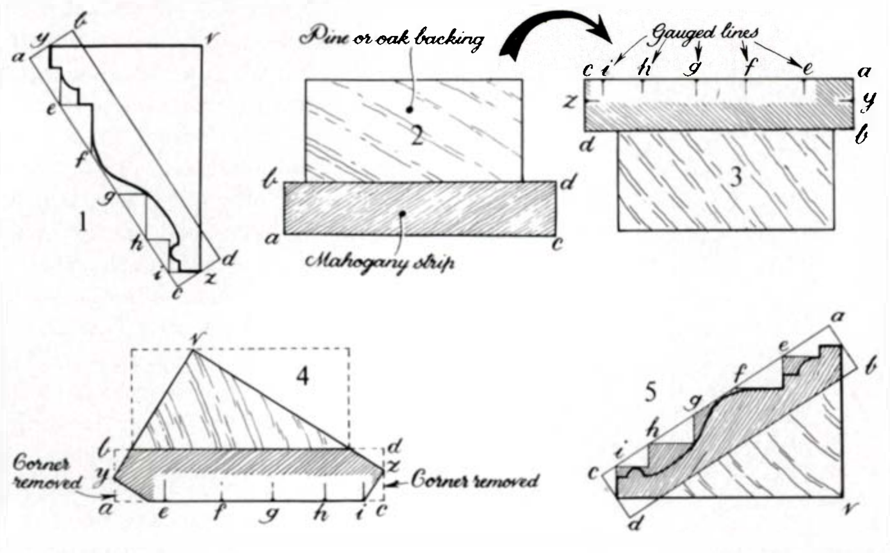
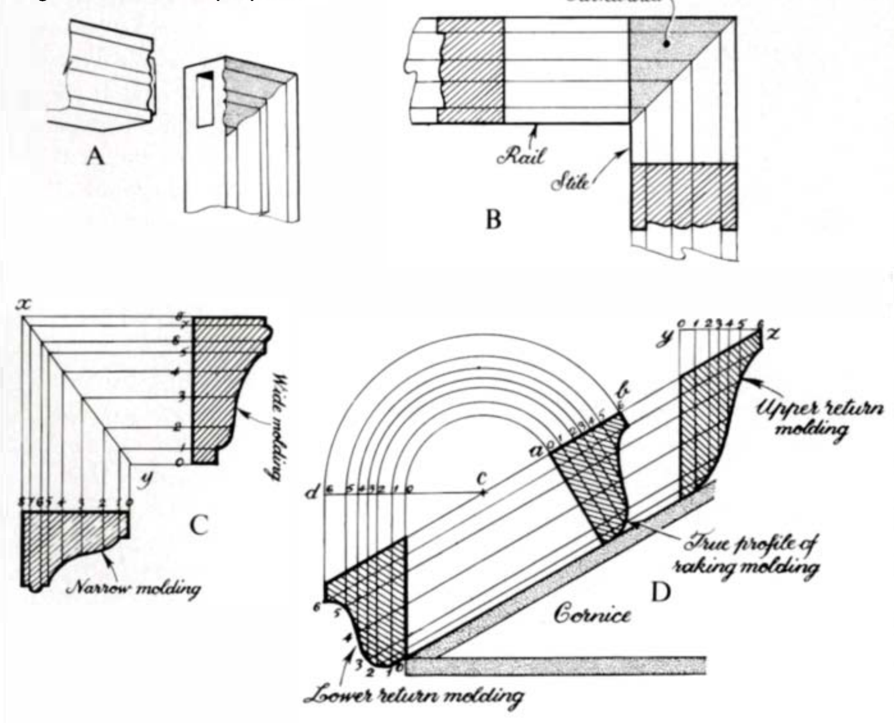



Fig. 6: Miters and proportions




**Moldings and miters**—One of the most common ways of joining moldings in medieval times was to use the "masons' miter," which looks like a miter, but is actually a disguised mortise-and-tenon joint. In figure 6, **A** and **B** show how it was carved.

True miters are not always 45°, even though the pieces meet at 90°. At **C**, two moldings of different widths need to be mitered. Drawing the outer lines of the moldings on paper indicates the miter angle—line ***xy***. Extending the profile points of either molding to the line will indicate the necessary proportions for the other.

The example at **D**, in which the "raking" molding of a cornice is pitched at an angle, requires three different profiles. To calculate them, draw the raking molding at its correct angle, and superimpose a drawing of its true profile. Draw reference lines parallel to each other along the molding and then mark off the profile points on the line ***ab***. With a compass at center ***c***, describe arcs from each reference point on the line ***ab*** to cut the horizontal line ***cd***. Drop perpendiculars, and the intersections will provide plotting points for the lower return molding's profile.

Similarly, you can find the profile of the upper return molding by drawing line ***yz*** and transferring the dimensions.

You don't, of course, need to begin with the profile of the raking molding, as this procedure works with any of the profiles as a starting point. □

*Victor J. Taylor, former editor of the British magazine* Woodworker, *wrote and illustrated the secretaire-bookcase article in* FWW *#38.*

# San Francisco in Miniature

*by Michael Pearce*

San Francisco's architecture is certainly varied and rich enough to deserve a place in the city's museum of modern art. Last winter the American Institute of Architects brought some local landmarks into the museum for a 100-year-retrospective show, the outstanding feature of which was a series of five spectacular basswood and maple models by Oakland artist Don Potts.

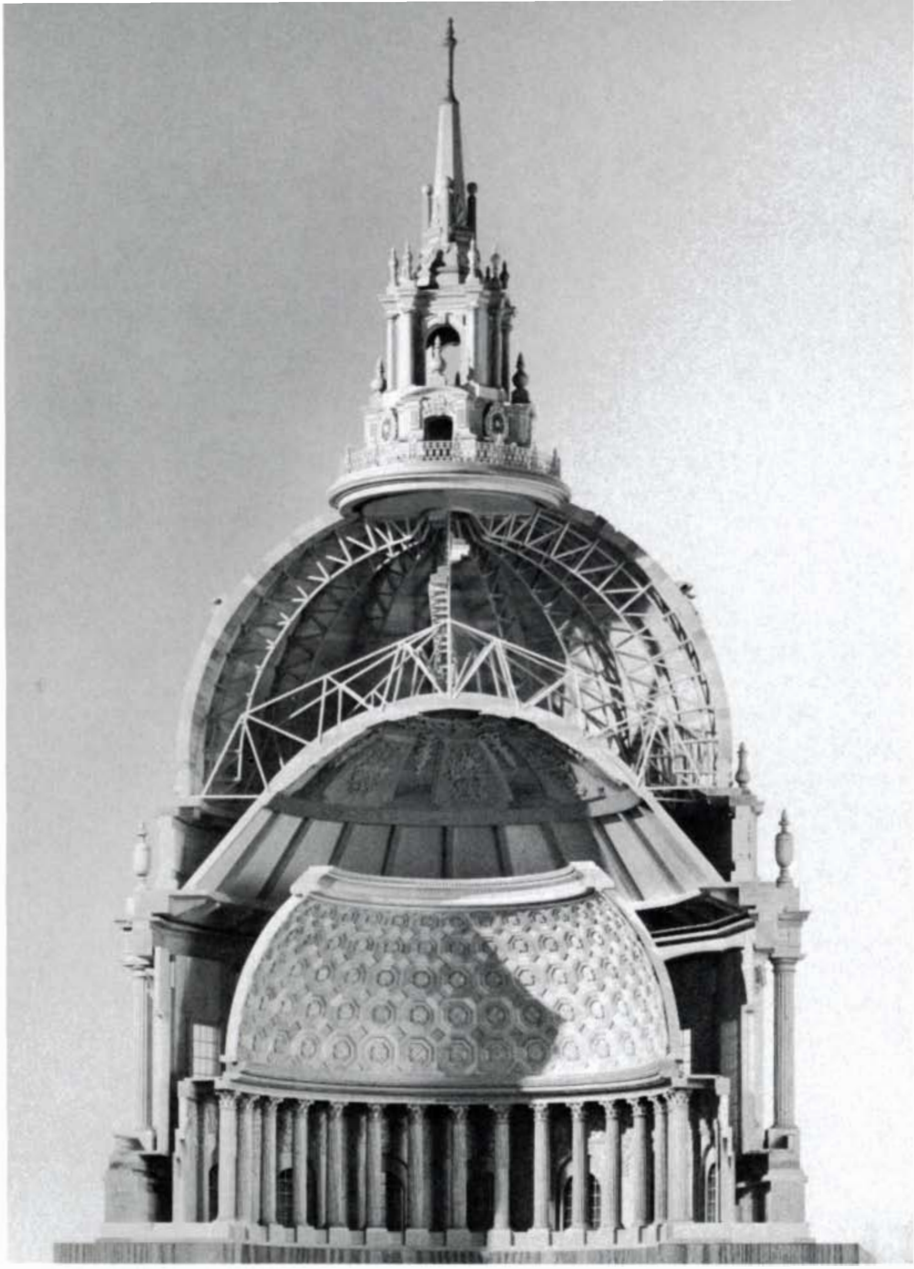
Architectural models are usually made in advance of construction to help clients imagine what will be built. Potts' models provide an exquisitely wrought explanation of already existing architecture. They not only offer a quick, tangible lesson in form and structure, they also invite a close look and close involvement. Looking at the City Hall dome cutaway—with its interior ceiling of recessed octagons, its fluted columns (complete with laser-carved acanthus leaves) and delicate balcony fences, and its spired lantern that sits on top like a crown—one can begin to understand something of the thought and craft that went into designing and building the original. Similarly, the other models—a tower of the Golden Gate Bridge, a sculpted relief of Golden Gate Park, and a typical (but elegant) Victorian house—seem uncannily lifelike, as if the originals themselves had been shrunk.

Studio photos: Joel Schopplein; installation photo: Michael Pearce

Potts' career in modelmaking began in an unlikely manner. In 1975 he was invited to spend a year in Germany in the Berlin Artist Program. He had gained considerable recognition in the early 1970s for a series of "car sculptures": sleek, low, skeletal frames on spoked wheels that look something like Class B dragsters engineered by Leonardo da Vinci. When Potts arrived in Berlin intending to continue this work, he was told that there was no funding available for a shop or for materials, though he could still stay on as an artist-in-residence. After several frustrating weeks of jousting with bureaucratic windmills, he gave up his original plan. He found himself daydreaming about a house he wanted to build in northern California, and so he began drawing plans, teaching himself drafting as he went. Finally he built the house in miniature—complete with kitchen cabinets, flooring, beamed ceilings, a stone hearth and banistered stairs—and displayed it as his residency project in an exhibition called, appropriately, *Mein Haus*.

Back looking for work in San Francisco, Potts ran into an architect friend who said he needed models. Potts brought his Haus over to the friend's firm, and was asked to begin work on a project that same day.

Potts believes that his lack of any formal training in woodworking allowed



*The interior of Potts' City Hall dome is done to a standard that matches the workmanship of the craftsmen who built the original. On facing page, a Victorian house.*

him a certain freshness of approach to the AIA project. "I've learned everything by the seat of my pants," he says. "A problem comes up, you draw from *anywhere* to solve it." Some of this creative pragmatism is evident in the wide range of techniques used in making the models. The City Hall dome was coopered together, then routed to its final shape with a clever jig that could be pivoted on two axes. Columns were turned on a metal lathe and fluted on a milling machine. The relief of Golden Gate Park was stack-laminated, after which the contours were stepped off on the mill, in accordance with a topographical map. The steps were then rounded over with a sander.

The most exotic technique used on the models was laser-carving, a technology Potts had not heard of when he began the project. Looking back, he is at a loss as to how he would have managed all the ornate fences, grilles and carved details had he not discovered Lasercraft of Santa Rosa, Calif., which fabricated the basswood veneer parts by scanning brass stencils with a high-power laser. A big breakthrough came when Potts realized that the hundreds of trees which cover the park model could be made efficiently and fairly realistically with the aid of laser-cutting. A few flat, irregular tree-shapes in top view were mass-reproduced from 1/16-in. veneer; the laser-cut pieces were then stacked three high with 1/8-in. spacers between them for trunks. The resulting "trees" look something like windswept Monterey pines.

*Museum visitors lend a sense of scale to the 9-ft. Golden Gate Bridge.*

San Francisco architect Marc Goldstein, a curator of the AIA exhibition, ran into problems raising funds for the show. Goldstein and co-curator Thomas Aidala asked for a $500,000 budget. They got $200,000, and were consequently unable to realize all of their plans. Potts' original estimate for the models was $120,000 (a bid he now considers low), but he was backed down to $100,000 when the final budget came through. Yet Potts still insisted—over Goldstein's admonitions—on including all the intricate detail. The models were seven months in the making, with as many as sixteen people working on them. Potts says he lost money. (The AIA hopes to find a donor to buy the models for the National Building Museum in Washington, D.C., from which sale they would recover their own expenses and pay Potts the remainder of his original bid.)

Goldstein remarked to me that both modelmaking and conventional architectural drafting have a limited future. Architectural plans can now be drawn simply by feeding the appropriate information into a computer. From those plans, computer graphic systems can put together a 3D picture of a building that can then be rotated and examined from all angles. But Goldstein believes that models will continue to be used—many clients feel more comfortable looking at a solid, complete object than they do being taken on an animated tour by a host of microcircuits. Yet he is also confident that the new technology will develop its own aesthetic. There will always be people, like Don Potts, who find ways to use new tools to make things of beauty. □

---

*Michael Pearce is a professional furnituremaker in San Francisco.*

# Keeping the "Poplars" Straight

## Many woods, good for many different things

*by Jon W. Arno*

To be told at the lumberyard that the board you are about to buy is poplar may be only slightly more helpful than to be assured that it is wood. The name poplar and the backwoods corruption of this term, popple, are applied to many different kinds of lumber in various regions of the country. Embroiled in the confusion are some dozen or more species belonging to four genera in two totally separate botanical families: the magnolia family, *Magnoliaceae,* and the willow family, *Salicaceae,* as shown in the chart on p. 64. Your lumber dealer probably doesn't know which species he has—to some extent he's at the mercy of the mill from which he buys his wood. The best clue to the wood's identity may be the part of the country it came from.

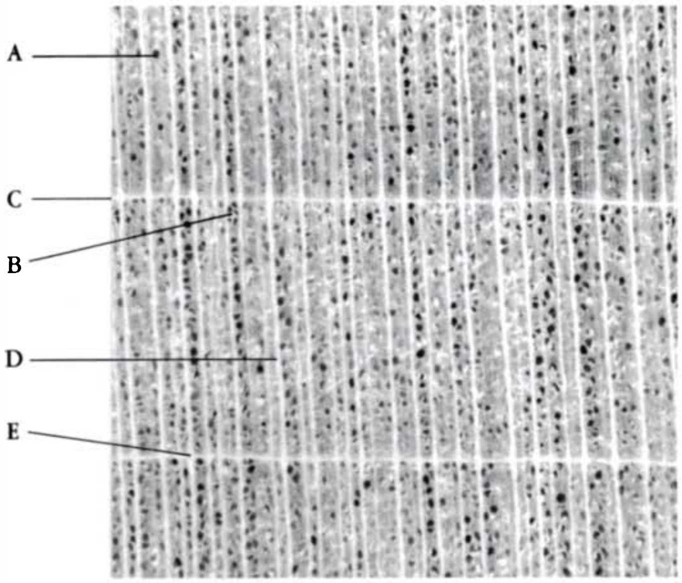
My first exposure to poplar came several years ago when I purchased a few board feet from a mail-order house. It was absolutely beautiful stock, arriving in nice wide boards with almost pure white sapwood and an olive-green heartwood streaked with chocolate brown. Some time later I ran across poplar advertised at an unbelievably low price from another mail-order house and I bought in quantity. Alas, it was a completely different wood. Both the sapwood and heartwood were creamy white in color, with a lot of tension wood, and the boards were no wider than 8 in. It even smelled different, reminding me of stale aspirin.

Both woods ultimately proved useful for totally different purposes and I'd gladly buy both again, but this experience launched me on a determined quest to learn what I could about the poplars, so I would at least know what had arrived when I got my future mail-orders.

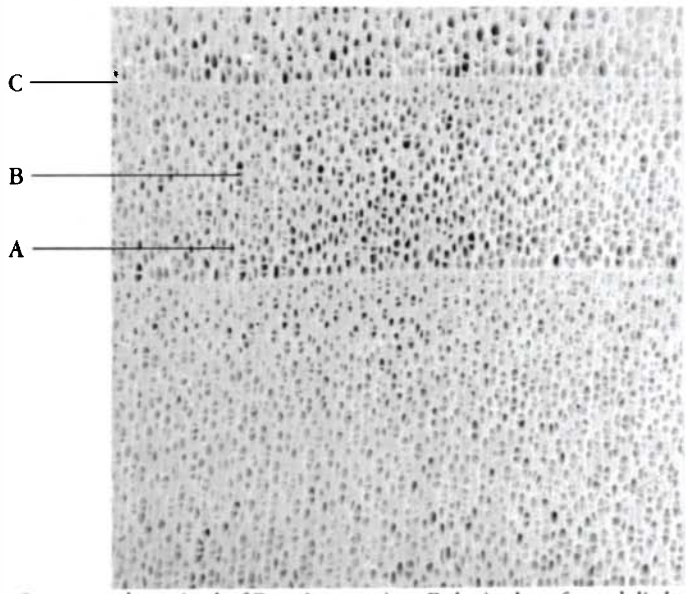
**The magnolia family**—My first purchase turned out to have been ***yellow-poplar*** or tuliptree, ***Liriodendron tulipifera,*** a member of the magnolia family native to the lower midwest, mid-Atlantic and southern states. Poplar shipped from mills in this region or referred to as tulip-poplar probably is this species. The tuliptree is a fast grower, and under the right conditions it produces a tall, clear trunk, so that boards up to 12 in. wide are fairly common. The tuliptree and sycamore vie for distinction as the largest of the deciduous trees east of the Mississippi. Tuliptree's huge size was once put to use by some Indian tribes for making dugout canoes. Although truly giant specimens are now rare, young stands are more common than ever. One reason that tuliptree is so plentiful is that it occupies the same ecological niche as the chestnut, and it has taken over many sites where chestnut once predominated.

Although the price of yellow-poplar seems to be increasing faster than other woods, it is a cabinet wood in its own right and still a good buy. According to the U.S. Department of Agriculture's ***Wood Handbook,*** the correct commercial name is yellow-poplar, but unfortunately it is neither yellow in color nor, as we shall see, a true poplar.

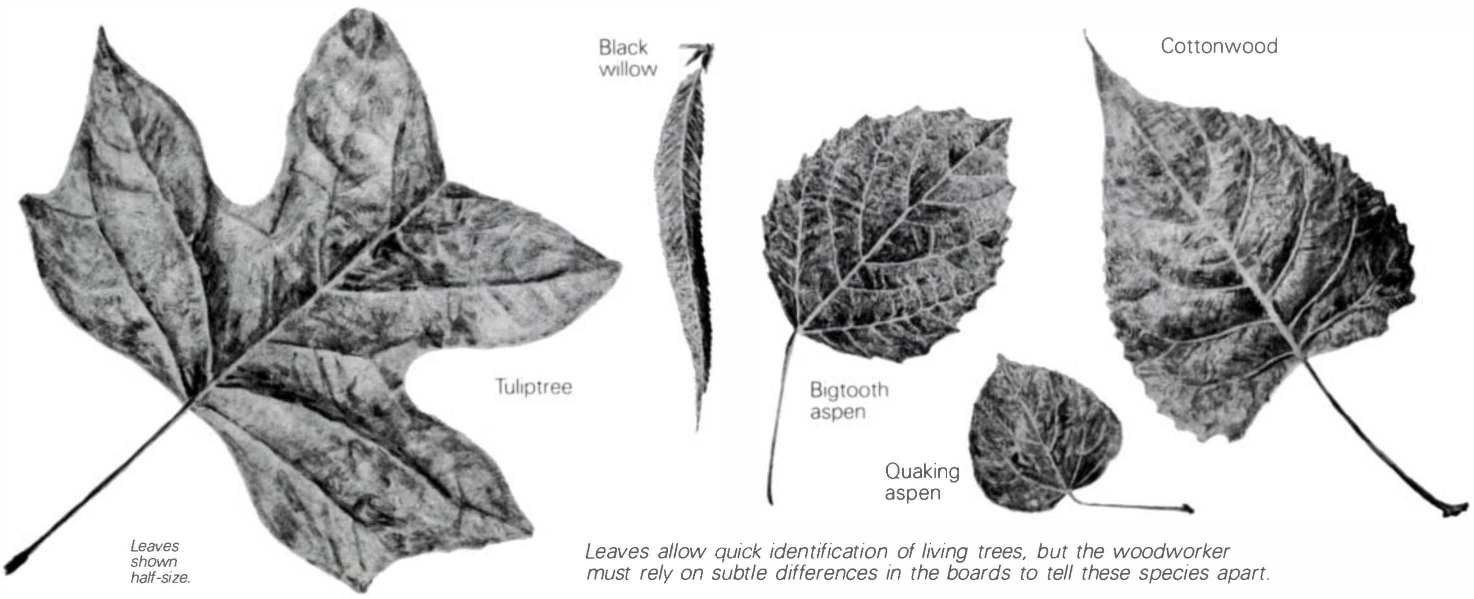
Yellow-poplar is a soft, diffuse-porous, fine-textured




*Yellow-poplar* (Liriodendron tulipifera)*: Moderately soft and moderately light (average specific gravity 0.42). Heartwood commonly green or greenish brown, occasionally shaded with purple, blue, black or yellow, or with streaks of various colors. Sapwood flat creamy or grayish white ('whitewood'). Diffuse-porous, pores small, solitary* (A) *and in multiples* (B)*. Growth ring distinct due to whitish or pale-yellow line of terminal parenchyma* (C)*, clearly visible to the naked eye. Rays* (D) *also visible to the naked eye (about as distinct as terminal parenchyma), often swollen (noded) at the growth-ring boundary* (E).




*Cottonwood, typical of* Populus *species: Relatively soft and light to moderately light (average specific gravity* P. balsamifera *0.34,* P. deltoides *0.40). Heartwood light brown to light grayish brown. Green wood often has a sour, unpleasant odor. Wood generally diffuse-porous, sometimes semi-diffuse-porous. Pores numerous, densely but uniformly distributed, solitary* (A) *or in radial multiples* (B)*. Largest pores barely visible to unaided eye. Terminal parenchyma form a fine, light line along the growth-ring boundary* (C)*. Rays very fine, indistinct even with hand lens.*




*Leaves allow quick identification of living trees, but the woodworker must rely on subtle differences in the boards to tell these species apart.*

wood. It's easy to work and stable, and it takes a good finish. It has a very subdued figure, much like birch except for its noticeably green color (sometimes streaked with brown, black or purple), which in time may turn deep brown.

Tuliptree was a new species to the European colonists. Wiped out in Europe by the Ice Age, it is native now only to the United States, with one very similar species found in southern China. In Colonial times the massive logs were often sawn so as to segregate the dark heartwood from the sapwood. The sapwood was referred to as whitewood, and was used in furniture as a secondary wood for drawer sides and interior parts. This same technique can still be used by the frugal cabinetmaker to create a piece of furniture that is solid yellow-poplar, yet appears to be made of two different woods.

Another member of the magnolia family, *Magnolia acuminata,* or cucumbertree, is sometimes mistakenly marketed with tuliptree as yellow-poplar. They are botanically close relatives and their wood is almost identical. A sharp-eyed timber grader looks for a lighter-colored sapwood in cucumbertree. The woodworker can distinguish both from the true poplars by their greenish heartwood. Under a 10x hand lens, as shown on the facing page, look for a fine whitish line separating the annual rings in the end grain. This line is formed by a row of small cells called parenchyma. When these cells appear as a line separating the annual rings, they are called terminal parenchyma. The line is clearly defined in both tuliptree and cucumbertree, while in the true poplars it is indistinct.

**The willows and true poplars**—These belong to the *Salicaceae* family, a broad grouping that includes many species, some of which are mistakenly sold as poplar. When freshly cut or slightly damp, most species in this family have a characteristic odor, an acidic, vinegary smell similar to damp aspirin. In fact, the willows are a natural source for the salicylic acid used in aspirin. When the wood is thoroughly dry, the odor disappears, but it may return under humid conditions.

The willows and their cousins the true poplars are far more similar to each other than any of them are to yellow-poplar, and are difficult to tell apart in photomacrographs. Yet each wood has subtle visual clues to its identity, and there are significant differences in their workability.

One branch of the family, the genus *Populus,* contains the aspens, the poplars and the cottonwoods, and virtually all of them have so many local and regional names that each tree ends up having more aliases than a con-man.

My second purchase of "poplar" was actually ***aspen,*** and should have been sold as such—the wood from the two aspens, quaking aspen and bigtooth aspen, is potentially troublesome because it's loaded with tension wood. This is not always easy to spot in the unfinished board, but the minute it is stained the surface becomes fuzzy or blotchy in appearance, and usually ends up looking like a very amateurish staining job. All of the true poplars have this problem to some degree, but the aspens are the worst. If the surface chips in planing or becomes fuzzy while sanding, you can expect it to stain unevenly, even after you think you've sanded all the fuzziness out.

The aspens have the finest texture of all the woods in the genus *Populus.* The wood is a very light cream color, almost white, with little contrast between sapwood and heartwood. The heartwood may have a slight gray cast and show streaks of a rusty or reddish-brown color around knots or where the wood has been damaged, but no greenish cast. It is soft and rather bland in figure, and for pieces that will be either painted or left unfinished, it is a reasonable choice as the primary wood. You can put on a clear finish, but plan to do a lot of sanding between coats.

Aspen shrinks fairly uniformly in drying, and is quite stable compared to other woods and even other members of the willow family. This makes it a good secondary wood for drawer sides and panels where any appreciable swelling can pose a problem. With an average specific gravity (SG) of 0.35 (oven dry), aspen is softer than yellow-poplar, 0.42 SG, and it compares to white pine, 0.34 SG, in being easy to work, but it is far superior in resistance to splitting when being nailed. It is a wood that will not splinter, making it a prime choice for children's toys—and sauna seats, too.

