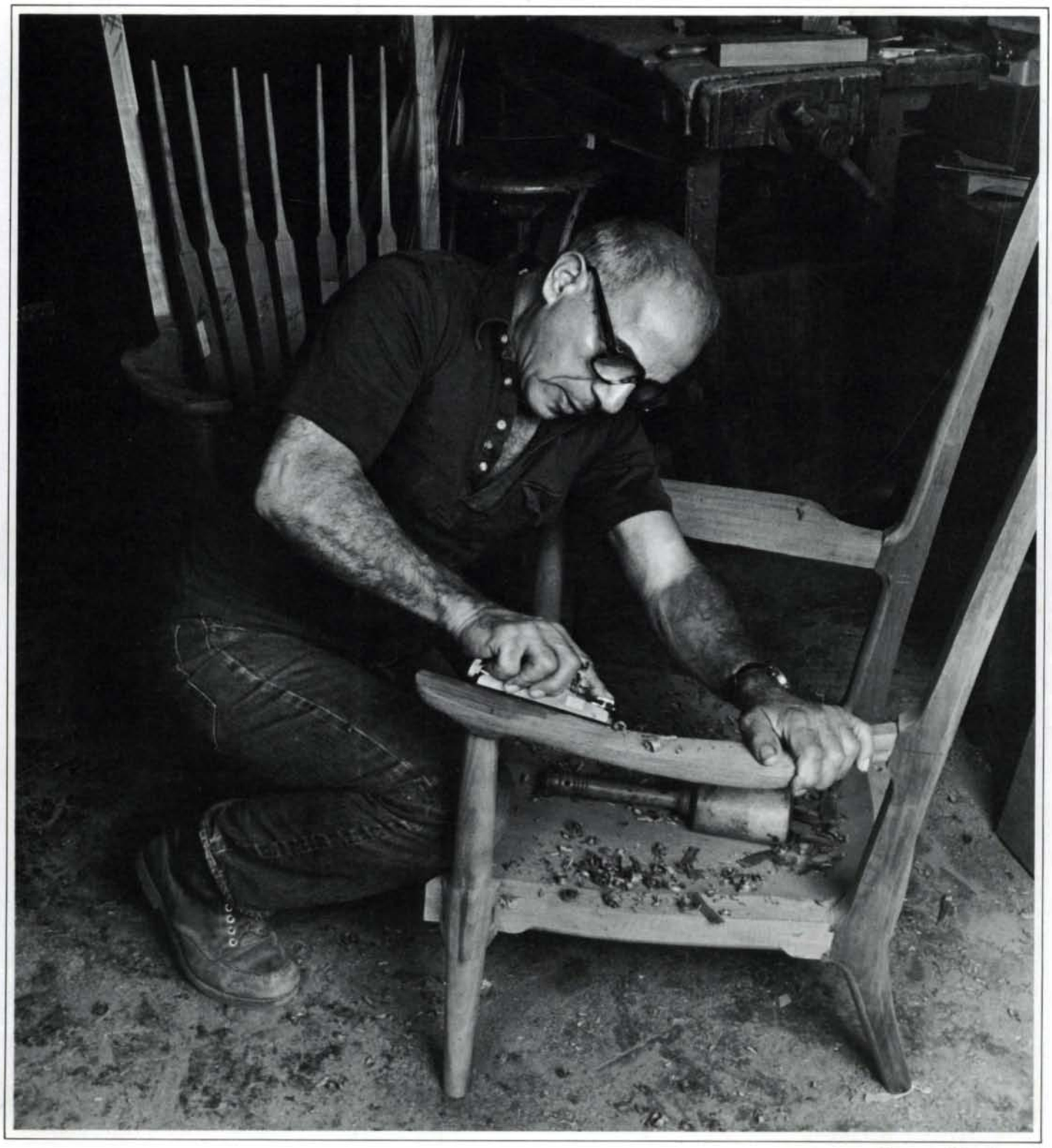
NOVEMBER/DECEMBER 1980, NO. 25, $3.00

Fine WoodWorking



Sam Maloof

A Message To The Readers of Fine Woodworking Magazine From Phoenix, Arizona Investor, Keith Stephens.

TWO YEARS AGO I BOUGHT AN AUSTIN HARDWOODS FRANCHISE FOR TUCSON.....

TWO WEEKS AGO I BOUGHT A SECOND AUSTIN HARDWOODS FRANCHISE FOR PHOENIX.....

Since I am a C.P.A. by training and an investor by profession, I was very intrigued with the exciting possibilities of the Austin Hardwoods Franchise Plan when it was introduced two and one-half years ago. I saw then, that rising furniture prices would generate a burst of activity in hobbyist woodworking. Further, I knew that rising oil costs would cause oil-based plastics to soar to a level that would make genuine hardwood furniture seem attractively priced by comparison. After 2 years of watching my volume increase dramatically from one quarter to the next, I know my perceptions were accurate. With the triple markets of commercial, school shop, and hobbyist business, I even have managed to sustain growth during the recession. How many businesses can make that statement?

The opportunity to be associated with a company that supplies inventory and guidance in this field is very attractive. I am involved in many different businesses. I am the president of a pre-school company which employs 500 people and has its own franchising plan. So I know quite a bit about franchising when I tell you this—Austin Hardwoods is offering a superb deal. For a total investment in the $70,000 range, you gain all the benefits of Austin Hardwoods' experience, have continuing guidance, extensive training in every aspect of the industry, inventory supply, a nationally known name, and interplay with other family stores.

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Keith Stephens

Other details are too numerous to list. This is a tremendous opportunity to make money either as an owner/operator or as an investor. If you happen to love dealing in fine woods, all the better. Please let us hear from you.

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Cover: Sam Maloof shapes the arm of a rocking chair (photo: Jonathan Pollock). Above, he sands to fit one of the spindles. Maloof, 64, of Alta Loma, Calif., has been making his living as a designer/craftsman in wood for more than 30 years. His furniture has attained international recognition, yet he continues to work much like the home craftsman he was when he started out. For more about the man and his work, see page 48.

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DEPARTMENTS

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Shame on you for taking your back cover *(FWW #24, Sept. '80)* to promote such adolescent nonsense. To ruin a piece of furniture with crayon or nails and render it unsellable only displays egotistical immaturity on the part of the craftsman and leaves me with many questions about what the School for American Craftsmen is teaching its students. I certainly will not hire any of its graduates if that is their attitude toward fine woodworking.... *—Henry Intili, Jasper, N.Y.*

Who would want the writing table? Too much wasted space. Who cares if it has a scribble and painted images? Bennett should have realized that an ax would have made his cabinet more distinctive than a nail. I wish I had his talent, with less of his imagination. Too many people are trying to be different by being silly.... *—Henry Fisher, Columbus, Ohio*

...The desk with the ironing-board top would, without a large and empty room, be a functional disaster. Imagine writing on the thing: the elbow constantly slipping into the lap, the paper sliding off the top, and heaven forbid that one should have to walk around it or open the drawer. It seems more like a prop for a Marx brothers comedy than so quiet and reflective a thing as a writing table....

I am only an amateur woodworker, and so I am hesitant to criticize someone else's work, particularly someone who has made it a career, but I believe that the aesthetes who see woodworking only as a self-indulgent expression of art should at least once stand before a tree that has endured a hundred years of adversity to become the two feet of heartwood that will, in turn, become their table or chair—and then have the courage to cut it down. At that humbling moment one realizes he has an obligation to express, in whatever he builds, not himself so much as the beauty of the wood, and even then, to quote Keats, he has only "the shadow of a magnitude." *—John Potter, Roanoke, Va.*

Re decorating versus desecrating, I'm very pleased to see wood handled well in a nontraditional direction. Only through experimentation will new directions appear.... One does not have to be limited to the known to be a fine woodworker.

I do feel, however, that in both examples the desecration process did not meet the obvious high standards of the rest of the work. No doubt the nail driven in the case was a "common" nail. How about an uncommon nail of sterling silver with a fine stone for a head? In the writing table, marquetry or laminating could have been used to develop the written image. *—William Jaquith Evans, Petaluma, Calif.*

...an addendum to your remarks on Chinese lacquer *(FWW #24, Q&A)*. *Rhus verniciflua*, the tree from which Chinese lacquer is prepared, is closely related to poison ivy and poison oak, and rhus dermatitis is an occupational hazard of lacquer work. Contact dermatitis can also result from wearing lacquer jewelry. So unless you're willing to pay the price of lying in bed scratching all night, look for some other finish.

—Michael Madison, Curator of South American Plants, Marie Selby Botanical Garden, Sarasota, Fla.

...Re "Period Furniture Makers" *(FWW #23, July '80)*, the only thing I disagree with are the type or style of dovetails depicted by Robert Emmett. I've cut untold numbers of the "duff-tails," as my old master called them, and use what I

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prefer to call the English type, sloping 8-1. On p. 37 two drawer sides are pictured. To me they are not balanced and appear more the Continental style. To my knowledge, there are no reports of those I've executed breaking and I assure you they had balance. But to each craftsman his own.... I agree as to the type of construction Emmett used for the rule joint, also the knuckle joint. Odd, I never placed any thought to these areas. I assumed all trained cabinetmakers followed the same pattern. I do now recall when doing restoration many times these above two areas were improperly executed. You are to be highly commended for publishing this article. How about more of these? *—R. S. Hill, Ormand Beach, Fla.*

...I am privileged to work on a daily basis with David Salisbury at Colonial Williamsburg, one of those interviewed in your article, "In Search of Period Furniture Makers." David and the others in the Anthony Hay Cabinet Shop work in a living museum and serve as a vital resource for those interested in researching handmade furniture-making techniques, for those interested in 18th-century environments, and for those examining 18th-century cabinetmaking establishments and early trade in general.

I welcome, as master of the shop, any and all who enjoy furniture, furniture-making and 18th-century life, and bid you visit us. We operate as a business—that is, we solicit orders from the public for custom-made furniture and we produce goods by hand in as economical a way as possible.... *—Wright Horne, Williamsburg, Va.*

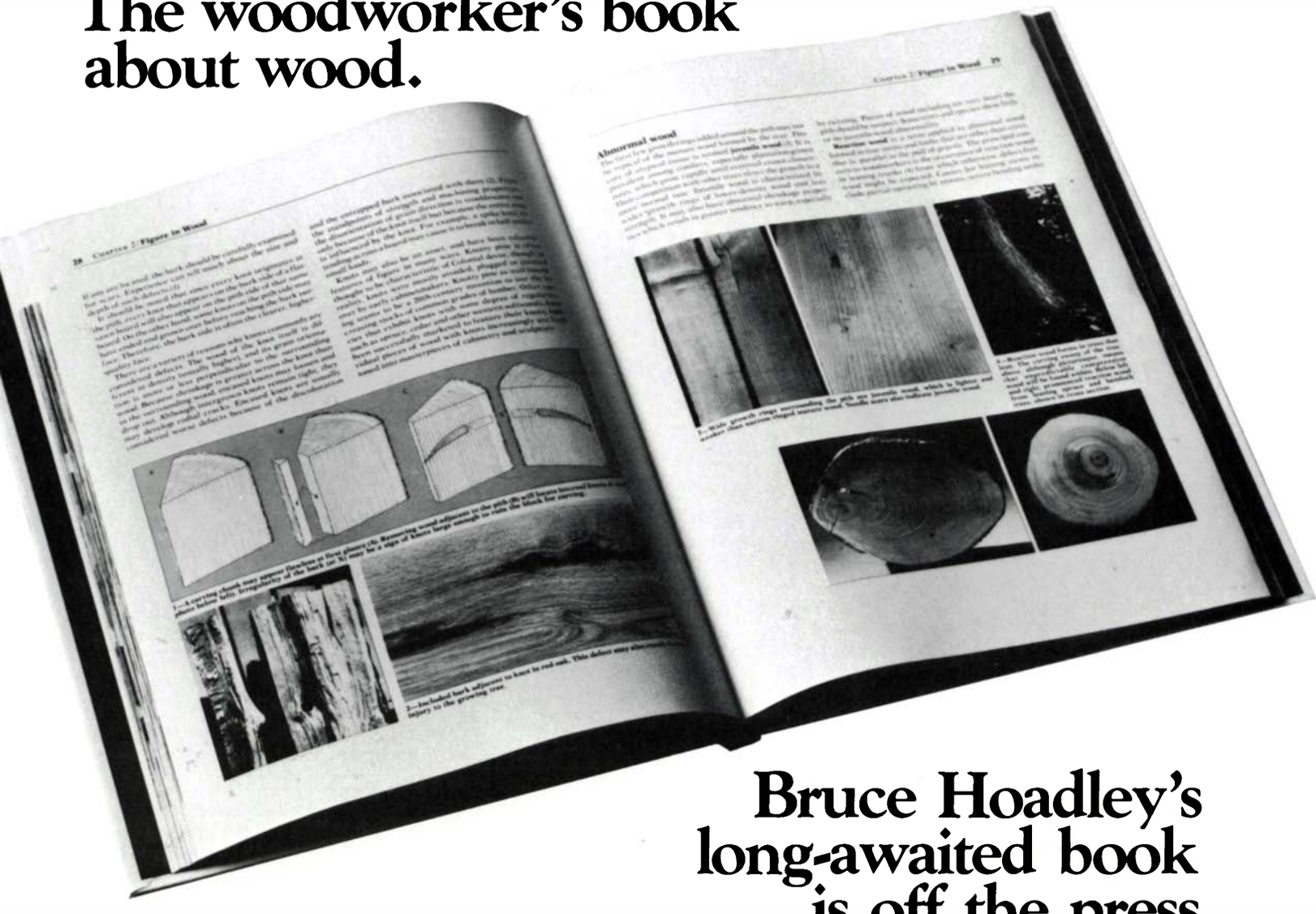
I'd like to commend you on your article "In Search of Period Furniture Makers" and to comment on it.... In my exhibit work for Historic Annapolis, Inc., I found most people have the impression one cabinetmaker executed a piece of furniture from start to finish. This could not possibly have been the case. Reading the 18th-century newspapers... you will find a leading cabinetmaker would furnish facilities for carvers, turners, furniture joiners, finishers, upholsterers and sometimes clockmakers or silversmiths. Furthermore, the leading cabinetmakers were extremely involved in the affairs of the city and state, not leaving much time for the execution of their trade. Therefore, it is my impression that pre-machine-era cabinetmakers were businessmen, like engineering firms today. The master would design and oversee, but the joinery and detail work would be handled by the individual tradesmen (like a subcontract). *—Jan Redpath, Severna Park, Md.*

...The study of blockfront construction in the July issue was very good. I find the thematic approach to a subject in an issue much superior to a series of articles, as you can find the various opinions and different approaches to the subject in the same issue. From the point of view of a student the various subtleties are more readily assimilated.... *—C.W. Meggison, Summerside, P.E.I.*

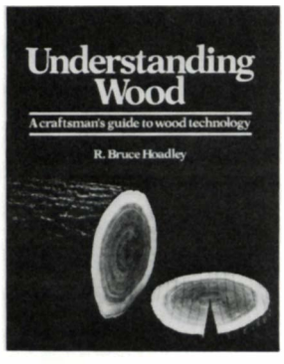
As an amateur who aspires to construct period furniture at least as well as the old masters, I found the article by Wallace Gusler *(FWW #23,* July '80) particularly interesting.

In the matter of dustboard construction I have devised a joined frame construction, which I call the floating rear-tenon method, that does not push the drawer blades out of their housings or push the backboards off. Construction is as follows: The side pieces are tenoned front and back. The front

The woodworker's book about wood.



Bruce Hoadley's long-awaited book is off the press.



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There's a lot more. Hoadley explores drying, bending, joining, fastening, finishing and modifying wood, and tells how to identify 54 common native and imported woods. Along the way, he blasts some common misbeliefs—terms such as "dry rot" (really dry wood will not decay) and myths such as "wood has to breathe." (It doesn't, and you don't have to feed it, either.)

Hoadley, a contributing editor of *Fine Woodworking*, has discussed some of this in his articles, but most will be new to our readers. The book is clearly illustrated with striking photographs and informative drawings. We think it's the definitive book about wood for woodworkers, and we expect it to be a classic for many years to come.

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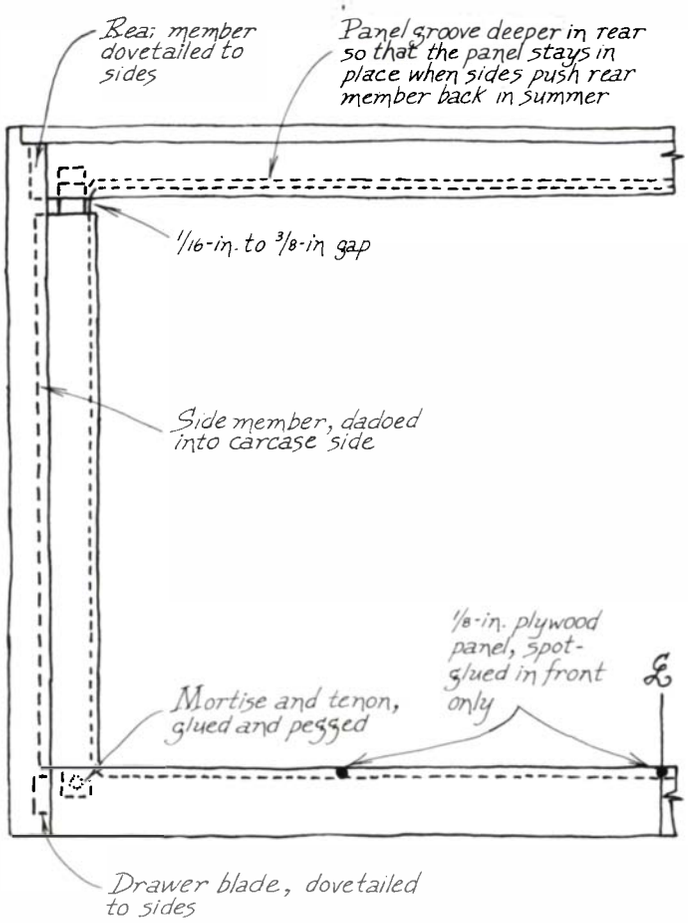
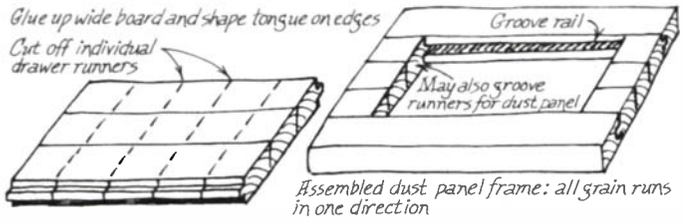


tenons are glued and pegged in their mortises at the rear of the drawer blade (or a separate front frame member to be edge-glued later to the blade). The rear tenons float in their mortises in the rear crossmembers (using hard paraffin wax instead of glue). The shoulders of these tenons are cut so as to leave a gap between them and the edge of the rear crossmember. The size of this gap depends on whether construction is in winter (1/16 in.) or in summer (3/8 in.). The ends of the rear members are dovetailed to the carcase sides the same way that the drawer blade is fastened in front. The sides are thus tied together at the back of each drawer level, so the frame plays an additional role, permitting a lighter back panel.

The floating tenon keeps the side pieces of the frame in place in their dadoes in the carcase sides. The dadoes support the weight of the drawers and contents. The rear member of the frame moves with the carcase sides as they swell and shrink, while the frame side members move freely in their dadoes with their rear tenons moving freely in their housings.... *—Stephen R. Miller, Essex, Conn.*

I read with pleasure the articles on reproducing period furniture in *FWW* #23 (July '80). The problems associated with dust-panel-frame and casework-side contraction and expansion were well addressed. A method that I have been using seems to eliminate many of these problems, in particular, the problem of joining long grain to cross grain. By this method the grain direction of the dust-panel frame is in one direction only, which is the same direction as the case sides, assumed to run from top to bottom.

As in the drawing on p. 10, a board of sufficient width is glued up from narrow stock. After dressing, its two long-



grain edges are given a tongue. The drawer runners are then cut from this board by sawing cross-grain. The rails, which form the front (Gusler calls this a "blade") and back of the frame, are prepared and grooved on the inside edges. Assembly is quite simple with the tongue and groove ensuring alignment. The edges that mate to the carcase sides may be dovetailed or simply fit into dadoes. I prefer to notch the front edge of the drawer blade and use a stopped dado in the carcase side. This design may be glued solidly to the carcase sides (providing the species of wood are the same) with little fear of the sides splitting, as grain direction is the same. The inside edges of the runners can be grooved to allow for a dust panel. *—Gerald C. Lauchle, State College, Pa.*

In *FWW* #23 (July '80), Stephen Goddard asks about planes from Henley Optical Co. I own their "Best English" miter plane, which I purchased with one spare iron in 1976 for £141. For a variety of reasons it remained an unused but lovely artifact until last winter, when I found it an extremely useful (but hardly indispensable) tool for planing end grain, and to a lesser extent for planing wild grain.

The plane is a handsome and heavily constructed miter plane, similar to, but much refined from those available pre-World War II. It is made of bronze with an inset steel sole, all highly polished. Wood infill for the front hand knob, cutter bed and wedge is French-polished rosewood. The cutter is 2½ in. wide and 5/32 in. thick, of high-quality steel. It came razor-sharp and with instructions on how to keep it so.... In profile the whole plane resembles a huge, low-angle block plane made proud by bronze and rosewood. It weighs about six pounds.

I like the plane, find it nice to look at, pleasant to use, and of superb workmanship. I do not know the current price but...as much as I like it and as often as I refuse to sell it, I do not expect to be able to make it earn its cost. It will surely outlast me—and one or two more, I am certain, so in the long run it might pay off. I keep it in its green baize bag (as furnished), in its shipping box (only cardboard, unfortunately) and every now and then—once every two months, perhaps—it is the tool for the job....

—Dante D'Alessandro, Tofino, B.C.

EDITOR'S NOTE: Henley Optical, now known as Henley Plane Co., sells the miter plane described above for £360, a smooth plane for £474 and five more planes of similar quality for similar prices. Spare irons are £30 each. The company's address is 13 New Road, Reading, Berkshire, England.

I am a carpenter concerned with protecting my eyes, and have noticed that very few of the many carpenters and woodworkers I have been around ever bother with safety glasses or face masks. Having used various types I can understand why this is: lost time, bulky inconvenience, scratched lenses and breakage. A solution that I have discovered works well is swimming goggles. They are worn around my neck (and there-

fore don't get scratched up) and quickly pulled up over my eyes when needed, resulting in almost no lost time. Mine cost about $4 (trademarked "Speedo").... The two plastic lenses are about the size and shape of eyewash cups, padded where they press around the eyes. I don't think the plastic is high impact, but for the usual dust and chips they work fine.

—Rod Howell, Kensington, Calif.

...Re caning chairs, after cleaning the canal I run a bead of glue inside the canal. Then using wedges I drive the cane into the canal. I then trim the excess off 1/16 in. below the outside edge with a sharp chisel. After this I run another thin bead of glue and tap in the spline. This prevents slipping with the knife on the top surface of the chair and also makes a neat and strong seat. *—Hank Rorden, Wells, Vt.*

Re questions in *FWW* #23, July '80 (p. 18), about veneers shrinking, anyone who has done veneering and marquetry knows that water-base contact glues cause this problem. Only the non-water base contact glues are recommended for marquetry. When a veneer is coated with water-base contact glue, the veneer absorbs the moisture while the outer layer dries. The two surfaces are then bonded but the water in the veneer continues to evaporate, thus causing the veneer to shrink.... I have used contact cement in marquetry for over 20 years and my work is still intact. I do not say it is the best, but *Fine Woodworking* does not recommend it. One should not be against something one does not understand....

The problem with veneer buckling (July '80, p. 19) should not happen if the glue is applied to the solid wood and not to the veneer. The veneer inlay is then pressed firmly into the recess. The inlay must then be pressed with weight or clamps before the veneer absorbs moisture. A thin layer of newspapers or cork on top of plastic or waxed paper is also helpful before clamping in case the inlay is slightly below the surface.

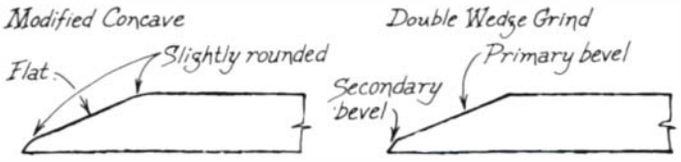
—Pete Rose, Saddle Brook, N.J.

Re problems with veneering over particle board, my guess is that 99% of the problems arise from trying to use contact cement. My experience over some years indicates that this is a completely unsuitable adhesive for veneering.

Some years ago I fell victim to the apparent ease of using contact cement (including that known as veneer glue) and the beguiling sweet talk of its purveyors. I was using various kinds of veneer on a base of plywood. My problems were the same as your questioner's, except that they didn't manifest themselves until from two to six months after the projects were completed. Unfortunately I know of no means of repairing this kind of trouble.... My solution is simple. I made myself a veneer hammer and invested in an electric glue pot. Incidentally, I've found Elmer's Glue-All quite satisfactory for inlaying border strips and small monograms in solid wood.

—S.W. Hathaway, Sudbury, Mass.

As a professional sharpener, I reckon I have looked at every kind of chisel, put on every kind of edge, and argued every kind of argument over the subject.... I'm a great proponent of the convex-grind edge for wood chisels, although not as radical as the drawings on p. 21 of the July '80 issue might suggest... in any chisel that is primarily used in the flat-down position. The chisels definitely seem to be stronger in the edge area and hold an edge longer. The double-wedge grind,



such as is often used on knives, is another shape that carries great strength and is not difficult to learn to use in normal operations such as paring. As for the hollow grind, I have found it weak and easily breakable in most applications.

So my answer is that there is no firm and fixed answer. Try the edge grinds I've suggested here. If you find that you can't stand them, the edges of well-tempered chisels are easily enough reshaped. At least you'll know.

—Kenneth P. Greene, San Francisco

I am sending you a wood stain for walnut sapwood that is always the right color stain. I hull a lot of walnuts each year for our family and friends. I fill a 2-lb. or 3-lb. coffee can about ⅔ full of the dry hulls, then fill to the top with water. Let it stand for two or three weeks then drain off the liquid, and you have a stain that is the natural color of walnut.

—Fred R. Taylor, Roseville, Ill.

Re Joseph Whitlaw's letter *(FWW #24*, Sept. '80), which criticizes the use of leather in gun cases because it would cause rust: While still working in my father's shop, I made some leather covers for the ends of his finest set of bench chisels. A couple of weeks later he went to use one of the chisels and found that it was completely coated with rust where the leather had covered it. After a long lesson on restoring rusty chisels to usefulness we found that the leather I had used, called "retanned" leather, was full of acids. On the advice of a harness-maker, I have since made tool covers out of vegetable-tanned leather, which does not have a corrosive effect on steel. I just checked a chisel that I made a leather cover for about ten years ago and has been lying in my tool box, unused, since then. There are a few specks of rust on the chisel, none where the leather has covered it. *—John Leeke, Sanford, Maine*

EDITOR'S NOTE: Several years ago, we learned of a process whereby the cellular spaces in seasoned wood would be completely filled with methyl methacrylate plastic, better known as Plexiglas. It involves putting the wood in a vacuum, then using atmospheric pressure to saturate it with liquid plastic monomer and a catalyst, then applying heat to polymerize the plastic. The result, called wood/plastic composite, is hard and dimensionally stable, yet can be worked with carbide tools. It looks like lacquered wood and can be buffed to a high polish with no need to apply a finish. We thought it ideal for such things as clock parts, where normal wood movement can spoil the action. We asked a government researcher to write an article describing the procedure.

That manuscript languished in our files until last summer, when we got it out for publication in the issue you are now reading. Because the risks of plastics chemistry had been in the news, we resubmitted the article to our safety consultants. To everyone's dismay, procedures that seemed safe a couple of years ago were now deemed too risky for craftsmen without laboratory training, and suppliers would not sell the necessary chemicals in small quantities. We had to kill the article. However, if reading this leaves you aching to know more, and you're able to handle highly flammable chemicals that produce noxious fumes, you can get the details from USDA Forest Service Technical Report NC-10 (1974), from the North Central Forest Experiment Station, Folwell Ave., St. Paul, Minn. 55101.

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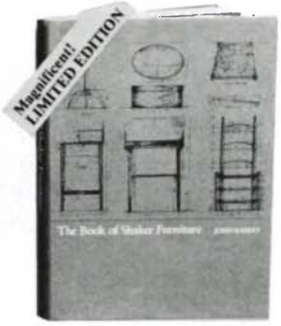

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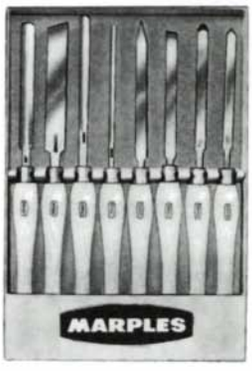

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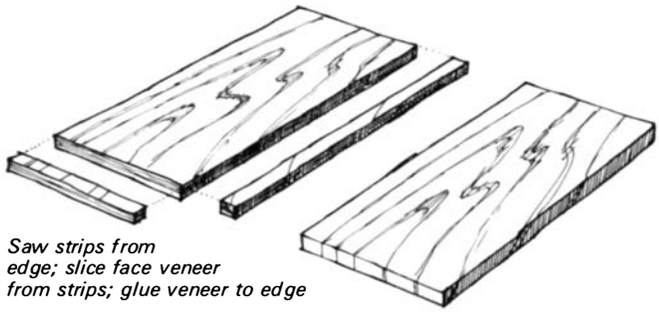
Methods of Work

Four ideas for edge-finishing plywood

Here's how to edge-finish plywood and match the color and grain exactly. Buy enough extra plywood so you can saw strips from the edge and ends of the panel slightly wider than the plywood is thick. Now saw off the face veneer from the strips using a thin-rim plywood blade on a table saw. To prevent the

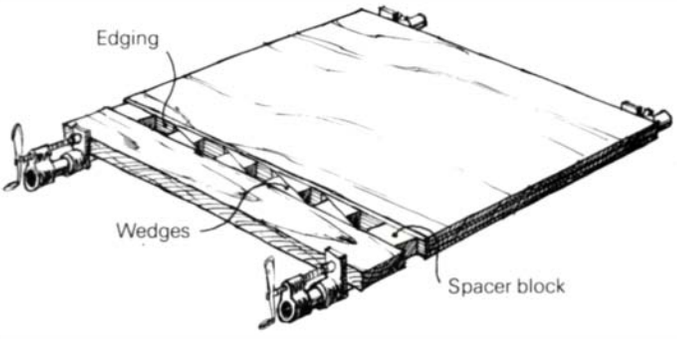


Saw strips from edge; slice face veneer from strips; glue veneer to edge

veneer from falling through the gap between blade and table insert, tape a piece of ¼-in. plywood to the saw-table top and elevate the blade through it. If you are careful in sawing the veneer, you can match the edge strips with the face to create a continuous grain pattern that's quite attractive. Glue the strips in place, then sand off the slight overhang.

—Floyd L. Lien, Aptos, Calif.

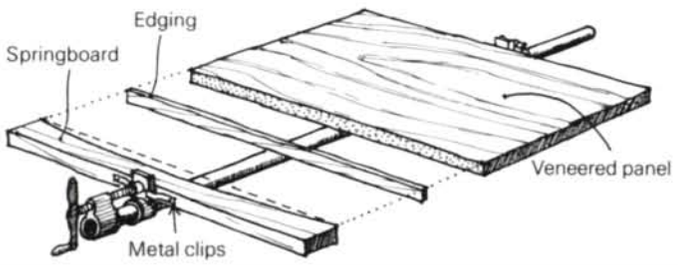
On a recent platform-bed project I needed to glue ¼-in. oak strips to the edge of a plywood panel. Only two of my bar clamps were long enough for the job. Luckily I hit on a way to combine the two clamps with a double-wedge clamping method I use in guitar construction. I simply clamped a stur-



dy oak 1x4 to the edge I wanted to glue, separating the board from the edge with two spacer blocks. The resulting gap left room all along the edge to drive home pairs of wedges. The system worked better than I expected. I was able to control the clamping pressure at many points along the edge without wrestling with a lot of clamps.

—Willis Overholt, Wichita, Kans.

In the small custom furniture shop where I worked some time ago, we glued solid oak edging to the unsightly edges of fibercore, oak-veneer panels. Because this required a bar clamp every 8 in. for a tight joint, we soon depleted our supply of clamps, time and patience. My solution is a springboard which applies even pressure to the edging using far fewer clamps. Cut the springboard about 20 in. long from ¾-in. thick, 1½-in. wide hardwood (I used red oak for its resiliency in bending). Plane the middle of the front edge to produce a concave shape, about ¼ in. deeper in the center than at the ends. Fasten with screws a couple of sheet-metal fingers to the back edge to hold the springboard in position on the clamp face while you're adjusting the work to be glued. As you tighten the bar clamp and close the gap, pressure will

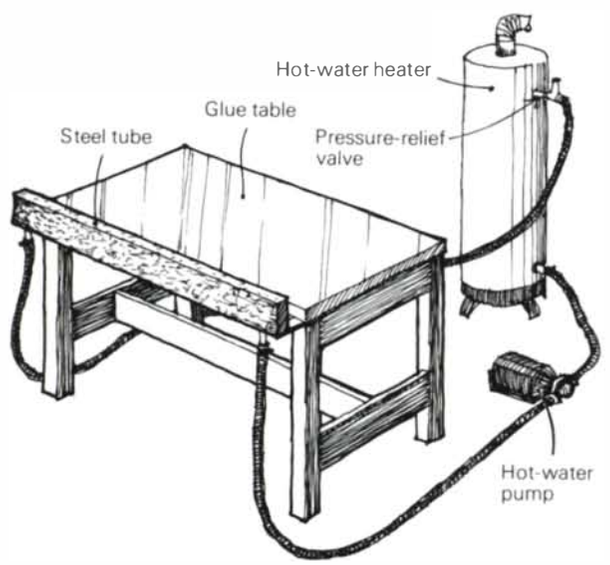


equalize along the concave face of the springboard.

—Michael Mikutowski, South St. Paul, Minn.

I use a hot-water clamp-table to speed up edge-gluing on plywood cabinet parts. When I clamp the plywood and edge strip to the rectangular steel tube (maintained at 160°F by circulating hot water) the plastic resin glue sets in 15 to 20 minutes. I trim the just-glued piece while the next one sets.

The device consists of a hot-water tank, a pump, hoses, fittings, a table and the 48-in. rectangular tube. Two points of caution: Use a pump designed for hot water (check with demolition companies—they salvage these pumps from old buildings) and install a pressure-relief valve. The valve is especially important if your system is closed, as is mine. Cover the work table with plastic laminate and wax so the glue will chip off easily after it has set. Leave a space between the rectangular tube and the table so that you can adjust the edging and leave an overhang on the bottom.



To use, apply glue to both surfaces, position the strip, then bring the edge against the hot tube. Start clamping with the plywood angled up slightly so the bottom glueline is tight but there's a gap on top. Apply pressure until the gap closes.

—Richard Esteb, Olympia, Wash.

Sanding block for beaded edges

On a recent mantle clock project I needed to sand the beaded edges without rounding the crisp corners or flawing the uniform curvature of the bead. Hand sanding with a folded sheet of sandpaper would just not do. I made a reverse-image sanding block by routing a cove into a small piece of wood. Then I cut strips of sandpaper and glued them to the cove with 3M's feathering disc adhesive. This adhesive, used by auto body men to attach abrasive discs to disc sanders, was excellent for my purpose. Since it remains tacky, I could attach new strips of sandpaper as the old strips wore out without reapplying the

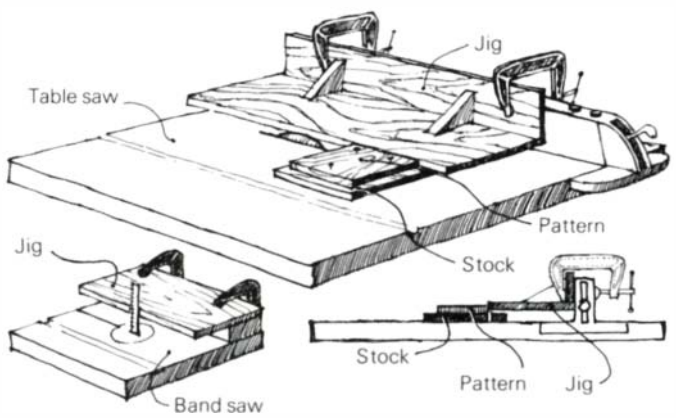
adhesive. It also works well for attaching wooden protective pads to the jaws of *C*-clamps and bar clamps.

—John Searles, Xenia, Ohio

Duplicating wood parts

You can produce exact duplicates from a master pattern using this overhanging jig on your table saw. To make the jig, glue the pieces of ½-in. plywood in an *L*, reinforcing the joint with braces and screws. Clamp the smaller side of the jig to the saw's rip fence with two *C*-clamps. Allow ⅛-in. clearance between the underside of the jig and the stock to be cut. Now, by moving the rip fence, set the guide edge of the jig directly over the outside of the blade.

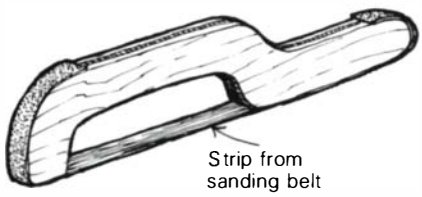
Cut a master pattern from ½-in. plywood to the exact size and shape of the part to be duplicated. Fasten the pattern to oversize precut blanks with tacks or double-sided tape. Now you are ready to cut the duplicate part. Press the master pattern against the guide edge of the jig and push through the blade. For safety's sake remove scraps from under the jig as you cut and stand to one side of the line of cut. Otherwise you'll be dodging projectiles of scrap that pile up under the jig and eventually get fired out by the blade.



The table-saw jig is limited to duplicating straight-edged parts in plywood and thin, solid stock. To reproduce thicker parts, and those with curved edges, set up a similar jig on the band saw.

—Ed Stevenson, Hammonton, N.J.

Hand sander



Here's an inexpensive, quick-to-make hand sander that's effective for smoothing out gouge marks on curved surfaces or for rounding off a sharp edge. You will need some scrap plywood, a used belt from a belt sander and a little contact cement.

First, cut the plywood into an 8-in. to 12-in. long hacksaw shape. Tear a strip from an old sanding belt as wide as the plywood you use and a couple of inches longer than the frame you cut. Spread a little contact cement on the backside of the strip and along the bottom surface of the frame and press the abrasive strip along the bottom of the handle to the front.

When completed, the sander has an open section with a little give for sanding curves and a rigid section for sanding flat surfaces. The rounded ends are designed for sanding concave surfaces. By changing the shape of the frame, the ap-

plications are virtually endless. When the abrasive is dull, just pull off the old strip and glue another on.