Also in the genus *Populus* of the willow family are the ***cottonwoods.*** Several trees have such similar wood that they can all be considered together. Unlike the aspens, the cottonwoods have a tendency to be semi-ring-porous. To be sure, they are not as large-pored as the oaks and the ashes, but they have enough variation in the size of the earlywood and latewood pores to produce a distinct figure when stained. The semi-ring-porous nature of cottonwood is easy to spot on the unfinished surface of a board by holding the board up to a bright light in the same way you would examine a freshly

Photos from *Understanding Wood,* The Taunton Press; drawings: Christopher Clapp

THE "POPLARS" AND OTHER PRETENDERS

| Family | Genus | Species | Common name | Lumber | Lumber characteristics |
|---|---|---|---|---|---|
| Magnolia (*Magnoliaceae* spp.) | *Liriodendron* | *tulipifera* | Tuliptree | Yellow-poplar | Close-grain/diffuse-porous, white sapwood, greenish heartwood. Soft, but slightly harder than other "poplars." |
| | *Magnolia* | *acuminata* | Cucumbertree | | |
| Willow (*Salicaceae* spp.) | *Salix* | *nigra* (and others) | Black willow (other willows) | Willow | Semi-ring-porous/open-grain, very similar to the cottonwoods. Black willow has dark-colored heartwood. |
| | *Populus* | *balsamifera* | Balsam poplar (balm-of-Gilead) | Cottonwood | Semi-ring-porous, very soft, cream-colored sapwood, light grayish heartwood. Can make an attractive primary wood if tension wood is avoided. Nice figure when stained. |
| | | *deltoides* | Eastern cottonwood ("eastern poplar") | | |
| | | *heterophylla* | Swamp cottonwood | | |
| | | *trichocarpa* | Black cottonwood | | |
| | | *grandidentata* | Bigtooth aspen ("popple") | Aspen | Close-grain/diffuse-porous, white color with rust-brown streaks around knots and blemishes. Tension wood very common. Soft, easy to work. Stable, makes good secondary wood. |
| | | *tremuloides* | Quaking aspen ("popple") | | |

varnished surface for dust spots. As a result of its coarser texture, the wood is not as lustrous as that of the aspens. Cottonwood is also not as stark white in color as aspen, and generally produces a cream-colored sapwood and slightly gray heartwood, which often has a very slight greenish cast.

While the cottonwoods are similar, they are not identical. Some balsam poplar I recently bought from a mill in the Upper Peninsula of Michigan was darker in color and more open-grained than cottonwoods I had purchased from other sources. So far it's my favorite "poplar," and I'd like more of it. I wouldn't buy it green, though—it's hard to dry.

One final group of species should be thrown into the confusion: the ***willows,*** of which there are many. While not members of the genus *Populus,* the willows are more closely related to the aspens and the cottonwoods than is the tuliptree. At least they belong to the same family. Technically they should never be marketed as poplar, but occasionally they are. From the user's standpoint, little harm is done, since the woods of willow and cottonwood are very similar. Normally, willow will be darker in color. This is because black willow, *Salix nigra,* is the most important of the willows in commerce: it's the largest and most plentiful. If you've been shipped black willow instead of cottonwood, don't complain. Black willow, while soft like all of the woods described here, makes a very nice primary wood. Its dark, brown-gray color is sometimes dark enough to not require staining, and its semi-ring-porous grain gives it a soft-spoken figure.

**Price and availability**—Virtually all of the so-called poplars are moderate to low in price, ranging from less than $.50 a board foot to more than $1.50. As with any lumber, the price depends on the grade, the amount of processing that has gone into it, and the quantity you purchase.

Yellow-poplar (*Liriodendron tulipifera,* i.e., tulip-poplar) is rising in price. It's still sold by several mail-order sources at $1.00 to $1.50 a board foot, but if you don't live in its native range, shipping costs will likely make it no cheaper than the common local hardwoods in your area. One of the advantages of yellow-poplar is that you can get wide boards with especially attractive heartwood color. For such stuff a price of $2.00 or more a board foot is not unreasonable.

Aspen and, in some areas, cottonwood are the most plentiful and least expensive of the true poplars. The aspens are "camp-followers of disaster" in that their favorite habitat is prepared for them when a forest is cut over or burned. In this sense they have benefited mightily from the arrival of European man and are now more common in pure stands than they probably have ever been. Although the aspens are relatively short-lived and eventually overtaken by the conifers and hardwoods which form the climax forest, they are fast-growing and a valuable resource for today's cabinetmaker.

Quaking aspen is native to most of Canada from coast to coast, and to the northern United States, while bigtooth aspen is an eastern tree, but their ranges overlap in the Great Lakes region and the St. Lawrence basin. Woodworkers who live in a region where aspen is common can save money by using it in place of the typical No. 2 ponderosa pine. Bought "run-of-mill," ungraded and green, directly from a local sawmill in reasonably large quantities—say, 100 to 500 board feet—aspen can be had for $.40 a board foot or less. In fact, on orders for more than a couple of thousand board feet, half that price would be a good place to start bargaining.

If kiln-dried and surfaced, aspen and cottonwood in the better grades—No. 1 and better—should sell by mail-order for between $1.00 and $1.50 per board foot. If you shop around, buy in fairly large quantities and haul it yourself, you'll be able to do better.

The genus *Populus* includes some of the fastest-growing cold-tolerant trees in the world, and hybridizing them for still faster growth has become a high-priority project among tree geneticists. There is real promise that from this work may come the "super tree" of the future.

It's important not to let one experience with a wood called poplar create a fixed opinion about what poplar is and what it's good for. The truth is, it's good for many things, because it's many woods. Discovering them and learning the unique qualities of each is not only challenging, it is enjoyable. □

---

*Jon W. Arno, of Brookfield, Wis., is an amateur woodworker. He wrote about elm in* FWW *#25, pp. 86-89.*

# Making Your Own Hardware

## Hand-worked brass beats the store-bought stuff

*by David Sloan*

Why let a limited selection of brass hinges force you to compromise the design of a project? You can have any style hinge you like if you make it yourself. The work is not difficult, even if you have no metalworking experience. All you need, in addition to regular woodworking tools, are a jewelers' saw and blades, a set of needle files, a propane or an acetylene torch, silver solder and flux.

The example here is a simple brass strap hinge with tulip finials, but the techniques I'll describe apply to any kind of brass hardware. Hinges can be constructed with a pin inserted through looped knuckles, or with a simple pivot pin. You can devise all manner of hinges, locks, pulls and handles, each tailored to your project.

The color and workability of brass make it the right metal for hardware making, though copper, silver, aluminum and steel are certainly acceptable. Brass is sold in dozens of different alloys, but one called CA-260, which is 70% copper and 30% zinc, offers the combination of strength and workability demanded for hand-working. It buffs to a rich, yellow luster. Brass comes in five hardness ranges: dead-soft, quarter-hard, half-hard, hard, and spring. Like most metals, brass work-hardens, that is, it gets tougher as you bend and hammer its crystalline structure into smaller, tighter patterns. To soften it again, you anneal it by heating it to a cherry-red glow with a torch, followed by a quick quenching in cool water. Picking a hardness range depends on how much cutting and shaping your design requires. Quarter-hard is a good grade to start with, since you can anneal it or work-harden it as required, but don't hesitate to use any available piece of brass whose hardness is unknown.

### *Sources of Supply*

Cardinal Engineering Inc., RR 1, Box 163-2, Knoxville, Ill. 61448. Brass, steel and aluminum sheet; rod and bar stock.

Paul H. Gesswein & Co., 255 Hancock Ave., Bridgeport, Conn. 06605. Jewelers' tools and supplies, including saws, files, scribers, solder, and polishing material.

Kitts Industrial Tools, 22384 Grand River Ave., Detroit, Mich. 48219. Metalworking tools, including taps and dies, measuring and marking instruments, and drills.

Small Parts Inc., PO Box 381736, Miami, Fla. 33138. Brass sheet; rod and bar stock; small fasteners.

Fig. 1: Tulip-finial hinge

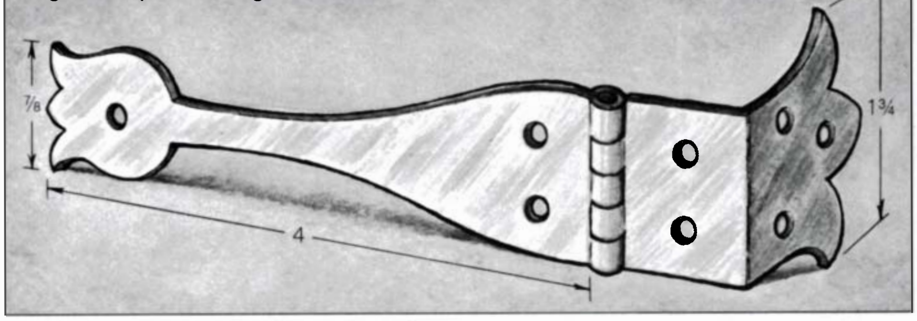
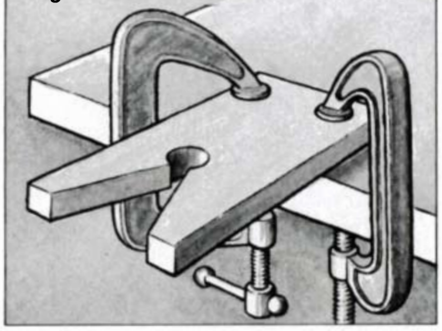



Fig. 2: Bird's-mouth



Brass sheet stock comes in various sizes, and in thicknesses measured by gauge numbers:

24 ga. = 0.020 in.
20 ga. = 0.032 in.
16 ga. = 0.051 in.
11 ga. = 0.091 in.

Rod, tube and bar stock are available in all sizes and shapes as well, usually in increments of 1/16 in. or 1/8 in. See the supplies box at left for mail-order sources.

I start my hinges by transferring a drawing of the shape to a piece of annealed 16-ga. sheet stock, allowing about 5/16 in. extra length for the fingers, which later will be looped into the knuckles of the hinge. Draw the fingers directly on the metal with a jewelers' or machinists' scriber and square. It's important that the fingers be square and accurate, or gaps between the knuckles will result.

A jewelers' saw—a small, adjustable-frame saw similar to a fretsaw—is used to saw out the hinges. Jewelers' blades are very fine and easily broken, but they're cheap and sold by the dozen, so it's best to purchase at least that many for one job. For cutting sheet brass, a fine-tooth No. 2 blade is good to start with. The saw should cut on the pull stroke, so when you insert the blade, make sure that the teeth are pointed toward the handle. The blade needs plenty of tension, too. To accomplish this, adjust the frame's blade opening so it's 1/4 in. to 1/2 in. larger than the length of the blade or piece of blade (broken blades of sufficient length may be reused). With the blade mounted in the front clamp, press the front end of the frame against the bench, bending it toward the handle enough to catch the blade in the rear clamp. When you release the pressure, the frame will spring back, tensioning the blade. A properly tensioned blade responds with a clear, musical "ping" when plucked.

Clamp the work to the benchtop so that the section being sawn projects over the edge, or else make a bird's-mouth, as shown in figure 2, to better support the work. This makes cutting somewhat easier, particularly with thin stock or where a piercing cut is made in the middle of a piece. When sawing, keep the blade perpendicular to the surface of the

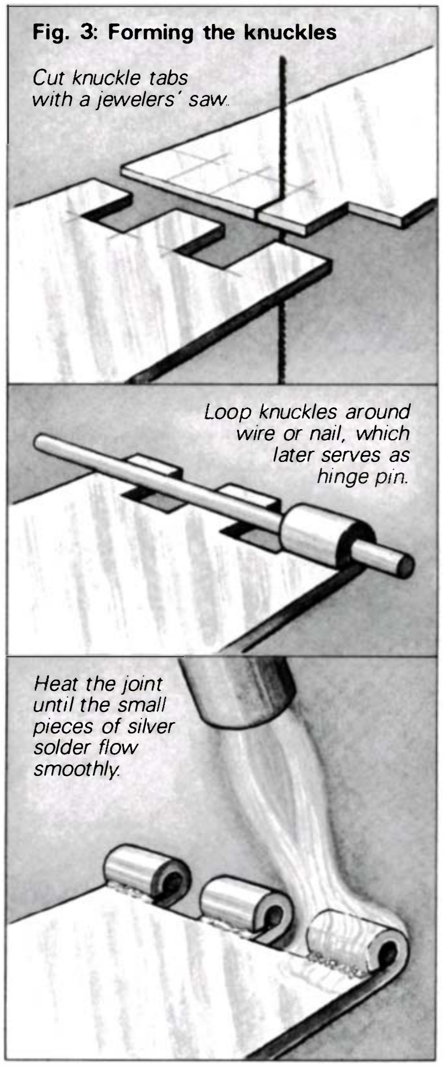


Fig. 3: Forming the knuckles

stock. After sawing, clean up the hinge with files, checking the fingers carefully for square.

I bend each finger separately to form the knuckles. A nail or a wire about 1/16 in. in diameter makes a good bending form. This will later become the hinge pin. Start each bend with a pair of pliers, wrapping the finger around the pin (figure 3), completing the bend by squeezing the knuckle in a vise whose jaws have been covered with wood or aluminum to protect the brass from marring. You should be able to make all these bends without having to anneal the brass again. When all the fingers are bent around the pin, a final clamping of all knuckles in the vise at once draws them up tight.

With the knuckles bent, I remove the pin and then silver-solder the ends of the knuckles to the back of the hinge, for appearance and strength. Silver-soldering differs from soft-soldering in that the solder has a much higher melting point. You also heat the part and the solder at the same time, instead of heating the part and melting the solder into the joint. Soldered joints are well up to the loads most furniture hardware must bear, and you can solder small pieces together to form whatever shapes you want. First, clean the parts thoroughly with fine steel wool. On the hinge shown here, I held the knuckle ends in the right position for soldering by simply bending the metal into place. If you are soldering separate parts together, clamp or wire them in their proper position. Then brush on silver-solder flux—usually a borax compound that chemically cleans the metal and promotes adhesion and flow—being careful to wet only the parts of the joint that you want to solder. Cut the silver solder into tiny pieces and arrange them along the joint, as close to the mating surfaces as possible. Play your torch quickly over the joint at first, until the parts heat up. Then concentrate the flame right on the joint. When it reaches the melting point, the solder will flow all at once, and you're done. When the solder has cooled, a drill passed through the knuckles will clear the pin hole of any excess solder.

Next, true up the soldered hinge halves with files and fit them together. This is a trial-and-error procedure and it helps to hold the two pieces up to a light to see where material must be removed. Once the pieces fit, you may still have to drill or bend the knuckles slightly to get the pin in. Oiling the pin helps. Once you've inserted the pin, you can close up slight gaps between the knuckles by gently tapping at either end with a small mallet.

When the two halves fit satisfactorily, use a fine file to smooth out the knuckles, and make sure that the outer surfaces are parallel. Make any additional bends your special hinge may require, but keep in mind that you can't anneal after soldering, so don't overwork the metal. Cut the hinge pin to length and peen the ends slightly to hold it in place. Finally, drill and countersink holes for the mounting screws.

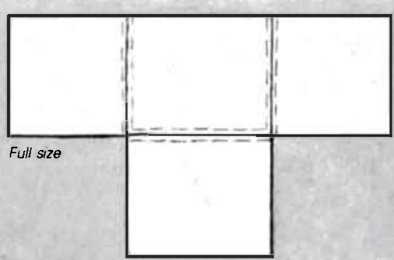
To clean away the residue left from annealing and soldering, polish up your work with progressively finer grits of wet sandpaper and steel wool, and, if you want a high polish, finish up with rouge on a buffing wheel. □

*David Sloan is an actor in New York City, and operates a part-time woodworking and metalworking business.*

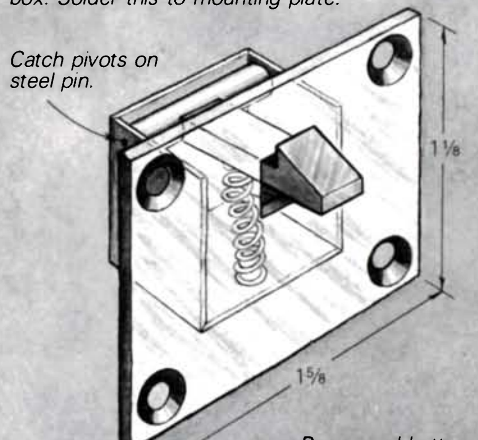
# A catch, three hinges and a lock

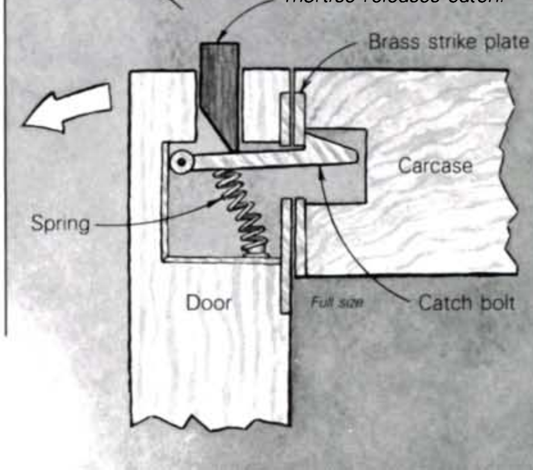
***Door catch:*** This spring-loaded catch, which I smithed for a fall-flap door, is essentially a three-sided box soldered to a flat mounting plate. I made the box by engraving V-grooves in flat brass stock and then folding the metal along the mitered grooves. A bead of silver solder reinforces the miter joint. The catch bolt is soldered to a piece of brass rod drilled to accept the steel pivot pin, which fits loosely so that it can be driven out for disassembly. I soldered a pin to the bottom of the box to anchor the spring; the top of the spring nestles in a dimple drilled in the underside of the catch bolt. The wooden activating button, which slides in a mortise, is beveled for leverage on the catch bolt. The strike plate is sawn from the same stock as the mounting plate.

*—Ian J. Kirby, Bennington, Vt.*



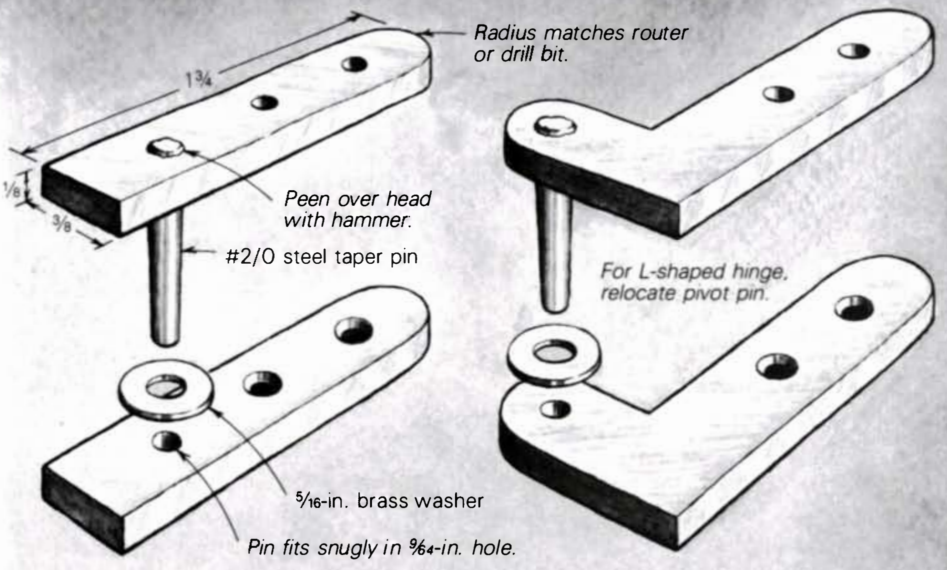
Scribe V-grooves with engraving tool, then fold groove into miters to form three-sided box. Solder this to mounting plate.



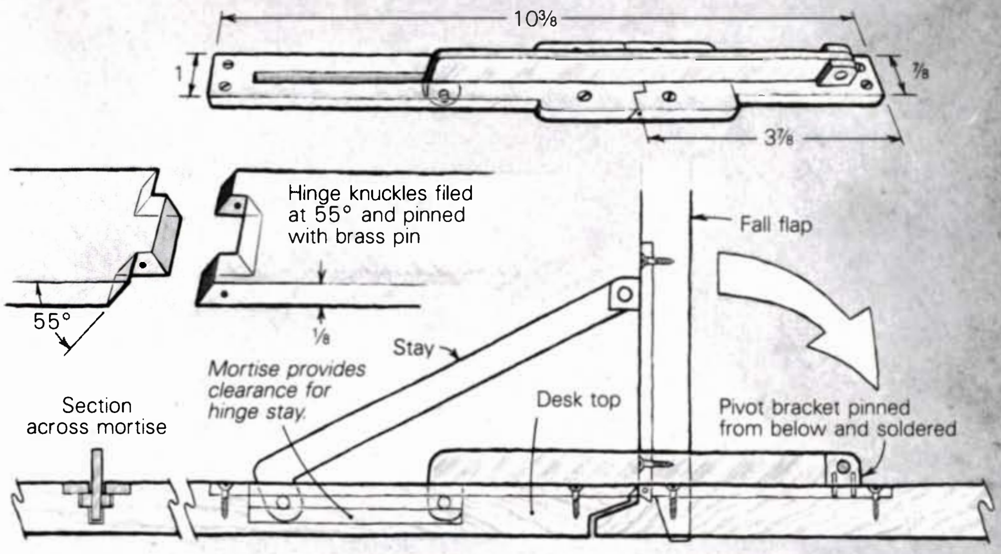
***Knife hinges:*** These knife hinges, which I made for a drop-front desk, can be tailored to fit any door where a small, unobtrusive hinge is wanted. I start with ⅛-in. thick, rough brass blanks slightly larger than the finished size of the hinges. I locate the holes in one knife with a scriber and center punch, drill the holes and then use this as a master template to transfer hole locations to the other knives. A #2/0 steel taper pin, available from industrial supply houses, serves as the pivot. Once I've drilled all the holes, I clamp the knives together, using 4d finish nails as locators, and then file the hinge to its final shape.

*—Tim Simonds, Chico, Calif.*

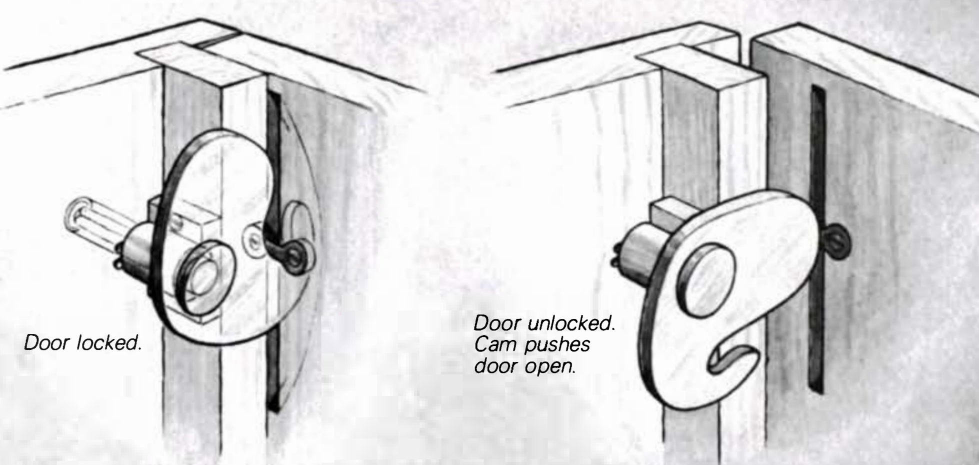


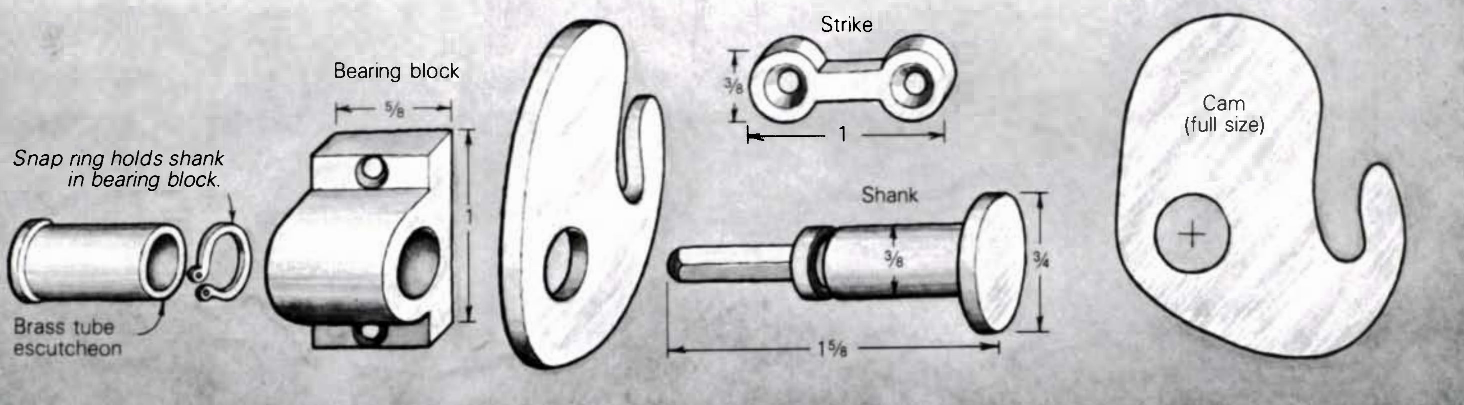

***Fall-flap hinge:*** Good fall-flap hardware is always hard to find, so I made a pair of these hinges for a desk I designed. I sawed the hinge parts out of 3/16-in. by 1½-in. brass bar stock, cutting, fitting and test-pinning the angled knuckles before shaping the rest of the hinge. The 55° angle on the flap-side knuckle is critical, to keep the hinge from binding when the flap is closed. I encountered one problem in soldering: small parts, the pivot brackets for example, floated out of position on a river of molten solder. When clamping isn't possible, I just tack the parts in place with brass pins and then solder the joint.

*—Randall Torrey, Scottsville, N.Y.*




***Cam lock:*** When I built grandfather clocks for each of my 12 grandchildren, I designed this cam lock to hold the pendulum door closed. The parts can be of brass or steel, silver-soldered together. I turned the shank on a lathe and cobbled the bearing block from a single piece of metal. The lock is operated from the side rather than the front of the case. I made my own brass key, but you can size the square part of the shank to fit the same key that winds the clock. A small section of brass tubing driven into the keyhole serves as an escutcheon. *—Raymond H. Haserodt, Lyndhurst, Ohio*



# Wooden Eyeglass Frames

## Making a spectacle of yourself

*by Howard Bruner*

My original motivation for carving a pair of eyeglass frames was economic as well as aesthetic. The first pair was native walnut reclaimed from a trophy base. I started with the basic shape of my metal aviator-type frames, exactly duplicating the inner dimensions to fit my lenses. From there I added a nose-straddling eagle linked to a bear, a weasel, a rabbit, a squirrel, an owl and the profile of a native American—all on the faceplate. One temple had a dragon breathing fire, the other an organic motif.