—Richard Neubauer, Jr., Cincinnati, Ohio

Surfacing wide boards

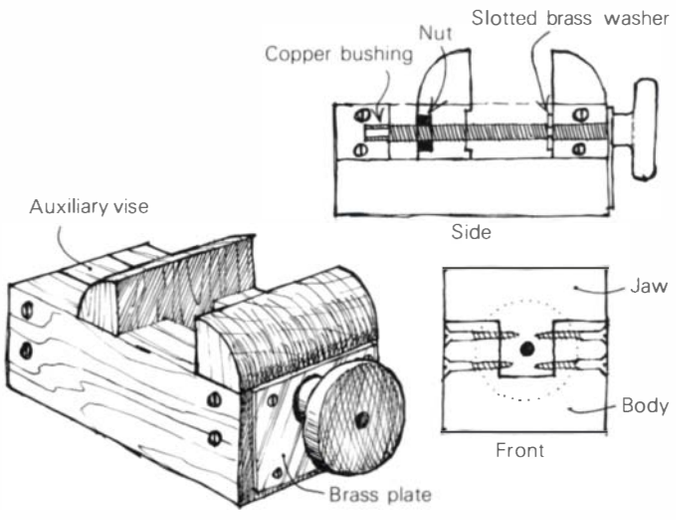
My jointer is small, but that doesn't stop me from surfacing boards wider than 6 in. Say you've found the perfect piece of cherry for a drawer front, but it's 9 in. wide, cupped or slightly twisted. To rip and reglue the board would spoil the gorgeous grain pattern. What I'd do is rabbet the two edges of one surface, run the new narrow width over the jointer, then flatten the top through the thickness planer. Flip the board over and plane the true board to thickness.

Naturally the nature of the cup, bow or twist and the thickness of the finished piece determine the depth of the rabbet. And, if you must rabbet both edges, you'll likely have to remove the regular fence from the jointer to center the work over the blade. *—Donald Leporini, Newton Centre, Mass.*

1. Cupped board *2. Rabbet sides* *3. Joint bottom* *4. Plane top* *5. Flip and plane to thickness*

Auxiliary vise

When I acquired a large European workbench, I decided to make an auxiliary vise similar to the one made by Ulmia. Held in the right-hand end vise, the auxiliary vise clamps thin boards or molding for planing. My version uses maple, a piece of ⅛-in. thick brass, a small handwheel and a length of ordinary ⅜-in. threaded rod.

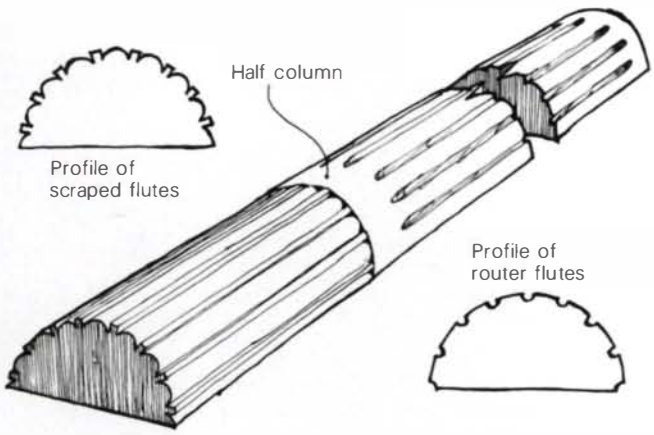


Make the body of the vise by cutting a 1-in. channel in a maple 2x3. Or glue up two or three pieces of maple into a *U*. Attach the fixed front jaw and the end block with bolts or screws driven in from the sides. Screw the brass plate to the front of the vise to prevent wear by the knob and threaded rod. Drill a hole through the vise and install the threaded rod and movable jaw as shown in the sketch. I reduced the diameter of the end of the rod and bushed the end block with copper tubing. Recess a nut into the back side of the movable jaw and pin the nut in place with a couple of fine screws, or

epoxy it. To keep the threaded rod from slipping out of the vise, file a notch around the rod just inside the front jaw and force a slotted brass washer around the notch as a retainer. Recess the front of the movable jaw to accommodate the washer. *—Ralph Luman, Virginia Beach, Va.*

Fluted columns

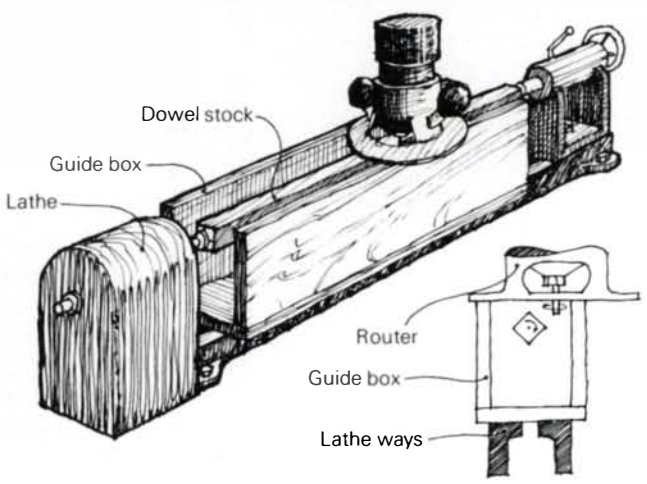
When building a tall clock case I needed two fluted half-columns 44 in. long. Since my lathe is only 36 in. between centers, I had to turn the columns in two pieces. It would have been almost impossible to match the flutes, match the grain and hide the joint had I tried to make the columns look identical through their length. So I borrowed a trick from a piece of furniture I saw in the Philadelphia Museum of Art.



First I glued up two column blanks with paper between (for separation into half-columns later). One blank was turned 35 in. long and fluted with a 3/16-in. veining bit in the router, stopping the flutes ½ in. from the ends. The other blank was turned 10 in. long and fluted by scraping with an inexpensive wood chisel ground to produce the shape I wanted. These flutes extend the entire length of the shorter piece. After the columns were split apart into half-columns, the longer sections were simply butt-glued to the shorter sections to produce 44-in. long half-columns. The butt-joint is weak but not critical since the half-columns will later be glued and screwed to the clock face. *—Richard M. Watson, Lindenwold, N.J.*

Making dowels

Here's how to make dowels on your lathe with a router. First build a guide box with sides a little higher than the turning stock. Allow about an inch of clearance between the stock and the box walls. Chuck a ¼-in. straight bit in your router and adjust the depth of cut so that when the bit is over the dowel

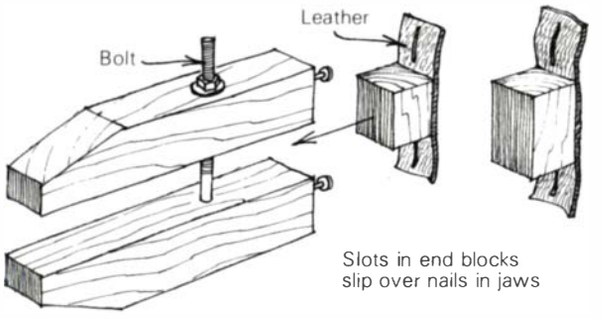


stock it will cut the dowel about 1/16 in. oversize. Position the router on the downward side of the stock rotation as shown in the sketch. Turn on the lathe, turn on the router and cut away. Take several light cuts to reduce the possibility of the bit grabbing and breaking the dowel. Lower the bit to the final depth and make one final pass with the router centered over the dowel. *—Lee R. Watkins, Littleton, Colo.*

Inexpensive homemade clamp

When you run out of clamps and money at the same time, these simple old-timers can be quickly made from wood scraps and an old leather belt. Make up several sizes of end-blocks to keep the front jaws roughly parallel.

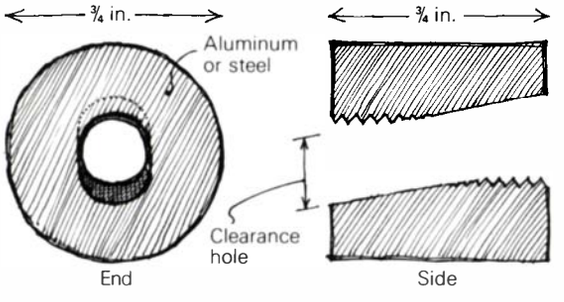
—Larry Humes, Everson, Wash.



Quick-adjust picture-frame clamp-nut

To make this clamp-nut, tap a 3/4-in. section of 3/4-in. aluminum or steel rod. Then cut through the tapped hole on an angle with an end-mill cutter to clear the threads. Use a 17/64-in. end-mill cutter for a 1/4-in. tap and a 25/64-in. cutter for a 3/8-in. tap.

To use, tilt the nut on the threaded rod and slide into position for quick adjustment. Then straighten out the nut for fine adjustment and locking. The nut works well not only on picture-frame clamps but also in other locking-knob or quick-adjust situations. *—Walter W. Yaeger, Maple Shade, N.J.*



Gain two clamps

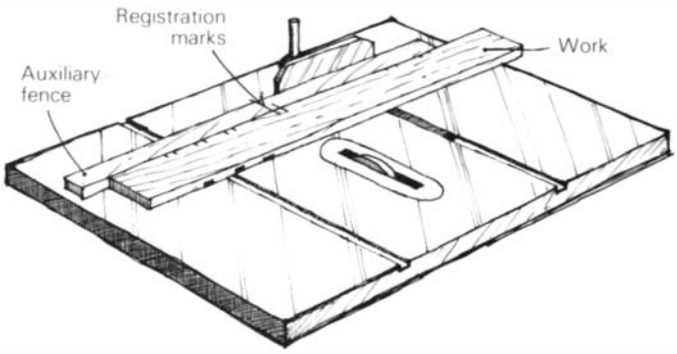
In exchange for a little ingenuity you can gain two large-capacity, versatile clamps: your drill press and lathe. Just clamp the work between quill and drill-press table or between headstock and tailstock (remove centers).

—Michael Bavlsik, Paterson, N.J.

Spacing dadoes

Recently, while building a cabinet for cassette tapes, I experimented with several methods for spacing the numerous dadoes needed. Using an auxiliary miter-gauge fence gave the measure of accuracy and easy use I sought.

Bolt a piece of wood the length of the saw table and about 1 in. wide to the miter gauge. This auxiliary fence becomes an extension of the gauge, stabilizing long pieces of work and preventing twisting on the saw. The auxiliary fence should be the same thickness as the workpiece. After the dado width is



set and tested on scrap, make a cut into the auxiliary fence. Mark the right and left edges of the cut on the top of the fence. The workpiece, marked for spacing, is moved along the auxiliary fence. When the lines meet, slide the gauge into the dado blade, making the cut.

—Paul Saffron, Rockville Centre, N.Y.

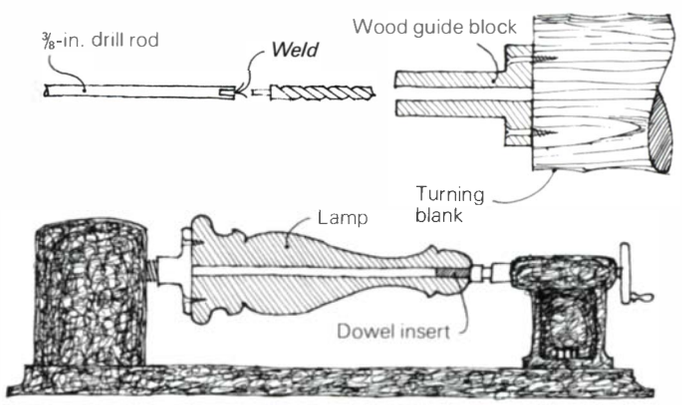
EDITOR'S NOTE: A variation of Saffron's method is common practice in many cabinet shops. Screw a new auxiliary fence to the miter gauge and trim off the excess by pushing the fence through the saw. Since the end of the fence now coincides exactly with the saw kerf, it can be used for accurate cut-off work. Just slide the mark on the workpiece up to the end of the fence and push through the saw.

Turning lamp bases

Here are a couple of tricks to turn tall lamp bases. I don't have a large drill press; I drill the electric cord hole on the lathe with a homemade extended bit and a wooden guide block. To make the long bit, weld the turned-down shank of a ⅜-in. bit in a ¼-in. hole drilled in the end of a 24-in. length of ⅜-in. drill rod. Clean up the weld with a file and sandpaper. Make the guide block as shown in the sketch, screw the block to the stock over the center and carefully drill the cord hole. Back out the bit frequently to remove the chips. The guide block helps keep the hole right on line through the center of the stock.

To prepare the stock for turning, glue a short length of ⅜-in. dowel in the top end of the cord hole. Screw a faceplate to the other end of the stock, centering the faceplate over the hole. Now mount the stock in the lathe, centering the tailstock's cup center on the dowel insert. When the lamp base is done, remove the faceplate and drill out the dowel insert.

—Bob Kurz, Hartsville, S.C.



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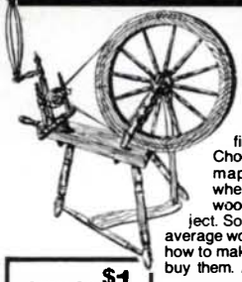

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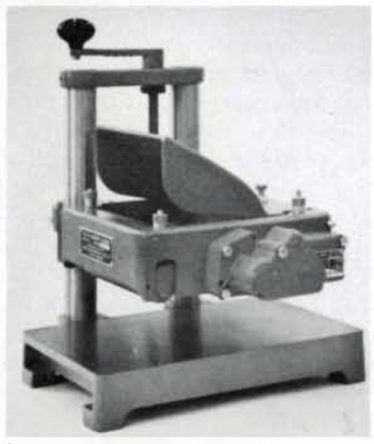

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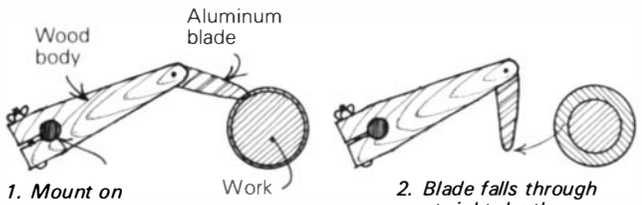


1. Mount on aluminum tube *2. Blade falls through at right depth*

measures the depth as well. Several of the gauges—the number depends on the complexity of the work—are mounted on a metal tube or dowel fastened behind and level with the work. Select ½-in. hardwood for the gauge body and 1/16-in. aluminum for the blade. Drill one end of the body to fit the metal tube and slot the other end to fit the blade. The blade should fit loose in the slot and pivot easily on the pin. Set the position of the gauges by sliding along the tube. Then vary the angle of the body to set the depth. In use the blade will ride on the work (in the parting-tool cut) and fall through when the right depth is reached.

—Bayard Cole, Marietta, Ga.

Sanding block for lathe work

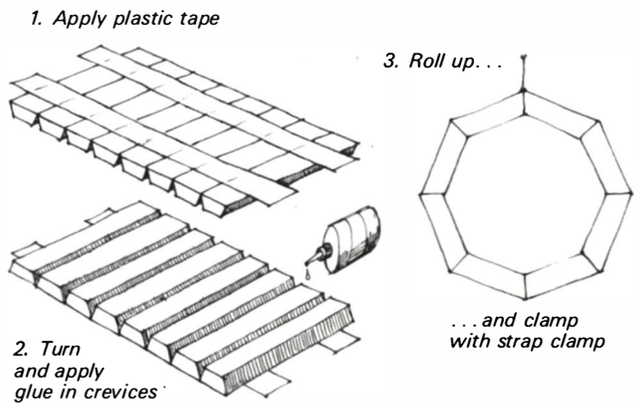
For years my woodworking students invariably burned their fingers sanding bowls and other lathe work. Then I hit upon the solution—sanding blocks cut from sheets of ½-in. thick rubbing felt. The felt sanding block shapes itself to shallow curves and can be deliberately shaped to match more elaborate forms.

Rubbing felt is available in 1-ft. squares from H. Behlen & Bros. (Box 698, Amsterdam, N.Y. 12010) and other suppliers. A similar material, used for typewriter cushions, is available from office-machine suppliers. Cut the pad with a razor knife and rule. One block lasts indefinitely.

—Russell Anderson, Torrington, Conn.

Assembling staved cylinders

Here's a method based on the principle of canvas-backed tambours that simplifies the assembly of staved cylinders. Lay the staves side by side on a flat surface and carefully align the ends. Apply rows of tape (I use 2-in. wide plastic tape) to the outside surface. Turn the assembly over, apply glue to the stave edges and roll up the cylinder. Apply a strap clamp to complete the job. *—Pope Lawrence, Santa Fe, N. Mex.*



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.*

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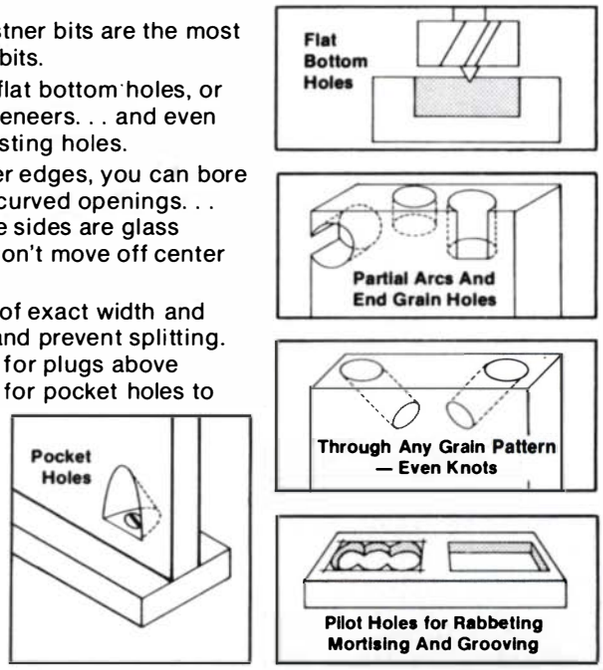

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Fine Woodworking books to help you in your craft.

Dear *Fine Woodworking* reader,

By now you no doubt have heard of the two new additions to the growing list of *Fine Woodworking* books from The Taunton Press: *Understanding Wood: A Craftsman's Guide to Wood Technology* by contributing editor Bruce Hoadley, and *Fine Woodworking Techniques 2*, all the technical articles from issues 8 through 13 of the magazine. This brings to seven the number of books from the editors of *Fine Woodworking*—books we feel set new standards of information and quality in the woodworking literature.

We didn't plan to do books when we started the magazine five years ago. But we soon found out there was a lot more going on in woodworking and a lot more to say about it than could be done in a magazine. For example, too many photographs of good work were being left out because of limited space. So we decided to do a book of photographs from our readers, and called it the *Biennial Design Book*. Reader response was so good that two years later we did a second one, *Design Book Two*. Both are unique statements of the woodworker's art in America, not to be found anywhere else.

We also realized that the hard-found technical information in the magazine needed a better chance to stay in the permanent literature than softcover magazines would afford. So the hardcover *Fine Woodworking Techniques* resulted, and this fall we've published *Techniques 2*, the second in what will now be an annual series. Putting together 111 technical articles from *Fine Woodworking* certainly results in two very useful and impressive volumes.

Our next book came from John Alexander, Jr., a Baltimore attorney who has spent quite a number of years rediscovering the little-known and almost forgotten lore of working green wood. It is unusual and useful information about an important facet of our woodworking history. Alexander's manuscript presented it in a clear and interesting fashion, so we were delighted to turn it into that little gem of a book, *Make a Chair From a Tree*.

Tage Frid has spent over a half-century as a cabinetmaker and teacher, but early on, we knew his valuable contributions to *Fine Woodworking* only scratched the surface of what he knew. So three years ago we outfitted his shop with cameras and lights and began to record everything he's found necessary and useful in woodworking. The first of these highly detailed, step-by-step books is on joinery, and I've been quite pleased with the response from people who bought the book and found with delight they could indeed do fine joinery. Frid is now working on the other two books in the series, which should be ready in the next couple of years.

Finally, there is Bruce Hoadley's book on wood technology, now off the press (see p. 7). There has always been a need for a book about wood from the woodworker's point of view. What better person than Hoadley—an accomplished carver and contributor to *Fine Woodworking* magazine as well as a teacher of wood technology—to write about it. It's a marvelously comprehensive and informative book that every woodworker will find invaluable.

The insert bound into this magazine gives you more information on these books. If you think any of these could add to your own or a friend's knowledge and enjoyment of woodworking, why not order and have a good look? If it's not what you were looking for, we'll be happy to refund.

In the meantime, I hope you keep finding good information and inspiration in the pages of *Fine Woodworking* magazine.

—Paul Roman, publisher

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Tage Frid Teaches Woodworking—Joinery: Tools and Techniques. 224 pages, hardcover, $16.00 postpaid

Understanding Wood: A Craftsman's Guide to Wood Technology by R. Bruce Hoadley. 272 pages, hardcover, $18.00 postpaid

To order these books, use the insert bound into this magazine or send your remittance directly to The Taunton Press, 52 Church Hill Rd., Box 355, Newtown, CT 06470. Conn. residents please add 7½% sales tax.

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I was assembling a dulcimer for a friend of mine, and since she was in no hurry for it, I put it aside for some time while I worked on other pieces. Initially, I glued three braces across the grain on the ⅛-in. cherry back. This was done at the first of the summer. By January, when I got around to working on the thing again, the back was conspicuously warped across the grain. I understand why it warped, but I'd like to know how to prevent such warpage in the future.

—Charles Kish, Saratoga Springs, N.Y.

As you suspect, the ⅛-in. cherry shrank across the grain as it dried out in winter, but the braces could not shrink along their length. Thus, it warped. I live near Boston, and in our climate I do not glue on bracing, or assemble tops and backs onto sides of guitars, between June 1 and October 1. I prefer to glue on bracing in the dead of winter, when everything is the driest. I put tops and backs onto sides in April and May. Then these have started to warp to a convex curve, and a little more wood is actually in the instrument between the bound edges. It can therefore straighten out more before it cracks or warps to a concave curve.

Also, bracing on most guitars is convex, arched by sanding or using a compass plane. Since the widest part of a dulcimer is usually 6 in. to 8 in., if you arch the brace a lot (4 mm to 5 mm from center to edge), that would probably be enough to keep it from going the other way. *—Thomas Knatt*

We have six church doors, veneered in oak, and have stained and finished them with several coats of good spar varnish. The trouble is that the finish doesn't last a year before the weather causes it to peel and flake off. Can you help?

—George Seibel, Stratford, Conn.

Spar varnish, marine varnish and other similar exterior finishes almost always degrade within a year and require refinishing. The major cause is ultraviolet light, which attacks the molecular bonds in the varnish. Many modern products contain ultraviolet absorbing compounds, but they don't help all that much.

I suggest using a penetrating finish, which deposits protective materials inside the wood rather than building up on its surface. Penetrating finishes will also degrade in time, but since there's no surface film to worry about, refinishing is merely a matter of applying another coat or two of the same product. You may have to sand or steel-wool lightly to remove surface dirt before refinishing, but that's all the preparatory work required. Since your doors have been varnished, you'll have to remove this old finish and expose the bare wood before using a new penetrating finish.

Watco Exterior Wood Finish should serve well for this, or you might try Waterlox Marine Finish, thinned down a bit with mineral spirits to ensure good penetration. Brush on a first coat, keeping the surface fairly wet. When the wood has soaked up all the finish it will take, wipe it dry and let it harden overnight. Apply a second coat the next day, again wiping off the excess.

If you want to stay with surface film products, try ZAR Imperial Polyurethane or McCloskey Marine Varnish. Another preparation worth trying is called Deks Olje, put out by the Flood Co., Hudson, Ohio 44236. It's a gloss finish for saltwater boat woodwork. *—Don Newell*

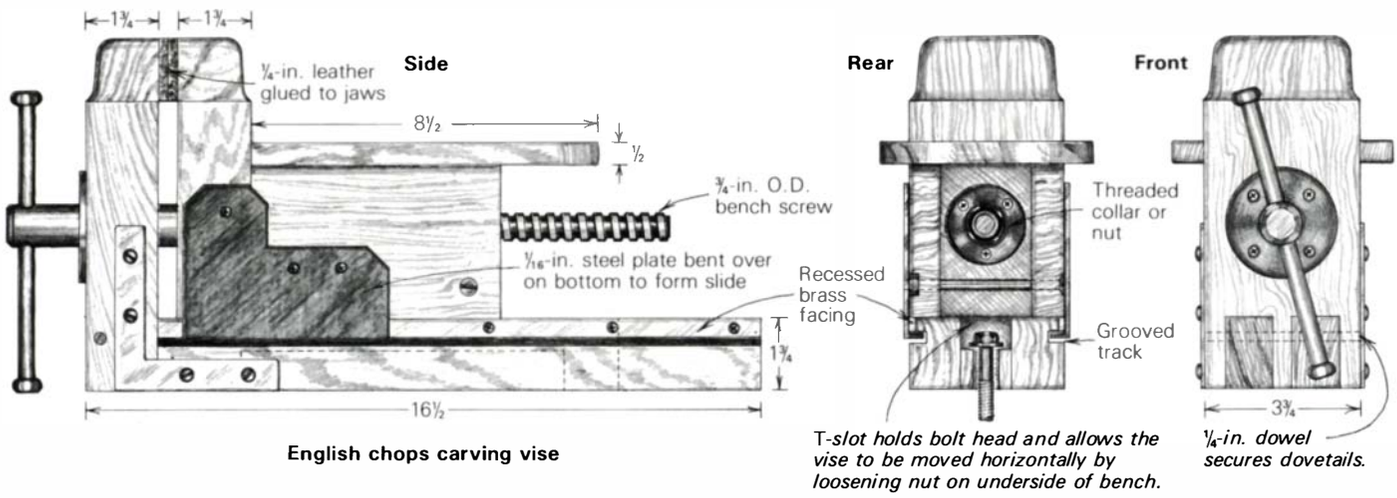
Could you give me some information on a "chops," the traditional English carver's vise depicted in FWW *#23, May '80, p. 62? —Robert L. Woodard, Mascoutah, Ill.*

Below are drawings of the chops mentioned in my article on carousel horses. Note the dovetail joinery. This particular vise was made for Gerry Holzman by an English joiner, though some woodworking supply shops in England do sell them. Holzman shaped the sides of the jaws at the suggestion of his British teacher. *—Roger Schroeder*

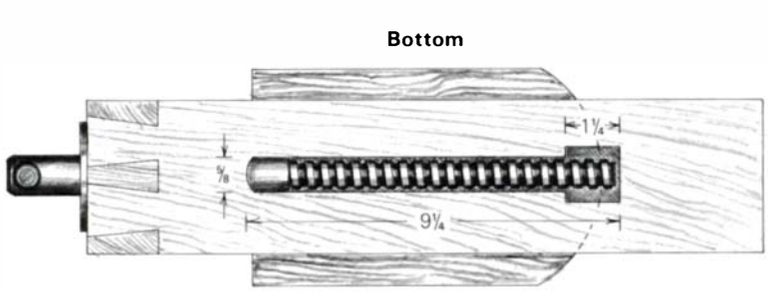
In doing inlays and marquetry, I sometimes need to stain and fill separate pieces. How can I prepare the other surfaces so they won't be affected by the stains and fillers?

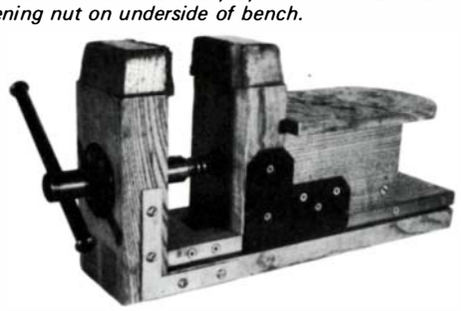
—George Rives, Memphis, Tenn.

The basic rules of inlay work require the use of already dyed wood or pieces whose natural color, grain and figure will lend themselves to the effect the maker wants to create. With rare exceptions, inlay work should not be stained after it is com-



English chops carving vise





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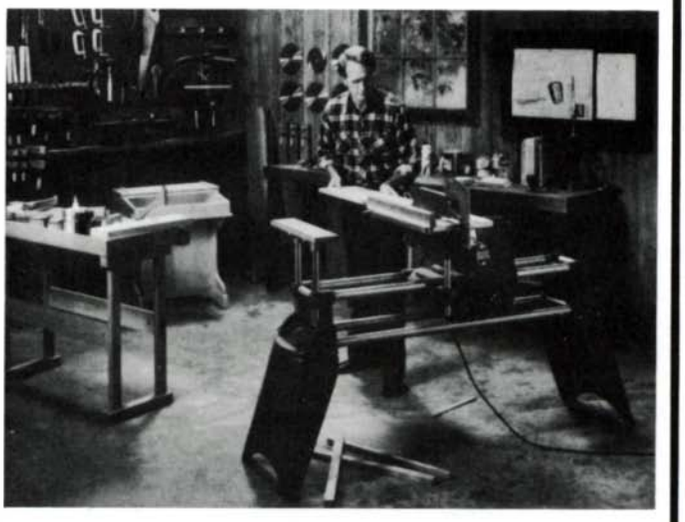

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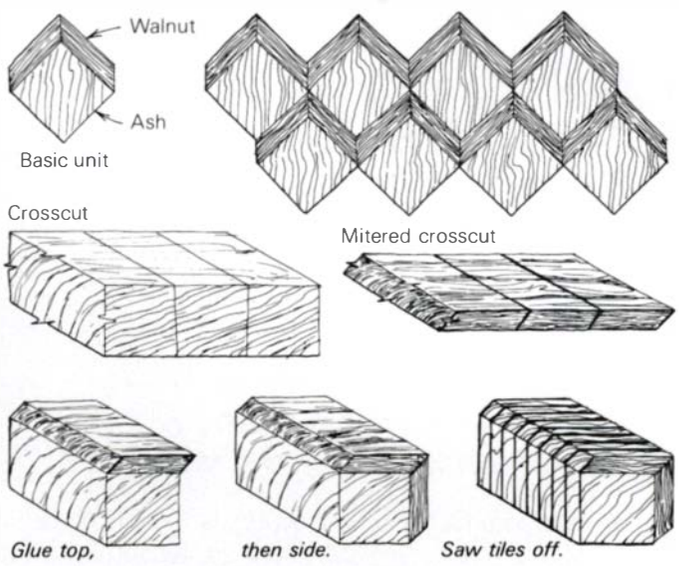
pleted. One exception is that when reproducing period pieces, parts of the inlay will be treated with chemicals to get a faded look.

Assuming that your work is completed and you still want to dye a certain part of it without staining the other areas, you have little choice. With great care, you have to cover the surfaces you want to preserve with either clear lacquer or clear shellac, using soft-hair brushes. This tedious work is the penalty you pay for poor planning. Next, you carefully apply the water stain, watching to make sure it doesn't get on the protected areas. With staining complete, you can begin finishing, but you must stick with the same material that you used to protect the non-stained surfaces. *—George Frank*

I'm quite adept at creating herringbone patterns in wood, but now I want to go a step further to create the pattern shown in the drawing at right. What's the best method for making this pattern? —Bob Guerrero, Pacifica, Calif.

The first step is to identify the basic element that is repeated to make the pattern, exactly as with parquet floor tiles. Then the problem is to find an efficient and accurate way to create the individual "tiles."

First surface some ash and walnut to the appropriate thickness (determined by a full-size drawing). Next crosscut strips of ash with perfectly square cross sections. Then, setting the saw to 45°, cut strips of walnut to the proper dimension, using the rip fence to keep the strips accurate. Then glue one ash and two walnut pieces together as shown. This forms the "log" which you then slice up to make the pattern. The tiles could be 1/16 in. to 1/4 in. thick, depending on their size and final use. The individual pieces are then glued and taped together and laminated to a core. As in veneering (which this actually is), you need a balancing ply on the back, with the grain running parallel to the majority of the grain on the front. To compensate for the discontinuity of the face, I would make the back face a little thinner. This type of project



depends on very accurate cutting and gluing, and although it is much harder to execute than a simple herringbone, it is more interesting.

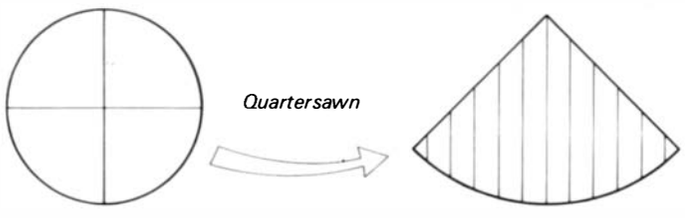
Additionally, since ash and walnut are both open-pore woods, sanding dust from one may clog the pores of the other and discolor it. This can be minimized by applying a wash

coat of shellac or lacquer before sanding and filling. If you are applying a high-gloss film finish, filling the pores is also tricky. Use a filler tinted halfway between the two woods, and the wash coat should prevent the lighter woods from absorbing the stain. *—Richard Newman*

Would you explain the correct way to quartersaw logs. Some simple sketches of how to orient the sawblade to the growth rings would help. —A. Trosin, Detroit, Mich.

The most common method of quartersawing is first to split the log into quarters, either with hammer and wedges or by sawing, and then to saw each quarter into boards—hence the name quartersawing.

Quartersawing has some disadvantages. It is laborious, time-consuming and somewhat wasteful. It necessitates handling the log more times than in other methods and yields boards

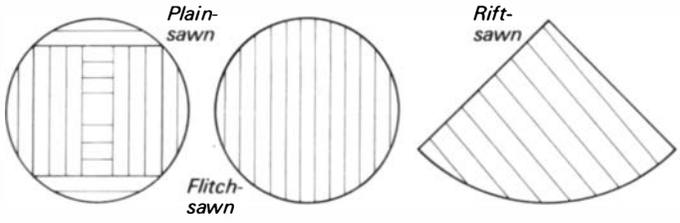


of random width with off-square edges. Also, it is practical to quartersaw only relatively short timbers, usually 4 ft. to 8 ft. in length.

The main purpose of quartersawing is to expose the ray cells of the wood. These cells radiate out from the center of the tree like spokes of a wheel. Many tree species have rays, but in most species, these rays are only one cell thick. In a few species, most notably the oaks, these ray cells are several cells thick and appear as vivid splashes marking the grain. Sycamore is another species that quartersaws beautifully.

There are other advantages to quartersawn lumber. It is always more stable because not only is there less shrinkage across the width, but the stress forces are fairly well equalized from one annual ring to another, thus greatly reducing the tendency to warp. Also, the annual rings are edge-on to the face of the board. By having the more durable latewood exposed in this way, quartersawn lumber can be used in places subjected to heavy wear, such as stair treads and flooring.

The other methods of sawing are plainsawing, flitch-sawing and rift-sawing. Plainsawn, or face-grain lumber, is the



most common type. The log is first squared, and as the cant is sawn, the blade passes tangent to the annual rings. Flitch-cut lumber is cut from a log that has not been squared. Rift-sawn lumber is cut so that the angle between the sawblade and the annual rings is not less than 35° or more than 65°. In quartersawing, the angle between the blade and annual rings is between 65° and 90°. *—Dwight G. Gorrell*

I have a Danish rosewood dining table. Its top has faded quite badly and doesn't match the pull-out leaves, which are

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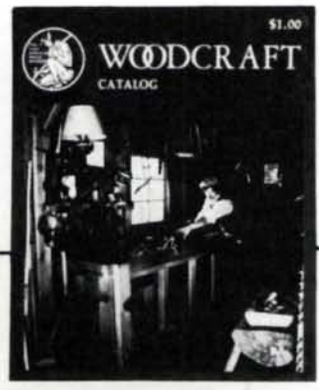

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generally protected. I suspect that the red in rosewood furniture is achieved with a dye. How can I restore the original color of this table? —*L. M. Foster, Chappaqua, N.Y.*

Whether your tabletop was dyed and the dye faded, or whether the natural pigmentation of the wood yielded to the bleaching action of sunlight, or even if the finish has become hazy with age, there is no simple way to bring back its original color. However, if the fading is in the finishing product and not in the color of the wood, there may be some hope of avoiding a complete refinishing. Dissolve some oil-soluble red aniline dye in mineral spirits. Next mix 50/50 the tinted mineral spirits with mineral oil. Cover the tabletop with this mixture and let it soak in well before wiping off the excess. It may bring back the color and the vigor of the finish.

If the wood itself has faded, your best bet is to wash off all the finish from the top, and also from the extra leaves, and sand everything until you have matching colors. It is hard work, but I am afraid this is the only way out. You may experiment with stains, dyes, or chemicals with very little chance of success. —*George Frank*

Follow-up

I read with interest Don Newell's reply to Claire O'Meara's question (*FWW* #23, July '80, p. 18). Polyurethane is a durable interior finish, but it's nearly impossible to get a clean, flat surface when it's applied full strength for three or more coats. One trick I've found is to start with spar varnish thinned 50/50 with turpentine. Apply this first coat with a clean, lint-free cotton cloth shaped like a French-polishing rubber. The second coat is thicker (75/25) and is applied with a bristle brush, followed upon drying by light sanding to remove dust and flecks. Then apply a third coat (gloss or satin) full strength with a foam-rubber brush. If any surface irregularities appear, they can be smoothed out with a light touch from a cabinet scraper. Then I rub with 3/0 steel wool, followed by vigorous rubbing with a cotton cloth. Finally, I apply Trewax with 3/0 steel wool, buffing it just prior to drying. A second coat of wax will give a higher luster, but this time it should dry completely before it's buffed.

—*Richard C. Ollig, Maryville, Tenn.*

Re Claire O'Meara's concern about the durability of various finishes: Five years ago I made a set of kitchen cabinets and finished them with two saturation coats of Watco followed by three applications of Minwax Paste Wax. They still look good, having been given no more than an occasional wiping with a damp cloth. I've used this finish on all kinds of furniture, and it's held up well.

However, tabletops and other pieces that receive lots of wear I spray with Deft lacquer before waxing. As for brushing Deft—forget it. If the humidity is high, it blushes; if it's hot, it dries too fast and develops little dimples and wrinkles; if it's cold, it takes forever to set. Deft shouldn't be thinned or lap marks and brush marks will result, and these are hard to eliminate.

For those who do lots of finishing and don't own a spray outfit, I advise getting one. The time you save and the superior quality of the finish you get will quickly offset your initial investment in a compressor and spray gun. I recommend spraying Deft reduced about 10% with lacquer thinner. Spray at 55 PSI, at 3 CFM to 5 CFM to produce a fan pattern about 4 in. wide. Hold the gun 10 in. to 12 in. from the

surface. Two consecutive wet passes give about the same film thickness as one brushed-on coat. I spray on a third coat about 30 minutes later. Then I steel-wool (4/0) the surface and wax it with Minwax paste several times, buffing each application with a chamois. *—J. E. Gier, Mesa, Ariz.*

Larry Green reported (*FWW* #23, July '80, p. 19) that he was having trouble with the outfeed table on his jointer and was unable to set it to the knife circle to get consistent results. This happened to me, and I was mystified until I checked and found that the outfeed table was warped. I attribute this in part to the fact that I had clamped a grinder to the end of the table and left it there for several days. A good machine shop can remedy the problem by taking a light cut on both tables with a milling machine and bringing them into the same plane again. The finish need not be as smooth as the original. *—John Wood, Tyler, Tex.*

Readers can't find:

I'm looking for a hinge mechanism for a slant-front desk that automatically extends the lid-support arms as the lid is lowered and retracts them as it's raised.
—Oran H. Williams, Jr., Corpus Christi, Tex.

. . . measured drawings or plans for an English seaman's trunk. *—Clyde S. Gay, Nashville, Tenn.*

. . . the tuned metal bars used in making xylophones.
—Larry Callander, Bennington, Vt.

. . . bamboo stock suitable for making furniture.
—James Barbeau, Sisters, Ore.

. . . milk paint in liquid (not powdered) form.
— Dick Soule, Orleans, Mass.

. . . parts and an owner's manual for a Sears/King-Seely 6¼-in. thickness planer, as produced in 1952.
—Richard L. Bremer, Belmont, Calif.

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—Leather embossing tools, gold foil and gold leaf: Antonio's, 532-A Jackson St., San Francisco, Calif. 94133.
—Hardware for antique trunks: Charlotte Ford, Antique Trunks, Ltd., Box 536, Spearman, Tex. 79081.
—Quarter-sliced oak veneer (intermittently available): The Woodshed, 1807 Elmwood Ave., Buffalo, N.Y. 14207.
—Holly boards: Our searches for solid holly reveal that this wood is in short supply and can be found only in small quantities when it is in stock. Apparently, there's no mill in this country that produces a steady supply of it.

Readers want to know:

Do you have any information about the construction of campaign-style furniture? I am particularly interested in the original kind of joinery used for the carcases.
—James Minch, Belvidere, Ill.

I recently acquired a small treadle lathe with a fretsaw attachment that mounts on the bed. Called "The Companion," this machine is pictured on p. 503 of the 1902 Sears catalog. Parts are missing, and I'm interested in restoring the machine. Does anyone have a parts list, owner's manual or other relevant literature? *—Ernest Laug, Stamford, Conn.*

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

Grinling Gibbons and the English Woodcarving Tradition by Frederick Oughton. *Stobart & Son Ltd., 67-73 Worship St., London EC2A 2EL, England, 1979. £12.50 (about $28), cloth; 224 pp.*

Grinling Gibbons (1648-1721) was one of the greatest woodcarvers England has ever produced. Although born in Rotterdam, Holland, and never fluent in the English language, Gibbons rose from obscurity to enjoy the patronage of kings, employing dozens of men in his several workshops. There is an attractive story that he was discovered accidentally by the diarist John Evelyn while he was working on a large representation of the Crucifixion in a broken-down cottage near London. Evelyn, a 17th-century busybody who was acquainted with all the important personages of the day, made a hobby of helping young talent gain recognition. Immediately recognizing Gibbons' genius, Evelyn not only brought various "Greate men" to Gibbons' cottage to see his carving but also made him known to King Charles II and to the architect, Christopher Wren. From then on Gibbons' success was ensured, and he never lacked patrons.

Before Gibbons, carving had been a trade, like saddlemaking or joinery. Gibbons made it an art. His rich and luxuriant style was a far cry from the restrained and stylized representations of nature traditional to English woodcarving. As Oughton points out, "Gibbons' work must have looked like some kind of sculptural freehand with disparate motifs introduced willy-nilly as scallops, seashells, fruit and flowers and other objects were apparently pushed together almost untidily but in the end forming a dazzling composition. Flowers refused to look neat, they sprang out at odd angles."

Oughton's book is an attempt to fit Gibbons and his work into the historical perspective of English woodcarving. It is an ambitious task, and in my opinion he succeeds admirably. He starts by describing the growth of carving from the earliest times, the tradesmen themselves and the money they earned from their work. Nearly half the book is devoted to Gibbons' life and work and that of his contemporaries. The effect of Crown patronage (or the lack of it) is addressed throughout the book because the fortunes of woodcarvers were closely related to the state of the royal exchequer.

The author is clearly an experienced judge of carving, both stone and wood, and does not hesitate to comment on the aesthetic quality of the work shown in the illustrations. He quotes freely from contemporary sources and also includes many fascimile reproductions of bills, letters, orders and contracts. The text is embellished with simple line drawings of carvings in the margins of the pages. The photographs, as well as the design of the book, are excellent.

In addition to an index there are appendices on present-day woodcarvers, the tools of the trade, research sources and an inventory, part of a larger work still in progress, of the best examples of woodcarving in the British Isles. This is a scholarly, well-organized book that is also lively reading. It is a pleasure to recommend it. —*Simon Watts*

The Wheelwright's Shop by George Sturt. *Cambridge University Press, 32 East 57th St., New York, N.Y. 10022, 1923 (reprinted in 1975). $28.95, cloth; $7.95, paper.*

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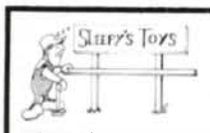

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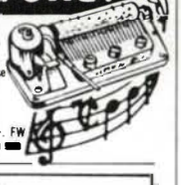

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about 35 miles southwest of London. On this property he established a wheelwright's shop. In 1810 the shop was purchased by one of its employees, George Sturt, who passed it on to his son in 1865, and he to his son in 1884. This younger George Sturt kept the shop until his illness forced its sale in 1920, at the dawn of the motor age.

Paralyzed and needing greatly to "pacify the time," Sturt wrote a kind of biography of the old shop and the industry it had housed for more than two centuries. Such a book in less capable hands might have been no more than a narrow technical manual filled with tedious minutiae. Indeed, the book does contain a wealth of technical information about wheelwrighting, including a 12-page glossary ("arm" to "worm").

George Sturt, however, was more broad-minded than the average wheelwright. He records not merely the way of life inside the shop, but the shop's place in community life. For example, we learn how the drawshave and the spokeshave were used, and also of their importance in the conservation of horseflesh, and why an occasional farmer resented it. Sturt explains in detail how elm hubs, oak spokes and ash felloes were crafted into sturdy, durable wheels for dung-carts and wagons, and also how wooden spokes made it possible to "dish" a wheel, and why the dished wheel was as important to civilization as the invention of the wheel itself. He tells us why his livelihood virtually rested upon the skill and judgment of the sawyers, yet he also explains why he detested sawyers as a class of worker.

The book is permeated with Sturt's appreciation of wood as the master material, an attitude now greatly diminished by power tools. Sturt believed that wood tested the intellect as well as the hand and eye: "Knots here, shakes there, rind-galls, waney edges, thicknesses, thinnesses, were forever affording new chances or forbidding previous solutions, whereby a fresh problem confronted the workman's ingenuity every few minutes. He had no band-saw... to drive, with ruthless unintelligence, through every resistance. The timber was far from being a prey, a helpless victim, to a machine. Rather it would lend its own subtle virtues to the man who knew how to humor it: with him, as with an understanding friend, it would cooperate."

Sturt also cared about the living forest from which wood came. He was outraged by the Great War's brutalization of the lovely English woods. He remembered sadly "this or that quiet place, the home of peace... turned into a ghastly battle-field, with the naked and maimed corposes of trees lying about." That was bad enough, he thought, but there was something worse:

"Still, trees might grow again... But what would never be recovered... was the earlier English understanding of timber, the local knowledge of it, the patriarchal traditions of handling it. Of old there had been a close relationship between the tree-clad country-side and the English who dwelt there. But now, the affection and the reverence bred of this—for it had been with something near to reverence that a true provincial beheld his native trees—was all but gone."

After a half a century, *The Wheelwright's Shop* remains a valuable social document, a perceptive look at a still pastoral English countryside and a "funereal tribute to a dead craft...." — *Fredie Steve Harris*

Simon Watts, of Putney, Vt., is a contributing editor of this magazine. Fredie Steve Harris, a writer, lives in Houston, Tex.

Connections

The Edward Barnsley Educational Trust aims to "run and maintain the workshops established by Edward Barnsley at Froxfield in Hampshire [see *FWW* #16, May '79] as a training unit, continuing to produce fine furniture and to provide opportunities for apprentices and pupils to be trained as master craftsmen and designers. . . and thereby to make a growing contribution to the Gimson-Barnsley tradition." The initial fund-raising goal is £200,000; businesses, foundations or individuals who would like to contribute may contact Karin Antonini, The Bee House, Froxfield, Petersfield, Hampshire, England.

Woodworkers making items for magic and illusions are invited to share their experiences with the Magical Woodworking Art Group (MWAG). Write Richard Schindler, 69 Green St., Cumberland, Md. 21502.

We are conducting basic research into fire hazards associated with sanding and vacuuming systems. We would like to know if anyone has experienced spontaneous combustion or combustion started by static discharge ignition when operating a sanding machine, a powered hand sander with or without an integral dust-collecting system, or when using a vacuum cleaner or system to collect dust. Please describe the incident fully, including the type of equipment, the species of wood and the ambient temperature and humidity. We would also like to know if any previously applied finishes were being removed or if any solvent vapors were present in the atmosphere. Write C. Overy, Project Engineer, Black & Decker Canada Inc., 100 Central Avenue, Brockville, Ont. K6V 5W6.

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NEW FENCED JOINTER PLANE. Other fine wooden planes, too. Data, $1. Stevens Cabinet Co., 18305 Queen Elizabeth, Olney, MD 20832.

DAVIS BRAND 6-piece woodcarver's tool sets in sub-miniature, miniature, small and standard sizes. Highest quality, bargain priced. Write Davis Fine Woods, 413 Chambers, Sioux City, IA 51101.

TRADITIONAL HAND PLANES: Shoulder, miter, thumb and chariot. Bronze with steel soles and fine wood infills. Brochure: Jamestown Tool Co., PO Box 96, Jamestown, NC 27282.

OLD TOOLS—planes, chisels, parts, blades, more. Illustrated catalog, $1.50. John Treggiari, 67 Lexington Rd., Dracut, MA 01826.

Stainless steel and brass SCREWS AND BOLTS. Small quantities, free catalog. Elwick, Dept. 393, 230 Woods La., Somerdale, NJ 08083.

Solid brass KNIFE HINGES as used by James Krenov. 1¾ in. by ⅜ in. by 3/16 in. $12/set ppd. Alan Miller, 1523 Eaton, Brush, CO 80723.

"WOODTURNING"—Are you interested in woodturning as a hobby? Take a two-day intensive course for beginners from a qualified instructor. Write PRACTICAL WOODTURNING, PO Box 102, Orangeville, Ont., Canada, L9W 2Z5.

THE APPRENTICE SHOP offers courses in guitar contruction and repair. Write for free catalog. Box 267, Spring Hill, TN 37174.

WOODENBOAT MAGAZINE CATALOG: Plans for versatile small craft to cruising sailboats, traditional construction to cold molding, for beginner and professional alike. Send $3 for catalog and sample copy of magazine to WoodenBoat, Box 78B, Brooklin, ME 04616.

MAKE TOYS—hardwood wheels, parts—catalog 50¢. Cherry Tree Toys, 2547 8th St., Berkeley, CA 94710.

Make 6-in. and longer toy vehicles from scrap wood. Nine full-size drawings. Send $2, Dept. FW, WEEKEND ENTERPRISES, 12342 La Barca, San Antonio, TX 78233.

CATALOG OF 200 WOODEN TOY PATTERNS, toymaking supplies, books. $1 refundable. Love Built Toys, F11, Tahoe City, CA 95730.

TOOL CABINET. Full-size furniture plan. Room for all your hand tools. Send 50¢ for pamphlet. Morrison Originals, Box 15272, Detroit, MI 48215.

SINE-SET provides TOOLMAKER ACCURACY to miter gauges, bevel squares, for 32 most used angles. $10 postpaid. Craft Design Innovations, 4221 E. 41st, Tulsa, OK 74135.

GOLDLEAF BOOKS, for art (Chambers) $10.95, for graphics (LeBlanc) $8.95; both $17.45. Request products list. Artessence, Box 260, Monsey, NY 10952.

SEEDLAC, SANDARAC, copal, mastic, damar and other resins. Free price list. Woodfinishing Enterprises, Box 10117, Milwaukee, WI 53210.

WOOD & TOOL EXCHANGE

For Sale

Clear, old-growth redwood slabs, wavy fiddleback, no checks or faults, 3 ft. by 6 ft. by 2½ in., $75 each. Hugh McKay, Box 328, Gold Beach, OR 97444. (503) 247-2332.

Estate Sale: Belsaw planer and molding cutters; Gunline bedding, bottoming, checkering tools. All new. Wormy chestnut lumber. Moore, 6105 Brandon Ave., Springfield, VA 22150.

Two 24-in. dia. carbide-tipped ripsaw blades. One used, one new, 1¼-in. center hole. $200/offer each. B. McCormick, PO Box 161, Comptche, CA 95427. (707) 937-5565.

Stanley #45. Like new, barely used. In box with 23 cutters, $215. S. F. Wilson, 505 Main St., Wethersfield, CT 06109. Eves. (203) 529-3856.

Italian stroke sander, motorized table and exhaust, single or 3 PH. Excellent condition. C. Laffin, RR #1, Kingston, Ont., Canada. (613) 548-8898.

Patternmaker's vise, Yost Co., 1908. $300. James Cooley, RD #1, Frankfort, NY 13340. (315) 894-3483.

Stanley #9, slight defect, $550. Stanley #1, good, $500. Bennett, 869 A Ave., Coronado, CA 92118. (714) 435-8458.

Large quantity of bird's-eye maple, kiln dried. 4/4 and 6/4, $1 to $3.50 per foot. Steve Fowle, Hillsboro, NH (603) 464-5058.

Stanley #45, complete in original box with manual. Never used. $250. Bought in 1946. H. J. Kovacic, RD #2, Conneaut, OH 44030. (216) 224-1042.

Wanted to Buy

Stanley/Bailey #9 plane ("box" shaped w/knob on rear); Sandusky wood plow plane w/center wheel adj.; Crown molding plane. Will pay very well for old tools in good condition. W. Phelps, Williamsville, VT 05362. (802) 348-6346.

Patternmaker sole planes and #57 Stanley or ratchet-type core box planes. M. Casciato, 12054 SE Lamplighter, Milwaukie, OR 97222. 1-(800) 547-6952.

Shaft locking wrench for Oliver #51 speed-lathe with Kimble headstock. I. Hentschel, PO Box 204, Kingston, NJ 08528.

SITUATIONS WANTED

Desire apprenticeship with a traditional woodworker. I have limited experience and want to learn. Will relocate to good environment. A. B. Steen, 706 W. 22nd St., Austin, TX (512) 472-6429.

Seeking apprenticeship with master woodworker. Have work experience in cabinet/furniture making and design. Will relocate. Jon Derry, 1012 Peosta, Helena, MT 59612. (406) 442-1904.

Professional finisher seeks use of spray booth anywhere in N.Y.C. for small jobs. Will pay rent. Call or write Minor Morgan, 12 Seaman Ave., Apt. 4D, New York, NY 10034. (212) 569-1981.

Furniture/cabinetmaker apprenticeship sought. Have basic skills, experience, some tools. Strong interest in w/w career. Gary Norvell, 240 12th St. S.E., Washington, DC 20003. (202) 543-8864.

The CLASSIFIED rate is $3 per word, minimum ad 15 words. Payment must accompany order. The WOOD & TOOL EXCHANGE and SITUATIONS WANTED rate is $2 per line, minimum three lines, maximum six lines, limit two 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. Commercial accounts must use Classified. Please inquire for DISPLAY CLASSIFIED rate. Send to: The Taunton Press, Advertising Dept., Box 355, Newtown, CT 06470. Deadline for the January/February issue is Oct. 25th; for the March/April issue, Dec. 24th.

Events

Events listings are free but restricted to workshops, fairs, lectures and exhibitions of direct interest to woodworkers. The next deadline is November 1, for events beginning January 1 to March 15.

ARKANSAS: **New Handmade Furniture**—original hardwood furniture by 37 craftsmen, Nov. 21, 1980, to Jan 4, 1981. Arkansas Arts Center, MacArthur Park, Little Rock.

ARKANSAS: **Toys Designed by Artists**—juried, all media, Dec. 5, 1980, to Jan. 4, 1981, Arkansas Arts Center, Little Rock. Deadline Nov. 7, 1980. Write Townsend Wolfe, Arkansas Arts Center, Box 2137, Little Rock, Ark. 72203.

CALIFORNIA: **Art of Fine Woodworking**—show of furniture, turnings, small items, and sculpture by members of the Mendocino Woodworkers Association, Nov. 28-30, Shell Building Gallery, Lansing St., Mendocino.

CALIFORNIA: **National Wood Carvers Association Show**—Nov. 1, Knott's Berry Farm, 8039 Beach Blvd., Buena Park, Calif. Contact Catheryn Craig, 8123 Bradwell, Whittier, Calif. 90606.

CALIFORNIA: **Afro-American Arts from the Suriname Rain Forest**—show of over 350 objects, including woodcarvings, calabash carvings, textiles and metalwork, to Dec. 7. Frederick S. Wight Art Gallery, UCLA, 405 Hillgard Ave., Los Angeles.

CONNECTICUT: **Hartford Christmas Crafts Expo**—Dec. 5-7 and 12-14, Hartford Civic Center, 1 Civic Center Plaza, Hartford. Contact American Crafts Exposition Presentation, Box 368, Canton, Conn. 06019.

DISTRICT OF COLUMBIA: **Clockwork Universe**—exhibit of "artistic and technological masterpieces" from the golden age of German clockmaking (1550 to 1650), including 120 clocks, automata (animated figures) and mechanical globes. The exhibit also describes the origins and functions of the mechanical clock, the significance of the guild system, the patronage of the royal courts, the creation of artificial life through automata and mechanical models of the heavens. Nov. 7, 1980, to Feb. 15, 1981, National Museum of History and Technology, 14th and Constitution Ave., Washington.

DISTRICT OF COLUMBIA: **One-Man Show**—furniture and boxes by Bob Trotman, Nov. 16-30, Seraph Gallery, 1132 29th St. NW, Washington.

DISTRICT OF COLUMBIA: **A Very Practical Wood Workshop**—with Tom Lacagnina. Cost is $37 for students, $45 for American Craft Council members, $53 for others. Dec. 6-7, Greenwood Gallery, 2014 P St. NW, Washington.

FLORIDA: **Suncoast Wood Carvers Exhibition**—Dec. 6-7, Recreation Building, 7701 Boca Ciega Dr., St. Pete Beach. Contact Peter Newton, 5900 22nd Ave. N. #12, St. Petersburg, Fla. 33710.

ILLINOIS: **John Henry Belter and the Rococo Revival**—exhibit of 60 pieces of furniture made by Belter's New York City firm, 1844 to 1863. Nov. 15 to Dec. 28, Art Institute of Chicago, Michigan Ave. at Adams St., Chicago.

ILLINOIS: **Midwestern Wood Carvers Show**—Nov. 2, Exposition Hall, 200 S. Belt East, Belleville, Ill. Contact Paul E. Dyar, 26 Farthing Lane, Belleville, Ill. 62223.

ILLINOIS: **Chicago Crafts Expo**—Nov. 21-23, Expo Center Merchandise Mart, E. Ontario St., Chicago. Contact American Crafts Exposition Presentation, Box 368, Canton, Conn. 06019.

IOWA: **Iowa Crafts: 13**—work by Iowa residents. Deadline, Nov. 2. Exhibit Nov. 23 to Dec. 31, Charles H. MacNider Museum, Mason City. Write Richard Leet, MacNider Museum, 303 Second St. SE, Mason City, Iowa 50401.

MARYLAND: **Waterfowl Festival**—includes art, carving and photography shows, auction and duck-calling contest, Nov. 7-9, Natural Resources Building, South St., and other locations in Easton. Contact Waterfowl Festival Headquarters, The Tidewater Inn, Easton, Md. 21601.

MASSACHUSETTS: **New England Buyers' Marketplace**—juried, all media, April 27-28, 1981; Hynes Auditorium, Boston. Contact NEBM, One Faneuil Hall Marketplace, Boston, Mass. 02109.

MASSACHUSETTS: **Combinations**—juried show, of work by Massachusetts residents; objects "made from two or more materials, or created by a collaboration of two or more artists, or designed to function in two or more ways." Nov. 9, 1980, to Jan. 18, 1981, Danforth Museum, 123 Union Ave., Framingham.

MICHIGAN: **Fruit Belt Carvers Club Show**—Nov. 15-16, Orchards Mall, Benton Harbor. Contact Mrs. John Springer, 9676 N. Branch Rd., Watervliet, Mich. 49098.

NEW YORK: **Northeast Craft Fair**—trade, June 23-24, 1981; public, June 26-28, 1981; Dutchess County Fairgrounds, Rhinebeck. Application deadline, Jan. 7, 1981; slides and fee. For official application packet write Carol Sedestrom, American Craft Enterprises, Box 10, New Paltz, N.Y. 12561.

NEW YORK: **Whirligigs, Windtoys and Woodcarvings**—exhibit of 140 pieces, including Amish folk art, to Nov. 9. Museum of American Folk Art, 49 W. 53rd St., New York.

NEW YORK: **American Crafts Holiday Festival**—juried, all media, Dec. 12-14 and Dec. 19-21, New York University, Washington Square, New York. Contact American Concern for Artistry and Craftsmanship, Box 221, Uptown Station, Hoboken, N.J. 07030.

OHIO: **Crafts National '80**—juried, all media, Nov. 1-30, Grover M. Herman Fine Arts Center, Marietta College, Marietta.

OREGON: **Sculpture by Moulton Andrus**—show, to Nov. 22. Blackfish Gallery, 325 N.W. Sixth Ave., Portland.

RHODE ISLAND: **A Case for Boxes**—exhibit, to Nov. 16, featuring 17th, 18th and 19th-century boxes from the Nina Fletcher Little collection and work by students and faculty of the Rhode Island School of Design. A lecture series in conjunction with the show includes Alice Winchester on the Little collection and Wendell Castle on contemporary boxes. Museum of Art, 224 Benefit St., Providence.

RHODE ISLAND: **Southern New England Handcrafted Home Furnishings**—exhibit, to Nov. 15, South Gallery, Roitman & Son, 161 S. Main St., Providence.

TENNESSEE: **The Box: New Form, New Function**—juried exhibit of work by Southeast artists, to Nov. 21, The Arrowmont School of Arts and Crafts, Gatlinburg.

VIRGINIA: **Northern Virginia Carvers Midatlantic Invitational Show**—Nov. 29-30, Community Center, Vienna. Contact Don Early, 4400 Olley Lane, Fairfax, Va. 22030.

ENGLAND: **Woodworker Show**—Nov. 7-9, Royal Horticultural Society's New Hall, Vincent Square, Westminster, London.

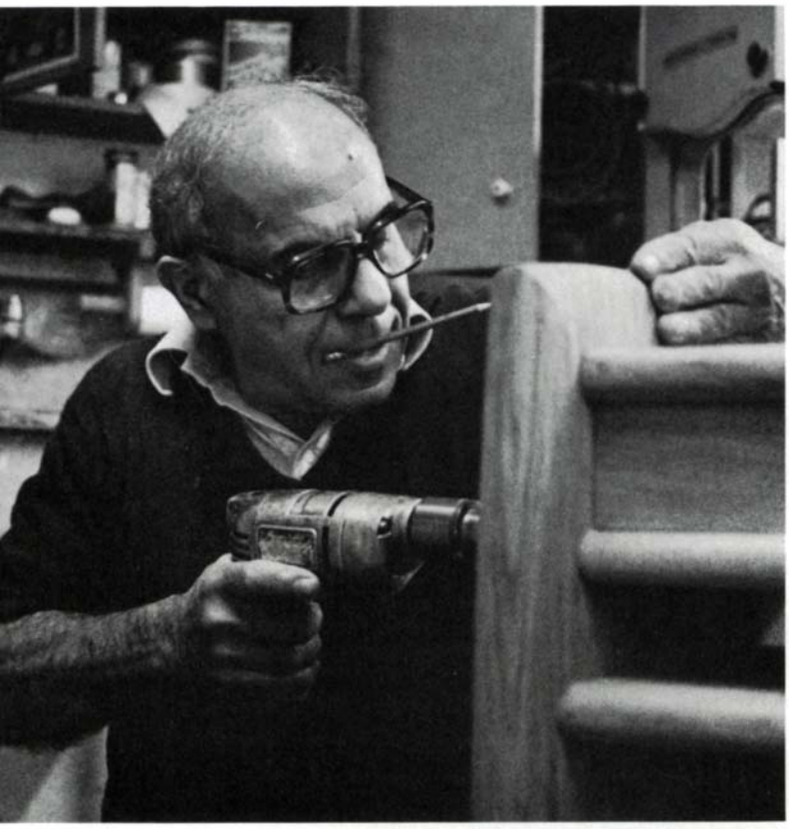
CORRECTION: The Woodturning Symposium in Philadelphia will take place in September, 1981, not 1980. Details from A. LeCoff, Amaranth Gallery and Workshop, 2500 N. Lawrence St., Philadelphia, Pa. 19133.

Fine Woodworking November/December 1980

Sam Maloof

How a home craftsman became one of the best there is

by Rick Mastelli



Call to mind the do-it-yourself magazines of the late 1940s, offering plans for boxy Masonite built-ins, and you'll sense the context in which Sam Maloof began designing and making furniture for a living. Picture too the invasion of the Danish Modern, the advent of the "clean, functional, but elegant line," and you will have the context of Maloof's first marketplace. But you will have a hard time tracing the influences on his work. For one thing, Maloof claims not to be conscious of any influence. He has had no formal training in either woodworking or furniture design. The subtle but steady refinement of his pieces began in a backyard workshop more than 30 years ago; they predate his first contact with the Danish furniture his work seems in touch with. Numerous articles on him in craft magazines and Sunday home supplements have described his work as "Western," "Gothic," "classic" or "organic," but Maloof is no student of art history. He was asked once by an admirer was he Egyptian—"Your chairs remind me of ancient Egyptian chairs." No, Maloof is not Egyptian (his parents were Lebanese), nor was it until after this remark that he took a close look at the Tutan-

Left, Maloof drives assembly screws into a brown oak desk. Below, three desks await crating outside Maloof's home and shop in Alta Loma, Calif. Variations on trestle structure, pinned joints and the adroit use of sapwood for graphic effect (all of these are walnut) characterize his work. Photo: Jonathan Pollock.

khamen exhibit in Cairo to find the similarity. Maloof is not an imitator, not tempted by trends to try the new because it is new. "My goal is to make furniture that people can be comfortable living with," he says. "If you're not preoccupied with making an impact with your designs, chances are something that looks good today will look good tomorrow."

A man of simple values, he feels the simple piece is the most challenging to design and make. Embellishments hide more than they show. He relies instead on a purity of line that follows the structure of the piece without violating the nature of the wood. He uses mainly walnut, No. 2 common for the liveliness of its figure, and he often includes the sapwood because he likes the contrast and because when he started making furniture walnut was expensive, 35¢ a foot, and why waste good wood? Characteristic too (he's one of the originators of this contemporary motif) is his exposed and sculpted joinery. "I've always exposed my joinery," he says, "Why go to all that trouble of making a beautiful joint only to hide it?" He's primarily a chairmaker, believing the chair to be the most difficult piece in the furniture-maker's repertoire—probably because it is simply joinery. He makes 20 different designs now, each with variations. To stay fresh, he will add two or three new designs a year. He also makes casegoods, tables and desks, identifiable again by their simple, evident structure. The tongues and grooves of drawer dividers are brought to the surface and faired to shape, framing neatly recessed faces. Tables are either pedestal or trestle, usually with legs like eucalyptus roots, their joints always pinned to view.

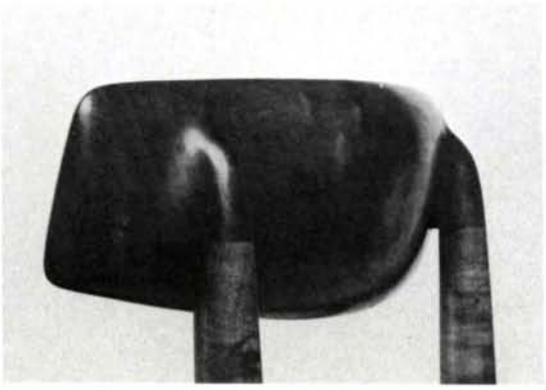
There's thus a remarkable consistency to his work—and in its coherent variations, a continual and discriminating growth. From the concentration in early chairs on lathe-turned parts meeting at sharp angles, there are now more compound, bandsawn curves. An increasingly sophisticated hard line, which on some pieces can be traced through every part, plays with the transition between curved surfaces. Intriguingly well-worked joints have become more integral with the overall shape of the piece. Throughout his work, there is the touchstone of symmetry—natural, exact, no matter how fluid the form. His is a style evolved of itself, carefully, gradually, with no dead ends.

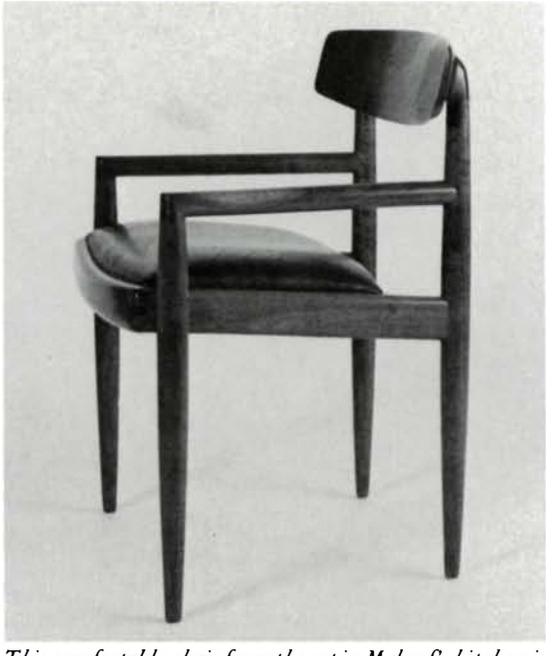
* * *

For many contemporary designer/craftsmen, Maloof is one who's made it. He's shown his work at the Vatican Museum in Rome, at the Smithsonian's Renwick Gallery in Washington, D.C., and at the American Crafts Museum in New York. Twelve of his chairs are in the permanent collection at the Museum of Fine Arts in Boston. Selling and showing throughout the country and giving generously of himself in lectures and workshops, his effect on contemporary crafts is wide-ranging and, to witness his imitators, often quite direct. What may be called California woodworking, with its organic, sometimes flamboyant shapes and sculpted joints, can be traced back to its most conservative practitioner, Maloof. He's 10 years younger than George Nakashima (*FWW* #14, Jan. '79) and almost 30 years younger than Wharton Esherick (*FWW* #19, Nov. '79). Unknown to one another until the early 1950s, and as distinctive as each of their work is, these three are the progenitors of contemporary designer/craftsmanship. Maloof was the first woodworker elected a Fellow of the American Craft Council—recognition for a contribution that requires first having worked 25 years in the field.

Maloof has years of work on order. He builds only what he wants to build, and he works and lives in enviable comfort. He's never sold at crafts fairs or galleries, except for small group and one-man shows—his last (four years ago) was sold out on opening night. It may be difficult for those who find themselves striving for such success to understand that Maloof did not so much strive for his situation as live it committedly from the first. Since his decision to make furniture for a living, his sole income has been from making furniture. Of course there were lean years when a down payment on a commission came just in time to pay the rent. But Maloof really

These three chairs span Maloof's career and demonstrate the consistency of his work, as well as its constant development. At left, chair from 1965 has lathe-turned spindles and softly rounded parts, complementing the wide, flat, figure-rich surfaces of the desk. Leather-upholstered chair, first made in 1955, is straight-lined and more angular. The chair at right is one of Maloof's latest designs. Composed of fluidly joined compound curves, its surfaces are sculpted with long, delineating edges.





Pedestal and wooden hinges are common to Maloof's stands and drop-leaf tables. Wood-threaded slide locks print-stand leaves at various angles. Horn-back chair with turned spindles was made in 1965—compare it to the later one at bottom right.

This comfortable chair from the set in Maloof's kitchen is sturdy after 25 years of use.

Maloof's home is his showroom. Left, dining room includes drop-leaf table for twelve, settee benches and slant-leaf hutch. Right, Maloof relaxes alongside a recent horn-back chair, an amalgam of Oriental, Gothic, Danish and Western elements.

Photos: Jonathan Pollock

works no differently today than he did when he started. He has never had more than a couple of helpers; he has one now. He does all his own designing, stock selection, joining, shaping, at least some sanding and finishing, even crating and sometimes delivery. He works a 60-hour week, producing 60 or 70 pieces a year, all of showpiece quality.

Maloof has never compromised the value he places on working directly for his customers and on making his own designs with his own hands. When he started making furniture, post-World War II southern California was a furniture designer's dream—one of the fastest growing, most affluent areas in the country. Other talented designers surveyed the situation and found it yielded best to prototypes that could be sold to furniture manufacturers for many times what an individual client would pay, and then often with royalties attached. Maloof has been approached to do the same; one company once proposed making a million of his pieces. But Maloof maintains it's not enough to be a designer only, that a design on paper is not a complete creation. Part of it must come from the craftsman who brings the idea into the real world. The changes it must necessarily go through, the little off here and the reconsideration of that curve there, the refinements that make the design right and give each piece its individuality, are important and fulfilling decisions. They're also more fun than supervising an assembly line. To design only or to build only from another's designs for a mass market is to be out of touch with the whole of the process, which includes the customer. "I want to be able," says Maloof, "to work a piece of wood into an object that contributes something beautiful and useful to everyday life. And I want to do this for an individual I can come to know as a friend. There's more to life than making things. Each time someone who has one of my pieces sits on a chair, uses a table or opens a chest, I want that person to know it was made just for him and that there is satisfaction and enjoyment in the object for us both."

* * *

Maloof lives in Alta Loma at the foot of the San Gabriel mountains, about 50 miles east of Los Angeles. His seven acres, bordered by eucalyptus and avocado trees, include one of the few still-producing lemon groves in the area. He remembers when the surroundings flourished with the largest citrus farms and vineyards in the world. And though he is a native, born in Chino about 15 miles from where he now lives, he doesn't have to go back more than ten years to tell how the building boom made his green-sheltered redwood hacienda an oasis of wood amid tracts of stucco houses, condominiums and shopping centers.

Maloof and his wife, Alfreda, who has managed the books, taken many of the photographs and been the hostess for the numerous house guests all these years, were married in 1948 and bought the property in 1952. Maloof was working as a graphic artist, doing silk-screens and scaling mosaic murals. He also drew for an architect. Before that were four years in the army. He'd taken to drawing in high school, the only schooling he's had, and as early as 1934 was making furniture for his parents, using the high-school woodshop at night. His first table was made of discarded plywood from concrete forms. Soon after high school he worked a year for Bauhaus graduate Harold Graham, "one of the only industrial designers I know," he says, "who could build what he designed." Graham was responsible for the window displays at Bullocks department stores—elaborate, animated scenes made of a variety of materials that "opened up a whole new world" for Maloof. There was a well-equipped shop and a journeyman carpenter to work with, and after the Christmas displays were done, Maloof helped build the furniture for Graham's house. All the while, both before and after his army service, Maloof built his own furniture on the side.

In 1952 he was 36. "There were two structures on the property when we moved in. We lived in what amounted to a shack where the guest house now stands. And I set up shop in a chicken coop with a dirt floor. But right from the start I knew exactly what I wanted." While he and his wife raised a son and a daughter, Maloof learned what he had to about woodworking and built a house, addition by addition, until it is now eleven rooms surrounding a central court, not counting the three rooms that are his shop. And not counting too the four woodsheds (he has some 15,000 bd. ft. of wood), and of course the guest house. He built all these and thousands of pieces of furniture. More than 40 of them he still lives with; his home is his showroom.

Now he works five or six days a week when he's not away giving workshops (which he vows to do less because of the

Maloof's first commission

I'd been working as a graphic artist since I got out of high school; I was 32 and we had a baby. I'd made furniture for myself and my parents using night-school facilities. And I got this offer from an interior decorator to furnish a dining room. The hardest part was telling Millard Sheets, my friend and mentor in art, I was going to quit, make furniture for a living, really on the strength of this one commission. I remember agonizing over it for days. Finally I admitted to myself I wasn't indispensable to him.

The order was for a dining table, 10 chairs and a buffet. When I asked for a down payment to buy wood, the decorator looked at me askance. "You don't ask for a down payment," he said. "Only people working on a shoestring ask for a down payment." Well, of course that's exactly what I was working on, but I bought the wood myself—birch it was. I built a prototype for the chairs. I'd built chairs before, but not for sale, and I wanted to make sure these were going to be strong. So I made the prototype of birch, got up on the roof and dropped it on the driveway. It lit on the back leg and shot up like to knock me off the roof. The leg broke, but not any of the joints, so I went ahead and made the chairs. The buffet was all solid stock with triple-mitered corners, very tricky joints. I made the drawers of solid wood too, 16 of them. I got $1,200 for that job, which turned out to be exactly what the materials cost me.

But what was worse was that the decorator had me stain everything this awful grey-brown. "Are you sure that's what they want," I asked. "I'm the decorator," he said, "they'll take what I give them." When I delivered it, the woman stood by the whole time with her hand sort of touching her mouth. When everything was in place I asked if she liked it. "It's beautiful," she said, "but I don't like the color." I reminded her that that's what the decorator had picked out. "The decorator doesn't have to live with it," she said, "I do." Well, I ended up having to haul everything back out, scrape it all down and do it the way she wanted.

I don't use stains any more, and seldom interior decorators.

—S.M.

Jonathan Pollock

Custom rocking chairs, now $2,500, remain Maloof's most popular design—he's built more than 100 of them and has 60 on order now. Working atop his table saw, left, Maloof drives 4-in. sheet-metal screws into the glued leg joint at opposing angles, then plugs with ebony.

The 1,000-sq. ft. machine room is the largest of the three rooms that make up Maloof's shop. He's got two table saws, an 18-in. planer, two jointers (16 in. and 8 in.), a 20-in. and a 14-in. bandsaw, a 1-in. shaper, two cut-off saws, a hollow-chisel mortiser, a drill press, a horizontal-boring machine, two disc sanders and three lathes. Maloof's tool cabinet, right, is well stocked with routers, rasps and files.

time and energy they consume); evenings and weekends might still find him working on the house. The actual time he manages to work in the shop varies. He will often work early, change his dusty clothes at lunch to run an errand or visit a customer, work in the afternoon again, all the while keeping an eye on the lemon grove. Feeling close to all he has made, he really does go to service his furniture. If a piece needs another coat of oil because its owner isn't confident doing it himself, Maloof will find the time to oil it.

In the shop he works on four or five projects at once. In the four days I was with him last May, he was working on a 6-ft. round pedestal table with a large lazy-susan center, a pigeonhole desk in brown oak, a couple of rocking chairs and a run of eight side chairs. He would rout the table parts round in the morning, fit the spindles for a rocker after lunch, and when his assistant, Jerry Marcotte, had sanded the surfaces of the desk, they would glue that up. The next day he'd bring them all a little further along.

A large man, not tall but broad and especially strong of hand, he works like the self-taught home craftsman he is, gone prolific with focused energy. He belt-sands and glues up wherever it's convenient, usually on top of his table saw. He'll sometimes sit on the saw too, shaping a chair part on his thigh with powerful rasp strokes. He supports his rocker spindles while filing for final fit in a notch worn 2 in. deep in a ratty old workbench; that's one of the few times I saw him use the bench. He's awfully handy with a router, holding it upside-down in one hand to round over the bottom edge of a desk top as readily as he held it upright for the top edge. Why turn the tabletop over when turning the router over is easier, especially when you're used to working alone? On the band saw he can carve out a pair of compound-curved chair arms in five minutes. At the end of another 15 minutes with rasps, Surform, files and scraper he will have a pair of arms symmetrical, as he says, "to within a hundredth of an inch—I use my fingers for calipers." Templates deck the walls, but no jigs; this is how he easily varies his designs, and if a client wants the seat of his rocker an inch deeper, Maloof will do

that too. It's evident he enjoys what he's doing. He never stops thinking about his work.