Although wearing such flamboyant spectacles never fails to provoke extreme reactions, carving your own frames can be rewarding. I've worn wood on my face for eight years now, and I think that anyone with a flair for individuality will find wooden eyeglass frames stylish and practical. Wood has been used for eyeglass frames almost as long as people have been putting lenses in front of their eyes to improve sight, and it remained an alternative material until the Industrial Revolution. Considering the many attractive wood species currently available, and the high cost of metal and plastic frames, wood is worth taking seriously.

The wood you choose is critical. It must be strong and even-grained. I have used walnut, Oregon myrtlewood and iron bark. I found walnut to be a little heavy and brittle. Oregon myrtlewood solved the weight and breakage problems as well as being, from my experience, one of the finest carving woods available. Iron bark is a shipwrights' choice for railings and other exposed areas on ships. This wood is heavy and oily, somewhat like teak. Its worst characteristic is a tendency to check and warp. My latest frame design called for an exceedingly strong, dense wood, so I picked iron bark to produce the pair I wear now.

**The faceplate**—The faceplate must be shaped according to critical dimensions (figure 1). The distance between the bridge edges of the lenses (D.B.L.) and the pupillary distance (the distance between pupils, dead center) are extremely important. It is best to work with an optometrist, if you can find one interested in the challenge. There is also the parabolic curve and the panascopic tilt to be considered. The first is the shallow curve across the faceplate from temple to temple. It is slight but important for accurate positioning of the lenses in relation to the eye. The panascopic tilt is the vertical angle between the plane of the lenses and the temples. This varies from 72° to 80°. Lastly there is the base curve of the lens, the curve of its outer face, which determines the shape of the rabbet the lens fits into. I gauged the critical dimensions from the metal originals on the first frames I made, and faked them on my second and third attempts.

You can make the frames first and then have the lenses dimensioned and ground to fit, but it's not easy to find a creative optician willing to do this sort of work. It's easiest to have the lenses ground first and then to carve the frames using the lenses as templates. I have found two ways to make the frames, and will describe both.

**One-piece frames**—The simplest method is to carve the entire faceplate from a solid piece of wood. But because the sides of the frames are short grain and thus liable to crack, the

**Fig. 1: Eyeglass frames**

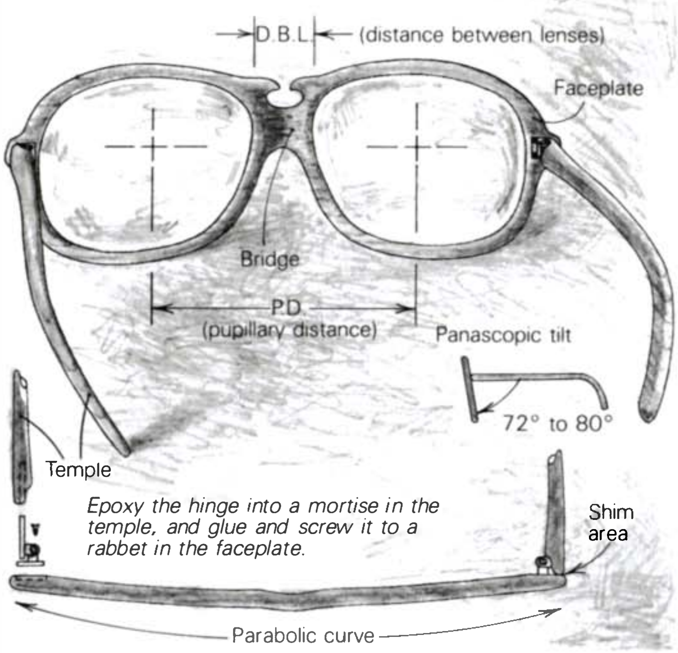
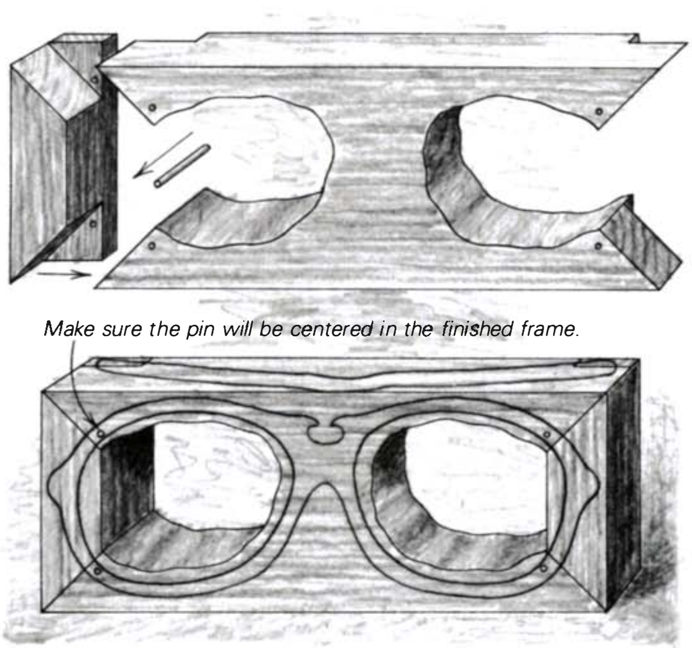
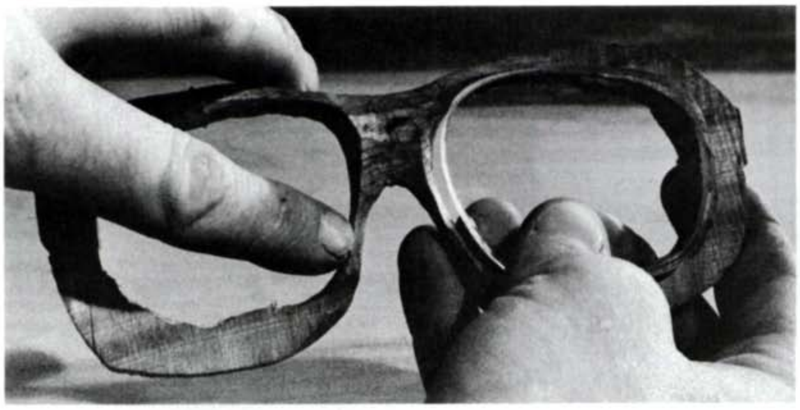
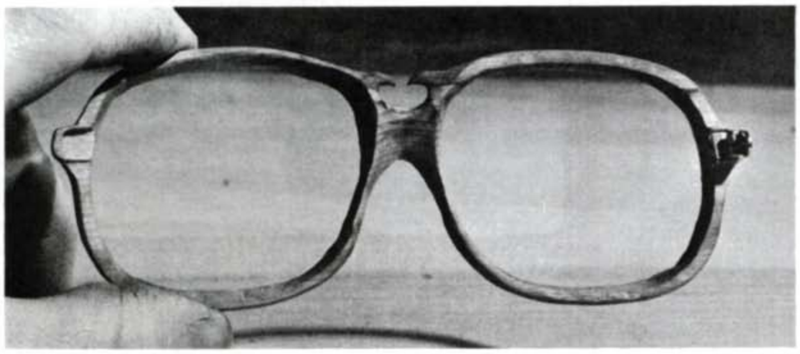


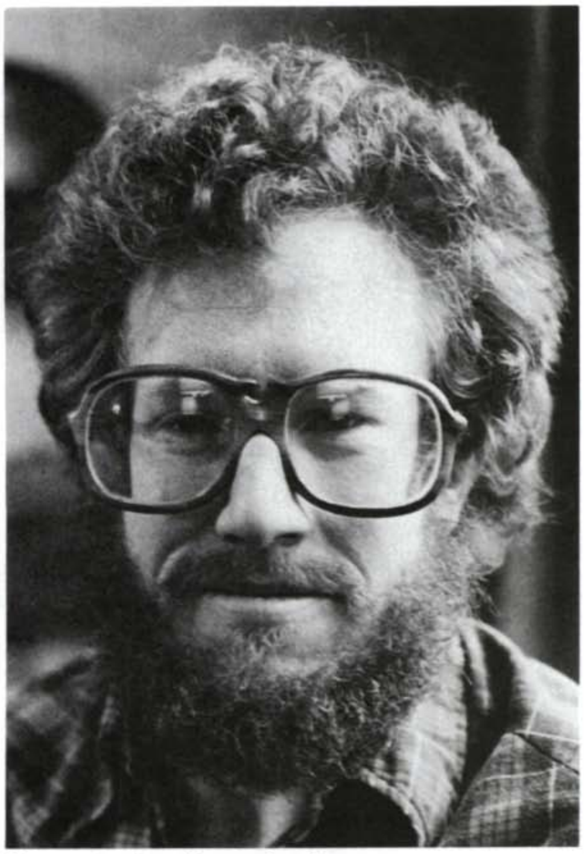

**Fig. 2: Alternative construction, a joined faceplate**





*Rough out the faceplate, sawing the outline and the curve across the face from temple to temple. Then cope out the lens holes and carve the lens rabbet, test-fitting often, as above. The rabbets for the temple hinges, below, are chiseled for a neat fit.*





*Bruner sporting his wooden frames.*

lenses themselves must provide structural support. Plastic lenses are best because they add flexible strength to the frames and because they let you use less wood than heavier glass lenses will allow. Heavy frames and lenses have an annoying tendency to slip down on your nose. Until the lenses of a one-piece faceplate are finally cyanoacrylated into place, the frames must be handled gingerly.

The first woodworking operation is to rough out a design in the faceplate blank. I bandsaw the outline with a narrow blade, and cut the inner holes for the lenses with a portable saber saw. A coping saw will work well too. I use an X-acto knife, chisels and files to further define the design. Begin at the bridge, making sure the fit on the nose is comfortable before turning to the lens area. Setting the lenses in rabbets on the inside of the faceplate is the most demanding part of the project. Work from the bridge toward each temple, carving the rabbet to conform to the shape of the lens, not only its outline but its face, or base curve. The quality of the glue bond depends on uniform contact with the frame around the entire lens. It is also critical that the lenses not be tilted vertically in relation to one another.

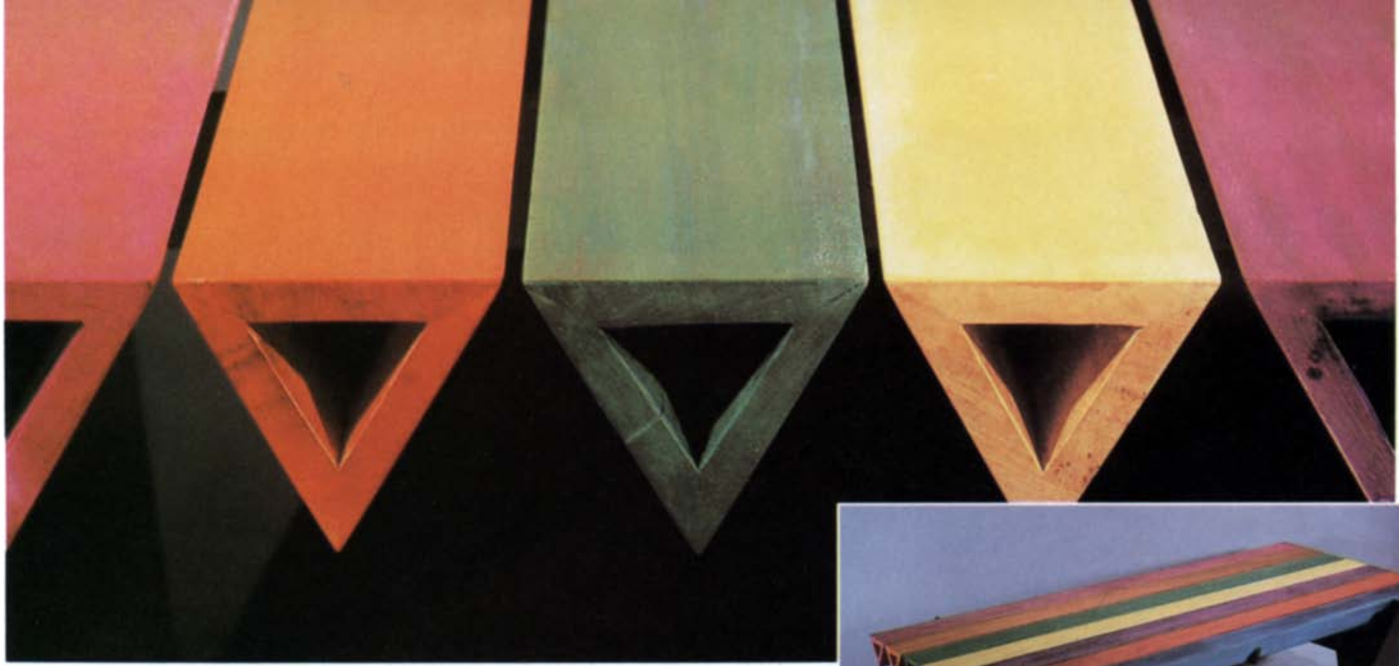
**Lap-mitered frames**—To avoid the disadvantages of having weak short-grain on the sides of the frames and of having to rely on the lenses for strength, you can make the two frame sides from long-grain members. These are joined to the faceplate with pinned, lapped miter joints, as shown in figure 2. The critical thing here is that the pins end up in the middle of the final thickness of the frame. Draw the shape of the frames on the blank before locating the pin.

**Temples and hinges**—When the faceplate is shaped, rough out the temples. Temples have a compound curve where they hook behind the ear, and it's best to copy the shape from another pair of temples you already know to be comfortable. If you do not have a model, you can use cardboard templates. In thin sections, wood loses its elasticity, and in time the temples may begin to fit loosely, requiring an adjustment. My solution is to mortise the metal hinges (pirated off a pair of plastic frames, but also available from an opticians' supply house) into the temples and to rabbet them into the faceplate. This allows minimal play and enough clearance to shim between the frame and temple when necessary. Another problem is the fit over the nose. Leave a little extra wood in the bridge, making final adjustments with fine files and razor knives, or with sandpaper.

Before mounting the lenses, sand and finish the frames. I've used polyurethane, the only problem with which is on the nose saddle, where skin oils and perspiration are concentrated enough to break down the finish.

Durability is affected by grain orientation, species of wood and the quality of the joints. Wood was originally rejected in favor of stronger, more consistent materials suitable for mass production. Anyone willing to create a pair of wooden frames should be prepared to treat the investment with care, because they are breakable. But remember, too, that they are usually repairable. My history of wearing wood is crowded with smashes and fractures. In one of the more memorable instances, a bus literally ran them down. Dodging traffic, I gathered all the pieces—the lenses, miraculously, were hardly scratched—and with patience and epoxy I had them on my face again in two hours. Frames of the other commonly used materials would not have been repairable at all. □

*Howard Bruner is a professional woodworker in Astoria, Ore. Photos by the author.*



*In design, color can carry as much weight as form does. Alphonse Mattia used aniline dyes to distinguish the triangular elements of his coffee-table top.*

# Color and Wood

## Dyeing for a change

*by Roger Holmes*

Ever since the current craft revival floated to America on a sea of Danish oil, clear wood finishes have seemed sacrosanct. Nothing should be allowed to obscure the natural beauty of the wood. Design should serve it; workmanship should enhance it, not get in its way. Nature provided ample color, how could it be improved? Staining wood was deceptive, painting it positively immoral. The best finish, we all seemed to agree, was the one you couldn't see.

This is beginning to change. Colored wood is elbowing in with colorful wood in galleries and at exhibitions everywhere. At last December's Brookfield (Conn.) Craft Center's exhibition, Color/Wood, stain and paint practically drowned natural beauty.

James Schriber, a woodworker in New Milford, Conn., by way of Boston University, organized the show. He'd been toying with paint, and he knew others who were on the color brink, or already over it. Tired of seeing the same old stuff at exhibitions, he decided to focus the show on color.

There was colorful wood, colored wood and color on wood. There were dyes, chemical stains, lacquers, enamel paint, auto-body paint, primer, even printers' ink. One end of the color spectrum was staked out by Silas Kopf's marquetry table—painting *with* wood, rather than on it. The competition was stiff for occupation of the other end of the spectrum. I thought Ed Zucca's silver-painted table, which looked like it was made of metal, right down to the rivets, was the winner.

There's nothing new about coloring wood. The Egyptians painted it, the Chinese lacquered it, medieval Christians covered it with gold leaf. In the 19th century, Lambert Hitchcock stenciled gold fruits and flowers on his black-painted side chairs. In the early 20th century, the Bloomsbury set painted large, bright patterns on simple furniture for the fashionable intelligentsia. No matter how fresh or outrageous any use of color seems, it's almost certain to have been done before.

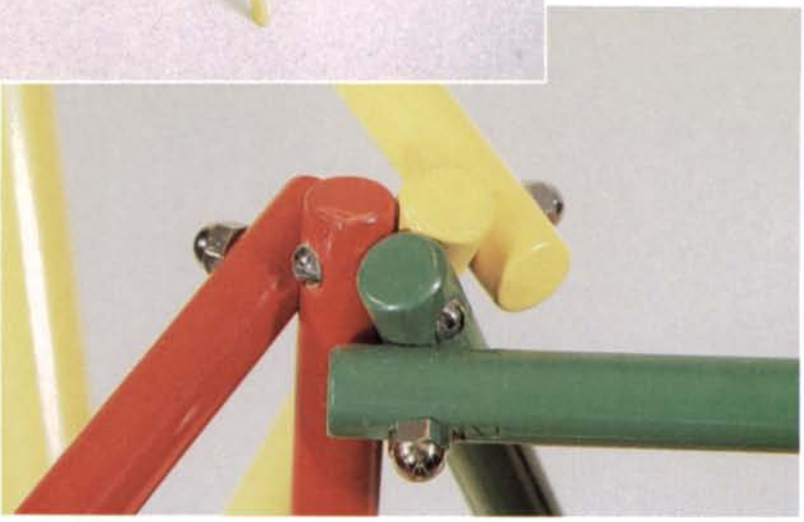
Twenty years ago, many designers would have been embarrassed or outraged if it were suggested that they had been influenced by work from the past. The Modern Movement, the dominant force in mid-20th-century design, had little use for history. Architecture and design ought to reflect the spirit of its age, not be constructed of used parts from another.

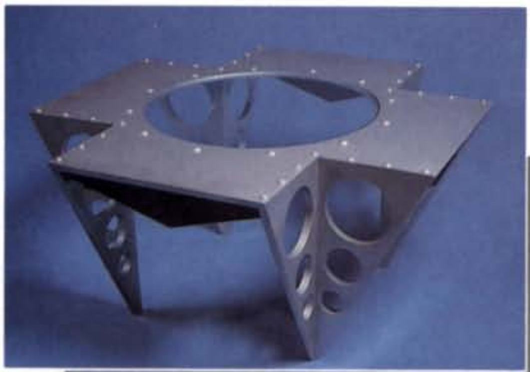
The Post-Modern Movement has rejected this, and many other tenets of the Modern Movement. Post-Modern designers quarry the past for inspiration and material—anything from a concept to a column—just as the Romans mined the Greeks, and the Renaissance mined the Romans. Any period is fair game today. Brookfield exhibitor John Dunnigan, searching for something different in leg-to-stretcher connections for his round table, found inspiration in the Deco designs of the 1920s. Suburban styles and pop culture of the 1950s and early '60s are favored by other designers—Wendy Maruyama borrowed Mickey Mouse's ears, and his color, for the tall chair she exhibited at Brookfield.

Pirated elements are seldom used as they were in the original. Instead of a Doric column, we get an abstract column, flattened out, painted or pasted on a surface. Stripped of their original purposes, separated from familiar surroundings, the elements can be used as symbols or used for their decorative qualities. This can be subtle or blatant, playful or serious. When it's done well, the whole is greater than the sum of its pilfered parts. Form and color are chosen to evoke a feeling or a mood, as well as for utility. Form that once followed function can now follow fashion.

Schriber's hall table (p. 72) is a good example of Post-Modernism in practice. The base presents a series of views of that basic architectural element, the column, flattened as in an elevation drawing or a pilaster. At the right end, we see the column full face, complete with cornice and plinth. The other two legs present it in profile, but the leg at the left has swollen

*Tom Loeser brushed a white enamel base coat on the large surfaces of his chair, above, black on its edges. He daubed on the thin enamel speckles with a natural sponge, letting each color dry before adding the next. John Marcoux used bold colors to articulate the triangulated base of his table, left. Three coats of carefully rubbed shellac serve as a ground for two top coats of enamel, sprayed from an aerosol can.*

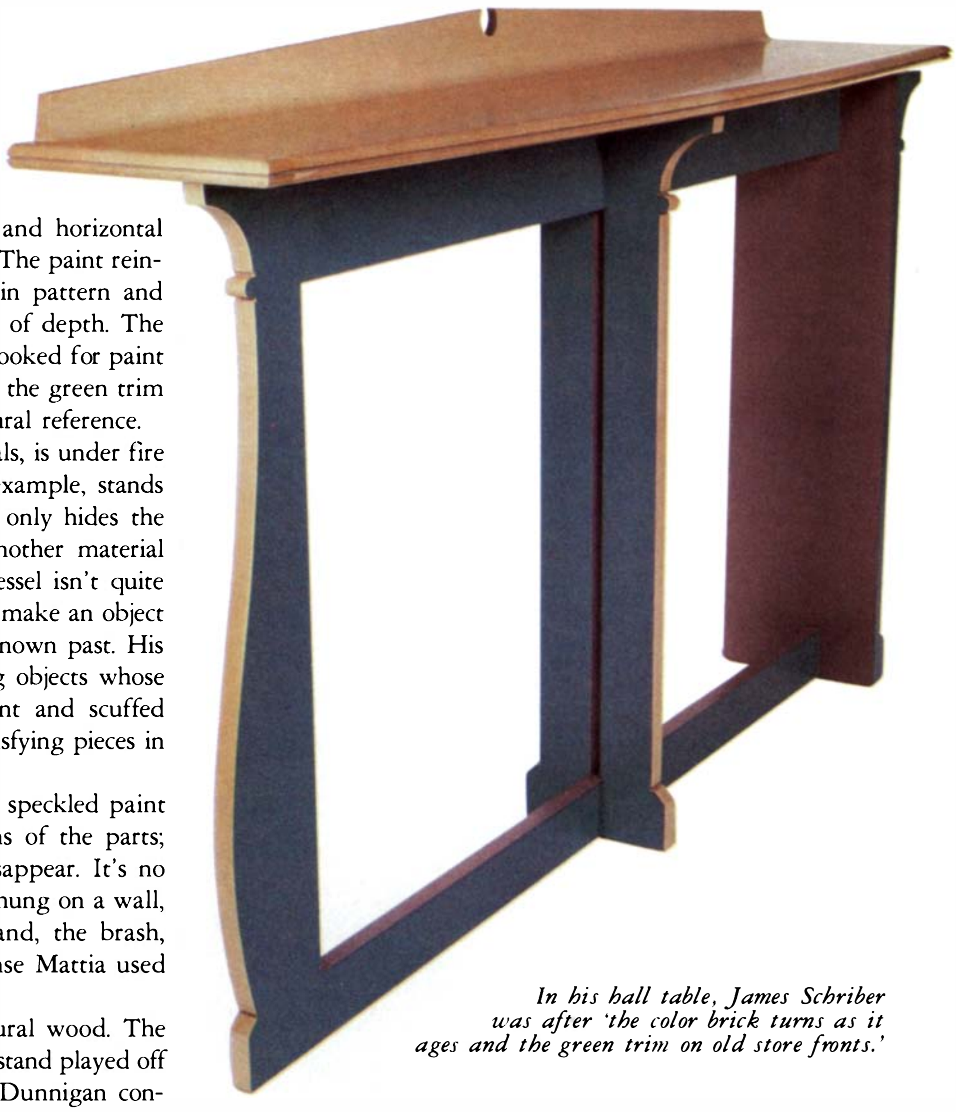




*Ed Zucca's silver paint is straight from an aerosol can, too. He prepared the surface of his table, left, with several coats of sanding sealer. A clear-lacquer top coat protects against greasy fingers.*

*Rosanne Somerson smoothed the edges of the plywood top and shelf of her plant stand, above, with Bondo, before enameling with foam brushes. The bars of color on the surfaces are thick paint, made with tiny stencils.*

and sagged—a column demoted to baluster. Tables have legs, buildings have columns—when table legs look like building columns, they give us something to think or smile about, while they're holding up the top.



*In his hall table, James Schriber was after 'the color brick turns as it ages and the green trim on old store fronts.'*

The table consists of flat pieces—the legs and horizontal connecting pieces are almost two-dimensional. The paint reinforces this flatness by hiding the wood's grain pattern and variations in hue, which can create an illusion of depth. The colors were carefully considered, too. Schriber looked for paint that was "the color brick turns as it ages and the green trim on old store fronts" to reinforce the architectural reference.

Another Modernist dictum, truth to materials, is under fire from Post-Modernists. Ed Zucca's table, for example, stands truth to materials on its head—the paint not only hides the wood, but, along with the form, suggests another material altogether. Michael Hurwitz's small carved vessel isn't quite what it seems to be either. Hurwitz wanted to make an object that appeared to have a rich history, or an unknown past. His vessel has the same evocative quality as aging objects whose history can be read in layers of peeling paint and scuffed surfaces. For me, this was one of the most satisfying pieces in the show.

Color can obscure or clarify structure. The speckled paint on Tom Loeser's chair blurs the demarcations of the parts; planes merge with one another and edges disappear. It's no surprise, then, to see the chair folded flat and hung on a wall, like a '50s action painting. On the other hand, the brash, intense colors that John Marcoux and Alphonse Mattia used on their tables emphasize the structure.