* * *

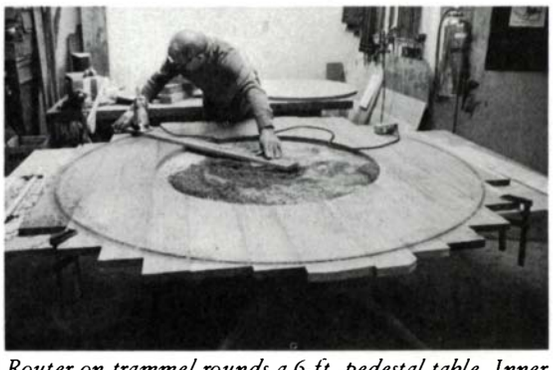
Does he mind not having gone to school, not having had a sheltered time to explore and experiment? "I've always experimented," he says. "People just like what I do and buy it. As for schooling, my clients are my teachers. They're the ones who bring me the design problems. Schools get too easily divorced from the real world. In many places students graduate and become teachers without ever making a living from their work. They grow stale. There's a preciousness I see in a lot of student work that comes from having too many hours to put into it. Perfection is fine, and nothing has ever left my shop that I'm not proud of, but you have to produce if you're going to make a living. I've heard people say they have to put a piece of wood aside until the spirit hits them. That's procrastination. Pick it up and work it—you'll feel the spirit. No, I think it's an advantage being self-taught.

"I get a lot of visitors. Many young people starting out, also older people dissatisfied with their careers. They come with a picture or two of pieces they've done and they want to know if I think they can make it as woodworkers. It's the romance of being a woodworker that attracts them, but a lot of them I don't think really want to work wood. It's very hard work. As for material security, if you're happy within yourself, you don't need a lot of things. I think anyone who knows what he wants to do and has faith in himself can do it. Talent, of course, is important too. Being a supersalesman goes only so far—you have to have something to sell. If it's recognition you're after, that tends to leave pretty quickly when it's quick to come.

"I have a romantic view of what I do. I love wood and I love my tools. But I have a practical side too. I've made a living for more than 30 years as a woodworker—raised a family, built a home. It's been good for me. It's brought me in touch with a lot of people." →

Maloof in 1956. Photo: Alfreda Maloof.

Assistant Jerry Marcotte helps position an 8-ft. bar clamp on a brown oak desk.



Router on trammel rounds a 6-ft. pedestal table. Inner circle will contain a lazy susan.

Maloof deftly bandsaws a compound-curved chair arm. It's a challenge that requires a narrow, taut blade and the ability to keep the work supported on the table where the blade passes through.

Maloof on his techniques

There are no secrets in joinery. It's a matter of figuring it out. But it was so hard for me, if I can help other people learn, then I will. A person who doesn't share is losing something.

I'm very careful about using mortise-and-tenon joints. I think they remove too much wood and are weaker than dowel joints. For instance in my pedestal tables, where the legs are mitered to the column, I'll run three ¾-in. dowels across the miter line, then secure those with ¼-in. pins. For added support I'll rout out for two crossbraces on the bottom of the pedestal (photo, top right). I rout the first brace ½ in. deep, glue that in and rout the other one across that only ¼ in. deep. Then I pin these at the ends. It's very strong. The column itself is square in section, plowed out to receive the tongues of the vertical parts of the legs.

For chairs I used to use dowels, but screws are stronger and they take out less wood. The joint I use now on a lot of my chairs I make with a dado blade and a router. The front legs aren't usually canted, so they're a little simpler. First I dado a 2-in. wide, ¼-in. deep notch in the edge of the seat blank, which is 2 in. thick. Then I run a ¼-in. rabbeting bit, with the pilot in the notch, over the top and the bottom of the seat. This produces a rabbet with a ½-in. radius.

For the leg I start with 2½-in. square stock and dado three sides of it, 1½ in. wide and ¼ in. deep. Then I lathe-turn the waste off above and below the joint. Shaping I do with rasps and files and Surform. To get the corners of the joint to fit in the seat rabbet with the ½-in. radius, I use a ½-in. rounding-over bit. It fits perfectly.

For the back legs I've had some special rabbeting bits made, one with a 3° cant in one direction for the top of the seat, the other with a 3° cant in the other for the bottom. The leg is then dadoed on a 3° angle to match.

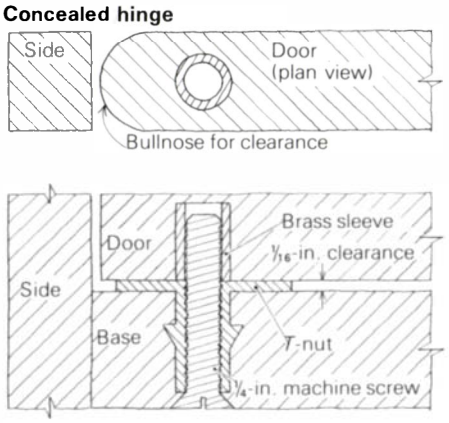
I put the legs and seat together by first gluing and clamping. When they're dry I fair the joint with chisels and files. Then I drive in two 4-in. sheet-metal screws, dipping the tips in glue for lubrication and toeing them at different angles to lock the joint. They're counterbored and plugged.

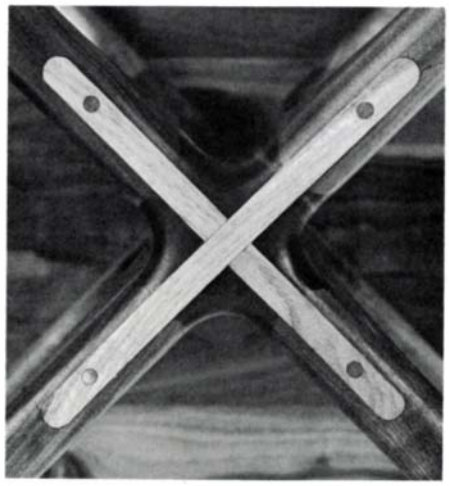
I use white glue for everything, except for mixing with sawdust to fill defects. I used to use white glue for this too but it shrinks, so I use clear epoxy now.

When I glue up panels I don't look at the end grain to see which way the rings are oriented. A lot of people argue over whether they should alternate or all go in the same direction. I choose the most beautiful side to be the face, and I've never had trouble with warping. I use dowels to locate the boards in relation to one another. It saves struggling with the piece during glue-up. I bore the holes on a boring machine so the space is ⅛ in. deeper than the length of the dowel, allowing room for expansion and contraction.

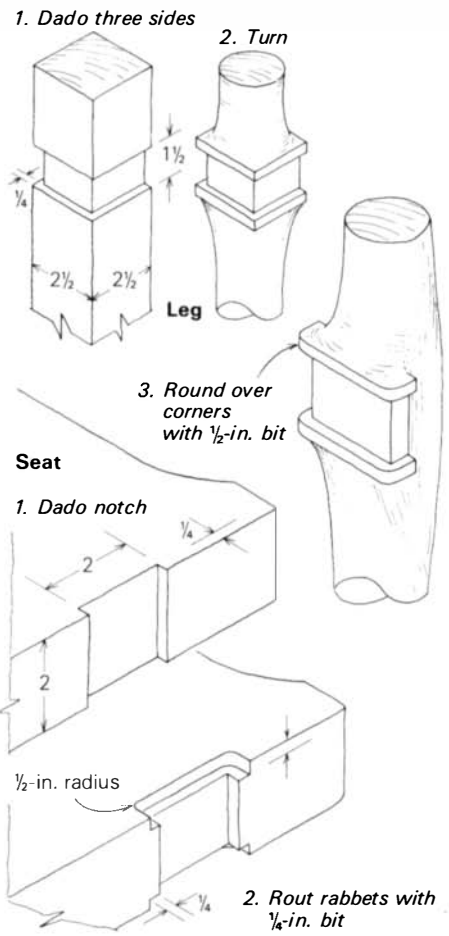
For hinges on cabinet doors I use a pin at the top and a machine screw through a *T*-nut at the bottom, as shown at left. I locate the top pin first, position the door and drill through the bottom of the cabinet into the bottom edge of the door with a ⅜-in. bit. A ¼-in. *T*-nut has a ⅜-in. O.D., so that fits into the bottom of the cabinet. I put a sleeve with a ⅜-in. O.D. and a ¼-in. I.D. in the hole in the bottom edge of the door, position the door again and screw a ¼-in. machine screw up through the *T*-nut into the sleeve. This way I can easily remove the doors if I have to and there's no hinge showing.

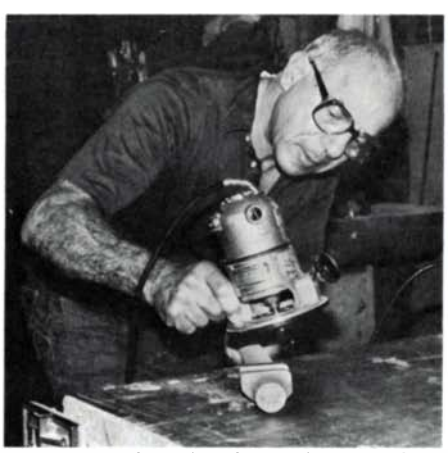
The finish I've used for the longest time is oil and beeswax. I take ¾ gal. of boiled linseed oil and grate in a handful of beeswax. It wants to be the consistency of cream. You have to rub hard when you apply it, once a day for three days, then buff with steel wool when it's dry. I used to use this on all my furniture except tabletops because a wet glass will leave a ring. Now I first apply two coats of a three-part finish (⅓ oil, ⅓ thinner, and ⅓ polyurethane varnish), then follow that with two coats of the oil and beeswax mix. —*S.M.*





Underside of pedestal table shows cross-bracing, routed in and pinned.

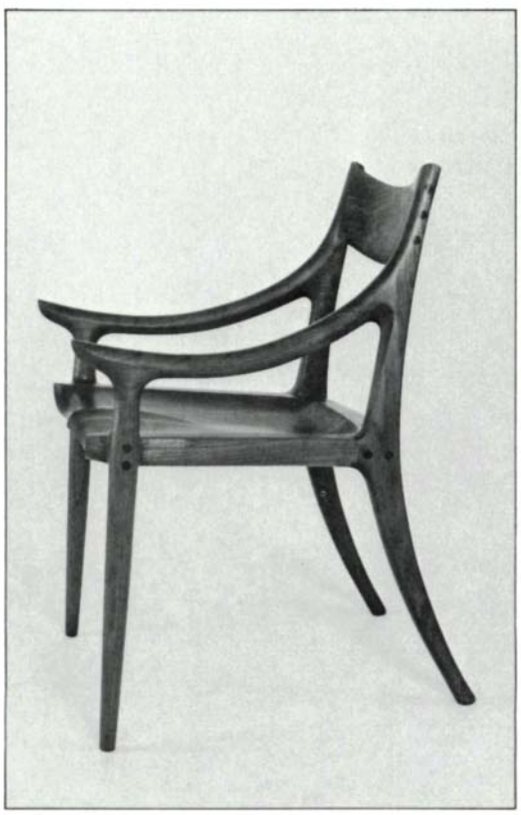




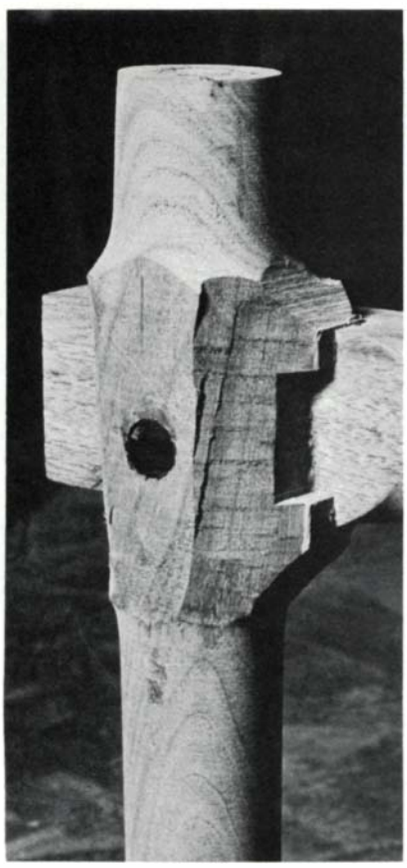
Leg joint is shaped with rounding-over bit.

Drawings: Christopher Clapp

'It's one thing making that hard line, and it's another making it mean something,' says Maloof. Pencil line, right, locates that hard line.



Side chair of walnut, first made in 1968, now sells for $1,400.



The router joint, as seen from the outside and from the inside, in progress, left, and finished, above.

Photos: Jonathan Pollock

The Router Rail

Using a router to surface large panels

by Giles Gilson

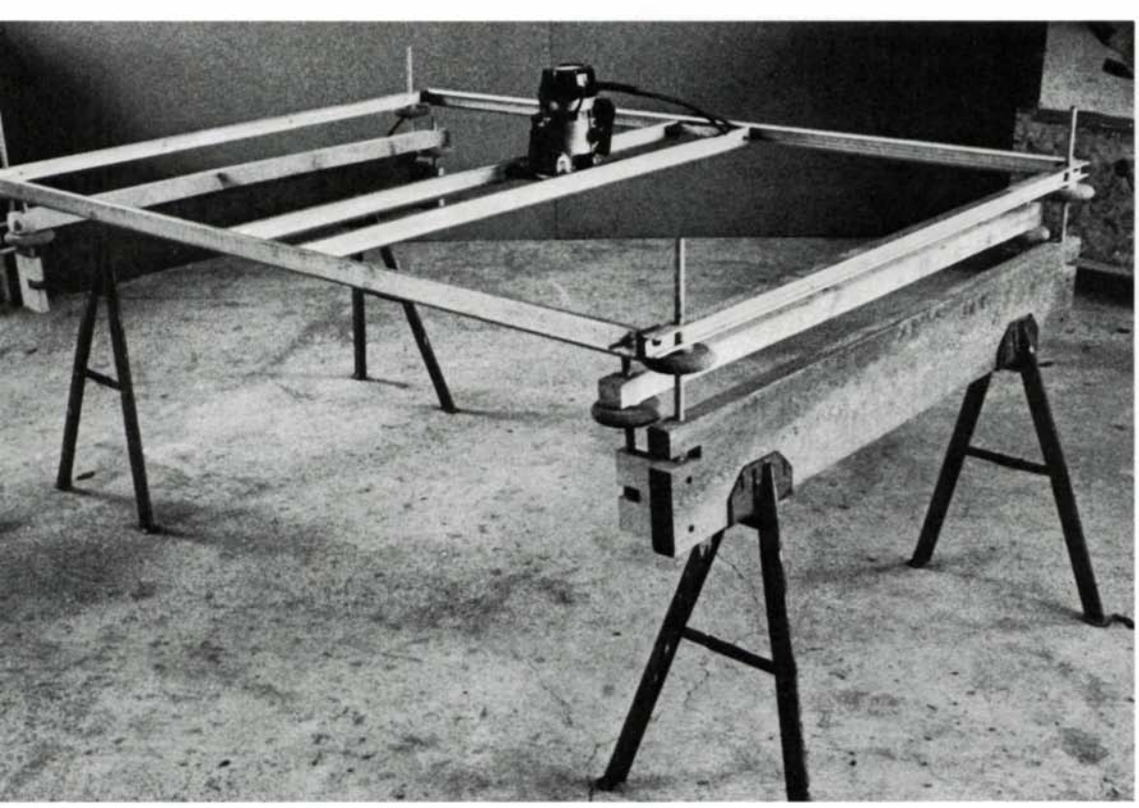
How often have you needed to plane a large surface such as a tabletop? The usual choices are to use a very expensive 2-ft. to 3-ft. planer or to use hand-controlled tools such as a plane or belt sander. Having faced this problem, I looked for a router accessory that would hold a router at a set elevation while allowing it to travel over a large area. I couldn't find such a device for sale anywhere, so I built an inexpensive one.

The router rail is fairly easy to build, and there are several designs possible. The principle is simple: A carriage just large enough to hold the router runs on rollers in two rails that form the long sides of a narrow frame, thus providing lateral motion. The frame itself has rollers at its narrow ends, and these ride in two rails that form the sides of a larger frame, thus providing longitudinal movement. Bars attached to end plates support the stock to be planed, and elevation wheels raise and lower the larger frame and the stock-support bars independently of one another. The dimensions of my system are 72 in. by 48 in. by 12 in., excluding the sawhorses.

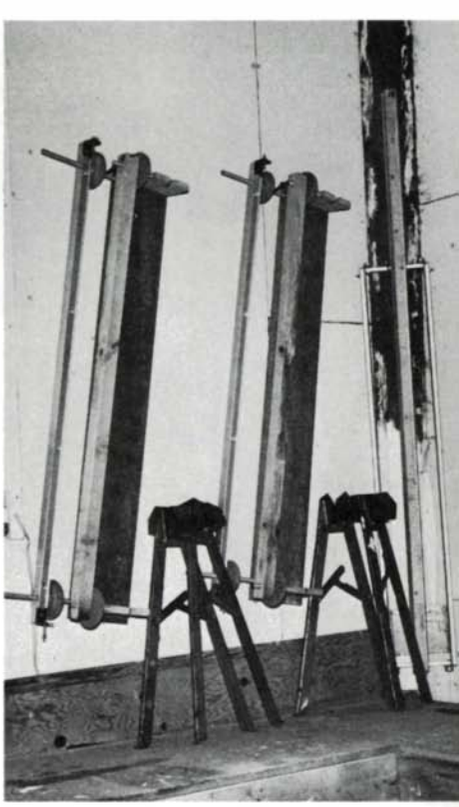
The materials can be obtained from a well-stocked hardware store or by scrounging in the scrap barrels of a metal distributor. The carriage is made from a piece of aluminum plate and has two rollers on each side. The rollers on my system are from a conveyor belt that happened to be living in a friend's junk-shop. A wiper, made from felt cut to the shape of the inside of the track, should be mounted next to each roller so that the track is kept clean ahead of the rollers. The rails can be made of garage-door track. Stiffeners (angle iron or plywood gussets) may be necessary on rails over 5 ft. long if the system feels bouncy. The ends of the large rail frame and the stock-support bars can be made of aluminum or wood. The stock-support bars should hold the work without flexing; the stock is clamped to these bars. The pieces are fastened together with corner brackets, bolts, and hex nuts or wing nuts, as shown in the drawing.

Eight elevation wheels allow for independent adjustment of the rail system and the stock-support bars. I use a 4-ft. level to level the rails first, then the stock. The elevation wheels can easily be turned from a piece of wood or composite board with a nut captured in the center, and the jackscrews on which the wheels run are threaded rod. To capture the nut I first counterbore a hole in the wheel blank the diameter of the distance across the nut's flats. Then I bore a clearance hole through the wheel for the threaded rod and use a bolt with a washer to draw the nut into the counterbore. The nut will cut its way into the wood and remain there when the bolt is removed.

The end plates and stock-support brackets are made of wood: 2x6s for the end plate, and birch plywood for the stock-support brackets. These brackets have cutouts in the

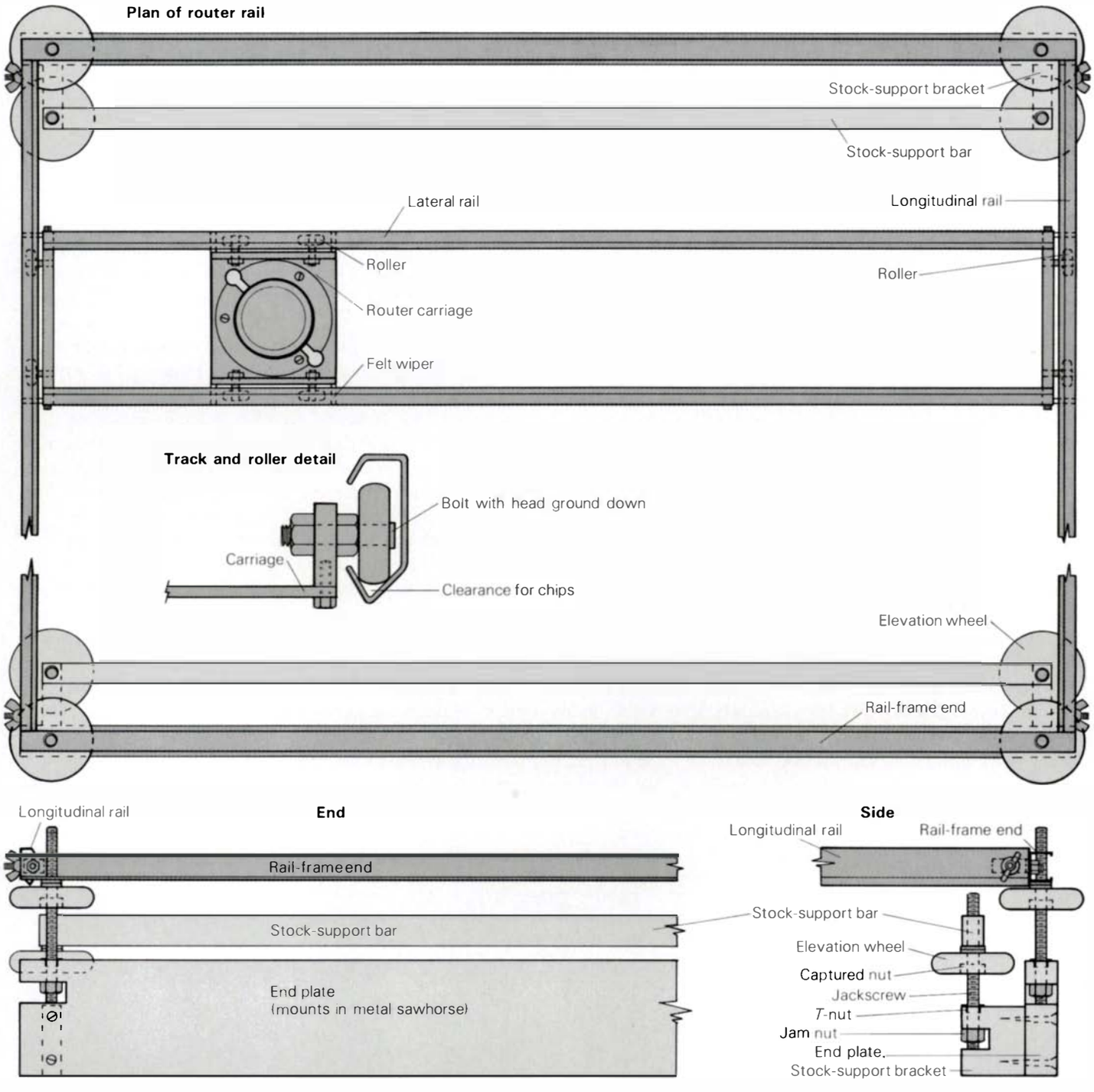


A router becomes a planer, using garage-door track and conveyor-belt rollers to control its movement on two axes. Small work can be surfaced if it is mounted on boards spanning the stock-support bars.



Four wing nuts disassemble the whole system for storage.

Photos: Giles Gilson and Rick Siciliano; drawing: Robert Croston



ends and a clearance hole drilled from the top through to the cutout. Fit a *T*-nut in the top of the clearance hole, screw the jackscrew in and secure it with a jam nut at the bottom in the cutout. The stock-support brackets can be fastened to the end plates by long wood screws and glue, or by through-mortising the end plate and cutting a tenon on the bracket long enough to be wedged crossways. The end plates mount in metal folding sawhorse legs that clamp to it when opened.

Bolts with wing nuts hold the larger rail frame together. Removing these breaks down the system into the endplate assemblies, including the stock-support bars and elevation screws, the two longitudinal rails, and the lateral rail assembly, including the carriage. The disassembled parts can be hung on a wall for storage.

The router rail is particularly well suited for planing end-grain panels, like butcher block. Although the largest bit I feel safe with in a router is a 1¼-in. carbide-tipped straight-faced bit, still I can surface a 6-ft. by 3-ft. tabletop in less than a half hour, including setup time, and that's significantly faster than I can do it by hand. Someday I'll build a heavy-duty version rigid enough to support a 2-HP motor that will take a 3-in. diameter cutterhead.

The router rail has possibilities for other routing operations besides planing. Stops can be placed on the long rails to allow the router to move only crossways. The carriage can be clamped, allowing only lengthwise movement, or stops can be placed to allow only a certain length of cut, for making stopped dadoes and slots. A sharp individual can get pretty inventive with one of these gadgets—so get to work. □

Giles Gilson, of Schenectady, N.Y., is a woodworker and sculptor who makes many of his own machines.

Return-Air Dust Collection

Shavings into barrels, dust into bags, heated air stays in the shop

by Mac Campbell

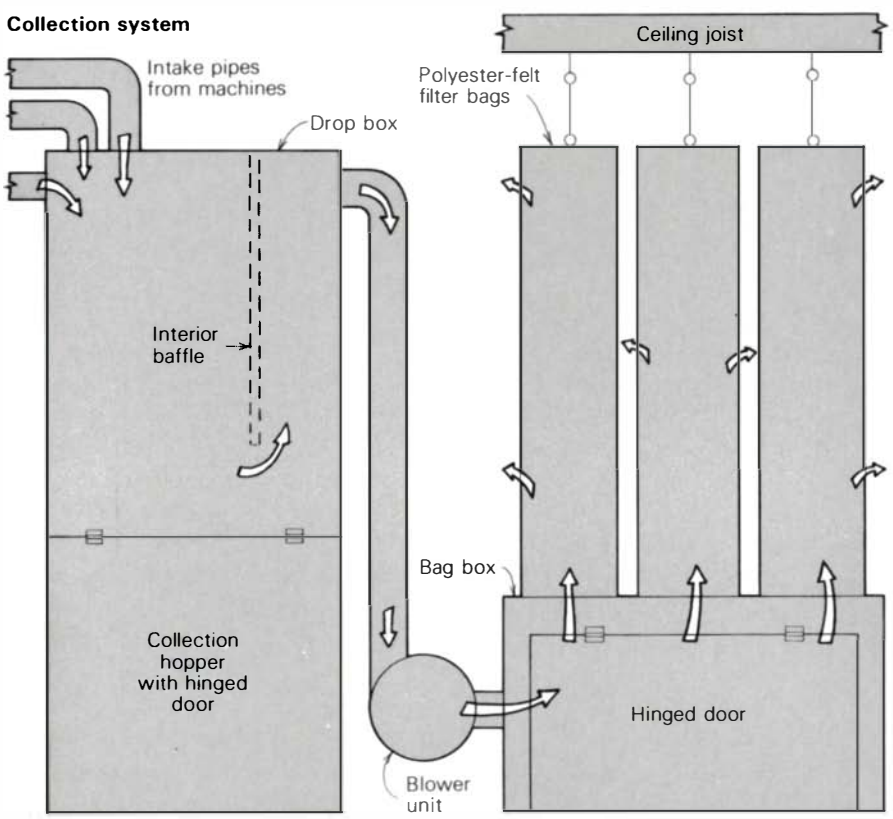
The woodworker must dispose of three types of shop waste: large chunks such as saw cut-offs, heavy particles such as jointer shavings and floating dust. The collection system I will describe can comfortably handle shavings and dust, as well as small chunks (large chunks go directly into the stove), and it exhausts through filter bags so that heated air can remain in the shop. This system could remove toxic vapors and fumes, but only if it were vented outdoors, whereupon heat would also be exhausted. The system is based on the principle that a given volume of air moves more slowly through a large passage than a small one. If the air carries a stream of particles, they will settle out as the airstream slows down.

My drop-box/blower/bag-box system is diagrammed below. A high-velocity airstream carrying waste from the machines enters the drop box on one side of an interior baffle. Because the box increases the size of the passage, the airstream slows down, and most of the larger particles settle into the collection hopper. At the outlet on the other side of the baffle plate, the airstream picks up speed and goes through the blower into the bag box. Here again it slows down, and returns to the shop only after being filtered of fine particles by the polyester-felt bags. If the system is to be vented to the outside, the bags would be enclosed in a separate box, which would then be vented through an exterior wall.

The size of your drop box is determined by the type of machines serviced and by space limitations in the shop. My drop box is 3 ft. square and 8 ft. high; the collection hopper consists of four 18-in. diameter barrels 36 in. high, with a baffle board over them to keep particles from falling in between them. Feeding 24-in. laminated panels through the planer as fast as I can fills the barrels in about 20 minutes, but normal shop use requires emptying them only once or twice a week. (In winter they are emptied more or less continuously into the stove.) The drop box should be carefully sealed, using either caulking compound, duct tape or both. The access door should be weatherstripped and latched; the internal vacuum holds it tightly closed when the system is operating.

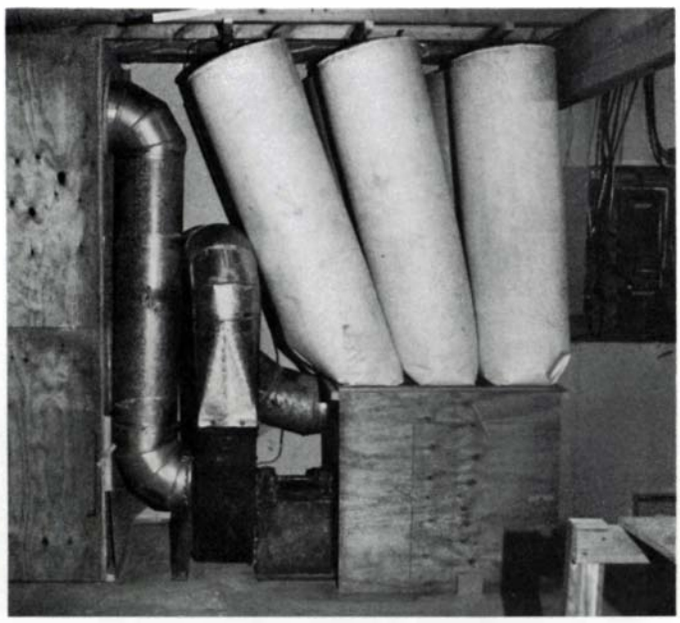
The bag box must be sealed even more tightly than the drop box because it's under pressure (rather than vacuum), and because fine particles escape back into the shop through the smallest of openings. A barrel or cart system is usually not necessary here; I just open the tightly sealed door and shovel out the dust as required. Though I've been unable to dig up any firm guidelines relating bag area to system capacity, my system, which exhausts one machine at a time, has a total bag area of about 180 sq. ft., and this seems to be about the minimum. These bags need an occasional cleaning, and you can do this two ways. One is to suspend each bag by a rope that runs through a pulley; cleaning is then just a matter of jerking on the rope a few times. A simpler method is to hang the

Collection system



Shavings and heavy particles are collected in four barrels at the bottom of the drop box. The baffle board on top prevents waste from falling between the barrels.

Photos: Jim DiVeto



Polyester-felt filter bags hang from stringers nailed to ceiling joists. Bag box must be strong and hermetically sealed with caulking and duct tape to keep dust from escaping into shop.

Usual branch sizes and exhaust volumes

Machine	Size (in.)	Branch pipe (in.)	Cu. ft./min. (CFM)
Jointers	Up to 6	3½	270
	6 to 12	4	350
	12 to 20	4½	440
Planers (single)	Up to 20	5	550
	20 to 26	6	790
	26 to 36	7	1070
Belt sanders	Belt width to 6	4	350
	6 to 9	4½	440
	9 to 14	5	550
Disc sanders	Up to 12	3½	270
Table saws	Up to 16	4	350
Band saws	Blade width to ½	3	200
	½ to 1	3½	270
	1 to 2	4	350

From *Design of Industrial Exhaust Systems* by John L. Alden and John M. Kane (Industrial Press Inc., 200 Madison Ave., New York, N.Y. 10016). This is an excellent source of technical information on all types of dust collection.

bags and beat them with a stick, much like old-fashioned carpet cleaning. Whichever way you go, bear in mind that the dust cake on the inside of the bag is what actually traps the finest particles. The cloth traps coarse particles, which trap finer particles, which trap even finer particles; so excessive bag cleaning will reduce the efficiency of the system. Experimenting will teach you the right balance between ease of air passage and effective filtration.

Mount the blower and motor anywhere between the drop box and bag box. The compact type of blower/motor combination used by Doyle Johnson (*FWW* #12, Sept. '78, p. 76) works well mounted directly on top of the drop box since the intake is on the bottom. The system is quite flexible, and parts of it can be placed around the shop as space permits. Johnson's suggestions for machine hoods are adequate, though I suggest sticking with the pipe sizes given in the table above. Each intake should be about twice the area of the pipe it supplies in order to provide enough air to carry the chips. Corrugated flex hose, while quite useful for making difficult connections, should be kept to a minimum since it significantly increases resistance. □

Mac Campbell, 36, designs and builds cabinets and furniture in Harvey Station, New Brunswick.

EDITOR'S NOTE: For a system in a small shop, the Cincinnati Fan and Ventilator Co. recommends using their model PB-10 blower unit with a 3,450-RPM, 1½-HP motor. It's rated at 490 CFM for 6-in. static pressure, and it costs about $300. Their address is 5345 Creek Rd., Cincinnati, Ohio 45242.

Though it is considerably more expensive, some woodworkers may want to install a centrifugal cyclone separator (shown at right). A cyclone separator employs a cone-shaped collector to create two concentric, helical air currents. Dust particles and shavings are separated from the airstream by centrifugal force and settle into a bin at the bottom of the cone. Cyclone systems can be used with or without filter bags. Cyclone collectors are manufactured in the United States by Torit Division/Donaldson Co., Inc., Box 43217, St. Paul, Minn. 55164 and in Canada, 2399 Cawthra Rd., Mississauga, Ont. L5A 2W9 and by Murphy-Rodgers, Inc., 2301 Belgrave Ave., Huntington Park, Calif. 90255.

You can get polyester-felt filter bags for your dust-collection system from Nauset Engineering and Equipment, Inc., 1 Washington St., Wellesley, Mass. 02181. This company will sell bags in standard sizes or custom-make odd-sized bags to order.

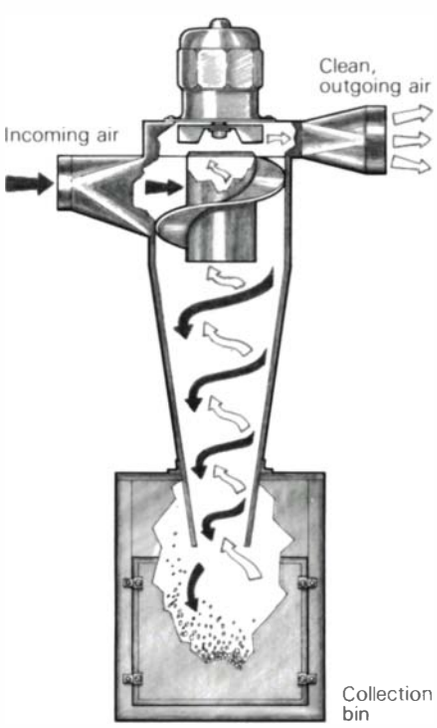
If you don't like fans, ducts and filter bags cluttering your shop, consider APSEE (Air Purification through Stimulated Emission of Electrons). An APSEE machine just whirs quietly high up in one corner of a shop. It makes fine sanding dust—particles ranging from 2 to 30 microns—fall to the ground instead of lingering in the air.

To check this sales pitch, we visited a busy shop whose employees persuaded owner John Petricka to install an APSEE late last year. Petricka has become a believer. He demonstrated by blowing up an impenetrable cloud of flour-fine dust. We fled outside for 15 minutes. When we returned, the air was clean.

Fine dust floats because the friction of sanding gives it a positive charge of static electricity. The particles repel each other. APSEE saturates the shop air with electrons, whose negative charge neutralizes the charge on the dust, whereupon it wafts to the floor. You still have to sweep, but doing so doesn't stir up the dust again. If anything, the extra electrons are healthy to breathe.

An APSEE costs from $2,500 on up, depending on shop volume. Contact Small Wonder, Inc., 3921 Mayette, Santa Rosa, Calif. 95405.

Cyclone collector



Small Projects

EDITOR'S NOTE: Small projects have a special appeal—they might be finished in a weekend. There's always someone, including yourself, who deserves some of your shop time, even if there's only little to spare. The ideas that follow require various levels of skills. They are from a growing file of reader-contributed, simple and elegant small projects. If you've got one to share, please send it in. We'll be making space again soon for more of these.

Candelabra from Chinese ideograms

by Warren Durbin

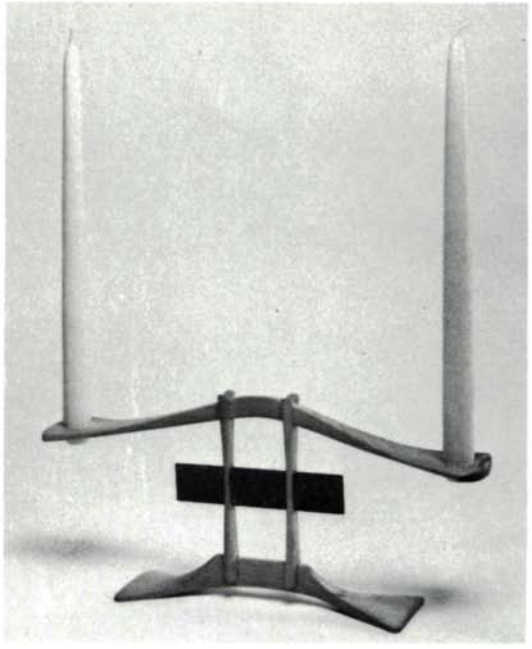
I have always admired the line quality of Chinese calligraphy and wanted to express its elegance and serenity in a usable object. Last winter I started work on a series of candelabra; the ones pictured here draw their inspiration from Chinese characters relating to shelter. I was interested in the interplay between light and shadow and so contrasted Gabon ebony with maple, and teak with oak. The small scale of the project makes it possible to use precious but otherwise wasted scraps.

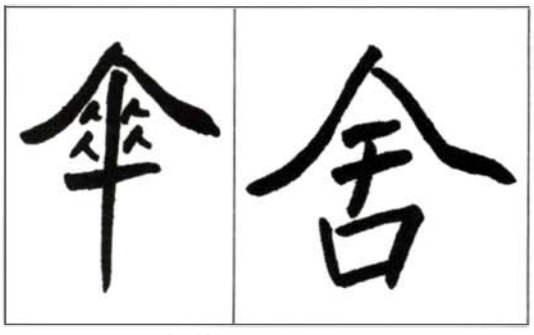
The candelabra shown below are about 15 in. by 6½ in. by 2½ in. But really the only dimensional constraints involve the candles themselves, which are a standard ⅞-in. diameter at the base. The rest of the shape is an aesthetic matter, and variations are possible. Bandsawing the top and bottom pieces, first in profile then in plan, reveals both radial and tangential grain patterns. I use a spokeshave, scrapers and sandpaper to take these to their final shapes, concentrating on symmetrical and fair curves. I make the uprights next, mortising in squared stock for the one or two horizontal cross pieces. Once again with spokeshave and scrapers, I take the uprights to final shape. To maintain their original integrity, I use bridle joints in the ends to connect the pieces. I make the delicate cuts along the grain with a Japanese backsaw (*dozuki*), then chisel carefully across the grain to remove the waste. The horizontal yoke piece or pieces, made next, fit the mortises in the uprights and accentuate the curves of the top and bottom pieces.

At this stage, with the stand dry-assembled, I mark the candle sockets for drilling, then disassemble to drill, though drilling could be done when the top piece is squared stock. For final assembly, I do not glue the yokes, only the bridle joints, clamping them lightly.

Oriental characters can provide inspiration for objects and furniture of various scales, including tables and chairs. It is a matter of abstracting the shapes of the original brush strokes and applying them to a functional structure. The success of the piece, as in calligraphy itself, depends on the balance and interplay of the separate lines and surfaces.

Warren Durbin makes furniture and wooden accessories in his shop in Burlington, Vt.





Bob Barrett

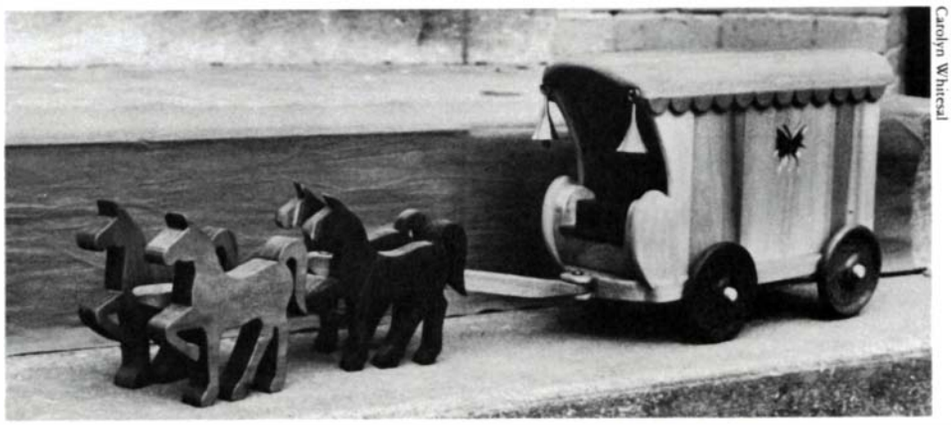
Candelabrum of teak and oak, right, inspired by the Chinese character for home, above right. Candelabrum of maple and ebony, top, inspired by the character for umbrella, above left.

Horses and wagon

by Robert Ruffner

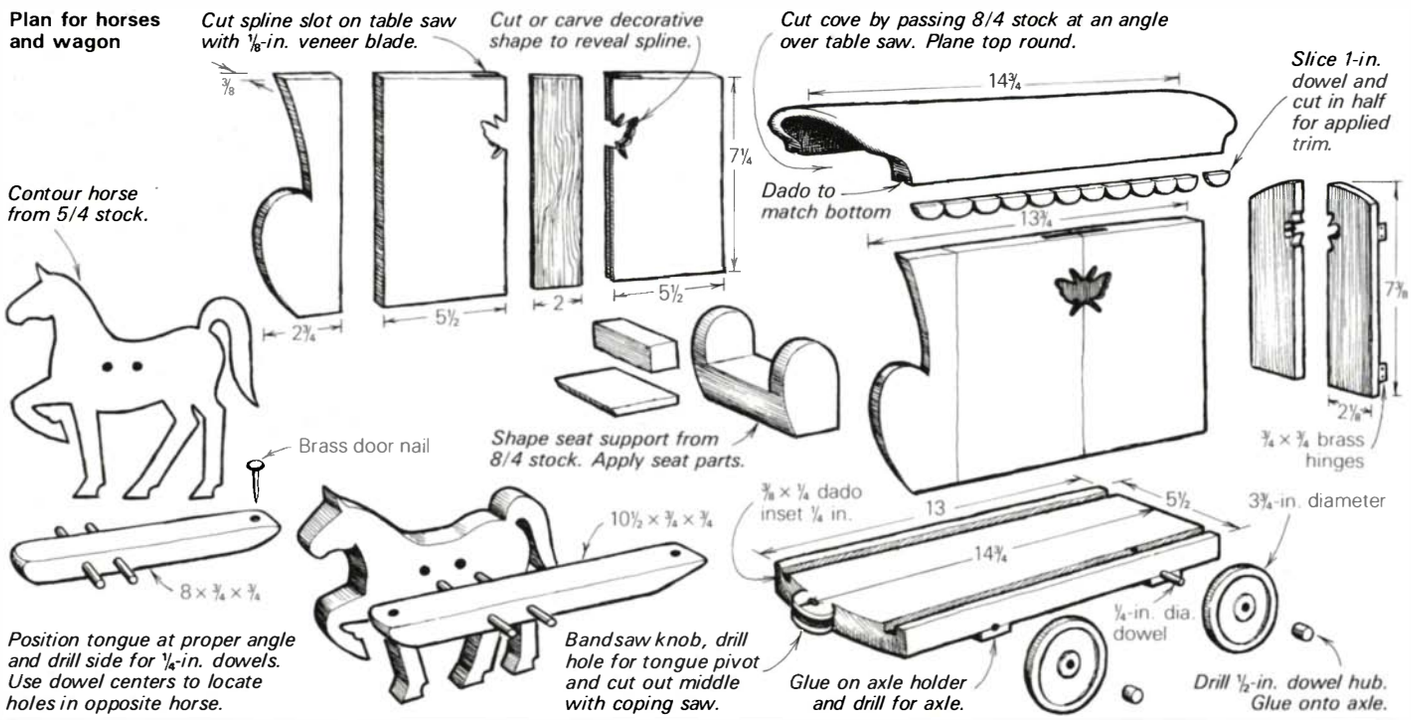
A simple piece with old-fashioned charm, this horse-and-wagon toy is made of poplar, walnut and birch. Variations are easy enough. The basic procedures are given in the drawing below.

Robert Ruffner lives in Irvine, Ky.



Carolyn Whitesal

Plan for horses and wagon



A triangular drop-leaf table with rotating top

by Pendleton Tompkins

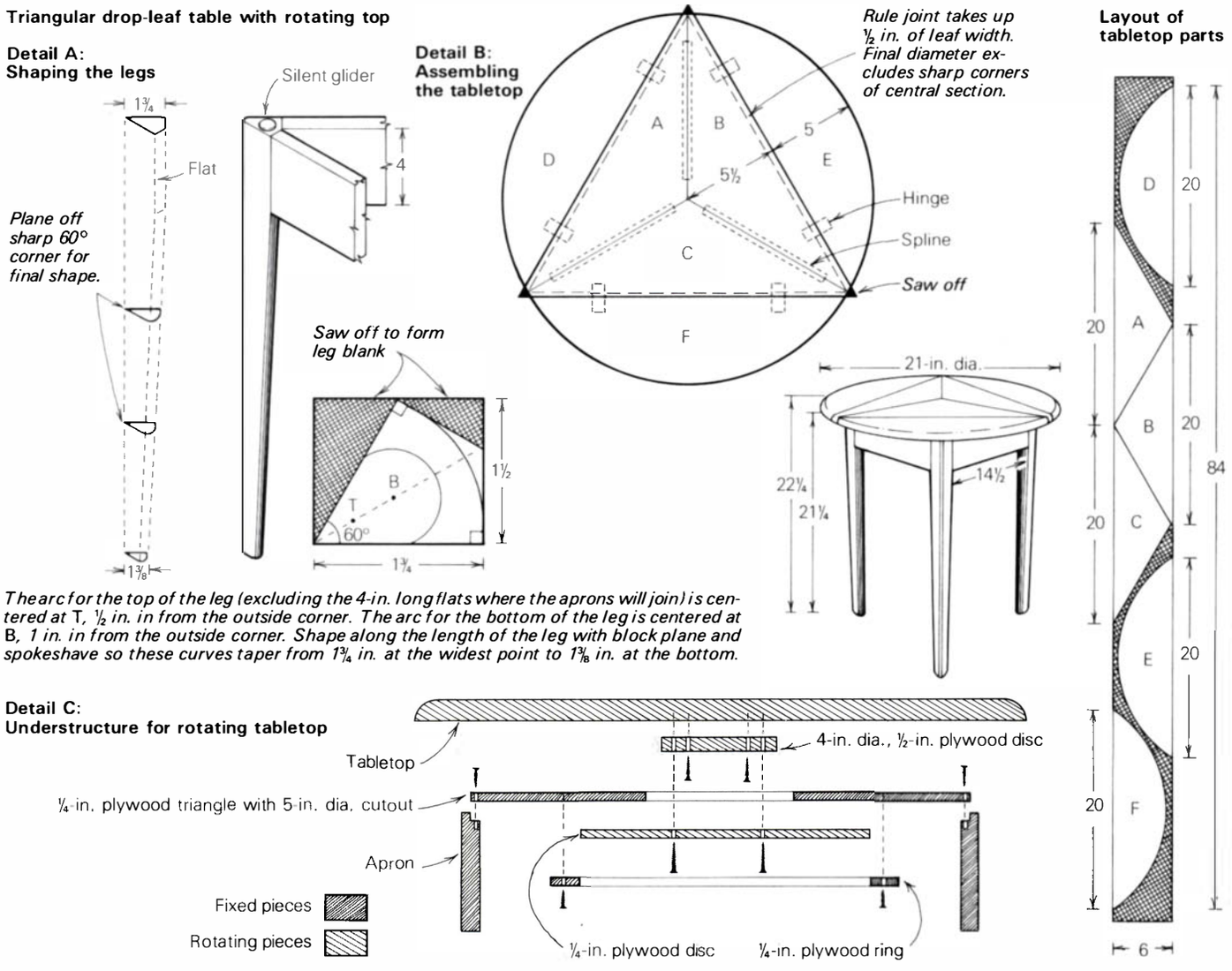
The advantage of a triangular table is that the sitters can face inward. The area of this tabletop becomes a circle when the leaves are raised and the top rotated 60°; the corners of the base then support the leaves. Any hardwood will do.

Make the legs first; they are flat-faced where they meet the aprons but taper to the foot with a graduated curve on the inside and fall straight along a 60° corner on the outside. To shape the legs I built a jig, basically a long, narrow frame in which the leg blank is held and rotated between two centers as it is passed over the jointer. The same operation can be performed with a router and jig, though the most straightforward way to cut the taper and graduated curve is with a sharp block plane and a spokeshave. Detail *A* (on the next page) shows the sections of curve and taper. With the legs shaped, cut the mortises for the apron tenons—no deeper than ⅝ in. or you will weaken the legs.

Before cutting the aprons to length,

Foto Associates West

The drop-leaves of this clever sidetable are supported by the base itself when the top is rotated 120°. It's a good project for practicing the rule joint, the mortise and tenon and the shaping of tapered legs.



The arc for the top of the leg (excluding the 4-in. long flats where the aprons will join) is centered at T, ½ in. in from the outside corner. The arc for the bottom of the leg is centered at B, 1 in. in from the outside corner. Shape along the length of the leg with block plane and spokeshave so these curves taper from 1¾ in. at the widest point to 1⅜ in. at the bottom.

spline together the three triangles that form the center of the top and cut the rule joints (*FWW* #18, Sept. '79) between this section and the three drop-leaves. All six pieces can be laid out and sawn from a 7-ft. long 1x6, as shown in detail *B*. With the hinges mounted, first bandsaw the top roughly round, then trim it to a circle with a router mounted on a plywood trammel that pivots on a temporary screw block in the center of the tabletop bottom. Note that the 5½-in. wide leaves have lost ½ in. to the rule joint and that the final diameter of the tabletop (21 in.) excludes the sharp corners of the central section. The edge can be molded to taste.

Now cut a tenon on one end of each of the three aprons and fit two aprons into one leg. Lay the hinged tabletop upside-down on the workbench, turn up two leaves and fit the leg with aprons into the angle between the leaves. Cut the aprons to a length that, with the remaining two legs attached, will exactly fit the tabletop with the leaves folded. Cut tenons and fit the legs and remaining apron together. Before assembling, cut a ¼-in. rabbet on the top inside edge of the aprons to receive a plywood triangle, yet to be made. Gluing up the legs and aprons requires a deft touch; it's best to fit the tenons a bit at a time in sequence and use a strap clamp to bring the joints together.

While the glue is drying, cut a triangle from ¼-in. plywood to fit in the apron rabbets. Then cut a 5-in. diameter hole in the center of the plywood, and screw and glue the plywood into the rabbeted aprons.

Now cut a ¼-in. plywood disc just large enough to fit snugly inside the triangle formed by the legs and aprons. Cut from within this disc another disc of 1-in. shorter radius, producing also a 1-in. wide ring with an entrance kerf that can later adjust the ring's size. Both discs should be near-perfect circles; the inner one must turn smoothly within the outer ring, so make this cut with a jig (*FWW* #16, May '79, p. 16). Sand the saw kerf lightly. Center the outer ring inside the aprons and glue and screw it to the underside of the plywood triangle in the table. To ease the top's movement over the base, drive ⅜-in. silent gliders into the top of each leg.

Once again with the hinged tabletop upside-down on the bench, set the base inside the triangular center section. From ½-in. plywood cut a 4-in. diameter disc and screw it to the underside of the tabletop approximately in the center, inside the 5-in. diameter hole that you've already cut in the plywood triangle. Take care not to screw into the splined joints of the top. Now place the disc of ¼-in. plywood within the outer ring and screw it to the disc of ½-in. plywood; detail *C* shows the relation of these parts. When the table is lifted by its top, this set of screws will hold the base on, so use screws long enough to enter the top. But before driving more than a couple, rotate the base 120° in each direction to see if the leaves can be folded without interference.

Pendleton Tompkins, a surgeon, lives in San Mateo, Calif.

Flip-open box from one piece of wood

by Daniel Mosheim

I've been making these boxes as gifts for a couple of years, and each one has proved popular and challenging to make. The design can be adapted to many uses with only slight changes. Here I'll cover the most complex one I've done, for business cards. I've fed the woodstove with one or two of these; you can spoil it with the last pass of the plane so work carefully and don't rush.

I've used apple, maple, chestnut, walnut and cherry, but quartersawn zebrawood remains my favorite. In general the darker and more straight-grained the hardwood, the better the overall effect. To start, you will need a piece about 3¼ in. by 6 in. by ¾ in., with faces and edges straight and parallel. Strike a witness mark across the face, as shown in figure 1. Put a sharp blade in your table saw and check your fence settings on scrap wood before making each cut on your good stock. You have four ripping cuts to make; after planing and scraping the edges smooth and pressing them together to check the fit, you should have two pieces about 5/16 in. wide, two pieces 5/16 in. wide and one piece that is slightly wider than your business card, usually 2 in. Place your card on the face of this piece and mark the center and a little past the ends of the card. Lightly square these marks around the pieces and make a ¼-in. slot for half the card all the way through the width of the stock, as shown in figure 2. I use a ¼-in. bit in the drill press to rough it out and a sharp chisel to true up the walls. Get this slot smooth now, it's your last chance.

Now glue the two 5/16-in. pieces to this center one, using your witness marks and all the clamps you have room for. Get good glue lines here. After the glue dries, cut a second slot through the width of the stock for the rest of the length of the card (figure 3). This slot will open into the first slot between the two 5/16-in. pieces. Don't spend a lot of time here because you can smooth this slot after the next two cuts. Using a beveled scrap block as a guide, cut with a backsaw two 45° angles at the ends of the second slot, *A* and *B* in figure 3. Separate the halves and smooth the insides. The ends of the slot at *C* and *D* can be cut on the table saw with the miter guide and your blade set at the right height. Be careful to keep your fingers where they belong.

Put all the pieces back together, including the two outside 5/16-in. pieces, and clamp them temporarily. To locate centers for the dowel hinges, strike a sharp line across the face of the pieces ¼ in. from the end of the first slot, at *E* in figure 4. Unclamp the three pieces and continue line *E* down the outside edges of the assembly and down the inside edges of the 5/16-in. pieces. With a marking gauge set to half the thickness of your stock, mark four points on these lines. Be accurate; the location of the dowel hinge is critical for your box to open and close properly. Using a 3/16-in. bit, drill into the center assembly to a depth of ⅜ in. and halfway through the thickness of the 5/16-in. pieces. Cut and place the dowels and put the whole thing back together again. If everything seems to fit and the box opens and closes, you're ready to glue. Paste-wax the sides of the big half of the center assembly and put a thin coat of glue on the sides of the small half and on the mating surface of each of the 5/16-in. pieces. Glue neatly so you have a minimum of cleaning up to do inside. And don't forget to put in the dowel hinges. Clamp lightly and open and close the box. If it works, clamp tightly.

When it's dry, cut the box to final length, shape it and finish it as you like. Be careful during the shaping that you don't cut away too much of the bevel or you'll have a gap to the inside and some fuel for the woodstove. □

Fig. 1: Ripping the stock

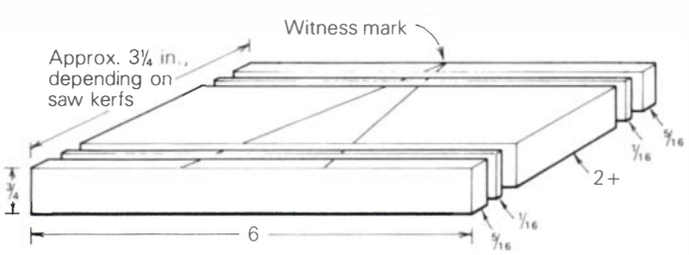
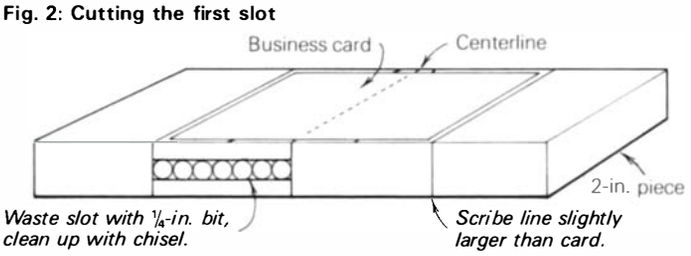
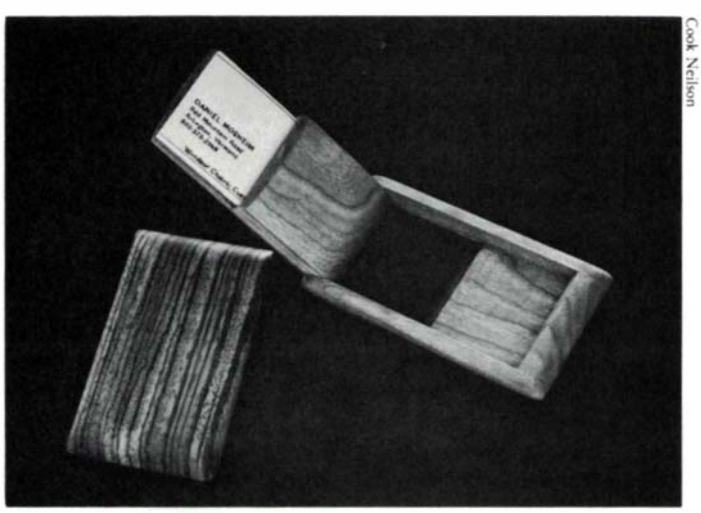


Fig. 2: Cutting the first slot



Waste slot with ¼-in. bit, clean up with chisel.

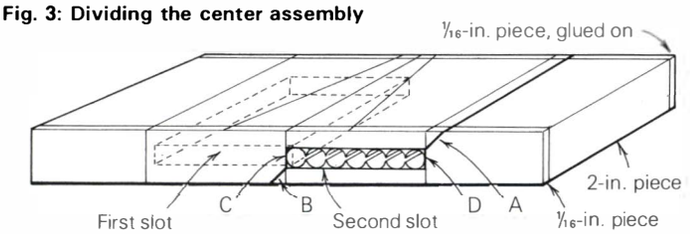
Scribe line slightly larger than card.



Cook Neilson

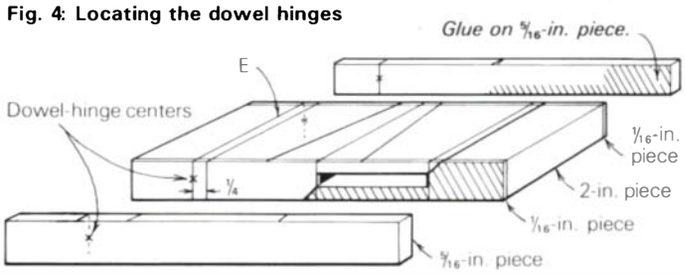
Precise sawing, boring and gluing yield a box whose design can adapt to other purposes. These are of zebrawood, left, and cherry.

Fig. 3: Dividing the center assembly



Saw apart at A *and* B, *smooth* C *and* D *on table saw.*

Fig. 4: Locating the dowel hinges



Bandsaw Boxes

The quick and easy way to make a complicated container

by John Alcock-White

The versatile band saw can be your primary tool for making small wooden containers. I have been experimenting with the band-saw technique and have found that with it I can produce attractive containers in comparable or even less time than by turning or conventional joinery. Since the container is made from a single (or laminated) block of wood and all the grain remains parallel, movement caused by humidity change is uniform—the bandsaw box is not adversely affected by changing moisture conditions. The method is so direct it has an inherent beauty.

Bandsaw boxes became popular and widely imitated after Arthur (Espenet) Carpenter developed his version back in the late 1960s (see p. 66). In addition to ingenious boxes, Carpenter made such things as pigeonholes and drawers inside roll-top desks. Carpenter, of Bolinas, Calif., is a quiet person who becomes shy when discussing his own work. When asked about bandsaw boxes, he replies that his technique is so simple it hardly needs explanation. Be that as it may, it has the elegant simplicity common to all important innovation.

I found this technique when I first began to use the band saw. The method is first to saw off the sides of a block of wood, to turn the block on its side and saw out the center, then to glue the sides back on. The procedure can be extended to make drawers (figure 1). After the sides of a block are sawn off, drawer pieces can be sawn out, resawn into smaller containers, and finally replaced in their original positions within the larger block. If the saw is set up correctly—top and bottom guides snug, blade sharp and tensioned as much as possible—the cut pieces can be glued directly back together with little or no smoothing. Because the kerf cut by the saw governs angles and clearances, very little fitting and measuring are required.

Although this technique had struck me as a marvelous way to make containers, I forgot about it for some years until a friend, who markets a line of bathroom accessories, was telling me how profitable it was to manufacture such items as oak toilet seats. However, to increase sales he had to offer a full line of accessories, most of them of good quality, simple design and easy construction. One exception was a box designed to cover a tissue package, constructed with an elaborate finger joint. He was getting $8 for it and it retailed for $15, and he admitted it was a money-loser but still an essential part of his line. Instead of sawing and gluing up the finger joints, I proposed he make the box from a solid or laminated block of wood. He'd then have only four operations: bandsawing, regluing, routing the opening, and sanding (figure 2). The waste wood would be used to make something else, and the $8 price might become more feasible.

This experience got me making bandsaw containers again, and I became convinced it is a viable technique with lots of potential. Mainly the method is fast, perhaps faster than anything else. It is economical if the sawn-out sections are used to make smaller containers or if they can be used in other phases of your operation. Expansion and contraction of the wood is not a serious consideration. Making these containers does not depend on a lot of equipment—apart from the band saw, a few clamps and some smoothing tools are all you need. Lastly, compared to traditional joinery, there is practically no measuring and fitting. You can build freehand and end up with some interesting shapes, without tooling contortions. Although purists may decide bandsawn containers are gimmicky, I find them an enjoyable relief from conventional, more exacting woodwork. They look complicated yet are easy to make, and best of all, people like them. I can sell for a profit what I make. I wish that were always the case. □

John Alcock-White, 31, makes furniture and bandsaw boxes in Nanaimo, on Vancouver Island, B.C.

Fig. 1: Bandsawing a container with drawers

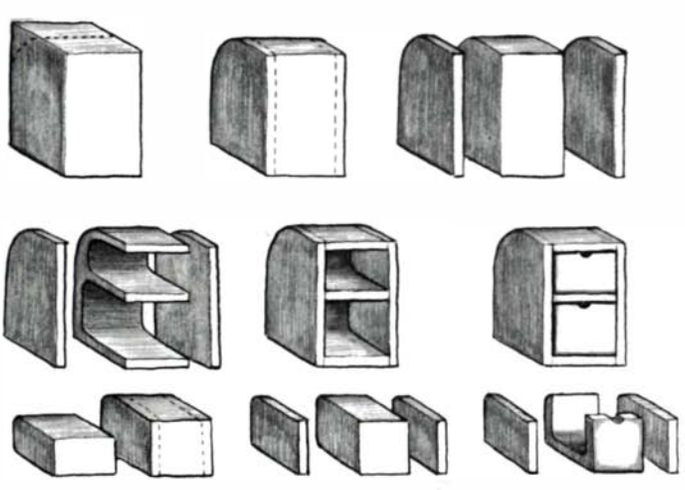
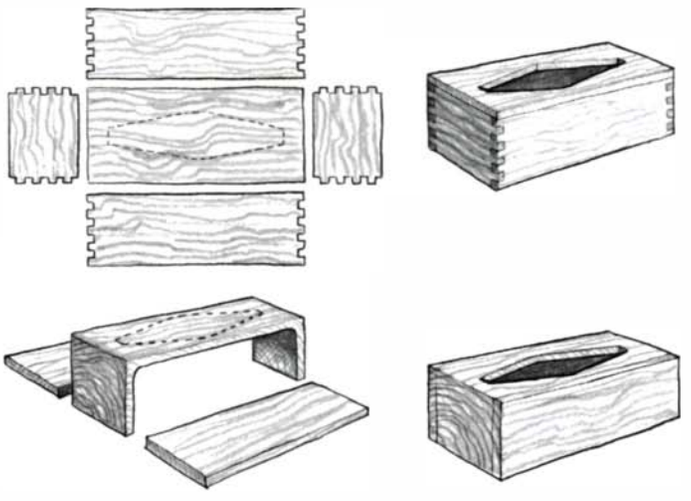
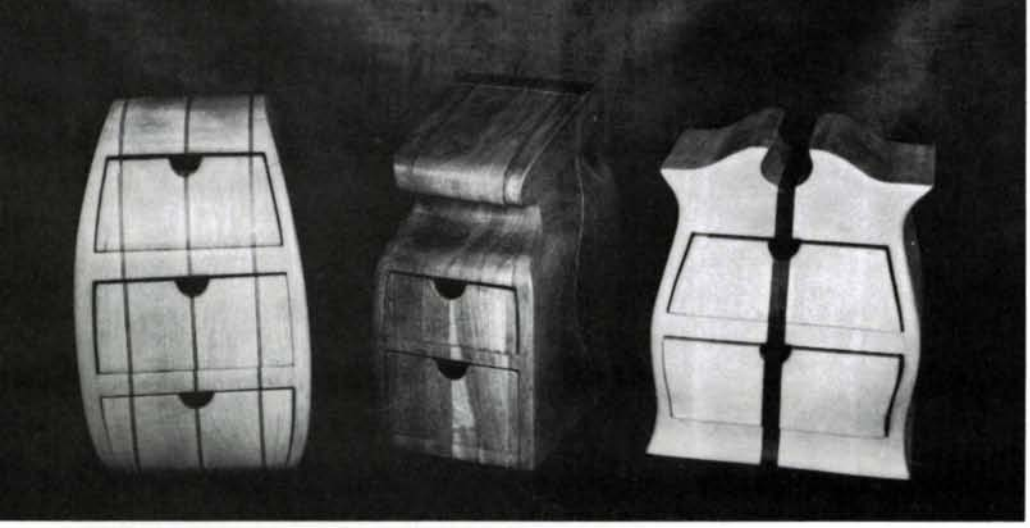
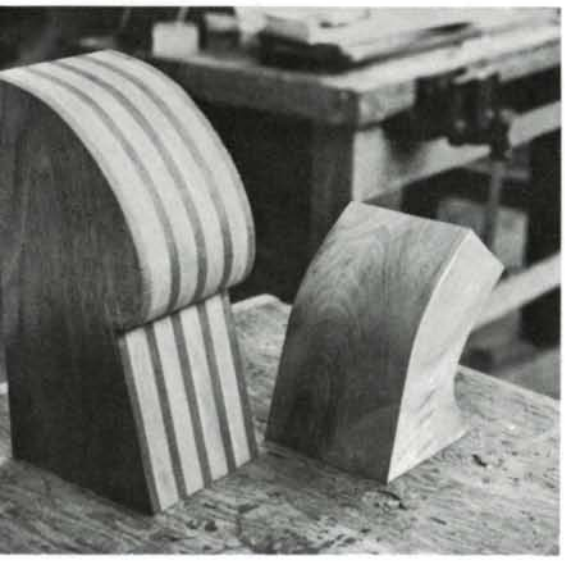


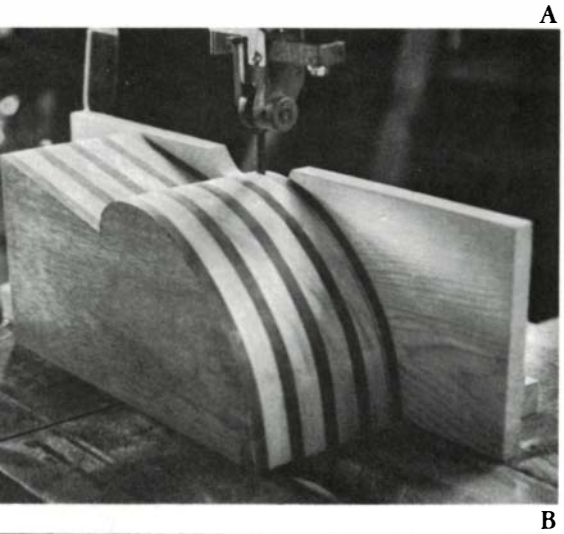
Fig. 2: Bottomless finger-joined box compared to bandsaw box



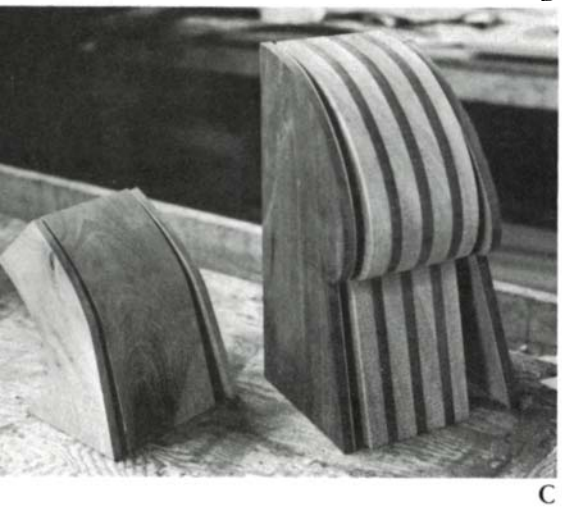




A



B



C

The boxes above, made by the author, have curved fronts and sides made by regluing along a curved kerf. The glueline is generally very clean; the major difficulty of holding the parts while sawing the interior is solved with improvised jigs and clamps.

A. To make a bandsaw box, start with a solid or laminated block of wood; shown are a small piece of myrtle taken from a bent section of the tree and a laminated block of Central American walnut with Honduras mahogany. Saw the block to contours you like, using a four-tooth, ¼-in. blade for heavy cuts and a six-tooth, ¼-in. blade for lighter cuts. Make simple containers with at least two flat sides before trying more complex shapes.

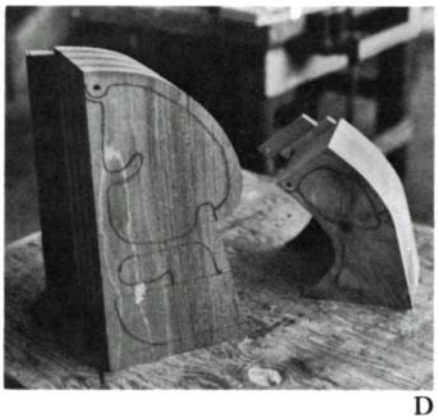
B. Set up a fence on the band saw and remove about 1 cm. (⅜ in.) from each side of the block. These pieces become the sides of the box, C, and since end grain does not glue well, saw them with the grain. The saw should leave surfaces smooth enough to reglue later, but for a perfect fit you can joint the cut-off sides and the central block.

D. Draw the interior of the container, and drill for the hinged lid. These boxes are fairly complicated, with a secret ledge above the drawer in the laminated block.

E. Saw along the lines, striving for smooth cuts. Resaw the blocks taken from the drawer openings. Rasp and sand any rough spots now, while they are still accessible.

F. Carefully glue the sides back on. Once the glue has set, insert dowels (or brass rods) through the hinges. Be sure the lid opens smoothly before driving the dowels home.

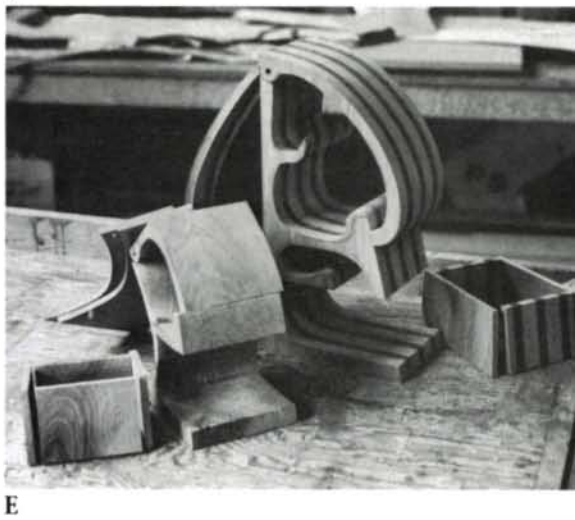
G. Trim off the dowels, cut a drawer pull, sand the outside of the box, and finish.



D

G

F

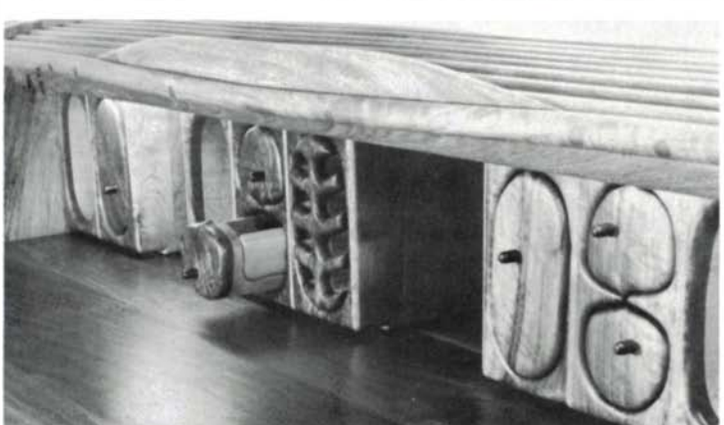


E

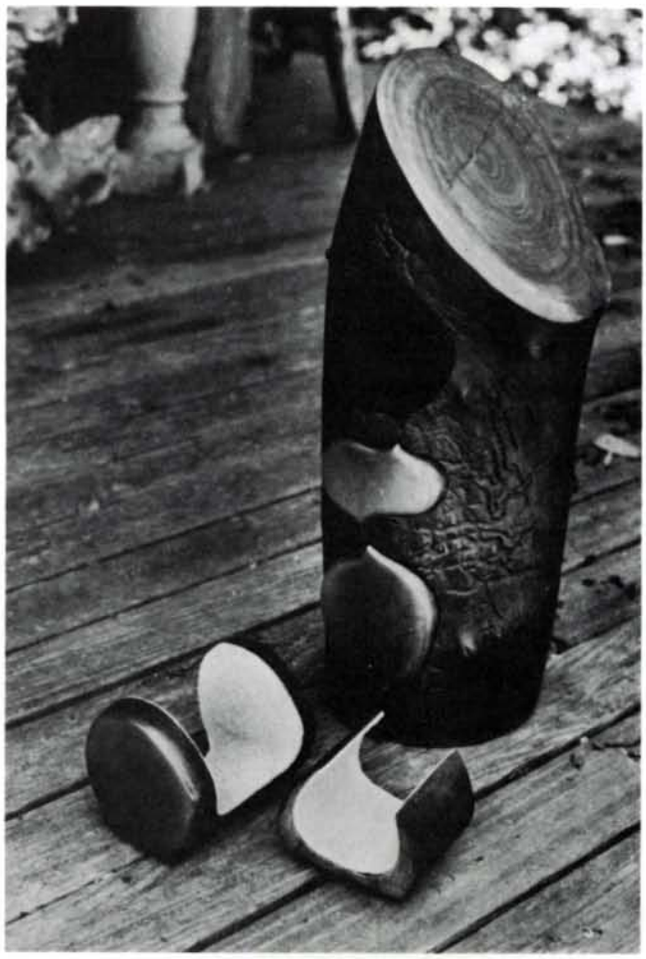
Photos: John Alcock-White

The Bandsaw Boxes of Arthur (Espenet) Carpenter

Arthur (Espenet) Carpenter began bandsawing boxes in the late 1960s. In the early three-drawer cabinet, below, only the front and the drawer openings are bandsawn; the carcase and drawers are conventionally joined. The kerf left by entering and leaving each drawer opening is glued up, thereby reducing the clearance around the drawer to the width of a single kerf. A five-drawer cabinet made in 1970, below center, shows how swiftly Carpenter made the transition to a fully laminated block. The entry kerf runs from the center bottom, up the right-hand side, around the perimeter and finally out the point of entry. In the process five drawer blocks—one of them within another—are isolated. They are then sawn to form the drawers. Later, the rear panel is glued to the back of the main block. Since the entry kerf runs across the grain, it is splined and glued with epoxy.

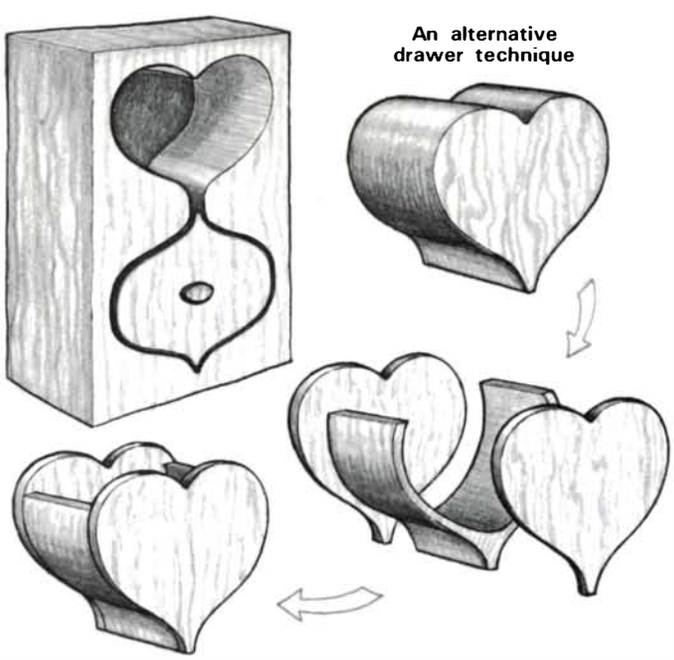


Carpenter doesn't make many bandsaw boxes these days, but he frequently uses the method in larger work such as roll-top desks, for shelving, drawers and pigeonholes.



Carpenter also worked with solid blocks of wood, like this three-drawered piece made from a walnut branch. The first step in constructing a box of this type is to rip a flat on the back of the log. A kerf is then run up from the bottom, outlining three drawers. The entry kerf is reglued and the rear section replaced. Carpenter then makes two separate cuts to form each drawer, lining the pieces with felt to take up the slack. The protruding drawer fronts are smooth and epoxied a fiery red. Drawer bottoms made Carpenter's way might be weak, because of short grain. Instead of two scoop cuts, you can saw off the front and rear of the drawer piece, saw out the center, then reglue the ends, as shown below.