Several makers contrasted colored and natural wood. The bleached-ash legs of Rosanne Somerson's plant stand played off the vibrant colors of the top and shelf. John Dunnigan con-

*Michael Hurwitz sanded through a heavy coat of white primer to reveal traces of the carved wood surface beneath.*

*Bruce Beeken picked bland white-cedar for his simple chest, then decorated it with linoleum-block-printed apples and leaves.*

*Fifteen coats of lacquer give John Dunnigan's table a gleaming, bottomless black finish. He made his own molds to cast the dainty pink feet and trim of epoxy resin.*

trasted a vivid purpleheart top with a base of highly polished, jet-black lacquer and pink cast-epoxy details. An earlier version had a wenge base, but Dunnigan felt that even the subdued figure of that very dark wood competed for attention with the form of the base.

Bruce Beeken used about a dozen linoleum blocks to print the apples and leaves on his white-cedar chest. He spent some time fiddling with color mixes before deciding to use thick, oil-based printers' ink straight from the tube. The apples and leaves add the quality of spontaneous gestures to the rather severe chest. "I meant the chest to be a simple, immediate thing, not very involved, not particularly esoteric," says Beeken. "I remembered a comment of Wendy Maruyama's about making elemental forms rather than complex, involved forms. Taking your perception of a chair and stripping it down to pure form—how you'd dream a chair. The chest was a stripped-down version of a box. The form and color supplied just a little tone to that, but as minimally as possible."

Beeken's piece was a favorite of mine. Though I couldn't buy the chest (it sits now in a house in the middle of an apple orchard), I could see myself trying to make something like it. I might not be as successful, but I could count on having a good time trying. "Painting frees you up," Schriber explains, "you don't have to worry about joinery, matching grain, what width the boards are. You can come up with any kind of form, and not have to rely on the same old shapes. We woodworkers end up worrying about things too much, overworking things to death. With painted stuff, I know if I mess it up, I can put a little putty in it. It's fun. You can make something quick and enjoy working in the shop."

There are, then, lots of reasons why people are painting furniture again. Old styles, old rules begin to chafe, to wear thin. People get bored. The familiar, honest, natural wood surface has become commonplace, often a cliché—what you see is what you get. Apply color and you can't be sure, there's a little mystery, maybe a little fun. □

---

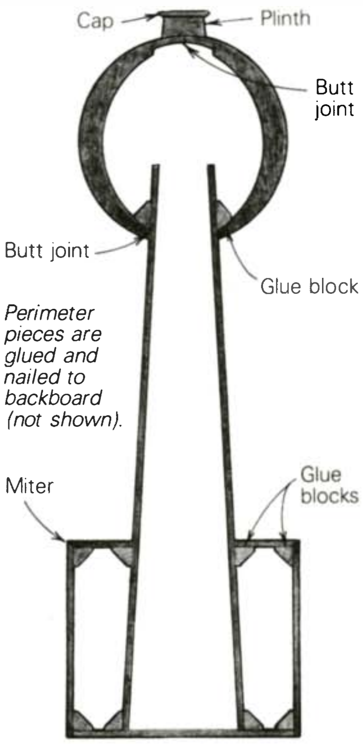
*Roger Holmes is assistant book editor at Taunton Press.*

Simon Willard's patented timepiece, 1805.

# Small New England Clocks

## Minimal cases hide elegant works

*by Jim Cummins*




Monroe's variation, 1815.

The clock shown at far left is popularly known today as a banjo clock, but when American clockmaker Simon Willard patented it—both the mechanism and the case design—in 1802, he called it his Patent Timepiece, and it made his name as famous as that of his compatriot, Paul Revere. The brass movement is elegantly simple, accurate, and long-lived (many of Willard's timepieces are still ticking today), but the case construction is another story. Popular taste demanded richness and detail, while the average pocketbook demanded a low price. The compromise, as shown in the drawing at left, was a clock case made with no fuss about the joinery but with a good deal of surface gleam. The bottom is dovetailed, but the rest of the clock is butt-joined, with the mahogany pieces held together by pine glue blocks. Willard's design so captured the American fancy that his patent was pirated extensively by his competition as well as by his own apprentices. A version by Nathaniel Monroe, for example, shown at left, varies the case only slightly and, to avoid a possible patent violation, has Willard's own movement design mounted upside down behind the dial, which required only minor modifications.

Willard's butt joints and glue blocks aren't the apex of woodworking, but the case shows sophistication in the economical ways its parts combine to create an apparent wealth of detail. The topmost decorative bead on the plinth, for instance, is not integral but an applied cap that's quick to make and stick on. The dainty bead at the back of the clock's entire perimeter is merely the edge of the full-length, ¼-in. mahogany back, which in fact is the strong spine on which the whole construction depends—all the perimeter pieces are glued and nailed to it. The plinth block on top covers and strengthens a butt joint, and veneers cover the mortise-and-tenon joints on the door and center panel. Much of the decoration is reverse-painted glass rather than expensive figured wood. And the brasses, including the



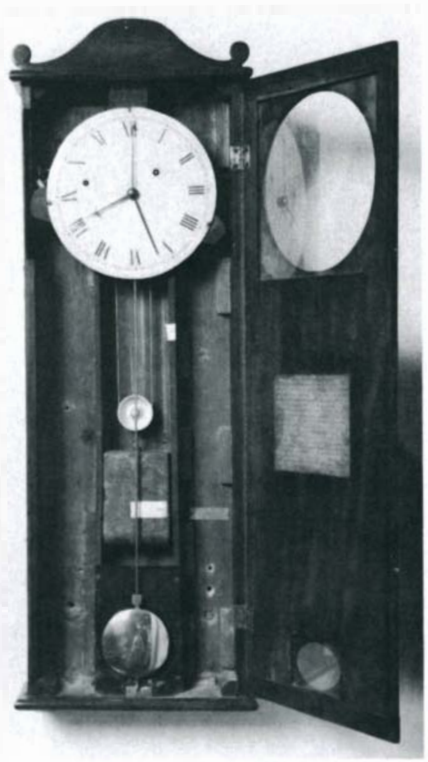
Photos: Henry E. Peach, courtesy of Old Sturbridge Village

*Simon Willard, 1753-1848.*

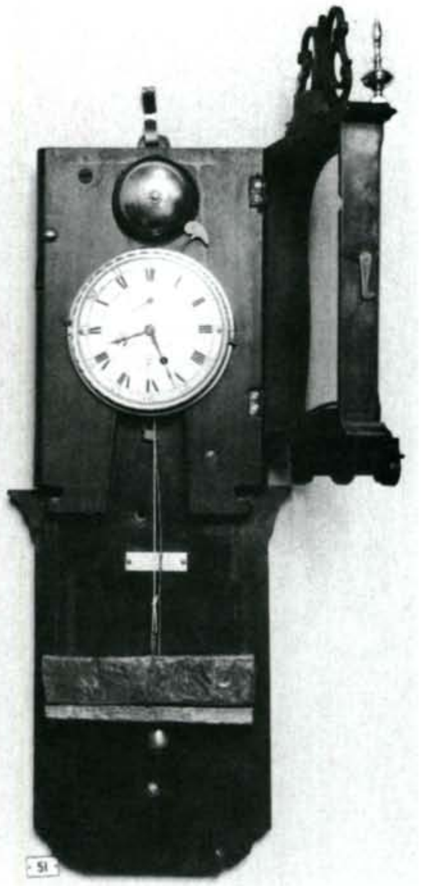
bezel, might be made of gilded wood if brass were in short supply. The clock is no more than it has to be: The center section and the box at the bottom are just wide enough to allow the pendulum to swing from side to side, flashing the passing seconds through the unpainted window in the glass. The dial is in proportion to the size of the base, and the case is no longer than required by the distance that the weight drops in eight days. The very bottom of the case is dovetailed, but it's not wasted labor. In any weight-driven clock, the string holding the weight will eventually break and approximately eight pounds of lead will come crashing down. Willard's bottom construction is insurance against the inevitable—there will be an awful racket when the weight falls, but the case stands a chance of staying together.

**Before factories** began mass-producing clocks, it took a diverse society to come up with the finished product. For a brass movement, like Willard's, the clockmaker or an apprentice would cast and cut the gears, making up movements with a variety of functions: A *timepiece* merely tells the time, and might run eight days, three days, or thirty hours, depending on the design and how much room there is in the case for the weights to fall. A *clock,* strictly speaking, must strike the hours, and not all timepieces are true clocks. (The word "clock" comes from the French word for bell.) An *alarm* might be just a timepiece or it might be a clock as well, and it could strike a bell, a block of wood, or taut piano wires to create a variety of sounds. In most cases, the alarm requires a second, separately wound weight to power it. Thus a timepiece might run a week, while its alarm might need winding daily.

After the customer had chosen an appropriate movement, the clockmaker would usually send the mechanism off to an independent cabinetmaker to have the case made and decorated to suit the customer's taste and budget. A parlor clock required imported mahogany, imported brasses, and the services of a gilder/painter for the glass paintings and the dial. Some clocks required that the cabinetmaker hire a carver as well, after which the case would go to the finisher to be polished up in the same manner as a piece of furniture. Each of these steps added to the expense. The clocks shown at right and below contain standard movements, but the cases suit a low budget, perhaps meant for an office or as a second clock in the servants' quarters. In some instances, clock movements were sold with no case at all, the buyer having the option of seeing to the case himself, or simply hanging the bare movement and dial on the wall. Some movements found their way to rural cabinetmakers, and their cases were made of local woods: walnut, cherry and



*Coffin clocks are relatively undecorated, which allowed them to sell for less, even though they had basically the same accurate movement as the patented timepiece shown on the facing page. Though their clean lines appeal to modern tastes, they were probably meant as second clocks, to be hung in the servants' quarters or in the kitchen, while a grander version kept time in the parlor. The clock at left above shows the unsophisticated cabinetry: lots of glue blocks hold the case to its full-length backboard. In this clock, which is missing the separate weight that powered the alarm, the alarm's hammers strike a wooden block, visible at nine o'clock, instead of a bell.*



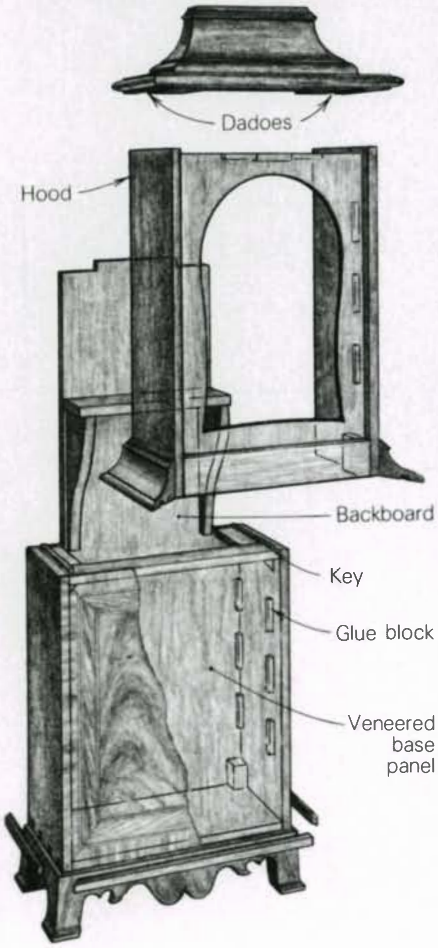
*An eight-day lyre-case timepiece by Curtis and Dunning, above, made about 1830, shows a painting of Truth and Justice. At right, an Aaron Willard 30-hour alarm timepiece from about 1780, disguised with false feet to suggest that it's a compact, spring-powered English import sitting on a separate box. When opened, top photo, its full-length backboard reveals the visual trickery.*

pine. If pine, the case was frequently painted with false grain to make it look like a more expensive, more urban, wood.

**In popular fashion,** when Willard began making clocks, were imported English bracket clocks, so called because they were small enough to stand on a wall bracket. The secret of the small size was that these clocks were powered by a coiled spring instead of a weight, thus they needed no long cases. The problem was that America had no manufacturer of clock springs (and wouldn't until the mid 19th century), and importing the springs was prohibitively expensive. Responding to the fashion, American clockmakers began making their small clocks in bracket-case styles and shapes, but with a box added beneath to conceal the weights. The clock shown open and closed at left was made by Simon Willard's younger brother Aaron. As is typical of many early clocks, the top part of the clock was fitted with feet to suggest that the box beneath was a supporting bracket. In contrast to the coherent designs of tall-case clocks, the disproportionate look of many small American clocks may have been deliberate—taste demanded that the halves look separate.

The interior workmanship in most clock cases is minimal, as evidenced in the drawing on the facing page. Though many standing clocks look like a series of carefully made, stacked boxes, most, including the tall ones, consist of a full-length back to which the fancy cabinetry is attached (*FWW* #26, pp. 67-71). Tall clocks require a certain amount of joinery to keep their own weight from breaking them apart, and occasionally a case was made with lavish attention to every detail. But in general, Yankee thrift and fierce competition kept the elegant gleam skin-deep. □

*This article was compiled with help from Robert Cheney, of Brimfield, Mass., clock conservator, and Douglas Currie, of Sudbury, Mass., consulting wood conservator. The clocks shown here were chosen from more than a hundred New England clocks on display in the J. Cheney Wells Clock Gallery at Old Sturbridge Village, Sturbridge, Mass. For more on how clocks work, see* FWW *#10, pp. 44-51. For a movement and dial like Willard's, write Kilbourne and Proctor, 73 Worcester La., Waltham, Mass. 02154.*




*Joshua Wilder sold this alarm timepiece, above left, in 1813. The sides and top are solid mahogany, but the front is veneered on pine, as are the feet. The movement sits on a bracket fastened to the backboard, and is covered by a removable hood, a three-sided box that slides on dovetail keys. The ⅛-in. thick veneer on the door (not shown in the drawing at left) overlaps the frame, forming a rabbet for the glass.*

*Eli Terry, clockmaker, and Seth Thomas, joiner, combined forces to make 4,000 tall-case clocks between 1807 and 1809, which got them both started on the idea of mass-production. In the early 1820s, Terry introduced this pillar-and-scroll case design, above, which housed a new wooden movement. Thomas soon bought Terry's rights, set up a factory, and found his fortune. The clock was cheap and so popular that hand-craftsmen could not compete.*

# LOCAL LUMBER DIRECTORY

This directory is open to lumber dealers seeking local business. The rate is $3 per word, min. 15 words, max. 9 lines. For display classified enclosed in a box, the rate is $150 per column-inch. Payment must accompany order. Non-commissionable. Deadline is the 15th of the third month preceding issue date.

### *ARIZONA*

**HARDWOODS**
**80 SPECIES**
Over 80 varieties of fine hardwood lumber • Plywood • Everything for the professional and hobbyist • Discounts for commercial users.
**AUSTIN HARDWOODS—Tucson**
2045 N. Forbes • Tucson, AZ 85745
(602) 622-7383

**HARDWOODS**
**80 SPECIES**
Over 80 varieties of fine hardwood lumber • Plywood • Everything for the professional and hobbyist • Discounts for commercial users.
**AUSTIN HARDWOODS—Phoenix**
3821 E. Broadway • Phoenix, AZ 85040
(602) 243-7191

### *CALIFORNIA*

**HARDWOOD CENTER**
*a complete store for woodworkers*
*Exotic Lumber*
*Domestic Lumber*
*Stair Parts*
*Over 3000 separate items*
Fountain Valley, CA
**(714) 540-7117**

SPECIALTY HARDWOODS CORP.
**11820 Western Ave., Stanton, CA 90680**
**(714) 891-8851**

Austin Hardwoods-San Francisco. Quality domestic and imported hardwoods for immediate delivery to commercial users and hobbyists. 2001 Oakdale Ave., San Francisco, CA. (415) 641-1972.

California hardwoods, direct from California's largest producer. Specializing in black oak, white oak, madrone, Fremont cottonwood and burls. Cal Oak Lumber, PO Box 689, Oroville, CA 95965. (916) 534-1426.

White Brothers. Domestic and exotic hardwoods, plywoods and veneers. 4801 Tidewater Ave., Oakland, CA 94601. (415) 261-1600.

### *CONNECTICUT*

Domestic and imported hardwoods, softwoods, 30+ species, kiln-dried, best quality. Hardwood paneling, flooring. Millwork. No min. Plywood available. Craftsmanship in Wood, Inc., 160 Oak St., Bldg. 6, Glastonbury, CT 06033. (203) 659-3528.

Wilson Woodworks. Stocking fine hardwoods and offering custom milling for the craftsperson. Dolge Mill, Rte. 19, Stafford, CT 06075. (203) 684-9112.

Local Lumber Co. Fancy hardwoods, custom milling and kiln drying. 113 Canal St., Shelton, CT 06484. (203) 735-3343.

### *FLORIDA*

Rare Wood Works, Inc. Exotic and domestic hardwoods, plywoods and millwork. Special on slab-cut cocobolo, 4/4 to 20/4, $10/bd. ft. 4360 NE 11th Ave., Ft. Lauderdale, FL 33334. (305) 564-8365.

F. J. Fitchett Foreign & Domestic Hardwoods, 409-411 24th St., West Palm Beach, FL 33407. (305) 833-5777. Millwork.

ATTENTION:
**FLORIDA WOODWORKERS**
We have Florida's largest selection of exotic and native hard and soft woods, table slabs, veneers, etc. for the professional and novice. Send SSAE for list.

**HENEGAN'S WOOD SHED**
7760 Southern Blvd(F.W), West Palm Beach, FL 33411
Call (305) 793-1557 for Prompt Delivery

Domestic and imported lumber, exotics, veneers. Hardwood Lumber Sales, Inc., 3128 Melson Ave., Jacksonville, FL 32205. (904) 356-0665

### *ILLINOIS*

Kiln-dried native hardwoods and veneers. Custom surfacing. The Hardwood Connection, "Your Complete Woodworking Store", 420 Oak St., DeKalb, IL 60115. (815) 758-6009.

### *INDIANA*

Exotic and domestic woods, huge supplies. Veneers, basswood to 4 in. thick. Marine plywood, hardwood plywood ⅛ to ¾ in. Northwest Lumber Co., 5035 Lafayette Rd., Indianapolis, IN 46254. (317) 293-1100.

### *IOWA*

Hardwood lumber, veneered plywoods, carving blocks and veneers. Woodcraft Shop, 419 E. 59th, Davenport, IA 52806. (319) 386-5318.

### *LOUISIANA*

Ruston Lumber & Supply, Inc., 311 W. Mississippi Ave., Ruston, LA 71270. (318) 255-4110. Quality hardwood lumber, KD. Custom milling, resawing.

### *MAINE*

Genuine Honduras mahogany, rosewoods, quality exotics, domestics. Black Mountain Wood Co., 53 Kennebec St., Portland, ME 04104. (207) 772-3332. $50 minimum.

Milk and Silver Hardwood Co., 6 Milk St., Portland, ME 04111. (207) 772-2450. Foreign and domestic hardwood lumber. Free advice for assembly. Quality, kiln-dried hardwood.

### *MASSACHUSETTS*

Rosewood and Teak
Cocobolo and other fine Hardwoods
Wholesale - Retail
Seasoned - Green
Call, or send your requirements
**B. Mills Inc.**
10 Spray Ave.
Marblehead, MA 01945
(617) 927-3323

Boulter Plywood Corp., 24 Broadway, Somerville, MA 02145. Fine hardwood plywood, lumber. See ad in Classified.

Hardwood, softwood, plywood, complete millwork, glued panels. Wholesale, retail. Large inventory. Amherst Woodworking, Northampton. (413) 584-3003.

Factory Lumber Outlet, Rte. 140, Boylston, MA 01505. (617) 869-2791. "Woods of the World". Stocking over 70 species of exotic and precious wood. Custom milling.

Cambridge Lumber & Supply, 135 Harvey St., Cambridge MA 02140. (617) 876-4460. Stocking over 25 species of exotic and domestic hardwoods. All FAS grade. Wide and long lengths. No minimum.

### *MISSOURI*

Hibdon Hardwood Inc., distributors of fine hardwood lumber, plywood, veneers and millwork. Custom hardwood flooring and paneling. Kiln-dried stock up to 16/4 in thickness. 1539 Chouteau Ave., St. Louis, MO 63103. (314) 621-7711.

### *NEW HAMPSHIRE*

Specialists in James Krenov's favorite woods, ebony, and other rare species. No order too small. Sold and selected by professional woodworkers. Mahogany Masterpieces, Bear Brook State Park, RFD 1, Wing Rd., Suncook, NH 03275. Visit us in sales-tax-free New Hampshire. (603) 736-8227.

Monadnock Forest Products, Inc. Kiln-dried domestic hardwoods from our sawmill in Jaffrey, NH 03452. (70 mi. from Boston). (603) 532-6011.

### *NEW JERSEY*

**Willard Brothers Woodcutters**
**300 Basin Rd., Trenton, N.J. 08619**
**Call (609) 890-1990**

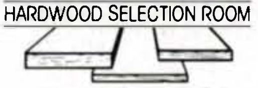
Sixteen species of cabinet-grade hardwood lumber 4/4 to 16/4, many 10 in. and wider. Veneers, carving blocks, hardwood plywoods, hardwood moldings, hardwood doors, custom surfacing and millwork at Mr. Roberts Lumber Centers, 50 Clements Bridge Rd., Barrington, NJ 08007. (609) 547-7620.

### *NEW YORK*

Exotic and domestic hardwoods. Ebony, rosewood, bubinga, cocobolo. Unusual dimensions. Lignum vitae blocks. Logs. Joshua Hoffman, NYC. (212) 964-2860.

### *OHIO*

**DENIER BROS.**
HARDWOOD SELECTION ROOM



710 E. SHEPHERD LANE
**CINCINNATI, OHIO 45215**
PHONE **(513) 554-0449**
ONE BLOCK EAST OF I-75 AT EXIT 13

Cabinet-grade kiln-dried hardwood lumber, turning squares, moldings. Croy-Marietta Hardwoods, Inc., 121 Pike St., Marietta, OH 45750. (614) 373-1013.

### *OREGON*

Medford Lumber Co., 3rd and No. Fir, Medford, OR 97501. (503) 773-7531. Extensive hardwood and softwood inventory, domestic and imported. Old growth redwood, Alaska yellow cedar, Port Orford cedar, kauri, sen, teak, East Indian laurel, Pacific madrone, macawood. AD koa, kuku, pau marfin, African padauk.

### *PENNSYLVANIA*

Wide walnut lumber FAS $3/bd. ft. Quantity discounts apply. Call Gerry Grant, Gettysburg, PA. (717) 334-6020.

Woodcrafters' Supply, Inc., 9509 Perry Hwy., Pittsburgh, PA 15237. (412) 367-4330. 54 species domestic and imported lumbers.

Austin Hardwoods Philadelphia. Comprehensive stock of furniture and cabinet-grade hardwoods at reasonable prices. 5701 Magnolia St., Philadelphia, PA. 848-9663.

Hardwoods, wide range of thicknesses. KD warehouse stock. Minimum, $100. Buehler Lumber, Ridgway, PA 15853. (814) 776-1121.

### *RHODE ISLAND*

Exeter Hardwoods, featuring wide line of air-dried hardwoods including cherry, walnut, curly maple and more. (401) 295-1243.

### *TENNESSEE*

Hardwoods of Memphis - 2667 Jackson, Memphis; 2000 Elm Hill Pike, Nashville. "Everything for the Woodcrafter". Domestic and foreign lumber, veneer, plywood, turning squares. Over 60 species. (901) 452-9663.

### *TEXAS*

San Antonio and South Texas' hardwood store. Austin Hardwoods, San Antonio, 2446 Brockton, San Antonio 78217. (512) 822-8833; 822-8323.

Dallas' finest. Hardwood lumber, 40 species. Plywood, veneer, moldings, milling facilities. Wood World, 1351 S. Floyd Rd., Suite 101, Richardson, TX 75081. (214) 669-9130.

### *VIRGINIA*

**McFEELY'S**
FOREIGN AND DOMESTIC
HARDWOODS•SOFTWOODS•VENEERS
CUSTOM MILLWORK•FREE CATALOG
43 CABELL ST. (804) 846-2729
P.O. BOX 3. LYNCHBURG, VA. 24505

Foreign and native hardwood lumber. Custom millwork and moldings. Woodworkers Supply, 430 Southlake Blvd., Richmond. 794-0883.

### *WASHINGTON*

Over 70 exotic and domestic hardwoods. See our display ad. Kaymar Wood Products, 4603 35th SW, Seattle, WA 98126. (206) 932-3584. Canadians welcome.

### *WISCONSIN*

**HASTREITER HARDWOODS, INC.**
**2nd & Pine Street**
**Marathon, WI 54448**
**Retail & wholesale domestic northern and Appalachian hardwoods 1" thru 2" kiln-dried, rough or surfaced.**

# A DREAM COME TRUE...

## for Woodworkers and Handymen!!


## Vunder™ Vise

**The most versatile vise system ever... at an unheard of low price!**

**FULL FIVE YEAR WARRANTY!**
Complete details with purchase or write for advance free copy to: D.R.I. Industries, Inc., Dept. FW-783 11100 Hampshire Ave. So., Bloomington, MN 55438

**INDUSTRIAL QUALITY**
Handle works from left side, right side or middle of the bench.

**EXCLUSIVE FEATURE**
Additional jaw fits on end stop, gives necessary support for large workpieces. No other system has it!

### Like a whole workshop full of clamps and vises—all in one compact system!

* Clamps any material—wood, metal, plastic, fiberglass.
* Takes on any size from minute watches to full size doors and even larger...and everything in between.
* Works in any position—above the bench, below the bench, on the left or right side, and even in the middle.
* Puts a super hold on any shape—whether flat round, jointed, bulky or awkward.

**Use it for...** *Sawing *Gluing *Planing *Routing *Nailing *Drilling *Filing *Grinding *Soldering...and much more.

### 100% Guarantee of Satisfaction!

Test Vunder Vise FREE of obligation to keep it. If you don't agree it's the ideal system, send it back for a complete refund.

**A fraction of what you'd pay for all the tools it replaces... a fraction of what you'd pay for any other similar system!**

just $49.99 plus $4.90 shipping and handling

D.R.I. Industries! We've introduced the NUT & BOLT SHOP® the 4-Wheel Wonder® and dozens of other high-quality, unique handyman products. OVER 2 MILLION CUSTOMERS.

**Shop and Compare.** Anything comparable costs about twice as much. But you get the same high qua ity plus the extra jaw!

**Order now and get 2 FREE GIFTS!** Free Shop Apron valued at $4.99 plus a Surprise Free Gift...BOTH yours to keep, even if you return your Vise!