An alternative drawer technique



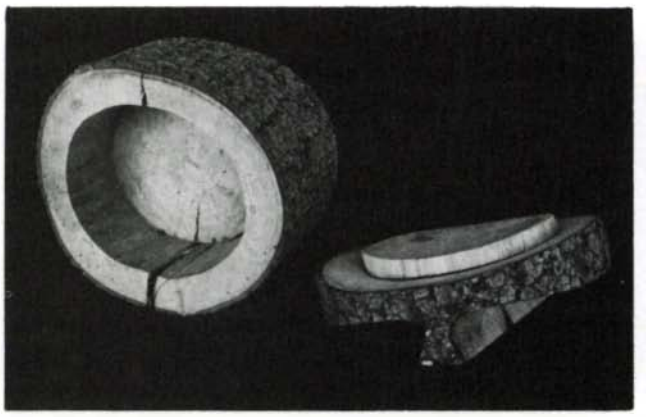
Photos: Art Carpenter

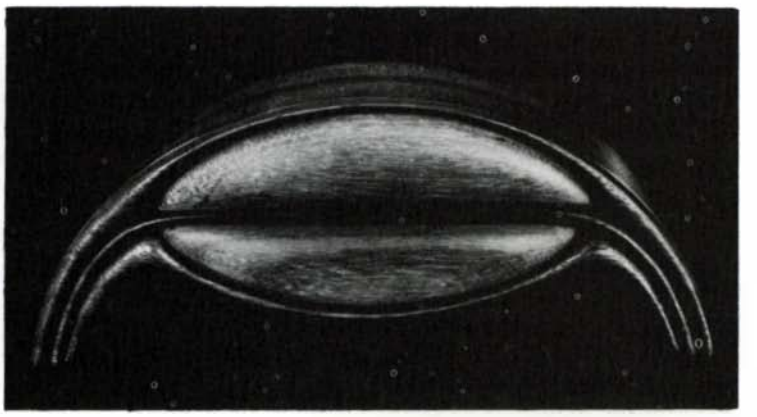
Another Case of Box Fever

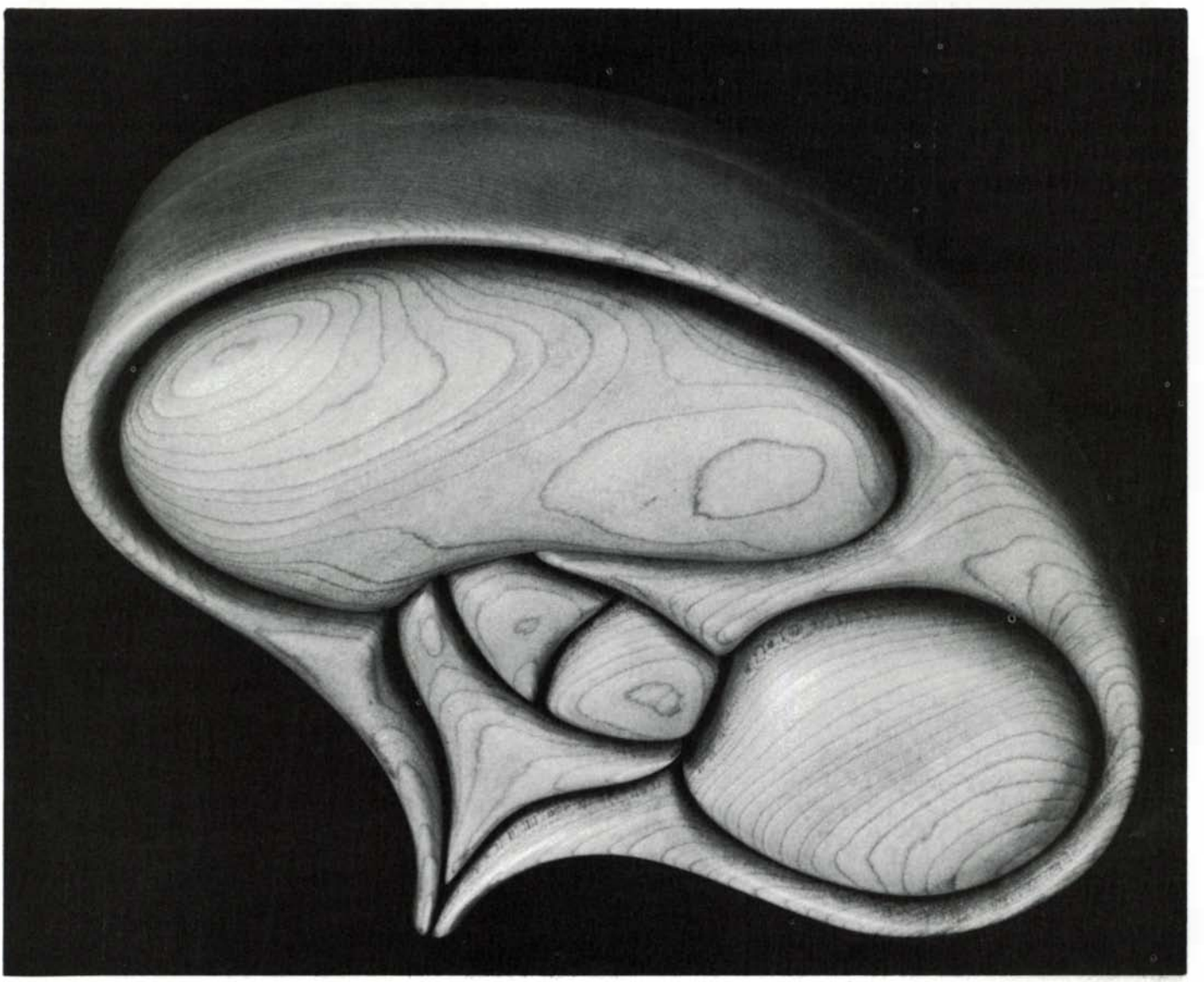
I was first impressed with the bandsaw-box technique when I saw a roll-top desk with bandsawn cubbyhole drawers by Art Carpenter at the California Design II show in 1971. I had had a shop for four years and was wondering where there might be other contemporary furniture makers. I was struck by that show; there was definitely a whole other world out there that I had not been aware of. I have had "box fever" ever since.

My earliest pieces (beginning the day following the design show) were called Hobbit Houses—tree limbs and burls that had small drawers free to open on either side. Turning Carpenter's technique on end led me to the lidded bandsaw box (below, left). First the top of the limb was sliced off, then the entry cut in the box bottom was made and the plug removed. Slices from the top and bottom of the plug were glued to the lid and to the box bottom. Making boxes from dimensioned lumber revealed the possibility of opening up the entry cut and incorporating it as a part of the design (below, right) instead of gluing it back together. I continue to use this approach in my current designs. One of my latest pieces (bottom) has a solid back and a mechanism, integrated with the design, to open the drawers.

—Michael Graham, Los Osos, Calif.





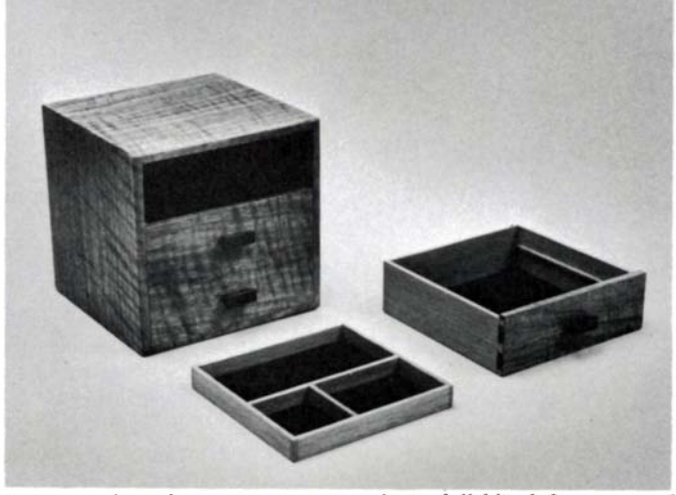


Photos: Michael Graham

On Precision in Joinery

How close is close enough?

by Allan J. Boardman



An exemplar of precise joinery, author's full-blind finger-joined music box is 4½ in. on a side. Carcase is flame-figured butternut, dovetailed drawers are English beech with rosewood pulls.

Comparing a machine tool such as a lathe for shaping metal with its counterpart for working wood suggests that entirely different methods and standards are normally applied when operating on these two dissimilar materials. The differences are obvious—finely graduated scales and dials festoon the metal lathe, while the wood lathe probably has no measuring scales at all. What may not be obvious is the fact that woodworkers nonetheless do approach tolerances that might seem appropriate only to metal. The flexibility and compressibility of wood, the acceptability of fillers, moldings and bulk-strength adhesives, the dynamic movement of the material and the omnipresence of shoddy commercial products all contribute to the belief that "precision" is not a word in the woodworker's vocabulary. However, a close look at a truly fine piece of cabinetry will reveal some surprising facts about the dimensional tolerances inherent in its joinery.

Consider the miter joint connecting two adjacent members of a frame made from 3-in. wide stock (figure 1). If the miter were tight at one end and open, say, 1/64 in. (0.016 in.) at the other, the joint would be quite unacceptable. The frame would be weak, since most adhesives work best in films far thinner than 1/64 in. Even an untrained eye could easily detect the mismatch, and filler could not disguise it.

Most shops have lots of clamps, and all too often they are used in abundance to bend or press a joint closed while the glue dries. The result may well be a tight joint, but the structure is liable to be distorted—warped, bowed or out-of-square. This distortion may cause extra work in fitting for doors or drawers, perhaps some unanticipated cosmetic repairs, or it may even be uncorrectable and quite obvious in the finished product. And regardless of how well one compensates, the assembly will retain residual stress after the clamps are released. Built-in stress will work against the adhesive for a long time, causing the joints to creep and the dimensions to change. Stress can burst open an otherwise strong joint months or even years later. Improperly seasoned wood and changing humidity, although usually contributory, are sometimes blamed for joint failure when the real problem is faulty joinery initially hidden by clamping pressure. In first-class work, there is no substitute for joints that fit properly.

In figure 1, note that the angle of the tapered space in the miter joint is less than a fifth of a degree. The tolerance in a good miter might be 1/10 of that, or barely 1 minute of arc. With such a fit, the open end of the tapered gap would be less than 0.002 in., or about half the thickness of a piece of paper. This, in most cases, would be acceptable from the standpoint of strength and appearance. But measurement and tolerances in thousandths of an inch and minutes of arc sound like the language of machinists, not woodworkers. After all, many of our measuring devices are themselves made of this changeable stuff, wood. The protractor scale on a woodworking machine goes no finer than one degree—minutes of arc, never. Parallax caused by the distance between pointer arrow and protractor ensures significant error, depending on where you hold your head. Does no one expect a woodworker to hold to a small fraction of a degree, except perhaps at 90° and 45°, where some machines have detents?

So it is with lineal dimensions too. For the seasoned worker, tricks, techniques, experience and feel (not mutually exclusive terms) compensate for the limitations of the equipment. But to the beginner, the not-quite-square square, the coarse graduations of scales and protractors, the machine's structural flexibility where rigidity is desired, all subtly suggest that only this crude level of accuracy is to be expected. Worse, because of careless use of words like "precision," "accurate," "professional" and "heavy duty" in advertising, the novice comes to believe that plus or minus a thirty-second is precise or that the machine by itself guarantees precision. Consequently, beginners may set personal standards for quality far lower than they should and progress far too slowly in the acquisition of those skills and techniques needed to overcome tool limitations.

Tool quality, measuring and marking—The limitations of our tools are not all bad, once recognized and understood. If a manufacturer were to add the weight, rigidity and precision some of us dream about, the cost of tools would rapidly become prohibitive. Also, because of the properties of wood, some of this extra precision would be wasted: The skilled maker would still have to compensate for the peculiarities of each species and piece.

Some tool limitations may require us to take lighter cuts, and they may inhibit some design options or demand greater skill, but by one means or another, we live with the available tools. Nonetheless, the first thing we must do is correct what can be corrected. For example, a framing square can be made quite true simply by peening the metal at the corner (*FWW* #17, July '79, p. 15). Likewise, cabinetmaker's squares having a metal blade and wooden stock can be filed true. Bench planes require all sorts of fine tuning before one can realized their full potential (*FWW* #14, Jan. '79, p. 52).

Leaving aside heavy-duty production machinery, one should not take for granted the implied precision or quality of tools. If you have the time and patience (and the indulgence of the shopkeeper) to examine and compare all of the squares, planes or chisels in stock, you may find one that is better than the others. The common test for a square, for ex-

Allan Boardman, 46, of Los Angeles, is an aerospace systems engineer and lifelong amateur woodworker.

Photo: Allan J. Boardman

ample, is to mark a line on wood or paper taped to the counter, then flop the square over to see if the blade lines up with the line (figure 2). Any discrepancy is double the inaccuracy of the square. But realize that you will have to spend time on most tools to make them right.

So how do you make them right? Against what do you check for square? There is no way around it: Every shop needs a reliable standard for straight, square and flat. A quality machinist's combination square is a good investment because it provides a reliable 12-in. straightedge, an accurate square and a 45° reference. A 3-ft. metal straightedge is useful and is available at some woodworker and most machinist supply houses. One can also buy a strip of flat tool steel and have a machine shop grind it true. The top of a quality table saw should be flat enough to serve as the reference surface, but it is best to check this if possible by removing it, toting it to a machine shop for measurement and, if necessary, having it ground. Other flat references are granite surface plates and slabs of heavy plate glass or marble, which are generally quite flat but must also be checked. The rule of thumb is that these shop standards should be five to ten times better than anything you are likely to check with them. It is also desirable to have at least one fairly large bench surface be rather flat, say within 1/64 in. over a two or three-foot square, for layout work. This can be prepared with a jointer plane and checked with your reference flat, by rubbing one surface against the other through carbon paper. If your reference surface is not easily moved and inverted, use winding sticks instead (figure 3).

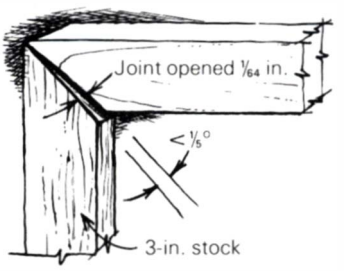
An accurate ruler or scale is also important. Simply because a stick or tape is marked in inches and fractions, it does not follow that the marks are where they should be. Some steel tapes are off as much as 1/8 in. in 10 ft. The machinist's combination square will provide a reliable 1-ft. scale against which others in the shop can be calibrated. The graduations are generally fine and deeply engraved for long life.

These points are about absolute accuracy. More important, most of the time, is relative accuracy. Once the dimensions of a given piece are quite close, the requirement for fit outranks the requirement for hitting the exact dimension on the nose. Consider cutting the four moldings for a picture frame. First, the pieces must be near to the desired length. Second, each piece must be the same length as its opposite, and third, after mitering, the corner joints must be tight (figure 4). Because the molding might not be perfectly true or straight, we trim the miter to fit, and as a result the mating surfaces may be a fraction of a degree off the nominal 45°, or one of the sides may be a deliberate but imperceptible fraction shorter than its opposite. A tiny variation in dimension cannot be observed, whereas an open joint will always be visible and weak. At the stage of final fitting, the ruler or gauge becomes a superfluous intermediary, an unwanted source of error.

This notion of dimension giving way to fit is not radical. It is like the intuitive procedure we use when setting a tool or machine whose protractor or scale has only coarse graduations. We guess at a setting someplace between two markings and then, ignoring the actual number of degrees or thousandths, we make small adjustments by trial and error, perhaps with a piece of scrap, until the fit is just right.

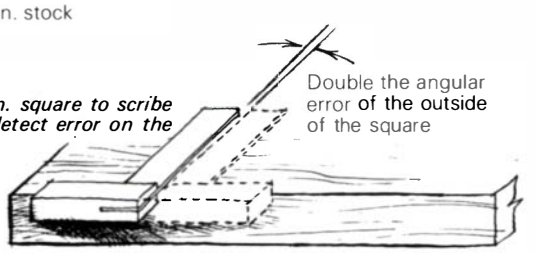
Marking can be done with a sharp pencil, but when the position of the mark impacts final fit, a marking knife should be used. Not only will the line be narrower and therefore better define the position, but a knife will lie much closer to the

Figure 1



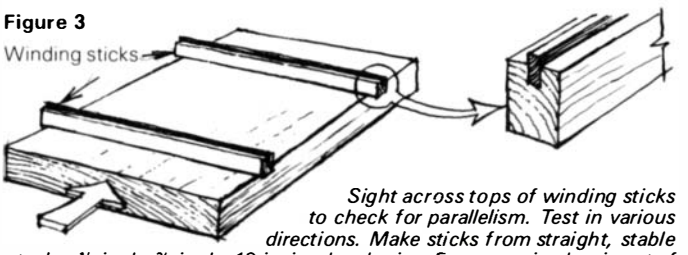
In a frame made of 3-in. stock, a total error of 1/5° in cutting the miters will cause a 1/64-in. gap in the joint. This could result from an error of only 1/10° in setting the saw or in using the miter box, or from warped wood, or even from a tiny chip lodged between the fence and the work. To avoid the error, woodworkers cannot rely on the gross measurement that machine scales provide.

Figure 2



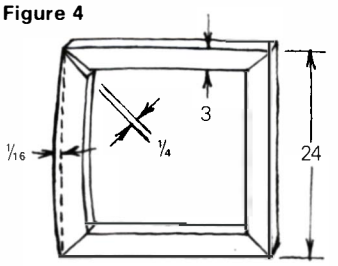
Flopping a 12-in. square to scribe two lines will detect error on the order of 1/20°.

Figure 3



Sight across tops of winding sticks to check for parallelism. Test in various directions. Make sticks from straight, stable stock — 1/2 in. by 3/4 in. by 18 in. is a handy size. Fancy version has insert of light wood in one stick, dark in the other, for better visibility. Well-made sticks used carefully can find 1/10° of error.

Figure 4



Even though all the angles are cut at exactly 45°, if three of the frame pieces are straight and the fourth bows just 1/16 in., over a length of 24 in. the joint will open about 1/4 in. Such an error is usually corrected by clamping pressure, but it's often better to adjust the angles as necessary and get tight joints without heavy pressure.

gauge, square or piece used in marking. Furthermore, the mark, being a physical incision in the wood, can often be used to position a chisel for the next operation. A typical example would be marking the shoulder line on a tenon to be cut with hand tools. The knife cut serves simultaneously to locate the shoulder edge, neatly sever the surface grain, and guide a chisel to create a starter groove for the tenon saw.

Cutting to the line—So much for measuring; the marked piece must now be cut. Precision in cutting is the exclusive domain of neither hand nor power tools. I say this despite diehard traditionalists who would argue that truly fine work can be done only by hand, and despite power-tool proponents who believe a plane is what you'd be forced to use if you couldn't afford a machine. There is seldom one best way. A proper table-saw setup would save time if a number of identical tenons were to be cut. The hand-tool method might be best for only one joint, if several different pieces are required or if the shoulder is not perpendicular to the rail.

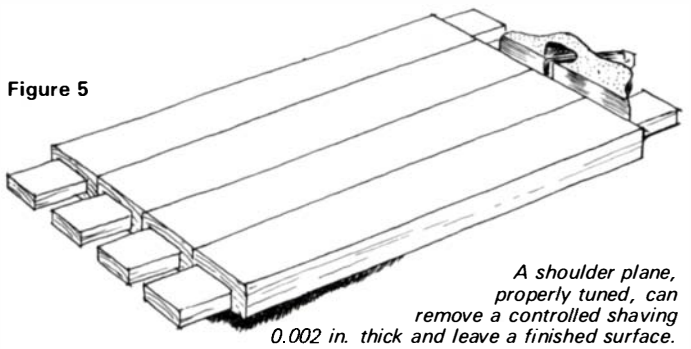
Often, a combination of hand and power tool methods offers optimum results, taking advantage of the best characteristics of each tool. Suppose tenons are cut at each end of a stile, but for some reason the distance between the tenon shoulders is just a bit fat. (This can usually be avoided by checking with scrap before cutting the work itself.) Moving

the table-saw fence a controlled 1/64 in. is tricky. And unless it has just been sharpened, a circular-saw blade is not too effective in trimming off the merest hair. The wood may burn or the blade may deflect, leaving a cocked, charred shoulder.

It is undeniable that power tools save time and physical exertion, but some cuts in precision joinery, such as shaving off that minute error, are clearly better performed with hand edge tools—planes in particular. In practiced hands a shoulder plane can trim that miscut tenon down to size in seconds. End-grain shavings as thin as 0.002 in. can be produced, enabling the scribed line to be approached under the watchful eye of the maker (figure 5). It makes little difference if the waste to be removed is straight or tapered. Because of these factors, it is often advisable when using machines to leave a little margin for hand trimming.

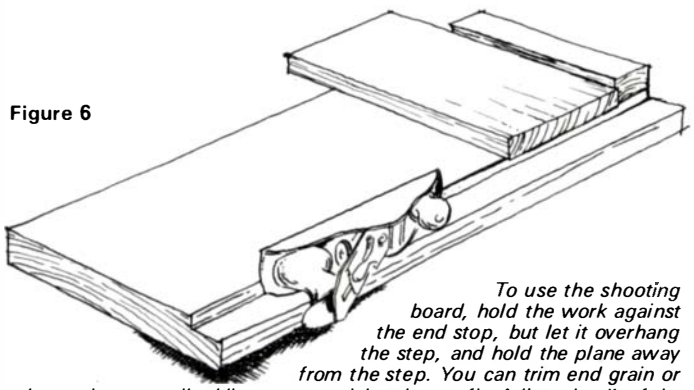
Planes do not cut like most power tools, virtually all of which cut intermittently, pounding on the wood fibers and doing inescapable damage on every cut surface (for a close look at the surfaces left by various cutting tools, see *FWW* #21, March '80, p. 52). The unique action of the plane with or across the grain, however, severs the wood fibers cleanly in a continuous, not intermittent, motion. The finished surface in many cases cannot be improved upon. The damaging forces involved in parting the waste from the work are absorbed by the shaving as it breaks or curls. The planed surface, except where the wood grain is particularly cantankerous, shows no evidence of the trauma. Even more important for precision is the fact that the plane can leave a good surface after each pass. The perfect fit can be approached by increments and when achieved, no further clean-up is required. In many routine joinery operations, this objective is far more difficult to reach with sandpaper, files, saws or routers. And as a bonus, all this control comes with no great sacrifice in speed. A plane stroke takes only a couple of seconds.

Figure 5



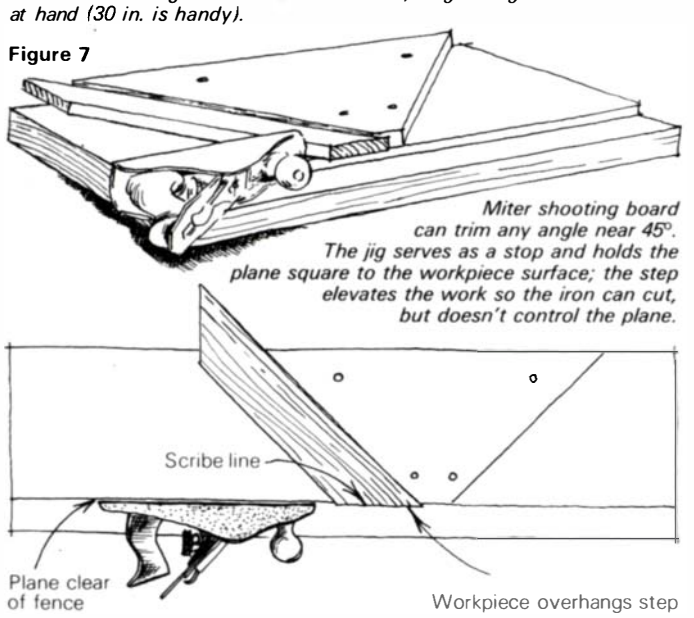
A shoulder plane, properly tuned, can remove a controlled shaving 0.002 in. thick and leave a finished surface.

Figure 6



To use the shooting board, hold the work against the end stop, but let it overhang the step, and hold the plane away from the step. You can trim end grain or edge grain to a scribed line, or to a trial-and-error fit. Adjust the tilt of the plane iron to keep the cut surface perpendicular to the face of the board. Make the shooting board from stable wood, long enough to suit the work at hand (30 in. is handy).

Figure 7



Miter shooting board can trim any angle near 45°. The jig serves as a stop and holds the plane square to the workpiece surface; the step elevates the work so the iron can cut, but doesn't control the plane.

Paring with chisels and other edge tools offers similar possibilities for working toward precise joints, particularly where the geometry prohibits using a plane. Here the control afforded rather automatically by the plane must be provided by the craftsman. However, the principle is the same—taking off just as much waste as desired, exactly where desired, and leaving a clean surface after each cut.

Jigs—The criteria I apply to virtually all joints are first, in hidden interfaces (the tenon in the mortise) there should be only enough clearance for a thin glueline; and second, visible interfaces (miters, for example) should appear tight with only light clamping. As you approach the final fit a shaving at a time, you quickly discover the need for devices that help keep the hand tools perpendicular, free from wobble, or otherwise aligned. Jigs and fixtures do not guarantee precision, but they can reduce the degrees of freedom the tool has so the craftsman can exercise greater control toward getting the fit.

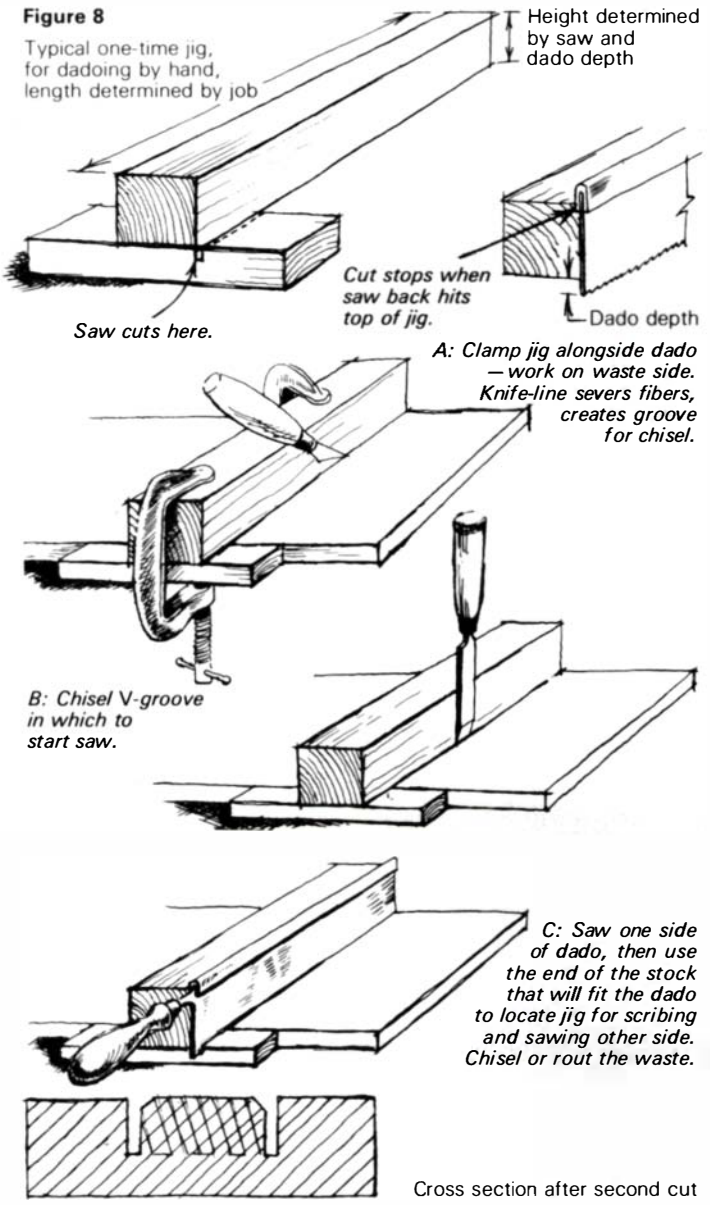
A jig of continuing use is the shooting board—nothing more than a flat piece of stable wood with a step at the edge and a stop near one end (figure 6). With it, one can simultaneously plane an end or edge of a piece exactly to a scribed line, straight and perpendicular to the surface. Using this same jig and a little blocking or intentional tilt of the plane blade, angles other than 90° can easily be cut for coopered joints or simply to compensate for some special condition.

Other jigs in this same family include several versions of the bench hook, and the miter shooting board—the solution to the problem that began this essay, of how to adjust a miter angle by a fraction of a degree (figure 7). In use, the plane is laid on its side on the ledge while the work is held against the 45° stop. If the plane body is out of square (it usually is), the mitered surface will not be perpendicular to the face of the piece. This can be corrected to some extent by adjusting the tilt of the plane iron, by shimming the work, or maybe 91° is really desired. The 45° angle (or 44° or 46°20′) is not a result of holding the plane firmly against the step in the fixture while pressing the work against the fence. Of course, it could be if the jig were made exactly at the angle desired, but that is too restrictive a use of the shooting board. Rather, one holds the work against the stop but overhung, and the plane sole away from the step. One then planes either to a scribed line or by trial and error to a perfect fit with the mating piece.

In contrast to such "permanent" devices, many simple jigs

can be made for short-term use. The usual reasons such jigs fall into the disposable category are that they get worn or damaged in use or are special in nature or dimensions. Consider cutting dadoes by hand in the two vertical sides of a bookcase (figure 8). A useful multipurpose jig fashioned from two pieces of wood not only simplifies the operation but also facilitates precision. In appearance, the jig is nothing more than a clumsy-looking square, the long leg reaching across the workpiece, the short leg attached accurately at right angles. The width of the members should ensure stiffness and rigidity. The thickness of the short leg should be a trifle less than the workpiece thickness so as not to interfere with clamping. The thickness of the long leg must be sufficient to keep the backsaw perpendicular, but it can also be such that when the saw back hits the jig, the cut is at the desired depth. The jig is clamped to the workpiece and at the one setting serves as a straightedge for scribing, a control for chiseling out a starter groove for the backsaw, a fixture for holding the saw upright, and a depth stop. Two such sequences per dado, followed by cleaning out the waste with chisel or router plane, leave an exceptionally clean joint the width of which can exactly fit the thickness of the shelf. With this method it matters little that the shelves vary in thickness from one to another, or that the dado head on your power saw cuts only in fixed increments that don't match your wood. Notice that in this example since all the scribing and sawing are done on the waste side, both long edges of the jig are used and so must be parallel. Obviously, the same basic technique can be adapted to other and more complicated joints—stopped dadoes, rabbets and dadoes, tapered dovetails and so on.

Figure 8



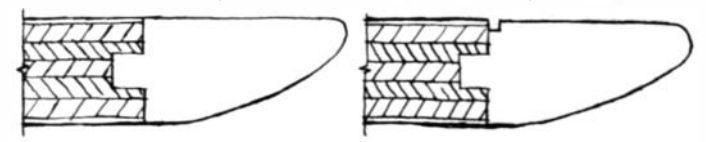
Precison is relative—In woodworking there is a scale of precision demanded by the nature of each project, from rough to finish carpentry ascending through built-ins to fine cabinetry, furniture-making and ultrafine craft objects like view cameras. Tolerances might range from plus or minus an eighth to one or two thousandths. In addition, we must superimpose a scale of functional tolerances that takes into account the size of the object and the wood's probable movement in response to changes in temperature and humidity. The "precision fit" of a drawer in a fine chest incorporates a neat but wider clearance gap than one would find around the drawer of an equally well-made jewelry box.

Finally, one should not neglect the many different design options that shift the need for one kind of precision to another, or eliminate the need altogether. The results can be quite acceptable and are normally found in abundance on commercial work. Take, for example, the use of a solid nosing around the top of a veneered cabinet (figure 9). To blend the grain of the solid piece with the veneered panel and to join it flush without damaging the thin and delicate veneer would involve considerable skill and risk. This requirement can be virtually eliminated by accentuating the seam instead of hiding it, with a routed or scratched groove used as a design feature. Likewise, moldings can effectively mask imprecise joinery, and overlapping fronts can conceal uneven clearance around cabinet drawers. With design skill, such techniques can permit production shortcuts. Often, they are the best choice in purely design terms, and the fact that less precision is required becomes a bonus.

The characteristics that denote precise woodworking are not limited to joint accuracy and fit. They also include grain and color matching, uniformity of detail and symmetry when intended, clean pre-finish surface preparation, crisp installation of inlays and fittings, minimum use of fillers, and so on.

Figure 9

Deliberately accenting a joint may be better than trying to hide it.



Precision in joinery is neither for everyone nor for every project. It can be an objective or an attitude that adds pleasure to the craft and quality to the work. It can, on the other hand, become an obsession that goes beyond common sense to the point of inconsistency with the nature of wood itself. But it seems far better for a woodworker to understand the options, recognize that certain skills and techniques can be invented or learned, know what is possible to accomplish, and then exercise free choice, rather than have his or her standards derive from crude scale markings and constant exposure to mediocre work. □

The Butterfly Joint

Double dovetails for strength and beauty

by Frank Klausz

Though the butterfly joint, sometimes called a double dovetail, is ancient, it was hardly ever used in traditional furniture making. Lately, however, it has enjoyed wider use since people have begun to make furniture from solid slabs of wood, from whole flitches or from root sections. George Nakashima's tabletops (*FWW* #14, Jan. '79, p. 43) show how the butterfly can be used for strength and decoration. Across the grain, this joint provides mechanical reinforcement and is especially useful for controlling checks in slabs and for repairing cracks in tabletops and chair seats. The joint can also be used to join separate boards into a single panel or to join up sections that are butted together lengthwise to form a long tabletop or bar top. Recently I put butterflies into a horseshoe-shaped kitchen countertop made from six separate pieces of butcher-block material. These were joined end-to-end with butterflies, three of them for each joint.

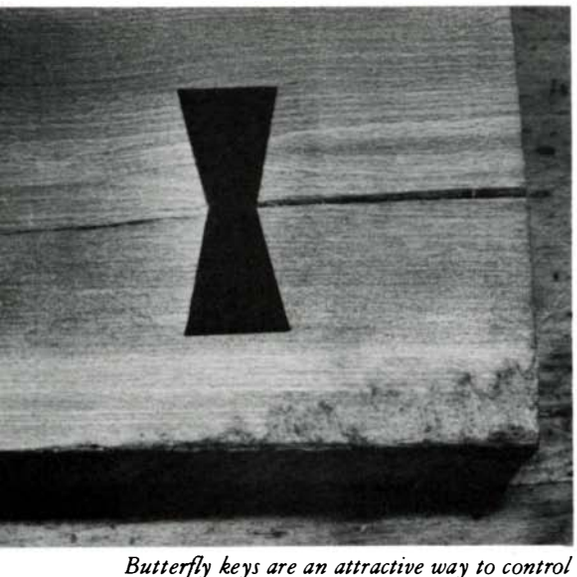
I try to make all my butterfly keys the same size, unless the job demands otherwise. So most of the time I cut them 3¾ in. long, 1½ in. wide and ⅝ in. thick. Instead of cutting them one at a time, I like to make a dozen at once. I first cut several strips of wood to a width of 1¾ in. and a thickness of ⅝ in. Then using my radial arm saw and a stop gauge, I cut the strips into pieces exactly 3¾ in. long. I glue 12 of these pieces together, face to face, with just a spot of glue in their centers. I wrap masking tape around the end grain, then I clamp them firmly together. I tilt the arbor on my table saw to a 10° angle and set the fence precisely 1½ in. from the blade where it intersects the plane of the table. The blade should be set 1 13/16 in. high (or slightly less) so the two waste pieces will stay attached to the stock after all four cuts. Make sure you leave an unsawn strip at least 3/16 in. wide in the center of the wood. With the clamp positioned so it can't contact the blade, I make the cut with one hand, using the bar of the clamp as a handle while pressing down on the stock. It is a hair-raising operation for one who hasn't had much experience using a table saw, but with care it can be done safely.

After making the four necessary cuts, you end up with a stack of perfectly dimensioned butterflies, except for the two waste pieces still attached to the center on both sides. Break these pieces out and clean up the valley by passing a sharp chisel left and right. Now knock the individual butterflies apart. The whole job from gluing to knocking apart shouldn't take longer than a half-hour, or the glue will set hard and you'll have a solid block of wood. Then you'll have to saw the pieces apart.

Instead of gluing 12 or more pieces together, you can cut them all from a single, solid block, if the grain runs in the right direction. This method is economical because you can cut off pieces of whatever thickness you need and save the rest. It also allows you to use short trimmings from wide, thick planks, pieces that ordinarily would be thrown away. Cutting all the keys from one piece is safest because you don't have to clamp the workpiece while sawing and you don't have to worry about them separating during the cut.

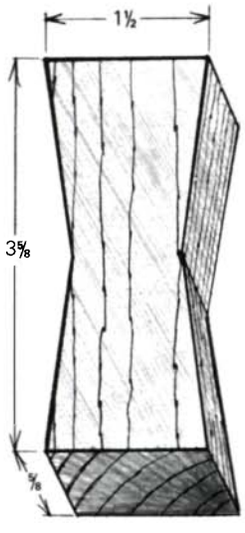
If you need only one or two keys, it's best to make a pattern, trace it onto your wood and bandsaw close to the line. Then clean up and straighten the edges with a sharp chisel.

Once you've made the butterflies, you have to set them into the wood. The simplest way is to place a key on the surface (centered across the check or joint and perpendicular to it) and trace around the butterfly with a sharp pencil. With a chisel cut the mortise, being careful to get no closer to the



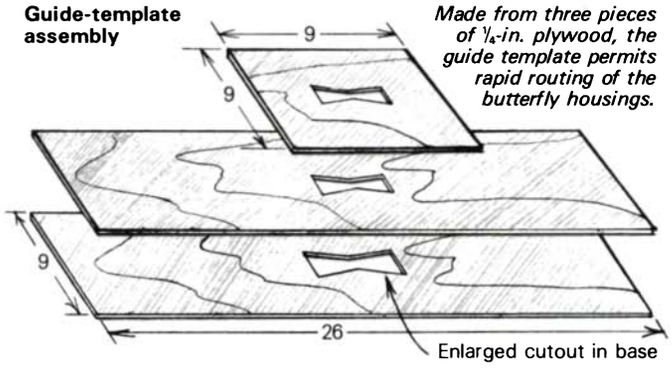
Butterfly keys are an attractive way to control checks. They can also be used to join single boards into panels.

Typical butterfly key

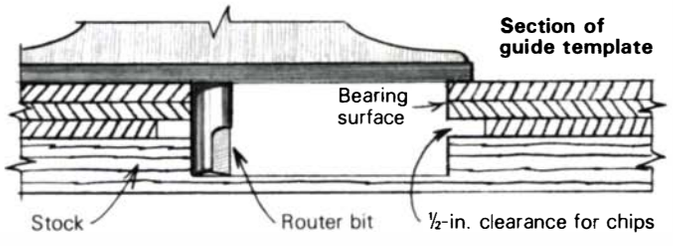


Guide-template assembly

Made from three pieces of ¼-in. plywood, the guide template permits rapid routing of the butterfly housings.