™Vunder is a trademark of D.R.I. Industries, Inc. Made in Taiwan



**Order Yours Now!** Just fill in the attached Special Offer Coupon and send it with your check, money order, company purchase order or credit card information.

Or credit card customers can call our 24-hour Toll-Free number:
**800-228-5000**
(in Nebraska, 800-642-8777).

### SPECIAL OFFER COUPON

28554 MAG-70

Try it FREE of obligation to keep it!
If not totally satisfied, you can return your order for a complete refund, including shipping and handling.
Make remittance payable and send to:
D.R.I. Industries, Inc., Dept. FW-783
11100 Hampshire Ave. So., Bloomington, MN 55438

INDICATE ORDER ______ Vunder Vise(s) @ $49.99 plus $4.90 shipping and handling each. (00007201)
How Many?

CHECK METHOD OF PAYMENT
☐ I have enclosed my check or money order for the full amount. (MN residents add 6% sales tax.)
☐ I have enclosed my company purchase order (this card MUST accompany ALL purchase orders).
☐ Charge it to: ☐ VISA ☐ MasterCard ☐ American Express ☐ Diners Club ☐ Carte Blanche

Card No. ______ Exp. Date ___/___

SIGNATURE X ______
(Need sign only if charging)

PLEASE PRINT NAME Mr. Mrs. Miss ______

ADDRESS ______
Street & No.

CITY ______ STATE ______ ZIP ______

# Sleuthing Bark Beetles

By Ivars Peterson

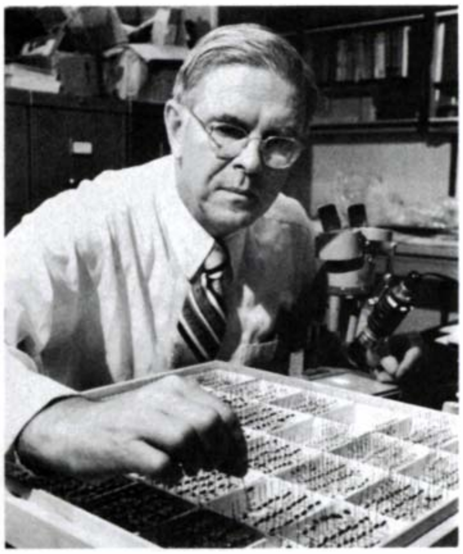
In tropical forests, the smell of mahogany released as a chainsaw or an ax rips into the wood is enough to attract a swarm of flitting ambrosia beetles. As soon as the tree settles to the ground, the insects land and bore into the soft sapwood laid bare by the cutting. Mahogany (*Swietenia* spp.), with just a small ring of sapwood, survives the onslaught and arrives at the sawmill only slightly damaged. But other species with wider sapwood may not be worth hauling out of these forests.

About 6,000 varieties of bark and ambrosia beetles populate the globe wherever woody plants grow. These insects are very specialized; few species attack all kinds of timber. Some bark beetles live in particular seeds or fruits, others in twigs of living shrubs, some only in cactus or coffee berries. Although bark beetles cause more than half of the insect tree destruction in U.S. forests, they are also beneficial by removing stagnant growth and speeding the recycling of dead material.

Nearly 500 different types of bark and ambrosia beetles flourish in the United States. The clearest evidence of their presence emerges when bark is stripped from a dying tree, revealing the intricate, varied patterns of the tunnels where these inconspicuous insects hide for most of their lives.

Stephen L. Wood has examined hundreds of thousands of bark beetles and the tracks they leave, and has traveled throughout the world sleuthing them down. Based at Brigham Young University in Provo, Utah, Wood last year completed a 1,359-page volume (available from Brigham Young University Press, Provo, Utah 84602) on the bark and ambrosia beetles of North and Central America.

Wood leaves the details of beetle behavior to other researchers. His specialty is identification and classification. "Bark beetles are among the most difficult of all insect groups in which to identify the species," says Wood, "and yet, you have to have them precisely identified." To control infestations, researchers must know exactly which organisms they are investigating, because a containment scheme may work with one species but not with the next. As a result, Wood's laboratory is piled high with packages containing specimens from all over the world. An important part of his work is tracing the migration of bark beetles. In past centuries, several dozen species have hitched rides to North America aboard wooden ships, and some of these clandestine immigrants have become serious pests. More recently, new insect species have arrived nestled in shipments of nursery stock imported from other parts of the world.



*Living in darkness, bark beetles can construct galleries of startling symmetry, as this photo of handiwork done by the European bark beetle shows. The species is a major carrier of Dutch elm disease. Above right, Wood catalogs one of the thousands of specimens in his collection.*

"About every year or so, I get involved in a decision that has multi-million dollar implications," Wood says. Once, when he was in Costa Rica on sabbatical leave, a U.S. embassy official arrived at his door with a vial containing an insect. "We must have an identification now, and you're the only person in the world who can do it," the official explained. The beetle had arrived in Los Angeles with a quarter-million dollar shipment of wooden products from Japan. The government had to decide whether to condemn the cargo or unload it. Wood says, "I looked at the beetle in the vial and said, 'You've already got them in California.' "

Wood can often identify bark beetle types from the gallery systems they bore. These tunnels can be simple cavities carved into the wood, or elaborate butterfly-shaped patterns, like those characteristic of the native elm bark beetle. Some tunnels are engineering and aesthetic marvels of insect woodwork that rival man's working. Long galleries (used for storing eggs) under thick bark often have ventilation tunnels placed at irregular intervals and extending from the main tunnel to near the bark's surface. These branches may also serve as turning niches or as escape hatches. Living in darkness, bark beetles rely on chemical signals, touch and occasionally sound for communication. As a result, some species have evolved elaborate, bizarre body structures, especially on the front of the head, the body part that receives sensory input in the narrow tunnels.

Of the thousands of bark beetle species, fewer than two hundred are really destructive. The best control methods require accurate identification and a detailed knowledge of individual species. "As the human population gets larger, our timber resources will become more vital to us," says Wood. "These beetles are going to become more important as killers of trees. We have to figure out ways to combat them." □

*Ivars Peterson is a technology and policy editor at* Science News *in Washington, D.C. For more on wood-eating bugs, see* FWW *#34, pp. 59-60.*

**Paint Magic, The home decorator's guide to painted finishes** by Jocasta Innes. *Van Nostrand Reinhold Company, 135 West 50th St., New York, N.Y. 10020, 1981. $29.95, hardcover; 240 pp.*

This is not the first book of its kind, but it is probably the first one aimed at the "home decorator," a breed of amateur that didn't seem to exist more than a few years ago. The processes explained here, such as graining, tortoiseshelling, japanning, marbling and gilding, used to be part of the professional finisher's advanced course, requiring years of study, much genuflection to one's master, and three or four years of doing nothing but sanding work before you were even allowed to touch a paintbrush.

Instead of years of study, *Paint Magic* calls for "a dash of venturesomeness, the will to get materials together, and the curiosity to try them out." Jocasta Innes gets away with it. The reader ends up with a good knowledge of different paints and solvents, how they interact, and how they were used in the past—on walls, on floors, on furniture. There are many double-page color photographs showing modern rooms decorated just right, and many original examples of rooms and furniture that may shake your notions about how the old folks really lived. After looking at some of these pieces—classical furniture seemingly desecrated by stencils and painted panels that completely obliterate its form—you may begin to see your old furniture with another dimension hovering behind, a phantom of outrageous vitality.

There are pieces here so successfully done that you wonder whether *all* furniture shouldn't be painted. This is expert's work, nevertheless. Lying just under Innes' burgeoning enthusiasm is an abiding respect for the master finishers who developed and practiced this magic. These projects are more difficult than they look, and scattered through the book are a few awkward examples, pieces that just don't make it. But paint can be removed or reworked, if first attempts leave a piece (or a wall) looking baffled and afraid.

This book's $30 price tag may put some people off, but the cost, to me, seems an honest one—the photographs are sumptuously reproduced. This is the sort of book that one often finds, months later, selling for half the price, but usually it isn't quite the same book: someone has bought the publication rights and cheaply reprinted it with fuzzy, off-color, out-of-register illustrations that take all the punch away. Thirty dollars is about the cost of a couple of gallons of paint these days. *Paint Magic* will give you some good ideas of what you can do with it.

—*Jim Cummins*

**Polychromatic Assembly for Woodturning** by Emmett E. Brown and Cyril Brown. *The Linden Publishing Co., Inc., 3845 N. Blackstone, Fresno, Calif. 93726, 1982. $15.95, paperback; 113 pp.*

Whether or not we realize it, most of us work wood polychromatically. Instead of seeing wood as monochromatically bland, we look for brilliant and multihued pieces—sapwood to create subtle light/dark patterning, zebrawood or rosewood for their dramatic pigment changes, walnuts with tinges of red and purple, aromatic cedars for their distinct red/white grain pattern. For visual impact, some woodworkers allow the oxidizing effects of light and water to color

the woods they use. Polychromatic assembly, however, is the deliberate use of wood species of contrasting colors to create distinct patterns and effects.

As a shop manual or reference volume, *Polychromatic Assembly for Woodturning* is excellent. There are lots of drawings and photographs detailing various fixtures, assemblies and finished turnings. The authors provide numerous formulas for computing the various angles and dimensions needed to arrive at a given shape or assembly. Assembly techniques are covered in depth, including studding, and block and segment constructions.

Unfortunately, the book has some serious flaws. Although the illustrations are plentiful, they are not always of the best quality. In addition, parts of the text are ploddingly detailed, and there are colloquialisms that make for difficult reading. The authors give only a sketchy history of polychromatic assembly, and skip lightly over adhesives and wood movement due to moisture. Having seen some of Emmett Brown's work, I can attest that even after twenty years there's no sign of checking, joint failure or wood movement. But he doesn't tell us how he did it, or what finishes and adhesives he works with. Fortunately, this information is well covered in other books, and the Browns do provide an excellent bibliography.

*Polychromatic Assembly* is almost double the cost of most shop manuals, but it might appeal to the devoted and moderately experienced woodturner. Despite their uneven quality, the photographs do provide considerable information and inspiration.

*—David Dempsey*

**The Complete Woodworker** edited by Bernard E. Jones. *Ten Speed Press, PO Box 7123, Berkeley, Calif. 94707, 1980. $7.95, paperback; 408 pp.*

A reprint of what appears to be a prewar British book (although it's unclear which war), this is a fairly thorough introduction for the beginning woodworker. The layout and sequence of operations for making a wide range of joints are well done, but you'll need to look elsewhere for the finer points of wielding the backsaw or chisel to cut them.

The old-fashioned prose is fun to read. I liked the chapter on the aviation woodwork of the day, a brisk and somewhat opaque explanation of the construction of the wooden wings, fuselage and propeller of a biplane. The other projects toward the end of the book are more earthbound, including a sturdy wooden wheelbarrow, an elaborate lattice-framed stepladder and a small greenhouse.

Hand woodworkers of all abilities will find some useful tidbits here—homemade clamping setups, various bench jigs for sawing and planing, tricks of the trade. A beading tool made of a block of wood and a flathead screw is offered, as well as 14 pages on the Stanley #55 combination plane.

This is a good browsing book. It's enjoyable to read about how things were done not so many years ago, and rewarding to discover that you're part of a tradition, too. For example, I learned that the way I make mortises, clearing the waste with an auger bit, was standard coachbuilders' practice.

*—Roger Holmes*

*Jim Cummins is an assistant editor at* FWW. *David Dempsey operates Wilshire Woodworks in San Francisco, Calif. Roger Holmes is assistant book editor at The Taunton Press.*

# Cornwall Carver: Charles Moore

BY DEAN K. OTTESON

Charles Moore is one of the three remaining figurehead carvers in England, and probably one of only a few such craftspeople in the world. He has carved more than a hundred figureheads, among them the Britannia for the restaurant on board the *Queen Elizabeth II*.

When I visited Moore in 1981, I found him to be a fascinating subject. Scarf tucked beneath his collar, he looked to me like a typical English gentleman. He told me that when he was younger he had worked in Indonesia on the rubber plantations, and had later taken a job with a clock manufacturer, working his way up to a top position in the company. Now 81 years of age, he started carving when he was 60, "after finding some tools and giving it a try." He had worked as a local boatman, so carving figureheads seemed natural.

At first, like all beginning carvers, Moore struggled with the problem of carving too flat and being afraid to get down into the wood. Seeking to bring life to wood, he fussed over his work, trying to keep from making eyes too flat and noses too long. He seems now to have mastered the work.

*Charles Moore with a pirate figurehead carved in Cornish elm.*

Moore told me about figureheads made by the Egyptians and Norsemen, and those of the Elizabethan periods. I'd always thought that most figureheads were of women, but depending on the period, figureheads of lions, rearing horses and men were typical.

Moore makes his own drawings and enlarges them with a kind of opaque projector. He then refines the drawings prior to roughing out, working mostly in yellow pine and Cornish elm. After the carving work is completed, he paints the figureheads, using oil paints for the faces and gold leaf applied over polyurethane while it still has a light tack.

Moore has a great respect for American figurehead carvers, but thinks that hobbyist carvers put too much emphasis on animals, birds and hillbillies. He suggests that we look toward space for inspiration, and experiment more with bold color and finishes. □

*Dean K. Otteson, the 'Wandering Woodcarver,' is a junior high school principal in Kenai, Alaska.*


forget about those awkward inventions where...
"taking off this or that part, adding another piece... turning something over... the machine becomes a planer, which becomes a moulder
and then you turn the table over and so on..."
Forget about the sheet metal boxes...
the drill powered gadgets,
the add-ons that get lost... the special wrenches and the costly accessories which seem to never end.
LOOK AT THE ZINKEN MACHINES
one lever 6 operations
MIA 6 SIX OPERATIONS:
surfacing planer · thicknessing planer · circular saw · spindle moulder · mortiser-borer · tenoning saddle.
The smallest for your big work!
The MIA 6 (weight 48 Kg. · 106 pounds, 1 HP motor with overload protection) has been designed and built after years of study and experience and with the collaboration of do-it-yourself experts.
This machine is very compact and complete; it is equipped with the latest devices which make it easy to use and guarantee precision work.
Its cast aluminium construction makes the MIA 6 light and sturdy. Since it occupies very little space and is easy to carry, this machine has been a success with hobbyists the world over.
ZINKEN COMPACT 21/S SIX OPERATIONS:
surfacing planer · thicknessing planer · circular saw · spindle moulder · mortiser-borer · tenoning saddle.
A solid machine (weight 110 Kg. · 243 pounds), with one-piece cast aluminium bed and stainless clad cast aluminium work tables. One solid unit which houses the motor, 1,5 HP with overload protection, single phase or three-phase, where all the moving parts are chromed; the rotating parts are mounted on prelubricated sealed-for-life ball bearings and all the vital parts are precision machined. There are more than 500 easily identified and interchangeable parts which were checked and assembled on a specially designed assembly line. The ZC 21/S's modern design makes this machine a technological masterpiece which is pleasing to the eye.
mi a6
Base optional
Sliding table and base optionals
ZC 21
The control lever is a real gearshift which automatically selects and controls the operation you want... and only that one! All the power from the motor is transmitted to only one operation.
When you need a planer the ZINKEN machines are planers and nothing else.
When you need a circular saw the ZINKEN machines are circular saws and nothing else. When you need a moulder the ZINKEN machines are moulders and nothing else... If you need a practical, easy to use, safe, precise, powerful and light weight combined machine, then the ZINKEN machines are the machines for you.
$1425 delivered
$3100 delivered
tenoning saddle
surfacing planer
surfacing planer
thicknessing planer
circular saw
splindle moulder
mortiser-borer
thicknessing planer
circular saw
spindle moulder
mortiser-borer
tenoning saddle
DISTRIBUTED BY:
Rudolf Bass, inc.
MAIN OFFICES & WAREHOUSE
45 Halladay Street
Jersey City, New Jersey 07304
(201) 433-3800
1101 East 25 Street
Hialeah, Florida 33013
(305) 691-BASS
Showroom:
175 Lafayette Street
(Corner Grand St.)
New York, New York 10013
(212) 226-4000
1-800-526-3003
VISA & MasterCard accepted.
AFTER 8 YEARS OF SUCCESSFUL SALES IN EUROPE, NOW AVAILABLE IN THE U.S.A.
DEALER INQUIRIES INVITED
DEALER INQUIRIES INVITED

# A New Paper, Daphnes, Gallery Closings

**Critical review** is the stated purpose of a new quarterly woodworking tabloid being published by the Wendell Castle Workshop. The first issue of the newspaper, called *Workshop,* was mailed out in March. Along with ads for Castle's summer courses (*FWW* #39, p. 103), it featured a New York show review and a discussion of the need for design criticism.

Castle says he means the periodical to be a non-commercial forum for "informed, objective criticism," rather than technical reportage. He invites editorial contributions; write him at 18 Maple St., Scottsville, N.Y. 14546.

**Four Daphne awards,** the Hardwood Institute's annual industry-wide furniture design competition, went to designer-craftsmen last spring.

Joe Agati, a Chicago ceramic engineer and glass craftsman turned woodworker, won first place in the limited-production division for a lacquered maple table and chairs much like the suite he showed in *FWW* #40 (p. 105). Runner-up awards in the division went to John Tierney of Easthampton, Mass., for his cherry-and-leather table and chairs, and to Dale Broholm of Boston for a veneered drop-leaf table. In the upholstered category, Jay Peters of Blue Hill Falls, Maine, won a finalist award for his cherry-and-spruce sofa.

For information on next year's competition, write the Hardwood Institute, 230 Park Ave., New York, N.Y. 10169.

Two discount woodworking tool firms, **John Harra Wood and Supply Co.** of New York and **Ten Plus Tools** of San Francisco, have filed for bankruptcy. Harra notified the bankruptcy court in New York City in early March that he hopes to reorganize his business to satisfy creditors under terms of Chapter 11 of the U.S. code. In San Francisco, Ten Plus filed a Chapter 7 action, which means that its assets will be liquidated to pay off creditors. Anyone with an interest in the Harra proceeding (case number 83B-10341) can write the bankruptcy court at 40 Foley Square, New York, N.Y. 10007. For the Ten Plus case (number 3-83-00885-E-LK), write the court trustee, John England, 55 New Montgomery, Suite 626, San Francisco, Calif. 94105.

**A soft economy** and shifting craft marketing patterns led to the closing of wood furniture galleries on both coasts. In Philadelphia, **Richard Kagan** closed up shop in April after ten years of selling his own furniture and that of other makers. San Francisco's **Signature Gallery,** a popular retail outlet for Bay area woodworkers, shut down in March.

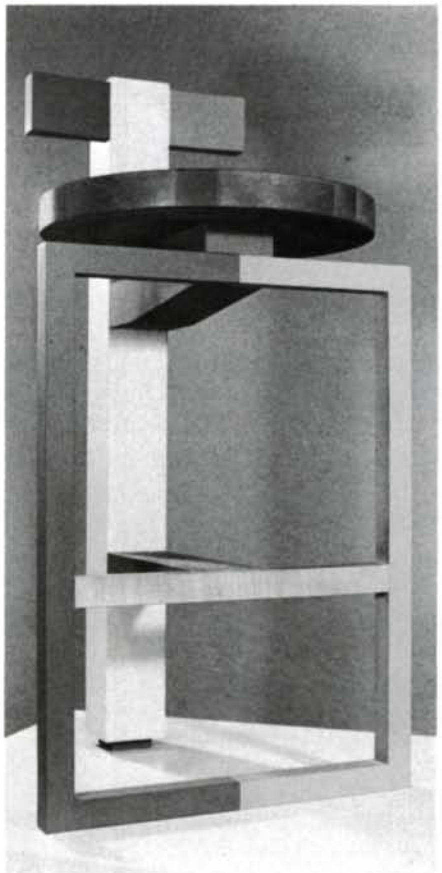
"When I opened up, there weren't any galleries or museums that were just about wood," Kagan said. "The field has changed now and I'm pleased with that. I'm looking forward to spending more time in the workshop." Many of the craftspeople Kagan had handled will now show at the Snyderman Gallery, set to open this fall in its new location at 319 South St., Philadelphia.

Dan Gordon, who with his wife Cynthia started Signature eight years ago, takes the view that galleries are too expensive a way to sell craft furniture, and that most craftspeople prefer dealing directly with clients. □

# WOOD AT THE WUSTUM

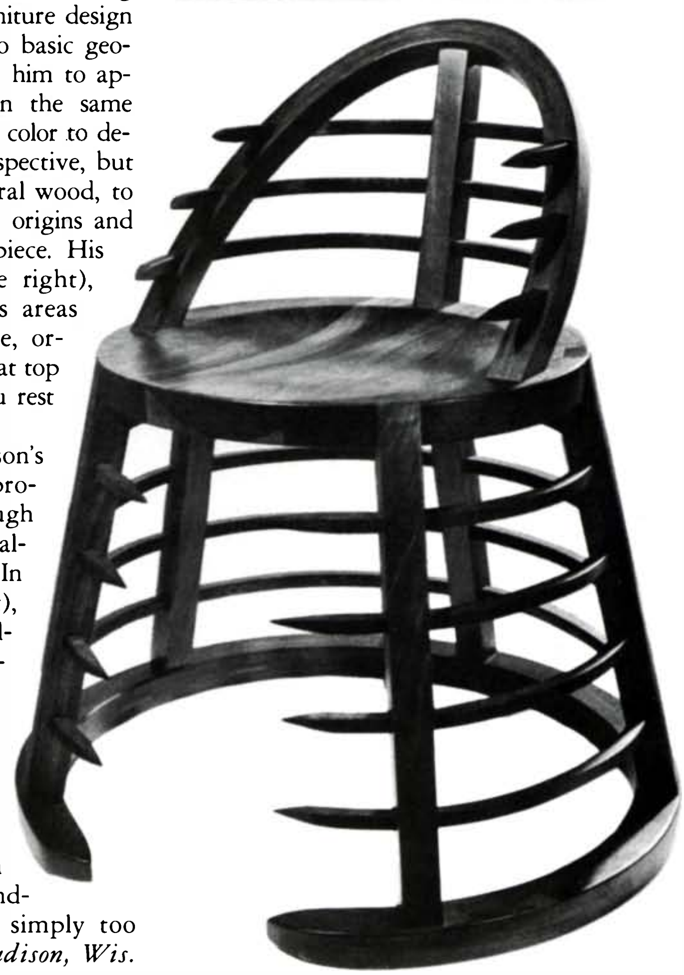
During April, Wisconsin Wood '83 gave woodworkers throughout the state a rare opportunity to display their work. Bruce Pepich, director of the Wustum Museum in Racine, told me that this was their first show strictly for woodworkers. The museum, accustomed to showing paintings, went out on a limb, and the response surpassed all hopes and expectations.

From traditional and contemporary to pop and funk, there were more than seventy pieces of furniture and sculpture, arranged as though they were part of the former residence of art patron Charles Wustum. Twelve artists were represented, many of them students and/or graduates of the University of Wisconsin-Madison Fine Arts program taught by C.R. "Skip" Johnson. Their innovative approaches to woodworking helped to bridge that ambiguous gap between sculpture and furniture. A walk through the museum's spacious yet intimate rooms suggested how this work might fit in your own home.



Palli Davene Davis, of Mount Horeb, is a woodworker who eschews discussions of technique. The image is primary in her work. She plays with wood, "discovering visual comparisons and finding deliberate use for them." Her "Acrobat Tables" (left), three white-oak table forms doweled together, have a strangely human quality without actually having hands or feet. Her intent, she says, is not to create anthropomorphic shapes; rather, "the tables remain tables, but as if caught in those seconds between midnight and 12:01, when inanimate things come to life."

Doug Redmond rejects notions of woodworkers as people who build Scandinavian or other historical furniture. As a graduate student at the UWM woodworking program, he has been searching for a fresh approach to furniture design by reducing its structure to basic geometric shapes. This enables him to approach furniture design on the same terms as sculpture. He uses color to depict forms from a new perspective, but leaves certain sections natural wood, to remind us of the structural origins and functional aspects of the piece. His "Harlequin Stool" (above right), made of hard maple, has areas painted yellow, green, blue, orange and gray, while the seat top and foot rail—the parts you rest on—are finished clear.



Another of Skip Johnson's students, Sam Caldwell projects his personality through his work, preferring to visualize furniture as sculpture. In "Violence Inherent" (right), which is made of black walnut and black iron, he combines precise craftsmanship with a twisted sense of humor to illustrate how attraction and entrapment often go hand in hand. He was delighted to discover how people would persist in trying to sit in it, despite finding that the hazards are simply too great.—*Joe Kleinhans, Madison, Wis.*



Photos: Bob Shehan

# Events

*Listings are free but restricted to events of direct interest to woodworkers. The Sept. issue will list Aug. 15–Nov. 15, deadline July 1; the Nov. issue will list Oct. 15–Jan. 1, deadline Sept 1.*

*CALIFORNIA:* Workshop—Design and operation of circular and band saws, Sept. 12–16; lumber drying, Aug. 22–26, by Univ. of Calif. Coop. Ext. and FPL, 47th and Hoffman Blvd., Richmond, 94804. Contact Dr. R. Szymani, (415) 231-9582, or Janice Montano, (415) 231-9404.
Workshops—Joinery and veneering, Tage Frid, June 17, 19 (San Diego), June 24, 26 (Berkeley). At Berkeley only: chairmaking, Grew-Sheridan, July 23–24; furniture of Gustave Stickley, July 15; making musical instruments, July 16; traditional boatbuilding, Aug. 12; oarmaking, Aug. 13; trimming out small rowing boats, Aug. 19; decoy carving, Aug. 20; "Make your own carving tools," Aug. 27. At Los Angeles: free Sat. tool and woodworking demos, July 9–Sept. 10; "Build a piece of furniture," Simon Watts and Joseph Bavaro, Aug. 22–26, Aug. 29–Sept. 2; Sam Maloof at his workshop, Sept. 17. Windsor chair workshop, Michael Dunbar, one week in Sept. and Oct. The Cutting Edge, Los Angeles: (213) 390-9723; San Diego: (619) 695-3990; Berkeley: (415) 548-6011.
Show—Woodcarving, Sept. 11, Concannon Winery, 4590 Tesla Rd., Livermore. Free. Call Liz Finigan, (415) 447-3186.
Craft fair—Fort Mason Ctr., San Francisco, Aug. 11–14. American Craft Enterprises, Box 10, New Paltz, N.Y. 12561. (914) 255-0039.
State fair—Sacramento, Aug. 19–Sept. 5. Write Calif. State Fair, Calif. Works, Box 15649, Sacramento, 95852. (916) 924-2015.
Exhibit—New furniture, Robert Erickson, through June 27. The Retreat, 3865 E. Thousand Oaks Blvd., Westlake Hills Plaza, Westlake Village, 91362. (805) 496-7615.
Exhibition—Southern Calif. Expo in Del Mar, through July 4. (617) 297-0338.
Seminars/workshops—James Krenov: projects course, June 27–July 30; toolmaking, Aug. 1–13; joinery, Aug. 15–Sept. 3. College of the Redwoods, 440 Alger St., Ft. Bragg, 95437. (707) 964-7056.
Show—Wood Invitational, Sept. 10–Oct. 8. Contact Bill Zimmer, Gallery Fair, Box 263, Mendocino, 95460. (707) 937-5121.
Exhibition/sale—Artistry in Wood '83, June 11–19, Sonoma County Woodworker, Luther Burbank Ctr., Santa Rosa, (707) 823-2822.