Section of guide template



Photos: Frank Klausz and Edward Ludlow; drawings: Ric Lopez

Cutting a dozen keys at one time on his table saw, Klausz uses a bar clamp to help grip the stock. This is a dangerous cut. Do it safely by making sure that the blade clears the clamp jaws and that the thumb is placed high on the workpiece.

To clean up the unsawn center portion of the stock, Klausz holds the chisel askew and slices at the waste, moving from left to right.

lines than 1/16 in. The floor of the cavity can be leveled and smoothed with a router plane and then the walls pared to the line with a chisel.

Because I make a lot of them, I prefer to cut these mortises with my electric router, using a guide template that makes the job quick and easy. So I can make the cutout in the template exactly the same size as the butterfly, I use a two-flute, 1/4-in. router bit, which lets the shank bear directly on the template guide. The best bit for this has cutting edges only 1/2 in. long and is made by Velpec (#4-4-AI) available from Force Machinery Co., Rt. 22, Union, N.J. 07083. You can use other 1/4-in. bits, as long as their cutting edges are flush with the shank, but since most of these bits (Rockwell and Sears) have cutting edges longer than 1/2 in., you'll have to increase the depth of your template so the shank will ride smoothly on the cutout edge with no danger of the bit cutting into the template itself. Remember, the farther the cutting edge is from the router chuck, the more chatter produced and the rougher the cut.

To make the guide template you will need three pieces of good-quality 1/4-in. plywood, two of them 9 in. by 26 in. and one 9 in. square. Glue the small square piece in the center of one of the longer pieces. Then lay one of your butterflies on the center of the square piece and draw around it with a sharp pencil. Drill a pilot hole inside one of the corners and saw out the waste with a saber saw, or you can chisel it out. Make sure you are doing very good work here, for all your butterflies will fit like this one. Leave your pencil line on the wood so you can do the final fitting with a file for a perfectly snug fit.

Now take your third piece of plywood, put it beneath the guide template just made and align the outer edges. Trace the cutout onto the bottom piece, remove the guide template and enlarge the tracing by 1/2 in. all around. Cut out this area with a saber saw. This bottom piece elevates the template the right amount; the enlarged cutout makes room for chips and dust that would otherwise interfere with the bit as its shank bears against the sides of the template. It's a good idea to glue a couple of sandpaper strips to the bottom of the base to help keep it from slipping. Put a little oil on the pattern where the router bit or guide bushing will rub.

Remember that you want the mortise to be about 1/8 in. shallower than the thickness of the butterfly so you can plane the key flush to the surface. For a butterfly that's 5/8 in. thick, I cut the mortise 1/2 in. deep.

If you want to use an ordinary straight-face router bit and a guide bushing, then you'll have to make the cutout in your template larger than the butterfly. The exact amount of this enlargement depends on the distance from the cutting arc of your bit to the outer edge of your guide bushing (see "Routing for Inlays," *FWW* #17, July '79).

To rout out the waste, hold the router at an angle so part of the base contacts the surface of the template and center the bit over the cutout. Switch on the power and let the router down flat. Work the tool in a clockwise direction, going from the center to the outside edges, and when you've removed the waste from the center, make a final pass around the edges so that the shank of the bit (or guide bushing) rubs the edge of the template. All that's left to do is to chisel out the four corners, where they've been left rounded by the router bit.

Because the butterfly is usually housed across the grain and the greatest amount of shrinkage and expansion occurs in this direction, a slight undercut on the ends of the mortise is sometimes desirable. This will help prevent the wood from checking if it shrinks against the ends of the key. Butterflies used for repair purposes and visible only from underneath should be cut slightly shorter than their housings, leaving a small gap at either end in case the wood moves.

The butterfly should be glued into its housing, clamped if possible and allowed to dry before you plane it flush with the surface. Avoid using a belt sander to work it down because you can never get the cross-grain scratches out. I use a sharp smoothing plane, followed by a cabinet scraper. Then I sand with 220-grit paper.

Because this joint needs very little material, I try to use dark woods—ebony, rosewood, padauk, purpleheart and black walnut—for contrast with the lighter wood of the tabletop or counter. If, on the other hand, the table is made from a dark wood, I use a light wood for the butterflies, such as lemonwood, satinwood, curly maple or white ash. □

Frank Klausz makes reproduction furniture and restores antiques in Bedminster, N.J.

Lion's-Paw Pedestal Table

Classic piece combines turning, carving and veneering

by Roger Schroeder

Oak furniture didn't originate in America. But the period from 1850 to 1930 in this country saw a profusion of solid oak furniture, paneling and molding, most of it finding its way into middle-class homes. Peculiar to this period was the widespread use of quartersawn oak lumber and oak veneer. Quartersawing produces very attractive grain patterns and makes for more dimensionally stable boards, though the veneer is becoming increasingly scarce in the U.S. (see Hardwood Survey, *FWW* #20, Jan. '80 for possible sources).

The oak pedestal table shown here and owned by Lee Sachs and Joy Kleinsasser of Kings Park, N.Y., was probably made at the end of the American oak period when solid oak tops gave way to plywood. What particularly impresses me about this piece is the exceptional quality of its veneers and the unusual character of its carving. Though its paws are rather typical and stylized, the lions' heads lack the marauding eyes and predacious fangs of rampant beasts. In fact, with their soft features and toothless jaws, they seem almost friendly. The faces of the four lions and the pleasing proportions of the pedestal distinguish this table from many others of its kind and make it a worthy model for reproduction.

It's not an easy matter to reconstruct hypothetically a complex piece of furniture, but this table so intrigued me that I couldn't resist the temptation. What follows, based on a careful study of the original, is my account of how this table was made, or rather how I would make it. With but two exceptions—the joinery of the staves that comprise the pedestal and the design of the expansion slides—my description is faithful to the original. I've altered the actual construction in these two instances because a contemporary craftsman working in a home shop can improve upon these existing features.

Traditionally, pedestals of this size were coopered from eight planks to form a hollow octagon. A solid column would require much more lumber, have an unmanageable mass, especially for turning, and be liable to develop deep checks from tangential shrinkage. To make the central column (figure 2, p. 76), rip eight pieces of 6/4 quartersawn oak to precise 4½-in. widths and crosscut the pieces to a rough length of 25½ in. Set your saw arbor at 22½° and bevel each stave on both edges, taking care not to diminish the finished width of 4½-in. from toe to toe. Next, slot each beveled edge to receive a ¼-in. by ¾-in. spline, which you should rip from solid stock or plywood.

Dry-assemble the staves and splines and draw the column together with three or four band clamps to make certain that all the joints will close tightly when the glue is applied. Disassemble and reassemble using a glue with moderate to long open time, like plastic resin glue.

When the glue is set and you've scraped away the excess, you want to prepare the stock for the applied collars, one of which is 4½ in. wide and located about midway on the pedestal while the other is 2½ in. wide and located at its foot. Cut eight pieces of your oak to a length of 8 in. and bevel both edges so that the heel-to-heel width, on their inside faces, is the same as the toe-to-toe width on the outside faces of the column staves. Crosscut the collar staves to length, 4½ in. for the central collar and 2½ in. for the foot collar. Hot hide glue is best for applying these because of its strong initial tack and slow curing time. All eight pieces for each collar should be applied at once and then clamped with deep-engagement bar clamps from opposite sides.

Now cap both ends with ¾-in. plywood plates so the blank can be mounted on the lathe. The plates should be flush with the outside of the pedestal and secured with white or yellow glue. Find the centers in each plate and mount the blank between centers on your lathe. Round the stock at a low speed, and then make the decorative cuts shown in figure 1, though it's a good idea first to make the parting cuts top and bottom that will define the finished length of the column.

With the turning done, you have the choice of veneering the unrelieved cylindrical surfaces while the stock is still in the lathe. If you do, the veneer can be trimmed at the several coves with a sharp skew chisel in scrape position. If you find the grain attractive as is, then there's no need to add veneer, and you're ready to deepen the parting cuts top and bottom so you can finish these cuts with a backsaw. The end-grain surface at the top should be square, as two supporting plates will lie across it.

Each leg and attached head is laminated from ten pieces of ⅞-in. oak, glued face to face. But I see no reason why thicker stock, 6/4 oak for example, can't be used, providing the final thickness is the same as the original. The grain for the legs runs horizontally, so edge-gluing pairs of boards that make up the head portion of the blank may be necessary to avoid using 12-in. wide lumber and having lots of waste.

A careful look at the head shows that the three outer boards on each side were sawn to shape and then glued to the leg and head like cheeks. Presawing these cheek pieces will save carving time. The paws, since they are also 2 in. wider on each side than the leg, can be treated in the same way.

Before shaping the blanks further, you need to bore two holes in the end-grain surface of each where the leg and head will abut the pedestal. On a centerline from top to bottom, bore a hole 3 in. down from the top, ⅜ in. in diameter and 1 in. deep to accommodate a tapered locating pin. Then bore another hole 6 in. down from the top and 5/16 in. in diameter for a ⅜-in. by 4-in. hanger bolt, which will secure the leg to the pedestal. Next, contour the inside surface of the leg to conform to the circumference of the pedestal. Pencil the arc on the leg blank and waste most of the wood by cutting a series of kerfs on your table saw, lowering the blade appropriately as you get closer to the outside of the arc. Clean up the rough contour with a Surform, half-round rasps and files.

Remove as much stock as possible on the band saw and

This quartersawn oak table was made toward the end of the American oak period, probably in the 1920s. Reproducing it involves a challenging range of procedures. The lions' heads, arms and paws are carved from laminated stock. The pedestal is coopered and turned. And the top, aprons and parts of the pedestal are veneered. Scale drawings appear on the following pages.

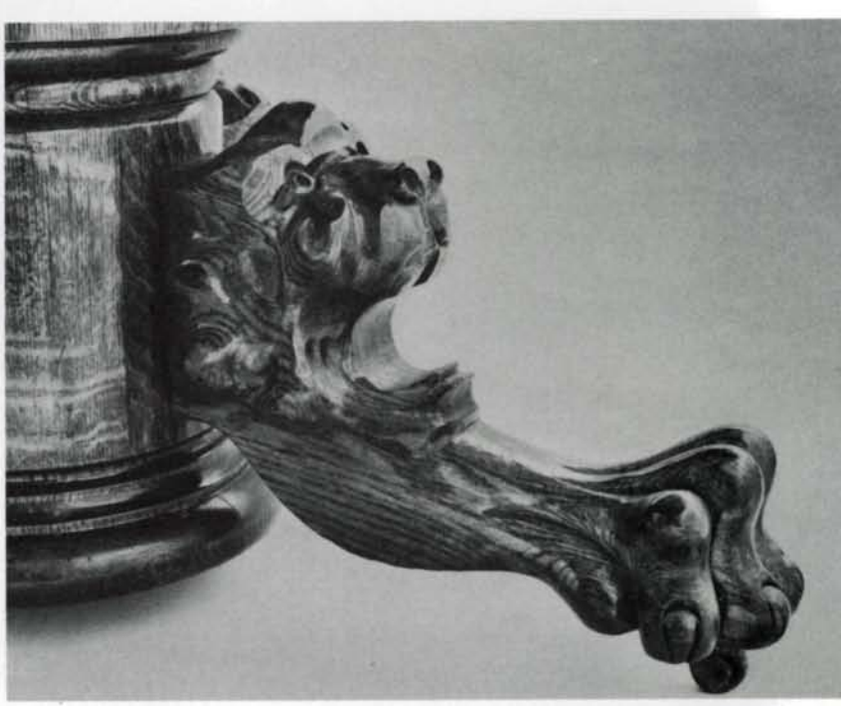


Fig. 1: Side elevation

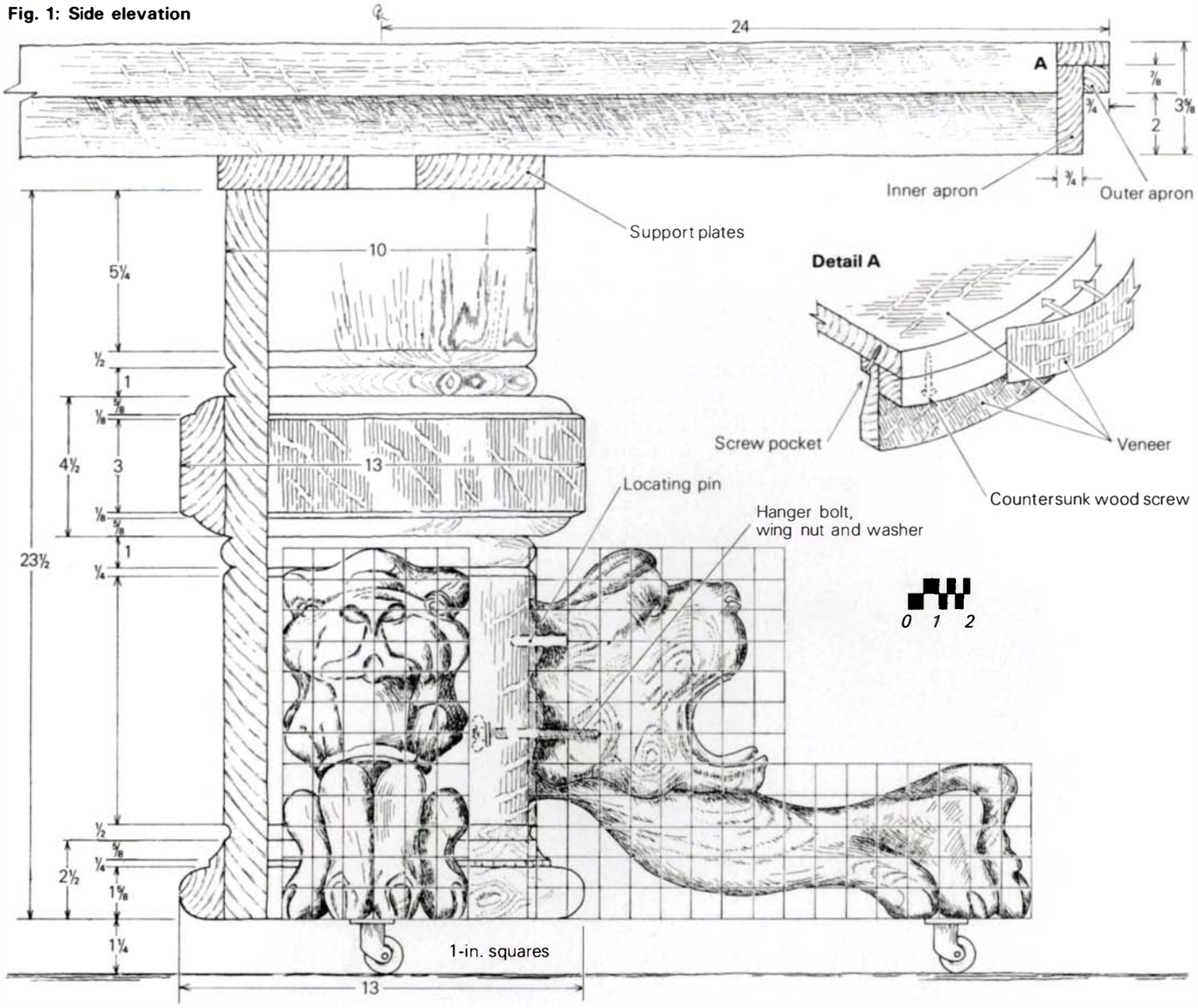
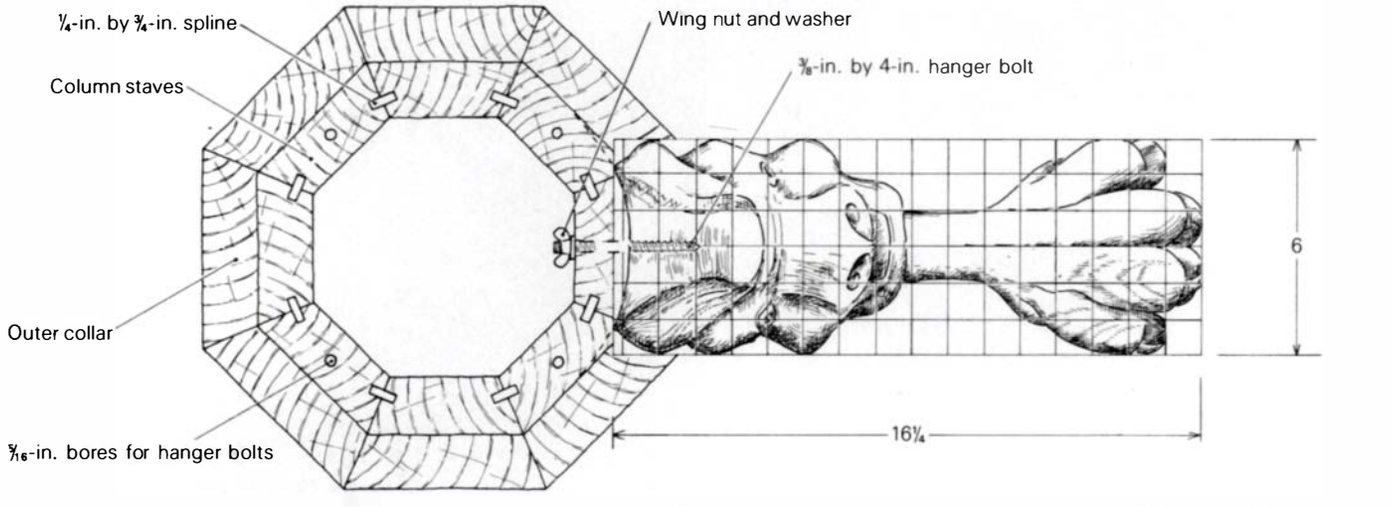
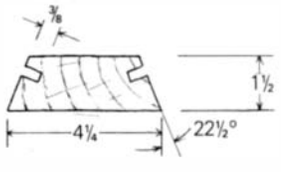


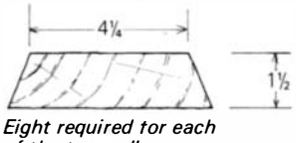
Fig. 2: Section of pedestal blank and plan view of leg



Section of column stave



Section of collar stave



Eight required for each of the two collars

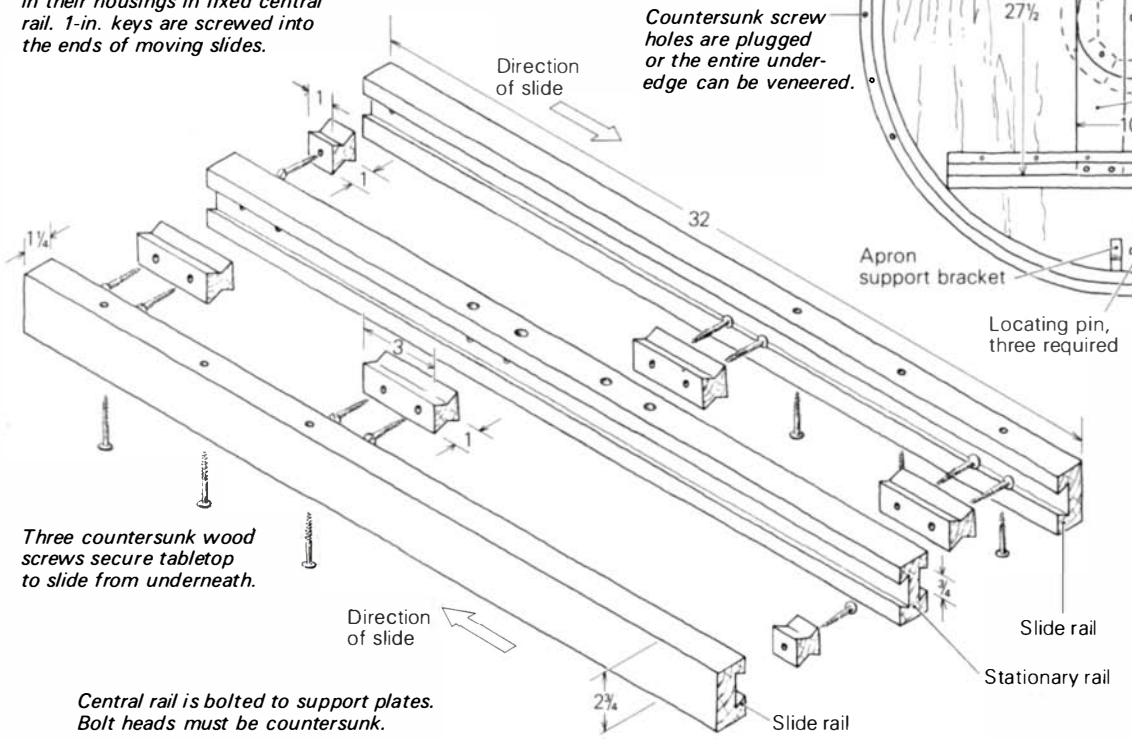
Drawings: Christopher Clapp

Fig. 3: Expansion slide assembly

To cut dovetail housings, first plow ¾-in. wide and ½-in. deep grooves down the center of slide; then using a standard ½-in. dovetail cutter and an appropriate setting on your router fence, form the inward angle on both sides of the groove.

Cut the dovetail keys from one long piece of stock after passing it through your table saw with the blade set at the proper angle and to the proper depth. Experimentation is necessary to get the precise settings. Then crosscut the keys to length.

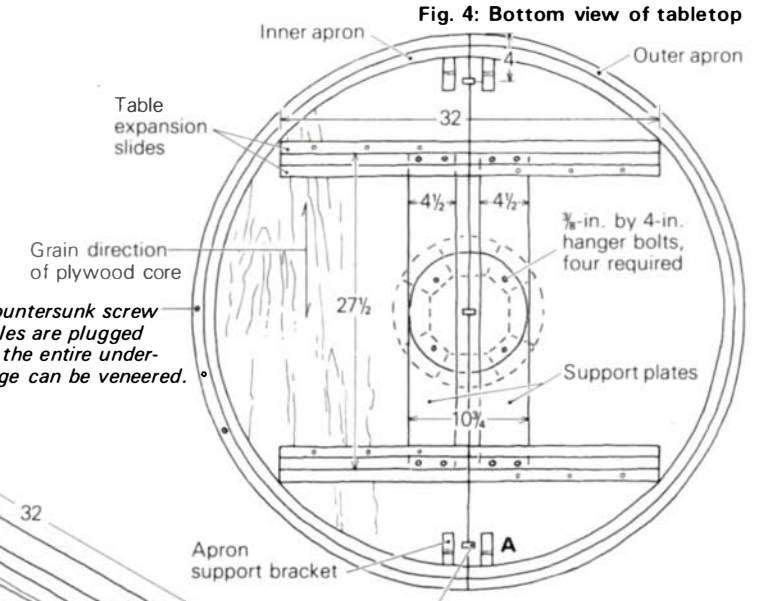
All four 3-in. keys are screwed in their housings in fixed central rail. 1-in. keys are screwed into the ends of moving slides.



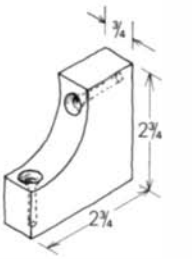
Three countersunk wood screws secure tabletop to slide from underneath.

Central rail is bolted to support plates. Bolt heads must be countersunk.

Fig. 4: Bottom view of tabletop



Detail A: Apron bracket



Bracket is attached with countersunk wood screws.

then begin carving the heads and paws, paying close attention to those anatomical details that determine the friendliness or ferocity of the lions. You'll find #5 and #7 gouges are good for much of the preliminary carving, while the sharper details can be executed with a *V*-tool.

If you choose to make an expanding top with leaves, the legs must be attached to the pedestal so that the separation in the top is diagonal to the legs. This gives greater support when the top is lengthened. Secure the legs to the pedestal with the hanger bolts bored for previously, running the machine threads run through the column and fastening with wing nuts and washers (figure 2).

Next the table-slide support plates (figure 4) are attached to the top of the pedestal with four ⅜-in. by 4-in. hanger bolts and secured with hex nuts and washers. Affixed on top of these are the tabletop expansion slides, which will permit the addition of two 15-in. wide leaves, making for a 78-in. long table surface. It's easiest to purchase these expansion slides commercially (available by mail order from Craftsman Wood Service, 1735 W. Cortland Ct., Addison, Ill. 60101), but if you choose to make your own, the necessary operations can be performed as described in figure 3.

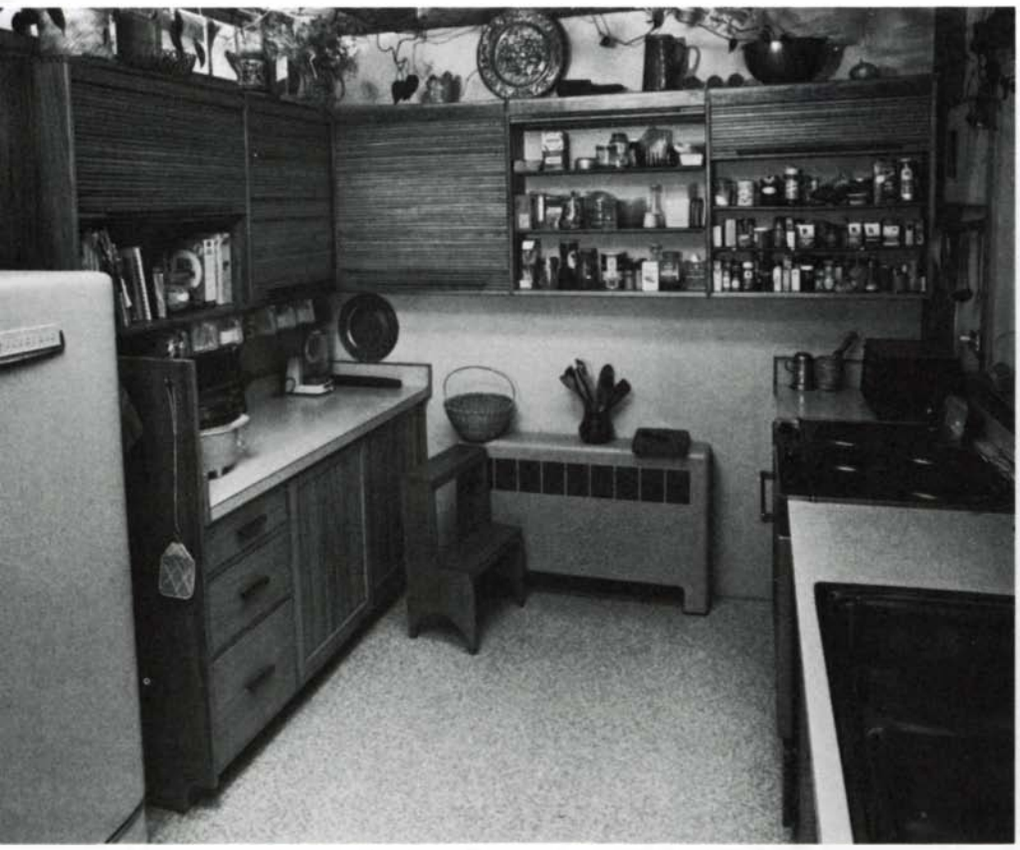
I recommend using ¾-in. lumbercore plywood for making the tabletop (and leaves) and veneering it on both sides with ⅛-in. quarter-sliced veneer, the most attractively figured pieces reserved for the top (see *FWW* #23, July '80, p. 78). If you divide the top to accept leaves, you should fit the three locating pins before sawing the top to shape. When you've rough-sawn the circular top, you can true it to a perfect circle by attaching your router to a trammel anchored with a wood screw to the bottom of the tabletop and trimming with a 1-in. straight-face bit.

The top has two aprons, one that fits flush with the edge to give the appearance of a thicker top and another that fits inside this one. The outer apron, ⅞ in. by ¾ in. in section, is fastened to the top with countersunk wood screws and glue. You can kerf-bend this piece, steam-bend it or make it from bent laminations. Once it's trimmed flush with the table edge, veneer the entire edge with quarter-sliced oak.

The inner apron, ¾ in. thick and 2¾ in. wide, fits snugly against the outer apron and can be steam-bent or made from bent laminations. It too should be veneered. The top is attached to the inner apron by means of wood screws set in angled screw pockets (figure 1, detail *A*). The leaves, should you choose to add them, must be treated in the same manner.

The kind of finish I recommend (a filler and light oak stain are optional) is several applications of satin varnish or lacquer, with each coat rubbed down with 4/0 steel wool. For resistance to alcohol and other liquids, the top will need at least four coats, more if you want to deepen the tone of the wood. More coats need not mean more gloss if you take care to rub properly between coats and give the final application a light buff with steel wool and a lamb's-wool wheel. □

Roger Schroeder, of Amityville, N.Y., is a teacher, writer and amateur woodworker.



Tambours in the Weed kitchen allow cabinets (all made of black willow) to remain open without swinging doors on which to bump your head or to obstruct access. Weed says this design requires no more work to make than a set of frame-and-panel doors. Right, tambour curtain disappears behind faceboard and false back, painted white. A stiffener strip neatens the top edge of the false back. Cabinet is deep enough for stacks of 10-in. plates.

Tambour Kitchen Cabinets

The conveniently disappearing door

by Richard Starr

"These doors are incomparable as far as convenience is concerned," says Hazel Weed about the kitchen cabinets built by her husband, Walker. "When I'm in here working, I just open them up and have everything where I can get at it." Weed, a woodworker who directs the student craft shops at Dartmouth College, feels that traditional doors are always in the way, obstructing other cabinets and banging you on the head. When planning the kitchen for their old farmhouse in the hills above Hanover, N.H., the Weeds chose disappearing doors—vertically opening tambours.

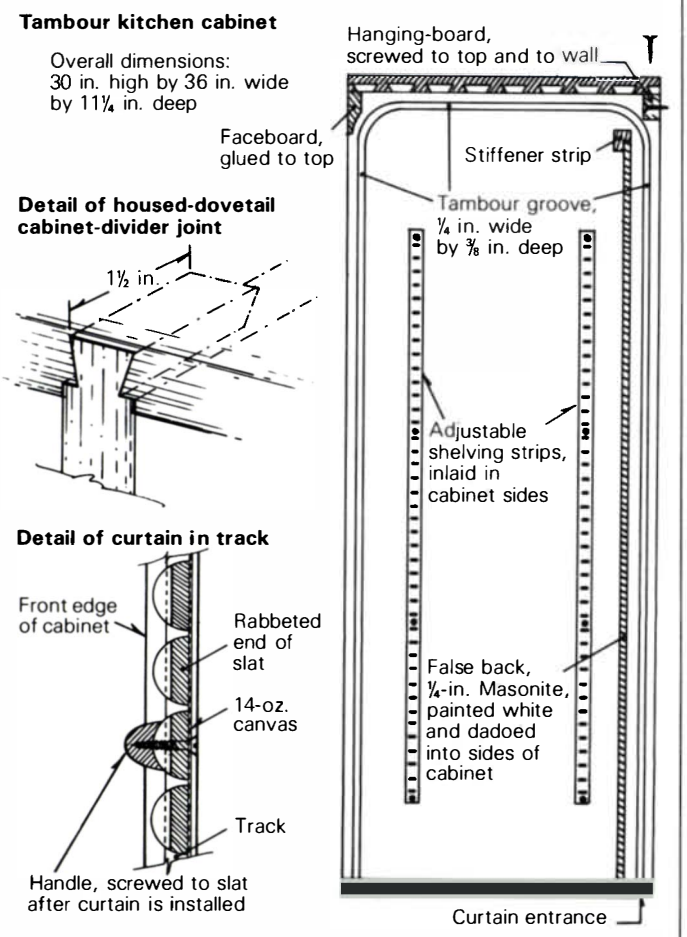
Most cabinets are boxes with doors hung on them, but a tambour must be designed into the cabinet structure. Weed routed the curtain track into the inner sides of the carcase (front, top and back) before assembly; the three straightaways were joined by tight curves. To ensure that the left and right tracks were identical, Weed used a template to guide the router. A false back, hung in grooves in the sides and trimmed with a stiffener strip at the top, hides the back of the open door from view. To cover the curve of the door as it arches into the cabinet, Weed installed a faceboard whose inner surface was contoured to match the track. Thus the visible section of the door is flat, creating the illusion that it is disappearing into the air over the cabinet as it is opened.

For the curtain to run properly the cabinet must be perfectly square; Weed emphasizes the need for accurate joinery. He fixed the cabinets to the wall only at the top so they would not be distorted by any settling of the house. The carcases are joined with half-blind dovetails at the corners. The dividers in the double and triple cabinets are set in dadoes; their front ends are housed dovetails that extend about 1½ in. back into the cabinet.

To make the curtains, Weed cut a board slightly longer than the width of the cabinet and planed it to ½ in. thick, the width of the strips. He rounded the edge of the board with a router, then ripped off this half-round strip, ½ in. thick, on the table saw. The newly sawn edge of the board was shaped again and the process repeated until he had enough strips.

The finished tambour curtain must be long enough to occupy both curves of the track when closed; its width will be slightly narrower than the distance from one groove bottom to the other. After washing and ironing the 14-oz. canvas backing, Weed cut it to a width slightly less than the inside of

Photos: Richard Starr; drawing: Joe Esposito



the cabinet, not counting the track. He left the canvas longer than the finished curtain, and trimmed it after gluing. Each strip was fixed to the cloth with a thin line of Titebond glue down its back, its length centered on the width of the fabric. The wood strips were butted closely together and weighted under plywood to dry. Weed suggests running the curtain over the edge of a table to break the hardened oozed glue, then folding it back on itself to scrape excess dry glue from the edges of the strips. The curtain was trimmed to width, then its edges were rabbeted on the table saw using a batten to hold it down on the saw table. Weed compares this step to fitting a drawer: Both surfaces of the rabbet must fit the groove closely but there must also be sufficient clearance.

After the cabinet is hung, the curtain slides into the track from the back end. Weed suggests waxing the rabbet before installation to ensure smooth running. Some friction is desirable since the tambour is perfectly counterbalanced only when half open; when more or less than half open, it wants to slide up or down. In actuality, the curtain stays put everywhere but a few inches from the ends of its travel. With the curtain in place, a fitted handle was screwed to the predrilled second slat. The handle stops the curtain against the facing at the top of the cabinet.

Weed estimates that a set of tambour kitchen cabinets would take no more time to make than a set with well-crafted frame-and-panel doors. The function of cabinet doors is to hide the clutter and to keep out the dust. Vertical tambours do it efficiently and beautifully. □

For a detailed discussion of the design and construction of tambours, see FWW *#12, pp. 52-57.*

Another kitchen idea: rosemaling

We didn't hope to create a totally different kitchen design. We wanted it to be unique without seeming modernistic, so we kept to the traditional and currently popular raised-panel cabinets. For innovation we decided to employ my wife's talent to hand-paint the panels of the upper cabinet doors with Norwegian rosemaling.

Norway's folk art has a long and colorful history. It goes back to the Vikings and Roman times. The Vikings traveled extensively so their art was developed with ideas taken from the Mediterranean peoples. Rosemaling, the freehand painting of colorful flowers (*rosemaling* means rose painting in Norwegian), became popular during the 18th and 19th centuries, taking the place of more common stenciled decorations. Decorative painting on furniture and cabinets has been popular enough to be mass-produced, the Lambert Hitchcock chairs of the early 1800s being the first notable example. Although ours are the only kitchen cabinets we've seen decorated with rosemaling, the techniques we used can be applied to any kind of decorative painting on wood.

We used clear pine for the raised panels of the upper cabinet doors. To prepare them for rosemaling they were first coated on both sides with an oil-paint primer, followed by a light-colored gloss enamel, to match the appliances. We applied a gloss varnish over this to make corrections in painting easier. On this surface, smoothed with wet 400-grit paper, the pattern outlines were drawn.

All painting was done with oil rather than acrylics. We mixed solid pigment (available through art-supply stores) with a medium made of equal parts of linseed oil, turpentine and varnish. The shades and hues were blended by carrying two colors on the brush simultaneously, which avoided sharp outlines between the two. As a protection for the decorations and to subdue the gloss background, we applied two coats of satin varnish to the completed paintings.

With the panels decorated and sealed, we assembled the cabinets and doors and finished the unpainted parts with two coats of Watco Danish oil, the second coat rubbed down lightly with 400-grit silicon-carbide paper.

—William A. Julien, Chatham, Mass.

Norwegian floral painting (rosemaling) enhances traditional frame-and-panel kitchen cabinetry. Pine panels are primed, enameled and varnished before painting flowers, which are protected with varnish top coat.

Tuning Up Your Lathe

Mass and rigidity make clean cutting easier

by Del Stubbs

Most lathes I've seen, in both amateur and professional shops, do not function as they could. Yet improving them is simply a matter of understanding and putting into effect the basic principles of lathe operation. The idea is to have no play anywhere, not in the mounting of the stock on the faceplate or between centers, not in the bearings or the shaft, not in the tool-rest base or the tool rest. Then the lathe needs to be mounted on a base so solid that the vibration of an out-of-balance piece or the jarring of an improperly used tool is immediately damped.

A common misconception is that the less serious you are about turning, the less of a lathe you require. The reverse is true. The beginner has enough problems, without a poorly built lathe adding to the burden. A skilled turner can cope with a sloppy lathe and get by, though there's no question vibration slows down the rate at which he can work and makes clean cutting more difficult. Vibration in a beginner's lathe can drive him to quitting. It should be pointed out, though, that in small-diameter turnings the stock has so little mass and leverage against the tool that a very solid lathe is not so necessary. Faceplate turning and large spindle work are the real test of a lathe.

Though the base is perhaps the most neglected part, it is the first priority in tuning up your lathe. For a test, grip the headstock and see if you can move it. It shouldn't budge. If yours is a sheet-metal base, so common on smaller, less expensive lathes, it will probably have to be braced or replaced. Price, though, is no sure determinant of a lathe's quality; I've seen $2,000 lathes whose mass was not proportioned effectively. One quick, inexpensive and removable way to keep the lathe fixed to the floor and to damp vibration is to use sand. Contain it in boxes or gunny sacks as close to the headstock as possible. Take care that grit doesn't get loose and into the bearings of the motor or lathe; wrap the sand first in a plastic trash bag.

For my lathe I bolted together some old 6x12s into a base that is so massive (it weighs about 500 lb., which I consider a minimum) it must be disassembled to be moved. Timbers damp vibration (without sending it back, as steel may). But putting timbers together rigidly, as they must be, involves a disadvantage: If the base is not sure-footed (if one corner is slightly higher), the whole lathe can rock, causing vibration. The solution here is to wedge and shim carefully until each corner carries the same weight. I also use felt pads to separate the wood from the concrete floor—these stop the lathe's tendency to walk around the shop while an unbalanced piece is turning.