*COLORADO:* Exhibition—Sculpture, through July 10. Foothills Art Ctr., 809 15th St., Golden, 80401. (303) 279-3922.
Workshops—Furniture, Art Carpenter, June 20–July 8, John Nyquist, July 25–Aug. 5, Sam Maloof, Aug. 6–7, Ian Kirby, Aug. 15–19, Peter Korn, Aug. 22–26; guitar and mountain dulcimer construction, July 11–15; basic woodworking, July 18–22; Shaker furniture, Walker Weed, Aug. 8–12. Anderson Ranch Arts Ctr., Box 2410, Aspen, 81612. (303) 923-3181.

*CONNECTICUT:* Workshops—Inlay and marquetry, Silas Kopf, July 16–17; chair-building, John Alexander, Aug. 8–12; wooden boatbuilding, Simon Watts, Aug. 15–21.
Exhibit: Tools of the Woodworker, Aug. 7–Sept. 18. Brookfield Craft Center, Box 122, Brookfield, 06804. (203) 775-4526.
Juried exhibition—Nov. 11–Dec. 23, deadline Aug. 1. Contact Roz Schwartz, Creative Arts Workshop, 80 Audubon St., New Haven, 06511. (203) 562-4927.
Crafts show—Conn. craftsmen, August, Guilford Hand Crafts Ctr. Contact Peter M. Petrochko, 370 Quaker Farms Rd., Oxford, 06483. (203) 888-9835.
Workshop—Lute building, July 24–30, Lute Society of America, Hartford. Contact Lawrence Lundy, 505 Elmside Blvd., Madison, Wis. 53704.
Festival—Conn. Woodcarvers, July 17, Center School, Old Lyme. Contact Al Watrous, Melody Ln., Ivoryton, 06442. (203) 767-0827.

*WASHINGTON, D.C.:* Exhibit—"The Art of Louis Paul Jonas," 75 wildlife miniatures. July 2–Aug. 28. Smithsonian Inst., Public Affairs, Washington, 20560. (202) 357-2627.

*FLORIDA:* Juried exhibition—Masks, Oct. 5–31, Netsky Gallery. Slide deadline Aug. 19. Contact Suzanne Kores, (305) 662-2453.

*GEORGIA:* Workshops—Carcase and drawer, July 9–10; wooden plane making, Aug. 6, 13–14. Contact John McGee, 218 S. Boulevard, Carrollton, 30117. (404) 834-7373.

*ILLINOIS:* Seminar—Marquetry Society, July 15–17, Concordia Teachers College, River Forest. Contact Gene Weinberger, MSA, Box 224, Lindenhurst, N.Y. 11757.
Workshop—Furn. conservation, July 11–15; adv. carving, July 18–22, Campbell Ctr., Box 66, Mount Carroll, 61053. (815) 244-1173.

*INDIANA:* Course—Hardwood lumber grading, Nov. 7–11, 4-H Center, Paoli. Write Galen Wright, S. Indiana Purdue Ag. Ctr., R.R. #1, Dubois, 47527. (812) 678-3401.

*IOWA:* Crafts exposition—Sept. 1–4, Pottawattamie County fairgrounds, Avoca. Contact Bob Everhart, 106 Navajo, Council Bluffs, 51501. (712) 366-1136.

# WE BEAT ANY AD IN THIS MAGAZINE (We match the price plus we give you a gift certificate of $5.00 to $25.00).

SPECIAL SALE TO READERS OF THIS AD!
You Must Mention This Ad When Ordering.

**Freight prepaid in Contintenal U.S.A. on orders of $35.00 or more.** (under $35.00 add $2.00 freight)

SALE! ORDER DIRECTLY FROM THIS AD.

**800-322-6100 Mass** 617-324-5500 Non-Order Calls
**800-343-3248 Nationwide**

MasterCard VISA

**TREND-LINES, INC.**
170A Commercial St.
Box 189A Malden, MA 02148

**Minimum Order $15.00**

RYOBI®

**POWER TOOLS**

### MAKITA TOOLS

| | | |
|---|---|---|
| 1100 | 3¼" Planer Kit | $174.95 |
| 1805B | 6-1/8" Planer Kit | 281.95 |
| 1900BW | 3¼" Planer | 92.95 |
| 2030 | 12" Planer/Jointer | 1399.50 |
| 2040 | 15-5/8" Planer | 1295.00 |
| 2116 | Band Saw | 1399.50 |
| 2400B | 10" Mitre Saw | 278.50 |
| 2401B | w/10" Mitre Saw | 242.95 |
| 3600B | Plunge Router | 194.50 |
| 3600BR | Plunge Router | 181.95 |
| 3601B | Router | 135.70 |
| 3608B | Router | 81.10 |
| 3700B | Laminate Trimmer | 89.95 |
| 4200N | 4-3/8" Circular Saw | 96.95 |
| 4300BV | Jig Saw Var. Sp. | 129.70 |
| 5007NB | 7¼" Circular Saw | 105.50 |
| 5012B | 12" Chain Saw | 114.95 |
| 5081DW | 3-3/8" Cord. Saw | 106.95 |
| 5201NA | 10¼" Circular Saw | 210.95 |
| 5402A | 16" Circular Saw-Electric Brake | 399.50 |
| 6000R | Uni-Drill | 109.95 |
| 6010D | 3/8" Cordless Drill | 79.95 |
| 6010DWK | 3/8" Cord. Drill Kit | 89.95 |
| 6012HDW | Cord. Drill Kit 2-Sp. | 109.75 |
| 6013BR | ½" Reversible Drill | 116.50 |
| 6300LR | ½" Angle Drill | 149.30 |
| 6510LVR | 3/8" Drill-Rev. 0 to 1050 RPM | 66.50 |
| 6710DW | Cord. Screwdriver | 102.50 |
| 6800DBV | Drywall Screwdriver | 95.75 |
| 9030 | 1-1/8"x21" Belt Sander | 118.90 |
| 9045B | Finishing Sander | 103.90 |
| 9045N | Finishing Sander-Dustless | 107.50 |
| 9207SPB | 7" Sander Polisher | 136.95 |
| 9401 | 4"x24" Belt Sander | 169.55 |
| 9501BKIT | 4" Sander-Grinder Kit | 76.55 |
| 9804 | Blade Sharpener | 585.20 |
| 9820-2 | Blade Sharpener | 159.10 |
| 9900B | 3"x21" Belt Sander | 129.90 |
| 9924DB | 3"x24" Belt Sander-Dustless | 138.90 |
| B04510 | Finishing Sander | 46.95 |
| B04520 | Finishing Sander | 50.95 |
| DA3000 | 3/8" Angle Drill | 113.70 |
| DP3720 | 3/8" Reversible Drill (0-1800 RPM) | 59.95 |
| DP4700 | Drill Reversible | 94.95 |
| JG1600 | Jig Saw Single Sp. | 74.95 |
| JR300W | 2 Sp Reciprosaw Kit | 124.75 |
| LP2501 | Surfacer | 2099.00 |
| LS1400 | 14" Mitre Saw | 429.50 |

### ZYLISS VISES

| | |
|---|---|
| Standard | $99.50 |
| Quick Release | 119.50 |

### PONY CLAMP FIXTURES

| | Each | Pkg. 6 |
|---|---|---|
| No. 50¾" Pipe Clamp | $7.85 | $7.10 ea |
| No. 52½" Pipe Clamp | 6.40 | 5.80 ea |
| No. 56¾" Pipe Clamp | 9.70 | 8.65 ea |
| No. 1215 Band Clamp (WEB) 15' | 6.40 | 5.80 ea |
| No. 6220 20' HD | 40.50 | 36.50 ea |
| No. 7456 Bar Clamp Pads | 2.50 | 2.25 ea |

### JORGENSEN BAR CLAMPS (Heavy Duty)

| | Each | Pkg. 6 |
|---|---|---|
| No. 7224 24" | $16.50 | $14.95 ea |
| No. 7230 30" | 17.25 | 15.65 ea |
| No. 7236 36" | 17.85 | 16.15 ea |
| No. 7248 48" | 19.75 | 17.90 ea |
| No. 7260 60" | 21.55 | 19.55 ea |
| No. 7272 72" | 23.40 | 21.20 ea |
| No. 7284 84"• | 25.30 | 22.95 ea |

(3 per pkg.) •No. 7284 only

### JORGENSEN BAR CLAMPS (Med. Duty)

| | Each | Pkg. 6 |
|---|---|---|
| No. 3712 12" | $5.85 | $5.30 ea |
| No. 3724 24" | 7.20 | 6.50 ea |
| No. 3736 36" | 8.80 | 7.95 ea |

**Catalog $1.00 — Free with any order.**

Mass. residents add 5% tax.

### JET 10" TABLE SAW $475.00

### JET TILTING ARBOR TABLE SAW $1225.00

10"

### JORGENSEN HAND SCREWS

| | | Each | Pkg. 6 |
|---|---|---|---|
| No. 3/0 | 3" | $8.85 | $8.00 ea |
| No. 0 | 4½" | 10.40 | 9.40 ea |
| No. 1 | 6" | 11.80 | 10.65 ea |
| No. 2 | 8½" | 14.10 | 12.70 ea |

### JORGENSEN BAR CLAMPS (5" reach)

| | Ea. | Pkg. 6 |
|---|---|---|
| No. 4512 12" Opening | 16.25 | 14.65 ea |
| No. 4524 24" Opening | 18.15 | 16.35 ea |
| No. 4536 36" Opening | 20.20 | 18.25 ea |

### JORGENSEN CARRIAGE CLAMPS

| | | |
|---|---|---|
| No. 103 3" Opening | $4.70 | $4.25 ea |
| No. 104 4" Opening | 6.35 | 5.75 ea |
| No. 106 6" Opening | 8.90 | 8.05 ea |
| No. 108 8" Opening | 15.45 | 13.80 ea. |

### DEEP THROAT C CLAMPS

| | Opening | Throat | Each | Pkg. 6 |
|---|---|---|---|---|
| No. 236-0 | 1" | 3½" | $2.45 | 2.15 ea |
| No. 237 | 1½" | 3½" | 3.85 | 3.40 ea |
| No. 245 | 2½" | 4¾" | 9.50 | 8.40 ea |
| No. 246 | 2½" | 6¼" | 11.80 | 10.50 ea |
| No. 174 | 4" | 4" | 12.25 | 11.40 ea |
| No. 176 | 6" | 6" | 17.95 | 16.10 ea |

### JORGENSEN CLAMPS

| | | |
|---|---|---|
| No. 3325 3 Way Edging | $5.15 | $4.65 ea |
| No. 1623 3" Hold Down | 6.85 | 6.17 ea |
| No. 3201HT1" Spring | 1.40 | 1.30 ea |
| No. 3202HT 2" Spring | 2.15 | 1.95 ea |
| No. 641 Edge Clamp | 5.35 | 4.75 ea. |
| No. 6709 Press Screws | 9.10 | 8.10 ea. |
| No. 9144 Adj. Miter Box and Corner Splicing | 6.85 | 6.15 ea. |
| No. 9133 Adj. Miter Box and Corner Splicing | 5.25 | 4.75 ea. |
| KERF KEEPER | | 4.05 ea. |
| DRILL SHARPENER | | 5.50 ea. |

### SUNGOLD X-WEIGHT SANDING BELTS

Sold in packs of 10 only
Outlasts regular belts 2 to 1

| Size | Grit | 10 | 50 |
|---|---|---|---|
| 3"x21" | 120.100 | .83 ea | .75 ea |
| | 80 | .85 ea | .77 ea |
| | 60 | .90 ea | .82 ea |
| | 50 | .92 ea | .84 ea |
| | 40 | .95 ea | .86 ea |
| 3"x24" | 120.100 | .89 ea | .81 ea |
| | 80 | .91 ea | .83 ea |
| | 60 | .95 ea | .86 ea |
| | 50 | 1.09ea | .99 ea |
| | 40 | 1.12ea | 1.03 ea |
| 4"x24" | 120.100 | 1.50 ea | 1.36 ea |
| | 80 | 1.55 ea | 1.40 ea |
| | 60 | 1.59 ea | 1.44 ea |
| | 50 | 1.65 ea | 1.49 ea |
| | 40 | 1.70 ea | 1.54 ea |

### SUN GOLD SANDING SHEETS

**9x11 Aluminum Oxide C Weight**

| Grit | Pk. of 100 |
|---|---|
| 150.120.100 | $20.95 |
| 80 | 22.65 |
| 60 | 27.50 |
| 50 | 30.95 |
| 40 | 36.45 |

**9x11 Non-Loading Silicon Carbide A Weight**

| Grit | Pack of 100 |
|---|---|
| 400. 360. 320. 280. 240 | |
| 220.180. 150. 120 | $18.65 |

**9x11 Wet & Dry Silicon Carbide C Weight**

| Grit | Pack of 100 |
|---|---|
| 600. 400. 360. 320. 240 | |
| 220. 180 | $24.95 |
| 150 | 26.45 |
| 120 | 27.60 |

### SQUARE RECESS WOOD SCREWS

| Size | 100 per pk. | 1000 per pk |
|---|---|---|
| 8x1 | 2.25 | 13.95 |
| 8x1¼ | 2.55 | 16.95 |
| 8x1½ | 2.75 | 18.65 |
| 8x2 | 3.05 | 25.75 |
| 8x2½ | 3.25 | 27.60 |
| 8x3 | 3.50 | 29.95 |

### SQUARE RECESS SCREWDRIVERS $2.95

| | |
|---|---|
| Square Recess Drill Bits | 75¢ ea |
| Phillips Drill Bits | 60¢ ea |

**WOOD SCREWS** - Flathead Phillips
**NEW** Hardened Furniture Screws

| Size | 100 per pack | 1000 per pk |
|---|---|---|
| 6x1¼ | $1.60 | $13.90 |
| 8x1 | 2.05 | 12.70 |
| 8x1¼ | 2.30 | 15.40 |
| 8x1½ | 2.50 | 16.95 |
| 8x2 | 2.75 | 23.40 |
| 8x2½ | 2.95 | 25.10 |
| 8x3 | 3.15 | 27.25 |

### WATCO FINISHES

| | Qts. | 1 Gal. |
|---|---|---|
| Danish Oil Nat'l | $5.30 | $15.85 |
| Danish Oil Black, Dark, Med. | 5.70 | 16.55 |
| Satin Oil | 5.30 | 15.85 |
| Satin Wax Dark | 5.80 | 17.15 |
| Satin Wax Nat'l | 5.80 | 17.15 |

### TITE BOND WOOD GLUE

| | Price Each |
|---|---|
| Pints | $3.20 |
| Quarts | 5.25 |
| Gallons | 11.50 |

### FRANKLIN WHITE GLUE

| | Price Each |
|---|---|
| Pint | 2.55 |
| Quart | 4.05 |
| Gallon | 11.15 |

### LIQUID HIDE GLUE

| | Price Each |
|---|---|
| ½ Pint | $2.65 |
| Pint | 3.70 |
| Quart | 7.55 |

### SPIRAL DOWELS

| | 100/pack |
|---|---|
| 3/8"x2 | $1.70 |
| 7/16"x2" | 2.10 |
| 1/2"x2" | 2.55 |
| 5/8"x2" | 2.95 |
| RH PLUGS 100/pack | 1.65 |
| BUTTONS 100/pack | 1.65 |

### FREUD SAW BLADES

Carbide Tipped 5/8" Bore

| No. | Size | Teeth | Use | Price |
|---|---|---|---|---|
| LU7210 | 10" | 40 | General | $44.95 |
| LU7310 | 10" | 60 | Cut-off | 52.20 |
| LU7312 | 12" | 72 | Cut-off | 74.50 |
| LU7810 | 10" | 80 | Plastic | 79.95 |
| LU8210 | 10" | 60 | Cut-off | 54.40 |
| LU8212 | 12" | 72 | Cut-off | 81.50 |
| LU8410 | 10" | 40 | Comb. | 45.50 |
| LU8411 | 10" | 50 | Comb. | 49.90 |
| LU8510 | 10" | 80 | Cut-off | 78.95 |
| LM7210 | 10" | 24 | Ripping | 41.70 |

### WHISPER SAW BLADES

| | | | | |
|---|---|---|---|---|
| WS7210 | 10" | 40 | General | 67.60 |
| WS7310 | 10" | 60 | Cut-off | 77.75 |
| WS7810 | 10" | 80 | Plastic | 115.70 |
| WS8210 | 10" | 60 | Cut-off | 83.95 |

All 5/8" Bore (LU7312 - 1")

MORE FREUD

| | | |
|---|---|---|
| TR100 | 3 blades & Dado set | 264.95 |
| DS306 | 6" Dado | 98.25 |
| DS308 | 8" Dado | 119.75 |

### ABRASIVE BELT CLEANER

Nu-Life No. 1 Pro Size $5.99

## WE SHIP QUICK!

Full Line **MAKITA** Distributor

Ryobi

**S-500 3" x 4-1/8" Orbital Sander**
12,000 o.p.m.
Double Insulated
**S-500 $43.95**

**Ryobi D-1010 3/8" Portable Drill**
Variable Speed
Reversible
Double Insulated
**D-1010 $89.50**

Ryobi

**B-7075 3" Belt Sander**
Double Insulated
w/Dust Bag
**B-7075 $118.95**

Ryobi

**B-7200A 4" Belt Sander**
Double Insulated
w/Dust Bag
**B-7200A $167.90**

Ryobi

**R-500 1/2" 3 HP Plunge Router**
Double Insulaed
Guide Holder, Straight Guide, Roller Attachment
Template Guide, Bit Adapter
**R-500 $165.00**

Ryobi

**R-150 1 HP 1/4" Plunge Router**
Double Insulated
Bit Adapter, Straight Guide, Template Guide
**R-50 $88.00**

Ryobi

**L-580 6-1/8" Planer**
Blade Adjustment Gauge, Sharpening Holder
**L-580 $189.00**

Ryobi

**TR-30 Laminate Trimmer**
Trimmer Guide
Straight Guide
Trimmer Bit
**TR-30 $78.95**

Ryobi

**E-3700A Drywall Screwdrivers**
Variable Speed
Reversible
**E-3700A $77.95**

Ryobi

Ryobi
**JSE-60 Orbital Jig Saw**
Electronic Variable Speed
Double Insulated
**JSE-60 $125.90**

**JET 14" BAND SAW $385.00**

**JET BENCH GRINDER/SANDER $299.00**
uses 6"x48" belts.
8" wheel

**JET WOODWORKING SHAPER $425.00**

**JET WOODWORKING 6" JOINTER $495.00**

**Freight prepaid in Continental U.S.A. on orders of $35.00 or more.** (under $35.00 add $2.00 freight) **Minimum Order $15.00**

*KENTUCKY:* Symposiums—Turning, Rude Osolnik, Dale Nish, June 16–18; turning and joinery, Rude Osolnik, Warren May, Terry Fields, July 14–16 (Berea Craft Festival: July 15–17). Contact J.R. Hall, Berea College, CPO 758, Berea 40404. (606) 986-9341, ext. 440.

*MAINE:* Workshops—Hand-tool ingenuity, Sam Manning; plywood lapstrake boatbuilding, Geoffrey Scofield. For catalog, write WoodenBoat School, Box 78F, Brooklin, 04616. (207) 359-4651.
Exhibit—"Practical Woodwork," Common Ground Country Fair, Windsor Fairgrounds, Sept. 23–25. To enter, send SASE to Bob Mowdy, RFD 1, Box 524, Bradford, 04410. (207) 327-2111.

*MARYLAND:* Crafts festivals—A number of arts and crafts shows to be held in '83. Write Deann Verdier, Sugarloaf Mountain Works, Ijamsville, 21754. (301) 831-9191.

*MASSACHUSETTS:* Consultation—Antiques I.D. and care, June 30, July 28, Aug. 25, Sept. 29; Traditional-craft fair, Nov. 5–6, deadline Aug. 1. Contact Frank G. White, (617) 347-3362. Old Sturbridge Village, Sturbridge, 01566. (617) 347-3362.

*MICHIGAN:* Seminar—Japanese woodworking techniques, Toshio Odate, June 24–26, Clague Middle School, Ann Arbor, 48107.

*MINNESOTA:* Juried exhibition—Furniture, carving and accessories. Minneapolis, fall of '83. Write Minnesota Woodworkers' Guild, Box 8372, Minneapolis, 55408.

*MISSOURI:* Show—Glass/Porcelain/Wood, July 16–Aug. 13. Craft Alliance, 6640 Delmar Blvd., St. Louis, 63130. (314) 725-1151.

*NEVADA:* Juried craft fair—KNPR Craftworks Market, Oct. 28–30, slide deadline Aug. 1. Write Craftworks, 5151 Boulder Hwy., Las Vegas, 89122. (702) 456-6695.

*NEW HAMPSHIRE:* Demonstration—Sept. 10, New Hampshire Farm Museum, Milton; hands-on workshop, Sept. 11–14, Lee, N.H. Contact Charles Cox, Tuckaway Farm, Box 57, Lee Rd., Dover, 03820. (603) 868-1822.
Seminars—Two-week courses on making/repairing violins and bows, June–Aug. Violin Inst., Univ. of N.H., Continuing Ed., Brook House, Durham, 03824. (603) 862-1088.

*NEW JERSEY:* Juried invitational—Malloran Convention Ctr., Pennsauken, N.J. Trade: Sept. 22–23; public: Sept. 24–25. Write Craft Market America, Box 30, Sugarloaf, N.Y. 10981. (914) 469-2248.

*NEW MEXICO:* Exhibition/sale—Recent work by Sam Maloof, Art Carpenter, Steve Madsen, Warren Fenzi, James Rannefeld and others, opening June 18; "Taos furniture," June 18. Palisander Gallery, 4 Bent St., Taos, 87571. (505) 758-8455.
Shows—July 3–16, Aug. 14–27. Contemporary Craftsman Gallery, 100 W. San Francisco St., Santa Fe, 87501. (505) 988-1001.

*NEW YORK:* Rhinebeck—Trade, June 21–22; public, June 24–26. Dutchess County Fairgrounds. American Craft Enterprises, Box 10, New Paltz, 12561. (914) 255-0039.
Workshops—History of furniture from 1750, Christopher Monkhouse, June 18–19; Windsor chairmaking, Michael Dunbar, June 20–24; furniture design and construction, Lee Schuette, June 22–July 8; turning, Stephen Hogbin, July 11–15; post-and-beam construction, Rick McAulay, July 18–29 and Aug. 1–12; furniture drawing and design, Wendell Castle and Wm. Sloane, July 25–29; inlay and surface embellishments, Richard Newman, Aug. 1–5; bentwood lamination, Michael Cooper, Aug. 8–12; working with green wood, John D. Alexander, Aug. 22–26. Contact Lanham Deal, 18 Maple St., Box 36, Scottsville, 14546. (716) 889-2378.
Exhibition and sale—Croton Point Park, Croton-on-Hudson, June 18–19.
Juried festival—Lincoln Center, New York City, July 2–3.
Juried fair— Fairgrounds, New Paltz, Sept. 2–5. Contact Quail Hollow Events, Box 437B, Woodstock, 12498. (914) 679-8087.
Summer workshops—Lake Placid. Write Special Programs, Parsons School of Design, 66 Fifth Ave., N.Y., 10011. (212) 741-8975.
Exhibit—Carvings and decoys, Sept. 17–18, American Civic Assoc., Binghamton. Robert Fischer, 3520 Vestal Rd., Vestal, 13850.
Workshops—Make a classical guitar, July 11–22 or Aug. 8–19; Japanese woodworking, June 13–17, Aug. 1–5; varnish making and application, Aug. 20–21. Robert Meadow, The Luthierie, 2449 W. Saugerties Rd., Saugerties, 12477. (914) 246-5207.
Seminar—Instrument making, Robert Meadow, July 26. Foundation for Baroque Music, RD 1, Wilton Rd., Greenfield Ctr., 12833.
Exhibit/sale—Sculpture, through June 25, Jeffrey Briggs, Michael Coffey, Walter Horak. Verbena Gallery, Fourth Floor, 16 W. 56th St., New York, 10019. (212) 586-3606.
Crafts—Madison Sq. Garden, Aug. 14–16.

*NORTH CAROLINA:* Workshops—Through Aug. 26, with John McNaughton, Wendy Maruyama, Hunter Kariher, Simon Watts, Seth Stem, David Ellsworth, David Anhalt, Dan Rodriguez. Penland School of Crafts, Penland, 28765. (704) 765-2359.

Country Workshops—Chairmaking, Dave Sawyer, July 4–8, July 25–29; Japanese woodworking, Carl Swensson, Aug. 1–5; knife, ax and adze, Aug. 15–19, & cooperage, Aug. 29–Sept. 2, Drew Langsner. Country Workshops, Rt. 3, Box 262, Marshall, 28753.
**Fairs**—Asheville Civic Ctr., Haywood St., July 20–23, Oct. 20–22. Contact James Gentry, S. Highland Handicraft Guild, Box 9545, Asheville. (704) 298-7928.

*OKLAHOMA:* **Carving** show—July 8–10, Woodland Hills Mall, 71st and S. Memorial, Tulsa. Contact Jim Inman, (918) 627-1602.

*PENNSYLVANIA:* **Crafts exhibition**—July 5, Museum of Art, Pa. State Univ., Univ. Park.
**Exhibition**—Port of History Museum, Penns Landing. Through July 4. Society of Phila. Woodworkers, 4101 Lauriston St., Phila.
**Juried** exposition—David Lawrence Convention Ctr., Pittsburgh. November 25–27, deadline Aug. 1. Contact Quail Hollow Events, Box 437B, Woodstock, New York, 12498. (914) 679-8087.
**Juried craft festival**—Longs Park, Sept. 3–5. Slides. Write Longs Park Amphitheater Foundation, Box 5153, Lancaster, 17601.
**Wholesale/retail exhibition**—"The Woodworker," at Phila. Armory, Sept. 22–25. Contact R. Rothbard, Craft Market America, Box 30, Sugarloaf, N.Y. 10981. (914) 469-2248.
Symposium—Seminars, workshops, lectures, with Alphonse Mattia, Robert DeFuccio, Steve Ripper, Mark Sfirri, Jon Alley, Rosanne Somerson. Bucks County Community College, Aug. 27–28. Also, B.C. Woodworkers' traveling show (Artmobile). Write Amy Orr, BCCC, Newtown, 18940. (215) 968-8424.

*RHODE ISLAND:* Craft fair—July 22–24, Newport Yachting Ctr. Contact American Craft Enterprises, Box 10, New Paltz, N.Y. 12561. (914) 255-0039.
Exhibition—Contemporary art, through Sept. 25; Museum of Art, RISD, 224 Benefit St., Providence, 02903. (401) 331-3511.

*TENNESSEE:* **Courses**—Woodturning, Rude Osolnik, June 27–July 1; marquetry and inlay, Silas Kopf, July 4–8; furnituremaking, John Dunnigan, July 18–29; production woodworking, Bradford Smith, Aug. 15–19; restoration workshop, Adam Turtle, Aug. 1–5. Appalachian Ctr. for Crafts, Box 347A-1, Rt. 3, Smithville, 37166. (615) 597-6801.
**Workshops/exhibition**—School faculty, through Aug. 19; furniture construction, Jere Osgood, July 4–15; turning, David Ellsworth, Aug. 8–12, Aug. 15–19. Arrowmont School of Arts and Crafts, Box 567, Gatlinburg, 37738. (615) 436-5860.

*TEXAS:* Show—Open to Austin area woodworkers, Nov. 11–20. Deadline Aug. 1. Austin Woodworkers Guild, 225 N. Congress, Suite 156, Austin, 78701. (512) 282-0493.

*UTAH:* **Workshops**—June 27–July 1, July 25–29, Aug. 1–5; Rude Osolnik, Sept. 19–23. Craft Supplies, 1644 S. State, Provo, 84601. (801) 373-0917.
Workshop—Gamebird carving, Richard LeMaster, July 18–22. Write Dale Nish, Brigham Young University, Provo, 84602. (801) 378-6491.

*VERMONT:* Classes—Machine woodwork, June 27–July 2, July 18–23; frame and panel, July 25–30; woodworking skills, Aug. 1–6; carcase and drawer, Aug. 8–13. Kirby Studios, N. Bennington, 05257. (802) 442-3119.
Workshops—Building the traditional wood/canvas canoe, Sept. 24–Oct. 2. Co-sponsored by Sterling College and Strong's Canoe Yard, Craftbury Common, 05827. (802) 586-2561.

*WASHINGTON:* **Saturday** workshops—One-day skiff, July 9. NW School of Wooden Boatbuilding, 251 Otto St., Glenn Cove Indus. Pk., Port Townsend, 98368.
Workshop—Woodbending, Steven Foley, lecture Aug. 19, workshop Aug. 20. Contact N.W. Gallery, 202 1st Ave. S., Seattle, 98104. (206) 625-0542.

*WEST VIRGINIA:* **Seminars**—Turning, Palmer Sharpless, July 11–15; joinery, Robert Kopf, July 18–22; oak basketry, Connie and Tom McColley, July 18–22. Write Crafts Ctr., Cedar Lakes, Ripley, 25271. (304) 372-6263.
**Summer classes**—Treenware, hammered dulcimer, basketry, chairmaking, instrument repair, folk carving, whittling, coopering, white oak basketry, July 10–Aug. 14. Write Augusta Heritage Arts Workshop, Davis & Elkins College, Elkins, 26242. (304) 636-1903.

*WISCONSIN:* **Workshops/exhibition/sale**—Carving, musical inst., wood I.D., furn. design, turning; trade show: tools, machines. July 15–17. Cont. Ed., Univ. of Wisconsin-Stout, Menomonie, 54751. (715) 232-1167.
**Crafts festival**—Downtown Menasha, July 16.

*QUEBEC:* Show—Canada/Wood '83, Oct. 27–30. Write Cahners Expo Group, 12233 W. Olympic Blvd., Suite 236, Los Angeles, Calif. 90064. (213) 826-6070.

*AUSTRALIA:* **Seminar**—Turning, Sept. 17–18. J. Stick, 12 Oxley Terrace, Corinda Q. 4075.

*ENGLAND:* **Summer** courses—One week each, start Aug. 7. Alan Peters, Aller Studios, Kentisbeare, Cullompton, Devon, EX15 2BU.

# Connections

*In Connections we'll publish membership calls for guilds, queries from authors, and appeals from readers who want to share special interests.*

**Motorized furniture** plans sought, James Bond style—sliding panels or walls, raising table, etc. Pat Curran, 2670 Montana 206, Columbia Falls, Mont. 59912.

**WOW**: Western Ohio Woodworking Club for amateurs and professionals. Write Jack Fisher, 270 Hilltop Dr., Dayton, Ohio 45415.

**Alabama Woodworkers Guild:** Write Box 327, Pelham, Ala. 35124.

**French luthiers sought:** I have a fellowship to study luthiery in England for a year, and next would like an apprenticeship in France. Tim Englert, Box 1247, Gambier, Ohio 43022.

**Toymakers and toy stores:** *The Toymaker News* features free listing of retail outlets for craftsmen. Love-Built Toys, 2907 Lake Forest Rd., Box 5459, Tahoe City, Calif. 95730.

Society of **Philadelphia Woodworkers** sponsors educational events, seminars and shows. Open to all. 4101 Lauriston St., Phila., Pa. 19128.

**Orange County Woodworkers Association:** Write Box 2, Placentia, Calif. 92670.

## School Survey Update

*In* FWW *#39 we listed as many woodworking schools as we could find in the United States and Canada. Realizing that there were bound to be some that we would miss in the first round, we promised an update in this issue. It's encouraging that, with these additions, the tally now exceeds three hundred schools. The following are listed alphabetically by state.*

Palomar College, 1140 W. Mission Rd.
San Marcos, **California** 92069.

Berea College Woodcraft
CPO Box 2320, Berea, **Kentucky** 40404.

Jefferson Parish Vocational-Technical School
5200 Blair Drive, Metairie, **Louisiana** 70001.

Haystack Mountain School of Crafts
Deer Isle, **Maine** 04627.

The Landing Boatshop
Box 1490, Kennebunkport, **Maine** 04046.

The WoodenBoat School
PO Box 78, Brooklin, **Maine** 04616.

University of Maryland-Eastern Shore
Box 1124, Princess Anne, **Maryland** 21853.

Heartwood Owner-Builder School, Johnson Rd.
Washington, **Massachusetts** 01235.

Northern Michigan University
Marquette, **Michigan** 49855.

New England Trade and Technical Institute
750 Massabesic St.
Manchester, **New Hampshire** 03103.

Jamestown Community College S.U.N.Y.
Artisan Ctr., Jamestown, **New York** 14701.

The Woodshop at Greenwich House
27 Barrow St., New York, **New York** 10014.

Catawba Valley Technical College
Hickory, **North Carolina** 28601.

Linn-Benton Community College
6500 SW Pacific Blvd.
Albany, **Oregon** 97321.

Bucks County Community College
Office of Admissions
Newtown, **Pennsylvania** 18940.

Vermont Instrument Workshop
Box 115, Post Mills, **Vermont** 05058.

Everett Community College
801 Wetmore Ave.
Everett, **Washington** 98201.

Northwest School of Wooden Boatbuilding
330 10th St., Port Townsend
**Washington** 98368.

University of Wisconsin-Stout
Menomonie, **Wisconsin** 54751.

Canadian Woodworker, Ltd.
4-1391 St. James St.
Winnipeg, **Manitoba** R3H 0Z1.

Ebenisterie Quebec, Inc., 28 St. Joseph
Ville Mercier, P.Q., **Quebec** J0L 1K0.

# CLASSIFIED

Established CABINET SHOP in Maine. 3PH, rewired, insulated, kiln and post and beam cape. Buy the business or just the buildings and equipment. (603) 356-3727.

SPACE AND EQUIPMENT for rent. $175 monthly includes everything. Heartwood Craftsman, Inc., 312 W. Columbia Ave., Philadelphia, PA 19122. (215) 236-3050.

WANTED: Resident woodworker, all skills, imagination. Apartment, salary. Hour from NYC. Box 30, Sugarloaf, NY 10981. (914) 469-2248.

WOODWORKING JOURNALIST to join Taunton Press staff as assistant editor. Successful candidate must have job experience in cabinet or general woodworking shop, plus job experience as a writer or editor, or proven deftness with the English language. Drawing and photographic aptitude an asset; relocate to western Connecticut. Liberal benefits, challenging work, good working conditions. Send resume and letter stating salary requirements, with photos or slides of recent work to: Personnel Manager, The Taunton Press, Box 355, Newtown, CT 06470.



Vladimir Kagan needs EXPERIENCED CABINETMAKERS familiar with fine veneer work and precision joinery. Light, beautifully-equipped workshop located in L.I.C., New York. Send resume and portfolio (if available) to: Michael Leidner, 21-21 41st Ave., L.I.C., NY 11101.

RALEIGH — North Carolina State University Craft Center. Aug. 10th through 14th workshop, "Laminated and Turned Wood Containers" taught by William Long. Housing available. For brochure contact Craft Center, Box 5217, Raleigh, NC 27650 or call (919) 737-2457.

Artistic WOODTURNING INSTRUCTION by a designer craftsman with 20 years teaching experience. Two-day course with emphasis on bowlturning utilizing the cutting method. Write Wayne Konkle, PO Box 4, Sharon, WI 53585.

Purchase of 3 HITACHI power tools discounted, makes you a Mini Dealer in your area. Call Kalman Electric now! Box 186, Boston. (617) 782-0300.

F.J. FITCHETT Foreign and Domestic Hardwoods, veneers and plywood. Custom millwork, resawing of lumber. Send SASE for price list. 409-411 24th St., West Palm Beach, FL 33407. (305) 833-5777.



Fine Latin American HARDWOODS. Black Mountain Wood Co., Box 3525, Portland, ME 04104. (207) 772-3332.

FOR LOVERS OF WOOD: Extensive inventory of top-quality foreign and domestic hardwoods, musical instrument supplies. New and exciting species. 8 years experience in shipments to U.S.A. and Canada. A. & M. Wood Specialty Inc., PO Box 3204, Cambridge, Ontario, Canada N3H 4S6. (519) 653-9322.

BIRD'S-EYE and CURLY MAPLE, fifty ft. or thousands. $1.80 to $12. List available. Cornucopia, Harvard, MA 01451-0044. (617) 456-3201.

TURNERS, CARVERS, CRAFTSMEN. Fruitwood stumps, bookmatched slabs, cut to your specification. Domestic and exotic available, AD or green. For brochure send SASE to World Exotic Woods, Ltd., PO Box 772, Hermosa Beach, CA 90254.

60 Beautiful BARN/WORKSHOP PLANS. (large/small). Catalog $3. (refundable). Ashlandbarns, 990WF Butlercreek, Ashland, OR 97520.

FOREDOM miniature power tools at discount prices. Send SASE (37¢): Smit Products Inc., Box 722, Bloomfield Hills, MI 48013.



EBONY and ROSEWOOD for musical instruments, inlaying, knife handles and pool cues. Contact PO Box 32, Haddon Hts., NJ 08035 or call (609) 546-2903.

HARDWOOD PLYWOODS. Ash, Baltic birch, red, white or natural birch, cherry, mahogany, maple, knotty pine, red oak, white oak, walnut, teak. All items ¼ in. and ¾ in. thickness. Sheet sizes 4x8, 2x8, 4x4, 2x4 or precision cut (1/16 in. tolerance) to any size, paying for what you order. Edging for all species in hardwood veneer strips or hardwood molding ⅜ in. by ¾ in. Sheets of hardwood veneer with polyester backing. Wholesale quantity discounts. Call (617) 666-1340 for quotations. Shipping in USA via UPS or a common carrier. Boulter Plywood Corp., 24 Broadway, Somerville, MA 02145.

BOSCH, MAKITA, Porter-Cable, Elu, etc. Free price list. Send SASE to Finan, RD 1, Hop-Bottom, PA 18824. (717) 289-4686.

INCA LATHE! Mahogany Masterpieces, No. 1 INCA dealer in 1982, has specially purchased the last INCA lathes ever to be made. Never exported to America before. Available while supply lasts from Mahogany Masterpieces, RFD 1, Wing Rd., Suncook, NH 03275. Send $1 for details.

HEXACON

**BRANDING IRONS**

DRILL PRESS or HANDHELD
250 to 500 watts
Threaded interchangeable dies/heat control unit

For Custom Logos or Artwork

SEND FOR FREE BROCHURE
ENGRAVING ARTS • P.O. Box 5191, Eureka, CA 95501

---

*THE LUTHIERIE*

**School of Instrument Making and Japanese Hand Woodworking**

*Write or call for our free brochure*
**Robert Meadow (914) 246-5207**
**2449 West Saugerties Road**
**Saugerties, New York 12477**

---

**Woodworkers Super Catalog**

Three pounds, 704 pages of tools, materials & machines, 60,000 items, valuable reference. **Name Brands Discounted**, call for our price before buying any machine Ph.607-729-6511
Send $5 or credit card to get your catalog

**McKILLIGAN SUPPLY**
FWC 783, Johnson City, N.Y. 13790

---

**Rosewood Fingerboards**

**East Indian • A Grade • Quarter Sawn**
Size: 2¾" × 5/16" × 21"
5–10 pcs. **$2.25 ea.**
11–49 pcs. **$2.00 ea.**
Over 50 pcs. **$1.75 ea.**
Add $3.75 plus 5% for handling/shipping.

**AZ IMPORT EXPORT INC**, 245 East 25th Street
Suite 14 C New York, N.Y. 10010
We handle everything in Rosewood & Ebony

---

**TABLE STROKE SANDER**

4 Models $585.00 – $685.00 *BALL*
Deluxe $750.00 – $900.00 *BEARING*

Sand 38" x 6' & 8'
*Sidestroke & String Sanders Available. Kits $40 to $420.*
(Less Motor)
F.O.B.
**McCall House**, Box 1950-F
Lenoir, N.C. 28645. 704-758-1991

---

**Quarter Sawn White Oak**

Precision Band Sawn. Extra Wide Stock.
EXOTIC AND DOMESTIC LUMBER
Personalized Service — (215) 775-0400
RD#3, Box 303, Mohnton, PA 19540

**TALARICO HARDWOODS**

---

**POLYETHYLENE GLYCOL**

***The new wood stabilizer and chemical seasoning agent.***
**Make crack-free table tops from log cross sections and flawless bowls and carvings from green scrap wood.**
**$1.00 for catalog.**
**The Crane Creek Company**
**Box 5553 F**
**Madison, Wisconsin 53705**

---

**TURNINGS**

TOYMAKERS SUPPLIES
WALNUT AND OAK DOWELS
Furniture Plugs, Pins, Buttons
Cabinet Spindles and Knobs
Shaker Pegs and Candle Cups
**WOODWORKS**
4013-A Clay Ave. Ft. Worth, TX 76117
817-281-4447
Send 25¢ — Catalog Wood Parts

---

**WOOD SCREW SPECIALS**

**#8 x 1¼ Flat Head Wood Screws — Phillips**
**1000 for $15.99**
**Add $2.50 for shipping. Fastener Catalog FREE with order. MasterCard and VISA accepted.**
**THE NUTTY CO., INC.**
**P.O. Box 473, Dept. FW**
**Derby, CT 06418**

---

SANDVIK BAND SAWS. Send SASE for price sheet. Tru Edge, 231 Baltimore Annapolis Blvd., Severna Park, MD 21146.

NEW ENGLANDERS! Authorized INCA dealer/service center delivering in central New England and Boston. Machines, accessories and parts in stock. Demonstrated by professional woodworkers. Mahogany Masterpieces, Bear Brook State Park, in sales-tax-free scenic New Hampshire. (603) 736-8227. No. 1 INCA dealer in 1982. Exclusive monthly payment plan for New Englanders.

INCA OWNERS: New dust collectors from Europe for quick connection to all INCAs. Two professional-quality quiet models: $450 and $638 exclusively from Mahogany Masterpieces, RFD 1, Wing Rd., Suncook, NH 03275.

HITACHI IN NEW ENGLAND: FA-700 Super Surfacer and hand power tools sold, serviced and demonstrated by authorized distributor, Mahogany Masterpieces, in sales-tax-free New Hampshire. (603) 736-8227.

HEGNER IN NEW ENGLAND: Hegner lathe, Duplicator, Polymax-3, Multimax-2 sold, demonstrated, serviced by Mahogany Masterpieces in sales-tax-free New Hampshire. (603) 736-8227.

LEASE TO PURCHASE INCA, Hitachi, Hegner! At last a monthly payment plan! Exclusively from Mahogany Masterpieces for woodworkers anywhere in New England! Lease an INCA for as little as $35/month for 3 years or Hitachi Super Surfacer for $103/month. (603) 736-8227.

MAKITA TOOLS. We will not be undersold. Call (800) 331-TOOL for price quotes. Example: 2400B, $249 delivered. Catalogs, $1. A.E.S., Box 1790, Fort Bragg, CA 95437. (707) 964-6661 (Calif.).

HUDSON VALLEY INCA-Sterling Woodcraft. INCA demonstration July 1 & 2, Box 335A R.D. 3, Highland, NY 12528. (914) 883-6780.

MAKITA planers, JET stationary tools and HITACHI combos at lowest prices. Pro Shop, (312) 832-3803, PO Box 721G, Elmhurst, IL 60126.

RESTORED MACHINERY. Finest woodworking machines ever made. Oliver, Yates, Northfield. Bandsaws, table saws, wood lathes, etc. Puget Sound Machinery, (206) 627-0802.

GENERAL WOODWORKING MACHINERY. Send $3 for catalog. John Gorrell Woodworking, 7188 Whitfield Dr., Riverdale, GA 30296.

CARPENTERS MACHINERY CO., INC. has one of the largest inventories of new and used industrial woodworking machinery in the country. Over 100,000 sq. ft. inventory. Offices in Philadelphia and York, Pa. Call us for our specials or with your needs. Rebuilt Rockwell Porta Nailer, $99. Carpenters Machinery Co., Inc. 212 N. 11th St., Philadelphia, PA 19107. (215) 922-7034; 365 W. Cottage Pl., York, PA 17403. (717) 843-2101.

SILVO HARDWARE, 188-page Hand & Power Tool Catalog, $1. Dept. FW3-8, 2205 Richmond St., Philadelphia, PA 19125.

JAPANESE TOOLS SINCE 1888. Free catalog. Tashiro's, "Monday thru Friday", 618 So. Jackson, Seattle, WA 98104. (206) 622-8452. "Saturdays only", 301 West Holly, Bellingham, WA 98225. (206) 647-0133.

---

• DOOR • WINDOWS • FIXED & MOVABLE LOUVRES • CABINET DOORS •

**"MIGHTY BOAR"**

A HORIZONTAL BORING ATTACHMENT FOR RADIAL ARM SAWS

FEATURES:
- Fits most 10" x 12" radial arm saws.
- Sturdy, accurate, safe, easy set up and operation

INTRODUCTORY OFFER INCLUDES:
- Complete conversion kit.
- One ⅜" drill bit.
- Adapter (please specify your make of saw).
- Pack of dowels, glue & dispenser.

Make check or money order payable to:

**DREAM VENTURES, Inc.**
**225 San Jose Avenue**
**San Jose, CA 95125**
**(408) 298-7070**
**$89.95**

Allow up to 30 days for delivery

• Calif. residents add sales tax.
30 day money back guarantee

TOYS • FRAMES • PICTURE • STAIR • RAILINGS • SCREENS

• TABLES • CHAIRS • BOAT CONSTRUCTION • CABINET FACE FRAMES •

---

OLIVER LATHES; rebuilt #159 12 in. by 6 ft., #51 12 in. by 3 ft., #20C 24 in. by 23 ft., #25A 16 in. by 5 ft., #25C 24 in. by 10 ft., #26 36/60 in. by 10/15 ft. HAPFO copying lathe 16 in. by 44 in.; NORTHFIELD 12 in. and 20 in. jointers, 16-in. table saw; YATES #2½ tenoner. (415) 488-4333.

JAPANESE HAND TOOLS: Finest hand tools in the world, many exclusively from Mahogany Masterpieces. Send for free newsletter/catalog. Masterpiece Tools, RFD 1, Wing Rd., Suncook, NH 03275. Oiichi chisels with proper handles.

UNIVERSAL TABLE SAW JIG! The Master Jig from R. J. DeCristoforo. Will fit any table saw. Allows the user to do tenoning, mitering, vertical mitering, circle cutting, notching, tapering, multiple cross cutting and more. Full size plans. Send $12 to DeCristoforo Designs, 27082 Horseshoe Ln. #2, Los Altos Hills, CA 94022.

FREE CATALOG. High-quality hand woodworking tools for the cabinetmaker, carver, boat builder and timber framer. Woodbutcher Tools, 38 Center St., Bath, ME 04530. (207) 442-7939.

GREENLEE BRAD POINT DRILLS. Set of seven high-carbon tempered steel drills. Includes ⅛ in, 3/16 in., ¼ in, 5/16 in., ⅜ in., 7/16 in., ½ in. bits and protective pouch. Designed for use in drill press or ⅜ in. portable drill. Sale price $22 postpaid. Woodbutcher Tools, 38 Center St., Bath, ME 04530. (207) 442-7939.

FREE BROCHURE. Taper-point drills, countersinks, doweling drills, spiral-groove dowel pins, wooden balls and wheels, Shaker pegs. Odd Ball Supply, Box 133, No. Attleboro, MA 02761.

---

**PROFESSIONAL TURNING TOOLS**
**Fittings and accessories**
**Send one dollar bill for catalog**
**PETER CHILD**
**The Old Hyde, Little Yeldham, Halstead, Essex, England.**

---

**Fine Hardwoods and Woodworking Supplies**
Send for brochure
Mail Orders
**CraftWoods**
**York Road & Beaver Run Lane, Cockeysville, Maryland 21030**
**(301) 667-9663 Telex: 87498**

---

ASHLEY ILES carving and turning tools. U.S. distributor offering dealerships. Inquire: Midwest Woodworkers Supply, 13209 I St., Omaha, NE 68137. (402) 330-5444.

Norris-type SMOOTHING PLANES. The best are now available. Information, Jeffrey Warshafsky, 12 Charles St., Winthrop, MA 02152.

CHAIR CANING SUPPLIES—Cane webbing, rush, splint, ash, rawhide, cord. Catalog, $1 (refundable). The Caning Shop (FW), 926 Gilman, Berkeley, CA 94710.

THE GOLD LEAF PEOPLE™, genuine, imitation sheets, rolls, supplies, and texts. In USA: 23 Lawrence (#8), Spring Valley, NY 10977. Canada: 454 Lawrence West, Toronto, Ont. M5M 1C4.

PLANES TUNED, including grinding sole flat. Smooth, $50. Jack, $60. Jointer, $70. HIS, $5. Bordelon, 1220 Mockingbird, Crowley, LA 70526.

FREE CATALOG! Veneering supplies, wood toy parts/plans, furniture plans, woodworkers' books, dowels, caning supplies. Simplified veneering instructions included. Hurry! Morgan, F04M02, 1123 Bardstown, Louisville, KY 40204.

BRANDING IRONS. Permanently mark wood. Free information, sample brand. Nova Tool, PO Box 29341, Lincoln, NE 68529.

NORTHERNERS. Sharpen ice augers! Average 15 minutes per auger. All kinds. Equipment, materials, instructions. Complete information, $1. Thomas Bushey, PO Box 1253, St. Albans, VT 05478.

POWER TOOLS SERVICED promptly by experienced personnel. Send tools to be repaired to Kalman Electric, 119 N. Beacon St., Boston, MA 02135. (617) 782-0300.

---

**FOLDING TIMBER GOUGE**

- Heavy forged stainless blade
- Rosewood handles-brass liners
- Highest quality-Sat. Guaranteed.

$26.50 ppd. Heavy leather belt sheath, specify right or left-handed-$8.50
**St. John's Wood Co.**
650 St. John, Pasadena, CA 91105
(213) 441-1067

---

**The Beall Tool Co**

Introducing the **Beall Wood-threader**, a new and better way to cut threads in ANY kind of wood. This patented device attached to your router allows you to make perfect ½", ¾" and 1" threads.
For more information write:
**541 Swans Road, N.E., Newark, Ohio 43055**
**614-345-5045**

**PLANS**

DETAILED—STEP-BY-STEP
**Ideal student woodworking projects that give professional results.**
Stacking Bookcase • Grandfather Clock
Curio Cabinet • Grandmother Clock
Adjustable Bookstand
BROCHURE $1.00 (refunded with order)
ABOUT TIME PLANS Dept F7-3
7707 Aurora Ave N., Seattle, WA 98103

---

**SEATTLE**
You'll find a large selection of the best woodworking tools at:
**The Wooden Boat Shop**
1007 NE Boat St., Seattle, WA 98105
(206) 634-3600
9 AM-5:30 PM weekdays
9 AM-3:30 PM Saturday

---

**WEST SYSTEM®**
BRAND EPOXY
Extremely versatile high strength adhesive for all typesof wood. Can be sanded, painted, or varnished when natural wood finish is desired. Used successfully in marine construction for many years. Decoupage epoxy also available.
*Send $2.00 for Manual and Price List to:*
Gougeon Bros., Dept. F., 706 Martin, Bay City MI 48706
Telephone: (517) 684-7286

---

"THE ART OF THE CABINETMAKER"
**JACQUES ANDRE ROUBO**
1772 Paris. Facsimile Edition
54-one-sided plates 11½" x 16½"
163 pages text in French. Unbound.
$115.00 incl. prepaid freight
**Copeland & Laird Int'l Corp.**
7323 Edmund St., Phila., PA 19136

---

**American Bald Eagle Blueprints**
Intensely detailed, anatomically accurate. Set of 4 large blueprints for woodcarvers and sculptors. Life size top and underside view of feathers, wing, tail feathers, leg. 6 feet views, 8 head views for modeling. 3 life size headviews-top, underside, side view. Top and underside glide chart. 520 measurements total in 10 separate scales.
send $20 check to:
Denny Rogers • 309 Daisy Lane • Normal, IL 61761

---

*NEW! MOST UNIQUE CONCEPT IN WOODWORKING PLANS*

NEW INGENIOUS METHOD ENABLES YOU TO EASILY BUILD BEAUTIFUL FURNITURE TO YOUR CUSTOM SIZES AND STYLE! MACHINED PARTS AVAILABLE TO MAKE YOUR OWN RAISED PANEL DOORS
*Send $1.00 for Brochure*
CFS
*for hobby or profit.*
Custom Furniture Systems
Dept FG 3901 Kline Ave.
Reading Pa 19606

---

*** BEND WOOD easily...**
Eliminates laminating, quicker too! See our May/June ad on page 32. Let our **Steamer/Bender** work for you. Send $179 (ppd.) to:
**WILHELM'S WOODEN WARES**
Box 303 RD #7, Hortontown Rd.
Hopewell Jct., N.Y. 12533
Tel. (914) 225-0969
* 30 Day Money Back Guarantee

---

**WESTERN PENNSYLVANIA WOODWORKERS**
50 Domestic & Imported Woods
Veneers • Finishes • Mouldings • Hardware
Carving Stock • Inlays & Bandings
Plans • Books • Magazines • Quality Tools
*Call or Visit Our Store*
**WOODCRAFTERS' SUPPLY**
9509 Perry Hwy. (Rt. 19)
Pittsburgh, Pa. 15237 (412) 367-4330

---

**FREE!** VENEERING CATALOG

90 VARIETIES WORLD'S RAREST VENEERS. FACES. FLEXIBLE VENEERS. SUPPLIES · ILLUSTRATED FULL COLOR — AT REASONABLE PRICES SIMPLIFIED INSTRUCTIONS AND BARGAIN STARTER OFFERS INCLUDED SAVE 25% HURRY!
**MORGAN, Dept. FO4K46**
1123 Bardstown Rd., Louisville, Ky. 40204

---

BEAUTIFUL WOOD FINISHING is easy with the Sealacell 3-step wipe-on process because it produces a hand-rubbed finish without special equipment or techniques and dries dust-free. Free Wood Finishing Guide and Products Catalog. General Finishes, Box 14363F, Milwaukee, WI 53214.

LOTS 'O LOCKS. German imported furniture locks of every description. Unusual, special purpose. Target Locks, 609 Plandome Rd., Manhasset, NY 11030.

CARVED QUEEN ANNE LEGS. In eleven different sizes and shapes for your custom-made projects. For brochure send $1 to Windsor Classics, 15937 Washington St., Gurnee, IL 60031.

BRANDING IRONS for craftsmen. Heat mark your products. Initials, signature, address, logo. Heat Mark Co., Rt. 6 Box 828, Mooresville, NC 28115.

FREE CATALOG of woodfinishing supplies. Varnishes, lacquers, dry shellac, stains, glues, PEG, books, bronzing supplies and more. Woodfinishing Enterprises, Box 10117, Milwaukee, WI 53210.

EASY ALIGNMENT TOOL for precise cuts on radial-arm and table saws. Guaranteed. Only $29.95. Exact Cuts, 5306 Boy Scout Rd., Florence, OR 97439.

BRANDING IRONS MADE TO ORDER with names, initials, monograms. Signatures, logos, designs, faithfully duplicated. Write for information and sample brandings, giving size and inscription wanted, and intended use. Norcraft Custom Brands, Box 277F, So. Easton, MA 02375. (617) 238-2163.

CRAFTING SMOKING PIPES book. Briar, stems, materials. Special tools. PIMO W73, Box 59211, Chicago, IL 60659.

PICTURE FRAME MOLDINGS, many patterns, species, short lengths, low prices, shipped UPS. Send $1 for catalog or $20 trial order. Xylo, Box 8062, Savannah, GA 31412.

We are your CARBIDE ROUTER BIT CONNECTION for sales, service and repairs of top-quality American-made bits. Buy any of our complete line at 25% off through August 31st or send us your old bits for retipping and save big. Volume prices available. Dealer inquiries invited. True-Cut Saw & Tool, PO Box 427, Hamilton, MT 59840. (406) 363-6697.

BUILD YOUR OWN SAWMILL! Inexpensive kits, plans. Free details. Sawmill, 35045-D Ede Rd., Lebanon, OR 97355.

---

**SPEAKER BUILDER**
Combine your woodworking skills with accurate electronic and acoustic design information to build better loudspeakers than you can buy. **Speaker Builder** is the world's only magazine for people who love good music and the best in music systems. Build all types from bookshelf kits to electrostatics. Only $18 for 2 years (8 issues). One year $10.
**SPEAKER BUILDER**
Box 494, Dept FW-1, Peterborough, NH 03458 USA
(Outside USA add $2/yr. postage; remit in US$ only.)

---

Build your own WOODEN CASKET! Send $4.95 for instructive blueprints. Shelters (FW), Campwood Rte., Prescott, AZ 86301.

MAKE WOOD TOYS FOR PROFIT. Toy parts, patterns wholesale. Lovebuilt Toys, FW7, Tahoe City, CA 95730-5459.

Professional plans for 18th-Century FRENCH COUNTRY FURNITURE. Catalog, $1 (refundable). Stephen Osborne, Piedmont, Quebec, Canada J0R 1K0.

Historic full-size DRAWINGS of Hemsch, Ruckers, etc. Plans, $30; Catalog, $3. R.K. Lee, 353 W. School, Watertown, MA 02172.

SWEDISH DOOR HARP PLANS, $4.95, accessory kit, $5.95, both for $10. Custom Woodworking, PO Box 8621, Erie, PA 16505.

LOWEST PRICES on furniture, craft and toy parts. Send $1 to K & K Woodcrafters, RD #4 Box 270A, Scotia, NY 12302.

PLANS: Toys and furniture. Iron-on veneers. List, 25¢, Catalog, $2. Deerbrook Industries, 1701 Deerbrook Trail, Xenia, OH 45385.

WOOD ANTIQUE MODELS and other projects. Full size patterns. Catalog $1, refundable. Criss-Cross, Box 324, Dept. CF, Wayne, NJ 07470.

MAKE TOYS—Plans, kits. Hardwood wheels, parts, dowels. Catalog, $1. Cherry Tree Toys, Belmont, OH 43718.

APPALACHIAN DULCIMER PLANS (full size) with detailed instructions, $7.95. Free catalog of dulcimer-related accessories (wood, strings, etc.) with order. Catalog only, $1. Carrell's Dulcimers, Box 203, Townsend, TN 37882.

STRINGED MUSICAL INSTRUMENT PLANS. World's largest selection. Catalog, 50¢. Peregrine, 7322 Hart, Mentor, OH 44060.

GUITAR, BANJO, violin, mandolin-making materials, accessories, books. Piano-tuning kits. Catalog $1. International Luthiers Supply, Box 15444, Tulsa, OK 74158.

LUTHIERS' SUPPLIES: Imported tonewoods, tools, parts, accessories for violins, violas, cellos, basses and guitars. Catalog, 50¢, includes 10% discount certificate. International Violin Co., Ltd., Dept. WO, 4026 W. Belvedere Ave., Baltimore, MD 21215.

GUITAR TOPS, Sitka spruce, western cedar. ⅛ in. ~~by 8¼ in.~~ by 22 in., 16 to 20 G.P.I. Excellent tonal wood for that special guitar. Satisfaction guaranteed. $24 postpaid, 2 sets $43. Buck Musical Instrument Products, Box 71B, New Britain, PA 18901.

---

ROSEWOODS / EXOTICS
TIMBERS / VENEERS
Importer Direct
Brazilian Rosewood
Kingwood
Tulipwood
Cocobolo
Pernambuco/Pau Brazil
*Wholesale Only* *Ship Anywhere*
MENDOCINO WOODWORKS
P.O. Box 362, Albion, CA 95410
(707) 877-3408

---

**CREATE AN HEIRLOOM with TOY DESIGNS**
CATALOG of PATTERNS & TOYMAKERS SUPPLIES
$1.50 (U.S. dollars)
**TOY DESIGNS,**
P.O. BOX 441F, Newton, Iowa 50208

---

**Whittling and Carving Tools and Supplies**
New catalog—60¢. American and foreign made quality tools.
WARREN TOOL CO., INC.
Rt. 1, Box 14-AF, Rhinebeck, NY 12572 (914) 876-7817

---

QUALITY MATERIALS FOR WOOD CRAFTSMEN
**3M ABRASIVES**
sheets-belts-discs
NU-LIFE BELT CLEANERS
For information write:
OHIO WOODSHOP SPECIALITIES
OWS
P.O. BOX 207 DEPT. 301
JACKSON, OHIO 45640

---

**WOOD TOYS**
Plans
Parts
Wheels
Catalog $1
Armor Products
Box 290, Deer Park, NY 11729, Dept. D

---

CONCEALED HINGES FOR WOOD & GLASS DOORS
STEREO AND KITCHEN CABINET HARDWARE
SLIDES ★ CATCHES ★ SPECIALTY ITEMS
MAIL ORDER ONLY — CATALOG $1.00
*ALLEN SPECIALTY HARDWARE*
P.O. BOX 10833 PITTSBURGH, PA 15236

---

**Wood-working Books**
HUNDREDS of TITLES available, worlds largest selection
send for free list:
BARK Service Co.
P.O. Box 637
Troutman, NC
28166

---

CATALOG ONLY $1
**MAKE TOYS**

PLANS & PARTS
JULIA WOODEN TOYS DEPT 1905
1283 AVERY CT. ST LOUIS MO. 63122
FULL SIZE QUALITY PLANS

---

**DUST COLLECTOR SYSTEMS**
**300; 650; and 1200 CFM**
Use when: sawing, planing, buffing, grinding, sanding, polishing, fiberglassing. Complete, Ready to plug-in, Portable. *Write for free brochure:*
**Tyssens Mfg. Inc.**
35216 McKee Rd.
Abbotsford, B.C., Canada V2S 6B7
604-859-7623

---

**WOOD PARTS**

TOY, FURNITURE, CRAFT & GAME
Wheels • Spindles
• Balls • Knobs
• Shaker pegs • And more!
Since 1927! Send $1.00 for Catalog
BROWN WOOD PRODUCTS CO.
P.O. Box 8246FW, Northfield, IL 60093 • (312) 446-5200

## WOOD & TOOL EXCHANGE

### For Sale

H.B. Smith 36-inch bandsaw. Running in excellent condition. $800 or best offer less electricals. J. Williams, (914) 763-5483.

Cherry $1.25, butternut $1.40, walnut $2.50, curly maple, KD or AD available. Many others. SASE for list. Ship anywhere. Mark Cramer, RD 5 Box 288, E. Stroudsburg, PA 18301. (717) 424-6519 eves.

Air dried ¾ in. red oak S2S 75¢/bd.ft. plus UPS charges. Random widths 6 to 12 in., 3 to 6 ft. lengths. Send check to J. Bowman, 3439 Rt. 167 E, Jefferson, OH 44047.

Blount 7-ft. cast iron lathe, 440 volts, 4 speed, ½HP, $500. (804) 823-5235. Box 178, Batesville, VA 22924.

Record multi-plane, $175, like new. K. Walker, Route 1, Rogers, NM 88132.

Stanley #45 good cond., $160. Repaired one, $50. Woodturning lathe, heavy cast head/tail stock, 4-step paper pulley w/14-in. and 36-in. tool rest on wood supports. E. Kurz, Rt. 2 Box 101, Poplar Bluff, MO 63901.

3-drum Yeats #401 43-in. roll feed sander. Rebuilt, excellent. Tools, installation and operating instructions, parts list. $2,100 loaded on your truck. Vermont. (802) 785-4364.

Stanley #45 plane, 17 cutters (one box), $135. One #45 plane for parts, $30. (219) 255-4517.

Cabinetmaker's bench (old world). Excellent condition, antique, Hammacher Schlemmer, $450. Dan, NY, NY (212) 674-2517, after Sept. 5.

Rockwell Uniplane, mint condition, $800. 19th-century wooden treadle lathe, 5-ft. bed, working order, $950. P. Bohne, RD 1129, Womelsdorf, PA 19567. (215) 589-4264.

16-in. jointer, 3HP motor, $550. Westchester, NY. (914) 939-6646 evenings.

Delta 10-in. tilting table saw w/Delta s.p. mtr. and stand in excellent original condition, $480. Miscellaneous Delta and Rockwell parts and accessories. (714) 536-7674.

Cocobolo and bocote as low as $6.50 per board foot. Lignum vitae at $3.50 per board foot. C. Hutt, 15861 32nd Ave., Surrey, B.C., Canada V4B 4Z5.

Oliver oilstone tool grinder #585, 3PH, $850. American double-spindle horizontal boring machine, 1HP, 1PH, $400. Will trade for patternmaker's lathe. Newman, Rochester, NY (716) 328-1577.

Crescent 12-in. cast iron table saw on casters, 2HP, 1PH, 2 miter heads, 12 blades, dado set, $750. Moore, Windham, VT 05359. (802) 875-2408.

2 padouk planks over 80 years old. 8/4 by 30 in. by 8 ft. Sell both at $15/bd. ft. Write/call: G.E. Murray, 921 Main St., Winchester, MA 01890. (617) 729-2820.

Powermatic 16-in. planer 3HP, 3PH; magnetic controls, $2,000. 16-in. R.C. Porter jointer (7-ft. bed) excellent cond. with motor mount, $1,400. Both for $3,300 frt. paid. J. Cesnik, (612) 253-8940, Sauk Rapids, MN.

High-quality dry redwood burly root slabs and bases. Svedvik, (715) 448-3174 (WI).

Inca deluxe 10-in. tablesaw with mortising table. Many accessories and blades. Mint condition, $1,300. (203) 259-4483.

### Wanted to Buy

Old Alexander Doods dovetail machine for parts. D. Snyder, Box 927, Dublin, PA 18917. (215) 348-8033.

Plane bottom for Stanley/Bailey #5. D. Hendon, 107 Olson, Long Beach, MS 39560. (601) 863-3499 collect.

Tailstock body for Delta model 930 11-in. lathe. Part #DDL-276. Neil Evans, Box 274, Victoria Harbour, Ont., Canada L0K 2A0.

Stanley #55 plane. Contact Tom McElheny, (716) 584-3363. PO Box 264, Pavilion, NY 14525.

Jointer 6 or 8 in., sensibly priced. Send price, condition, telephone. PO Box 278, Vincennes, IN 47591.

Shopsmith 10ER speed changer, jointer-shaper fence; used Jorgenson 'I' bar clamps. (617) 862-0925. D. Koplow, 9 Brent Rd., Lexington, MA 02173.

¾-in. ball bearing spindle shaper in rebuildable condition. N.W., 211 Marilyn Dr., Hatboro, PA 19040.

## SITUATIONS WANTED

Apprentice cabinetmaker, 2 years vocational training, 1 year work experience, seeks position in custom furniture. L.A. area. Carey Delzell, 1416 E. Windsor Rd., Glendale, CA 91205. (213) 246-9436. Have tools.

Serious and responsible, independent cabinetmaker seeks to rent space within equipped shop. New York City or Westchester. Philip Meskin, (212) 549-9394 eves.

Professional wheelwright with carving, upholstery production, cabinetmaking and supervisory experience seeks other opportunities. Mr. J. Jay, Rt. 2 Box 68, Stoney Creek, VA 23882.

Novice seeks l/earning position with cabinetmaker in Westchester/NYC area. J. Bolger, 320 So. Broadway, Tarrytown, NY 10591.

Professional (primarily solid wood custom & production) seeks job in San Fran. area shop. Have bench, all tools, portfolio and references. Hardworking. Call Eric, (916) 452-2601 collect.

Exp. furnituremaker, seeks summer/fall '83 work with housewright/master carpenter mid/upper Hudson Valley, NY or Western Mass. A. McClintock, 823 Park Ave., Albany, NY. (518) 489-8222.

The CLASSIFIED rate is $3.50 per word, min. ad 15 words. Payment must accompany order. Commercial accounts must use Classified. The WOOD & TOOL EXCHANGE and SITUATIONS WANTED rate is $4/line, min. 3 lines, max. 6 lines, limit 2 insertions per year. Allow 30 letters or spaces per line, including name and address. The Wood & Tool Exchange and Situations are for private use by individuals only. Please inquire for DISPLAY CLASSIFIED rate. Send to: *Fine Woodworking*, Advertising Dept., Box 355, Newtown, CT 06470. Deadline for Sept./Oct. is June 24th; for Nov./Dec., August 25th.

## INDEX TO ADVERTISERS



## Fine WoodWorking Reader Service

To make use of any of the services listed here, write your name and current address below.

Name ____________
Address ____________
City ____________
State ________ Zip ________

**MOVING?** So you won't miss an issue, please give us your new address at least six weeks before the next issue.

Name ____________
New Address ____________
City ____________
State ________ Zip ________

**SUBSCRIBER LIST.** We're now renting our subscriber list to carefully selected companies—only those we believe you'll want to hear from. If you don't want your name on the lists we rent, check the box below and we will remove it at the first opportunity.

☐ Please do not rent my name.

**PROBLEMS.** If you've run into a subscription-related problem, write to our Subscription Department. We will do our best to help.

The Taunton Press Box 355, Newtown, CT 06470

# PICK-UP STICKS

BY JOHN MARCOUX

Vacation is the perfect time to make rustic furniture. Away from your shop, you have the opportunity to simplify your work. You *must* simplify, since you're limited to the tools you can fit into your suitcase, and to the materials you can find at your retreat.

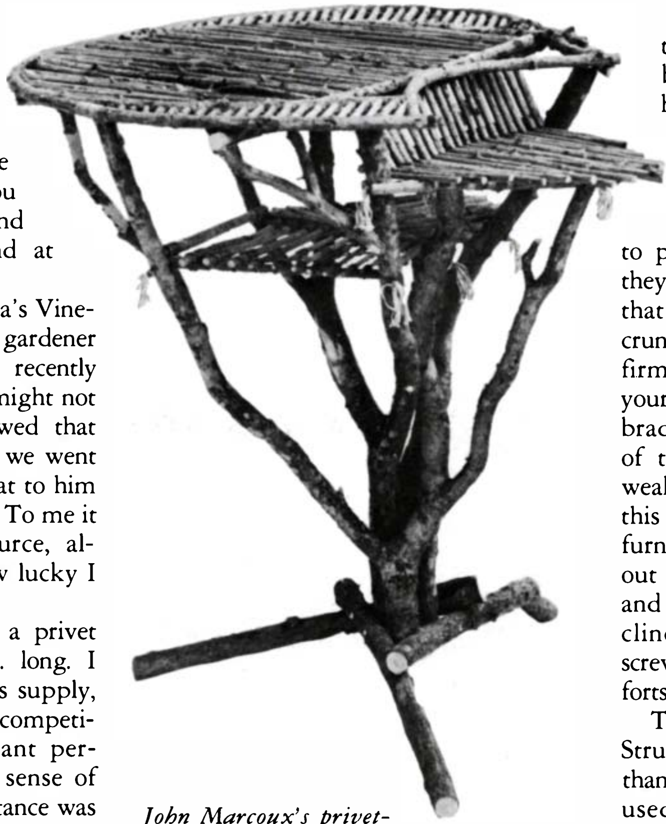
On my second day at Martha's Vineyard last year, I sought out a gardener friend to find out if he had recently cut any brush, and, if so, if it might not still be around. Franklin allowed that maybe he could help me. Off we went in my station wagon to see what to him was surely only a pile of debris. To me it was a potential natural resource, although I still had no idea how lucky I was to be.

He had recently cut down a privet hedge 20 ft. high and 40 ft. long. I stood looking at this marvelous supply, mine for the asking, with no competitors in view and no exorbitant per-board-foot price to assail my sense of value. Instead, a casual acquaintance was going to give me something I prized.

I didn't want my excitement to appear too silly to Franklin. He was very kind and tolerant of aberrations in others around him, guarding his own sense of balance by not getting too curious. But he was already treating me a little condescendingly because of my mumbling about building furniture from a pile of brush.

Looking through the trimmings, I realized that this privet, given its head for 20 years, was first-class material for making rustic furniture. It had everything. Some of the old growth had a natural stubbornness to it, almost like bonsai, and I picked it to signify age and to impart both real and symbolic strength. There was straighter, mid-age growth that could become legs or healthy stretchers. Some of these pieces were ⅝ in. to ¾ in. thick, yet young and green enough to be easily bent into arcs of 18-in. diameter and even smaller. The very young shoots, up to ¼ in. thick, were infinitely flexible, and when unflexed were pencil-straight. One more unexpected virtue of the privet was its very gradual size change over the length of its limbs—lengths of 3 ft. or 4 ft. were virtually the same diameter at each end. I had brought a saw, small pruning shears and my knife. Without being able to identify or anticipate my exact needs, I cut out a full assortment.

I began building by putting the elements together in experimental ways, trying to establish a form from which to proceed. When I stumbled on a combination I liked, I encircled it with wire and twisted the wire firmly in place. This was a temporary but powerful fastening that could be easily snipped away for any necessary changes, or in preparation for the final fastening—a brad or a screw. Another way to make a joint is to flatten the twisted wire ends against the wire wrapping, then cover the wire with a lashing of linen, rattan or cane. You could also use only the lashing of string or fiber, but including the wire makes the joint much stronger. I didn't use these methods because I like the idea of exposing the fastener that is actually doing the work.



*John Marcoux's privet-hedge table.*

I proceeded pragmatically, putting things together as I came to them. Making all these important decisions left me as pleased as if I had been running the whole country. At the beach, feeling elated, I schemed about what I'd do when I got back to the cottage. I must tell you, though, that it rained a lot on my vacation, so I got a lot done.

Clinched brads are the mainstay of the table I built. Clinched nails are direct and powerful, and when they rust they fit the character of rustic furniture perfectly. But privet is hard wood. You must drill through for each nail connection; otherwise the nails bounce back, or the wood splits. Drill the hole and hit in a brad; if it projects more than ⅛ in. out the back side, cut it off and clinch it with channel-lock pliers. This is a wonderful system. The pliers adjust to practically any span you need, and they are so powerful (use the large ones) that they send the back end of the nail crunching into the wood to make a firm, reliable fastening. Be sure that your drill is the same diameter as the brad, or a little smaller, so that the head of the brad doesn't slip through and weaken the joint. Don't underestimate this clinching operation. This type of furniture is usually nailed together without predrilling and without clinching, and that's why it falls apart. The nail-clinching, along with an occasional screw or strategic bolt, can save your efforts from the flimsy pile for many years.

The three-element base is important. Structurally, it needs to take more stress than any other section of the table. I used 1¾-in., #8 round-head wood screws with a pass-hole through the applied member, although 6-32 nuts and bolts would have been even better, with the bolt peened over onto the nut. The legs are not only screwed to the center column, but from underneath to each other where they cross as well. I've found this to be a wonderfully neat and strong way to fasten legs to a column. Some of the upward branching is natural growth, and some I added.

When I finished the table, in an attempt to regain some credibility, I showed it to Franklin. He leaned on his lawn rake, relishing the break, and said, "Ain't that something!" When he told me that I'd be surprised to find what some of those rich people would pay money for, I knew I had a winner. And I finally understood why city slickers are reputed to have thought of the idea of rustic furniture and to have created and continued the demand for it today.

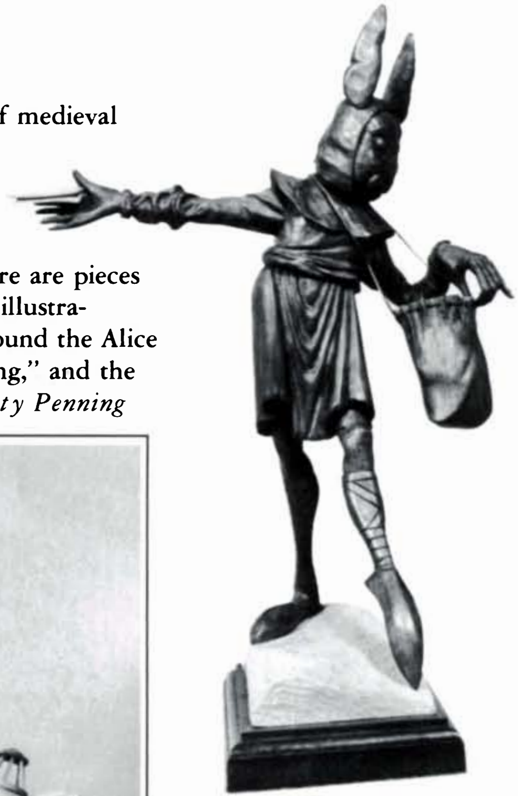
I could tell you more about how this table is made, but I wouldn't want to spoil your vacation. ☐

*John Marcoux designs and makes furniture in Providence, R.I. Photo by the author. For a more colorful example of Marcoux's work,* *see p. 71.* Fine Woodworking *buys readers' adventures. Suitable length is 1,500 words or less—up to six typed pages, double-spaced. Please include negatives with photographs.*

# Alice's Wonderland

Most Englishmen are brought up on a diet of medieval castles, Arthurian legends and Gothic cathedrals, but few of them find lasting inspiration there. Ian Norbury, of Cheltenham, Gloucestershire, incarnates such imagery in yew, boxwood and limewood. Pictured here are pieces from his series inspired by the John Tenniel illustrations to the Lewis Carroll classics. Norbury found the Alice in Wonderland books "exciting and mystifying," and the characters familiar as a bedtime story. *—Betty Penning*

*The White Rabbit blew three blasts on the trumpet and called out, 'First witness!'*



*'There's nothing but hay left now,' the Messenger said, peering into the bag.*

*'You see,' said the White Knight, 'it's as well to be provided for* everything.*'*

*Tis the voice of the Lobster;*
*I heard him declare,*
*'You have baked me too brown.*
*I must sugar my hair.'*

*. . . and in his confusion the Hatter bit a large piece out of his teacup instead of the bread-and-butter.*

*'To answer the door?' said the Frog. 'What's it been asking of?'*

Photos: The Gloucester Photographic Agency