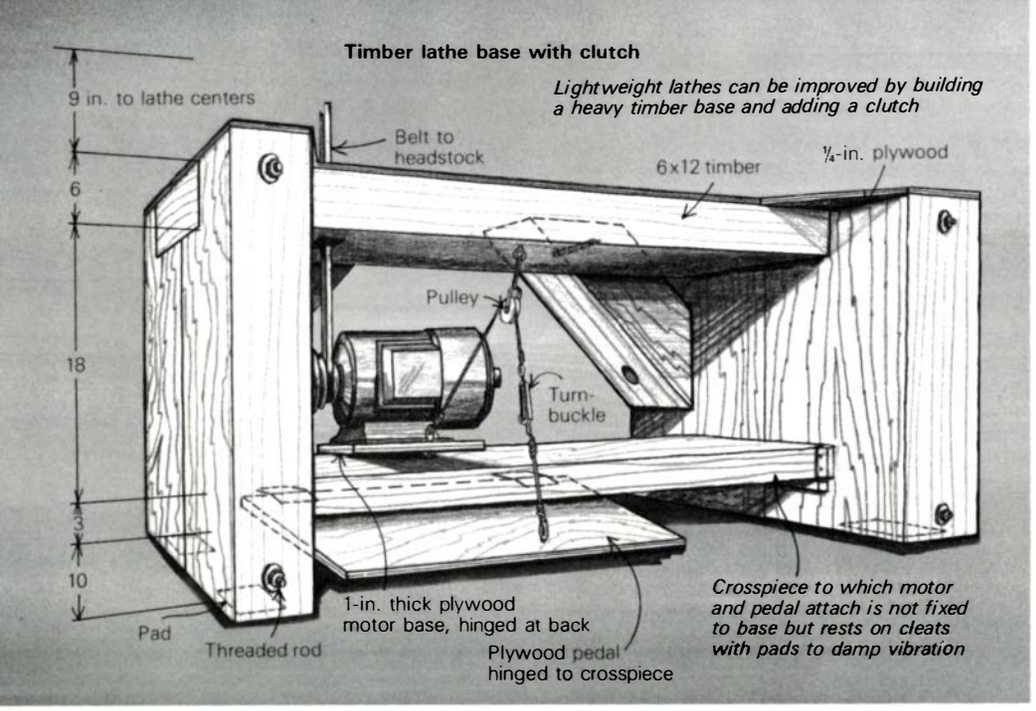
What about bolting the lathe to the floor? If the floor is wood, the whole building may shake as well as the lathe. If the floor is concrete, well, as an old millwright told me, "If you bolt a rigid lathe to a solid floor and turn a heavily unbalanced piece, it could tear up your lathe—something's got to give." The alternative is not a lathe that walks around, but a base that absorbs vibration and deadens it. That's what's ideal about sand: Bang a steel bar and it resonates, punch a bag of sand and it's dead. Wood and cast iron have similar advantages. An old cast-iron lathe has so much mass that it will not resonate like a light steel one. If you build out of wood, triangulating the structure will help achieve rigidity. Set the legs out at an angle and cross-brace them.

One addition that's rare on lathes is a foot-operated clutch; I consider one important. A clutch allows you to start the motor under no load, which saves the motor and electricity, and makes for quicker starts and stops. A clutch is also a safety feature. Out-of-balance pieces can be started slowly—if a corner hits the tool rest, it just stops, and you have the chance to see if the lathe will shake. A clutch also is a foot release, if ever your hands can't get to the switch.

The most important advantage for me in having a clutch is that by slipping it I can modulate speed readily while cutting—mostly to slow down to help stop chatter in difficult or delicate cuts. I often use speeds about 200 RPM to 300 RPM in getting that final clean-up cut in some faceplate and spindle work, the foot on the clutch constantly adjusting the speed as the cut changes. I also experiment with slower speeds, especially if I'm having trouble with a particular cut. If the tool isn't cutting right when the stock is turning slowly, it won't cut any better at high speed. Adding a handwheel to the outboard end of the lathe and turning the stock by hand so the tool cuts at about the speed of a pocketknife through a piece of whittling wood is one way to see if you're getting the shear cut you want. With a clutch you can move the stock almost this slowly, and still have both hands on the cutting tool.

Probably the simplest clutch is to have some way of lifting the motor and thus lessening the tension on the belt. This method uses only the weight of the motor on a hinged motor mount to provide belt tension. A pulleyed cord, moved by a hinged foot pedal, raises the motor mount and releases tension. There should be enough travel for the belt to slip, but not so much for the belt to come out of the pulley grooves. I include a small turnbuckle in the cord that raises the motor to allow fine adjustment of the clutch. With one foot under the plywood pedal and the other pressing it down, I adjust the clutch to release just as the pedal touches my foot.

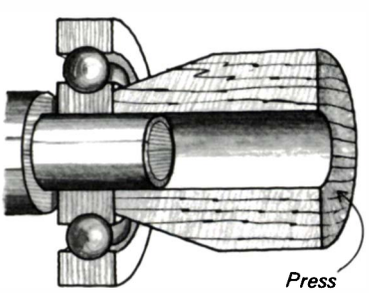
Belt quality is important. An unevenly manufactured or worn belt creates vibration. For smooth, positive power I've found a notched *V*-belt best. In some cases, though, these will grab even when tension is relaxed; a solid, stiffer belt should then be used. Old-style flat belts slip best and an adjustable idler pulley can be used as a clutch with these, or with any belt if the motor is too heavy or inconvenient to lift. If in heavy-duty cutting you find a belt slipping, use a cam to lock the motor down or add weight to the motor mount. If



possible mount the motor separately from the lathe, to reduce transferred vibration. If not, include a damping pad between the motor and the lathe.

Testing for play in your shaft and bearings can be a lesson in sensitivity. Have the shop completely quiet. Take the belt off the pulley, and grip the shaft. Try to rock it from side to side and in and out. Listen and feel very carefully for any knocking. End play is as much a problem as side play in faceplate work. All end play and some side play are eliminated in spindle work by the pressure of the tailstock. You felt a knock—now what? If it's end play, the problem might be solved by tightening an allen screw, moving a collar, adding a shim or tightening an outboard faceplate. Side play probably means shot ball bearings, worn sleeves or Babbitt bearings, or a loose fit between shaft and bearing or between bearing and headstock. If it's a ball-bearing lathe, turn the shaft (belt disconnected) and feel for any catch or roughness. Also give it a spin and, with your ear pressed to the headstock, listen for rumble. If you sense either of these, plan on getting new bearings. In lathes with external grease fittings, play can be temporarily reduced by filling the gaps with a shot of grease; don't overdo it.

If you have to replace the bearings, try first to get an assembly drawing of your headstock from a tool supplier or from the manufacturer. Also take care not to apply pressure or impact to any part of a bearing except the inner sleeve (see "Basic Machine Maintenance," *FWW* #13, Nov. '78). I pound on my bearings with a piece of hardwood drilled out to just fit over the shaft and turned down at one end to just the thickness of the sleeve. I replace the bearings every 1,000 to 1,500 hours of lathe time, and this has become a routine operation.



Shaft size is important in selecting or in building a lathe. Flex in a small, ¾-in. shaft is significant, especially in faceplate work. I would recommend 1½ in. as a minimum for serious bowl turning. Not that fine bowls can't be turned on a smaller shaft; I'm talking here about ease of cutting quickly and cleanly. I'd not recommend taking a small lathe and rebuilding it for a bigger shaft or bearings, as the lathe would still be no more rigid than the rest of it you hadn't souped up. The "weakest link" principle should also be kept in mind in fabricating a lathe.

The mounting of the stock on the lathe is another area that should be checked for play. If it's faceplate turning you're doing, first make sure the faceplate sits securely on the spindle—check for bright spots on the mating surfaces that will indicate only point contact. Next make sure the mating surfaces between faceplate and wood blank are perfectly flat and free of particles. Chamfer the holes in the stock into which the screw or screws will be driven, so the screws raise no splinters that will keep the faceplate and blank from meeting flush. Looseness can also be caused by voids sometimes found in plywood glue blocks. After the blank is mounted, grip it and test-pull it in several directions, checking for movement between the work and the faceplate. Solid mounting is critical for smooth cutting.

In spindle work check the spur center to see that all four spurs are sharp and the same length and that the point extends no more than ⅛ in. beyond the spurs—if it's too long, it will prevent the spurs from making solid contact. I use a small Dremel grinder to true up the spurs while the lathe is turning. Wear safety glasses and grind no farther than the shortest spur. Then take the center to the bench grinder and get the spurs sharp. Thin spindles will be remarkably less flexible if all four spurs are in solid contact. If you have a ball-bearing center, check it with a spindle in place and replace the center if there's play.

The weakest part of most lathes is the tool rest and tool-rest base. To test yours hold one end of the tool rest and press down firmly. If it gives, it will give also under a heavy cut, causing dig-in or chatter. If possible, get a heavier model tool rest and base than is standard for your lathe. For years I had to use a lathe whose tool rest wasn't rigid. I adapted by staying away from using the end of the rest and by applying considerable pressure down on it when cutting. It also taught me to take a lighter, more careful cut, an advantage after all.

Nicks in a tool rest make smooth travel across the workpiece impossible. They are caused by chatter and other impacts, but also by sharp edges on a skew chisel cutting a groove as it is pushed into the work. Check all turning tools for sharp edges and round them over with a stone. Also file the tool rest smooth, then wax it. Be sure the bearing surfaces between the tool rest, its base and the lathe bed are smooth and that they can be tightened together securely. Use a longer wrench for more leverage, if necessary.

If you understand the principles, you can make most lightweight lathes a good deal better than they come straight from the manufacturer. I still use a small Rockwell (with the timber base) for most of my small spindle and faceplate work. If you decide to stick with a sheet-metal base, do a lot of bracing to stop flexing and add weight, at least 100 lb. □

Del Stubbs is a professional turner in Chico, Calif.

Drawings: Ric Lopez

Turnings Without Screw Holes

Make sectored-jaw faceplate chucks to hold the work

by E. Carroll Creitz

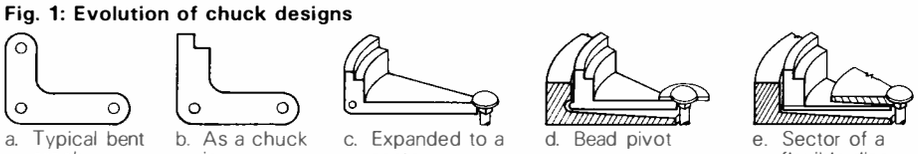
Traditional methods of mounting workpieces for faceplate turning leave something to be desired. Screw mounting leaves holes that must be plugged. Jam-fitting the workpiece to a recess in the faceplate requires critical fitting. Glue-and-cardboard mounting works well but the cleanup is time-consuming and irritating: The glue and paper fibers quickly ruin a sanding belt, which is costly these days. Washing off a water-soluble glue is a chore, and it raises the grain, which requires additional sanding before the finish can be applied. It seemed there had to be a better way.

The machinist's pot chuck (figure 2) appeared a likely candidate for adaptation to the wood lathe. The three jaws are sectors of a circle, and since pot chucks are usually furnished as blanks, the machinist can cut as many concentric gripping rings, of whatever diameter, as are required. Actuation is by a draw bolt in typical collet fashion: The chuck is pulled back into a tapered section, causing radial compression of the jaws. Pot chucks are not generally available for wood lathes, and they can't be made by most amateurs. But sectored jaws and the convenience of draw-bolt actuation are features worth having.

There are several ways to transmit longitudinal motion through 90°, the most practical of which is the bent lever. The evolution of a bent lever into a sectored faceplate is shown in figure 1. The chance of success in using a curved pivot point (figure 1c or 1d) seemed doubtful. So I temporarily shelved this design in favor of a bent lever whose movement would be provided by pressing a slotted disc into a dish-shaped cavity (figure 1e). The flexibility this would require could be provided by a thin, good-quality plywood, to which could be attached a jaw ring. The chuck I thus constructed is presented in figure 3. No dimensions are shown because they are a matter of convenience rather than necessity. Note, though, that the support plate must be thick enough that the screws attaching it to the faceplate will not interfere with recessing its face. Make the outside diameter of the jaw ring about ½ in. to ¾ in. larger than the diameter of the workpiece to be gripped. The thicker the stock from which the ring is cut, that is, the larger the distance between the base and top of the jaw, the larger the travel and the less the force on the workpiece.

I started with 8/4 stock to form jaws to hold a 4¾-in. diameter workpiece. This combination permitted a jaw travel of 3/16 in. I made the jaw ring about 1 in. wide to allow for a good solid glue joint (I used epoxy) between it and the ⅛-in. plywood, which forms the flexible member of the chuck. I centered this jaw assembly (ring and plywood disc) by first turning a flat-bottomed recess in the support plate, about ⅛ in. deep, and of a diameter slightly larger than the jaw assembly. Then, using a ¼-in. drill in the tailstock chuck, I drilled all the way through the support plate at its exact center. I unscrewed the faceplate from the headstock with the support plate still attached, inserted the jaw assembly into the recess, plywood side next to the support plate, and drilled a ¼-in. hole through the center of the plywood using the support plate as a guide. I next inserted a ¼-in. machine bolt, with washers, through both support plate and jaw assembly and tightened it to hold the jaw assembly in place.

Fig. 1: Evolution of chuck designs



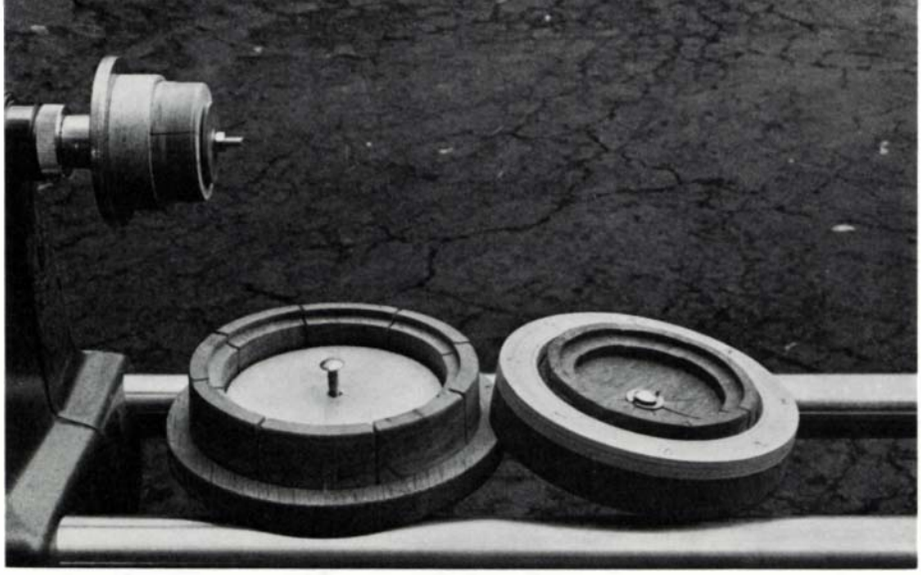
a. Typical bent crank
b. As a chuck jaw
c. Expanded to a sector
d. Bead pivot
e. Sector of a flexible disc

The faceplate with its various attached parts was then returned to the lathe and the jaws turned. In the machinist's pot chuck, several concentric gripping surfaces can be used because they all move together and all exert the same force on the workpiece. Multiple gripping rings on a bent-lever chuck are not recommended because of the inverse relationship between motion and force. Accordingly, I turned only a single ring on this chuck. It is necesary to undercut the gripping ring a few degrees to form a circular dovetail of the required diameter. I then removed the jaw assembly from the support plate and remounted it in the recess with the plywood side out, so I could use the headstock index to mark for sawing the radial slots. I removed the jaw assembly and sawed the radial slots, leaving a 1⅜-in. dia. circle of solid plywood 1⅜ in. in diameter around the center hole. I deepened the recess in the support plate about 3/16 in. at the center hole, tapering to the outside edge of the recess.

A pressure plate is needed to press the plywood disc into this dished recess, so I cut a piece of ¼-in. Baltic birch plywood to fit inside the jaw ring and turned its inside face to about the same taper as the support-plate recess. I squared the hole in its center to accept the head of a ¼-in. x 20 carriage bolt, slipped the carriage bolt through and connected it to a draw bolt (¼ in. x 20 threaded rod) using a ½-in. piece of aluminum rod, drilled and tapped. A thick nut would do. The draw bolt passes through the hollow shaft of the headstock to the outboard side, where I attached a handwheel: a brass cone and a Lucite disc. The handwheel draws the pressure plate against the jaw assembly and tightens the jaws. Because the saw kerfs limit the radial motion of the jaws, I enlarged them with a handsaw.

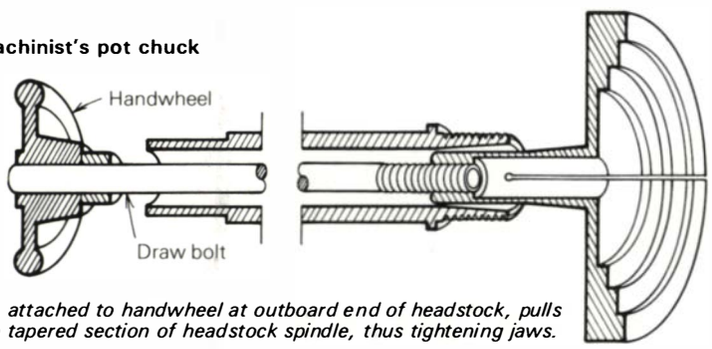
I turned about 25 bowls and plates using this chuck, first screwing the blank to an ordinary faceplate and turning a foot to about the diameter of

Drawings: Robert Croston



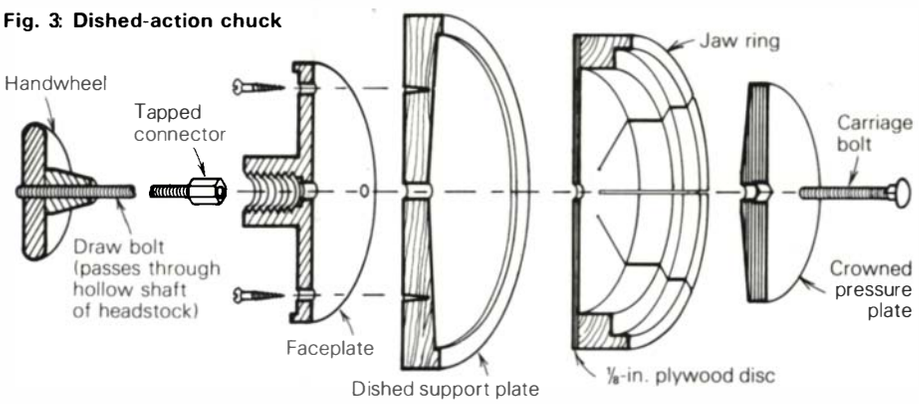
Shop-built faceplate chucks hold the work without marring it and without large waste blocks attached. On the ways are dished-action chuck, left, and bead-pivot chuck, right. Expanding dished-action chuck, mounted on the lathe, is for bracelets.

Fig. 2: Machinist's pot chuck



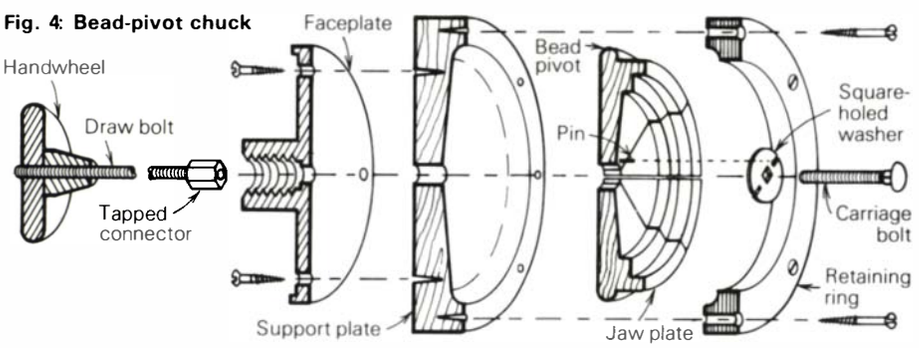
Draw bolt, attached to handwheel at outboard end of headstock, pulls chuck into tapered section of headstock spindle, thus tightening jaws.

Fig. 3: Dished-action chuck



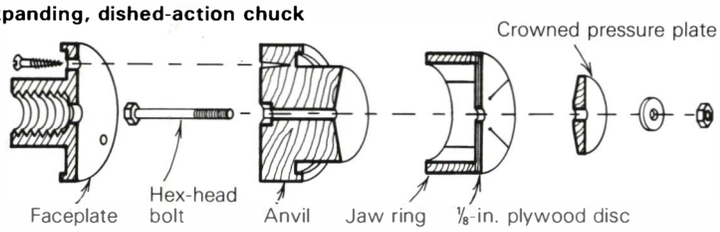
Pressure plate forces plywood disc to conform to dished surface of support plate, thus tightening jaws.

Fig. 4: Bead-pivot chuck



The eight separate sectors of the jaw plate pivot on a bead captured in the groove of the support-plate/retainer-ring assembly.

Fig. 5: Expanding, dished-action chuck



the jaws. The method was so successful that I made additional chucks for 3-in. and 6-in. workpieces. The holding power seems equal or superior to that of a screw center.

The success of the dished-action chucks prompted a return to the pivot-point type of bent-lever chuck, specifically the bead pivot (figure 1d). Thus I made the chuck shown in figure 4. Instead of the jaw ring being applied to a flexible disc and then segmented, I turned the jaw plate from one piece of hardwood, cutting a bead at the base that would pivot in a groove cut into the support plate and retainer ring. I left the bottom of the jaw-plate thick because sawing it into sectors would result in two sectors short-grained at their narrowest ends. I tried a one-piece support plate but found that a separate retainer ring alleviates tedious fitting of the jaw sectors. You can turn the jaw plate to an exact diameter, adding one saw-kerf width for the reduced diameter caused by sawing into sectors. Then the support plate can be turned, its recess dished, and the groove for the bead cut, all with the retainer ring attached. Unscrew the retainer ring and insert the jaw plate, sawn into sectors. The carriage bolt, with a square-holed washer, keeps the sectors from falling down. Pin the washer to two of the sectors to prevent it and the carriage bolt from turning.

Partly because of curiosity about how much punishment ⅛-in. ramin plywood would take, I made the expanding chuck in figure 5. I built it on a 3-in. faceplate, using a piece of 1⅞-in. thick pine as the anvil against which the pressure plate deforms the plywood and expands the jaws. I left a shoulder on the anvil to help align the workpiece. Since the end of this chuck is left exposed, a nut and washer replace the handwheel and draw bolt of my other chucks. The machine bolt to which these attach is countersunk into a hexagonal hole in the anvil to prevent its turning when the nut is tightened. I made two of these chucks in diameters of 2½ in. and 2⅞ in. and with them have turned more than 70 bracelets. The surface of the jaws of the larger of them is getting slick and will soon need pieces of sandpaper glued onto its surfaces. □

Carroll Creitz, a retired research chemist, lives in Kensington, Md.

An Improved Screw Chuck

Good engineering refines a common design

by Richard Starr

The screw chuck is a convenient way to mount work on the lathe for faceplate turning. It requires little preparation of stock, wastes little wood and the work is easy on, easy off. An avid amateur turner, Jerry Glaser of Playa del Rey, Calif. focused his engineer's eye on the screw chuck and came up with a superior device. A perfect replica of Glaser's chuck would require machinist's tools and skills, but some of its features might be used to improve existing chucks.

First, Glaser emphasizes that a faceplate chuck should screw to the spindle of the lathe rather than be secured in the tapered socket. Morse-tapered chucks are fine for work between centers but are not built to resist much radial thrust; a taper-fitted screw chuck not secured by a draw bolt is likely to wear the taper and the spindle socket, eventually resulting in a loose fit.

Next, Glaser examined the contact between the work and the faceplate. Stock is seldom faced off perfectly flat. Work with a hollowed face will sit securely against a flat faceplate, but slightly convex or uneven ends will wobble and soon become loose when held by a single, central screw. Glaser dished out his faceplate, leaving a narrow rim at its edge; this shape is more forgiving of inaccurate facing off of stock. It also gives a tighter fit since all the compression between stock and faceplate is concentrated at a maximum radial distance from the screw.

Glaser's major innovation is a specially designed screw that is cylindrical in shape with a thread whose section is almost knife-thin. A screw's holding power is directly proportional to its diameter. A tapered screw's grip is concentrated where it is thickest, getting progressively weaker toward its tip. But a cylindrical screw maintains its full diameter, and full holding power, along its entire length. For screws of the same nominal diameter, cylindrical screws hold better. Where shallow penetration is desired for delicate work, the tip of a tapered screw is almost useless.

The tapered screw might be preferable in soft woods where work can be threaded right on the screw without predrilling; some production turners, for example, fit stock on a running lathe. But in harder woods a pilot hole is necessary to avoid splitting the stock. Many turners grind a drill bit to a taper matching that of the screw in their chucks, but Glaser has to drill only a cylindrical hole the minor diameter of his screw. The very thin threads cause minimum damage to the fibers when entering the wood and have little tendency to split the work. They grip better than screws with thicker threads because they take up less room, and there is a larger volume of undamaged wood retained within the diameter of the screw. This is especially important when holding in end grain, as screw chucks usually do.

The screw holds so well that it is sometimes difficult to remove work from the chuck. Glaser recommends waxing the threads before mounting the stock. To keep the chuck from turning he inserts an allen key in the setscrew, propping the key against the tool rest. He then unscrews the stubborn work with a strap wrench improvised from some rope and a stick.

Soft metal won't do for a screw with tall, thin threads. Glaser has his cut in a steel called 17-4 P.H., which comes heat treated to 32-35 Rockwell C (the limit of machinability is about 45 RC). He suggests that it could be cut in drill rod that has been hardened and tempered to a medium straw color. It would be risky to try hardening or casehardening this delicate thread after cutting, for fear of burning its edges. A machinist can cut these threads using the same technique used for cutting acme threads. A square-ended cutter is ground with sides shaped to half the included angle of the screw, but narrower than the space between threads. While feeding the cutter at right angles to the work, a helix is cut to full depth, then subsequent cuts are made setting the tool over to the right until the crest of the thread is sharp.

The front end of the thread should have a ¼-in. lead of a diameter tapering to the core of the screw. The end of the thread is tapered with a file while turning in the lathe so the thread seems to rise in height from the core of the screw. This leading edge is sharpened with a jeweler's file. The thread is polished by brushing some lapping compound on it and screwing a block of wood on and off a few dozen times.

The shaft of the screw has a flat ground onto it as a bearing surface for the setscrew that keeps the shaft from rotating in the chuck. The tension of the screw is taken by a pin through the shaft bearing against the inner surface of the faceplate (see drawing). The screw's protrusion is controlled by adding or removing washers between the pin and the chuck. It is an absolutely secure system capable of small increments of adjustment.

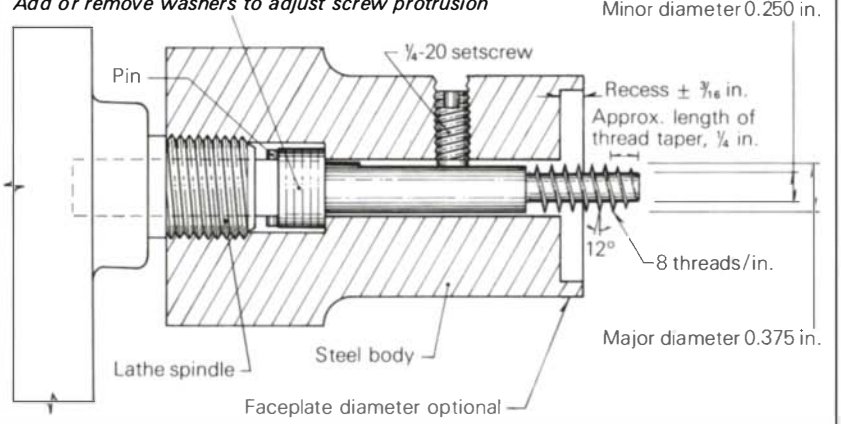
One advantage of the chuck, according to its designer, is the almost perfect recentering of rechucked work it affords. This has allowed him to mount specialized wooden chucks or spuds on the lathe, confident that they will always run true. He also uses a pot chuck that is simply a block of wood with a conical socket turned into its end. The outer surface of the block is turned round and kept from splitting by wrapping it with nylon cord glued with epoxy, a quick and easy ferrule. Work is crudely whittled to fit the taper and jammed into the socket for turning.

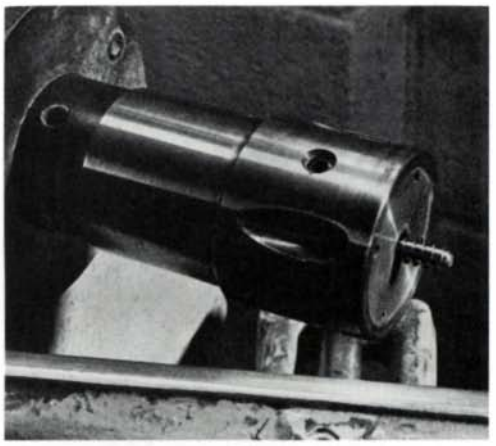
For Glaser, the joy of using this screw chuck is its easy versatility. He has used it for turning tiny, very thin objects as well as for big jobs, like an olivewood vase 14 in. long and 8 in. in diameter, turned green. Examples of Glaser's work appear on the facing page. □

Richard Starr, of Thetford Center, Vt., is Fine Woodworking's *New England correspondent. Glaser's screw chuck will soon be commercially available from Turnmaster Corp., 11665 Coley River Circle, Fountain Valley, Calif. 92708.*

Fig. 1: Improved screw chuck

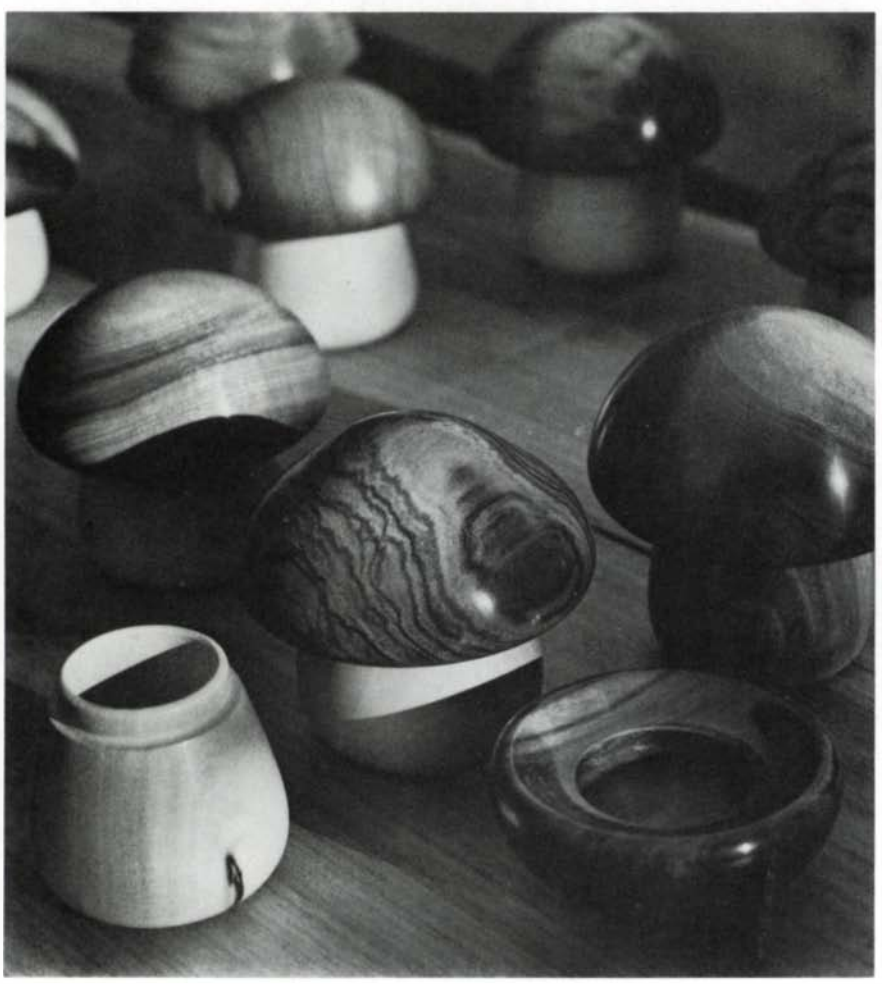
Add or remove washers to adjust screw protrusion





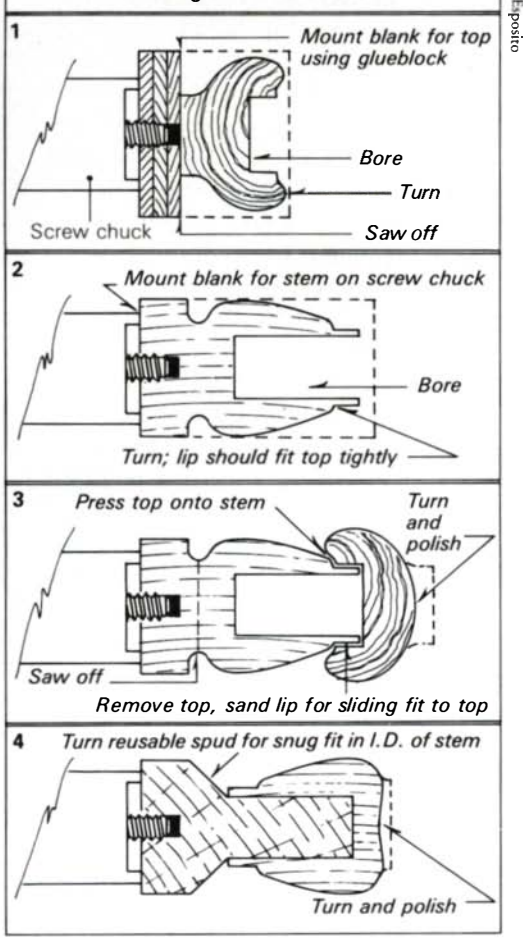
Sharp, wide threads of Glaser's adjustable-depth screw chuck secure work with minimal penetration of stock. Optional screw pockets supplement holding power for turning large blanks.

With wooden pot chuck, left, screw chuck can turn the tiniest of goblets. Alone it grips larger stock for vibration-free turning along the full length of mallet, right. Mushroom boxes with putumuju tops, below, evidence more of the versatility and precision possible.



Joe Esposito

Making a mushroom box

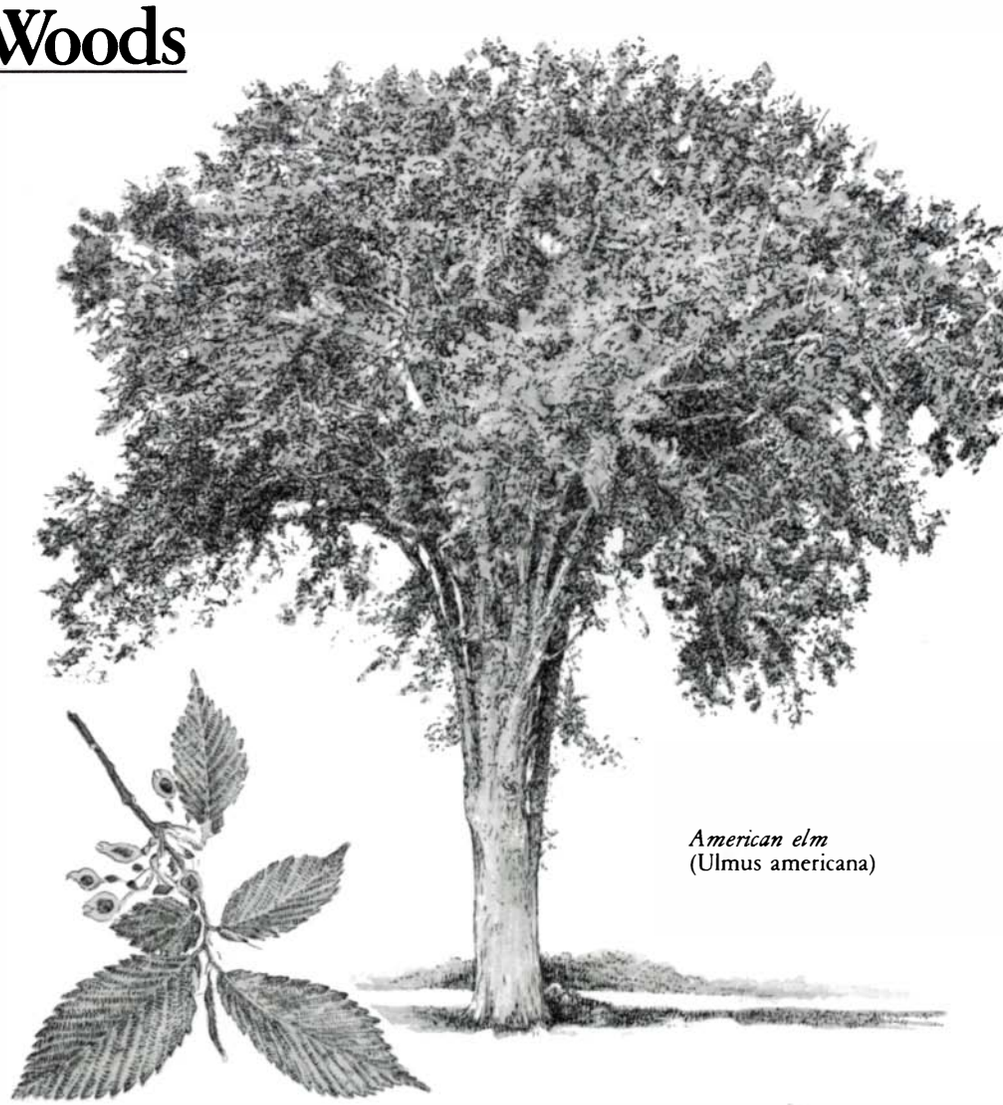


Photos: Jerry Glaser

Two Neglected Woods

Elm: modern power tools make it workable

by Jon W. Arno



American elm
(Ulmus americana)

From the founding of the first colonies, American cabinetmakers have been both blessed and spoiled by a choice of native woods unequaled anywhere else in the world. Virgin stands of both deciduous and coniferous trees stretched over a third of the continent. The variety and abundance have, to this day, retarded our thorough utilization of what we have. A perfect example is the elm tree *(Ulmus americana)*.

Elm is one of our most attractive hardwoods. It has always been plentiful, yet over the past three centuries, elm has been used only sparingly. Now, because of the Dutch elm disease, we are stacking it up and burning it by the hundreds of thousands of board feet annually. In some states it is the law that an infected tree be so destroyed. Yet the disease, a fungus carried by a bark beetle, could as well be controlled by slabbing the bark off and burning only that. The rest of the log could be used; kiln-drying would eliminate any unlikely contamination that had penetrated to the heartwood. Were we in the midst of a walnut blight, every board foot would be carefully gathered and used, but because elm has had no place in our past, its place in our future is in jeopardy.

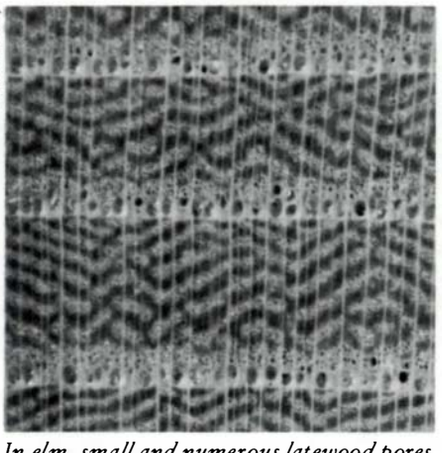
Early on, elm must have had its opportunity, as did virtually every species an ax could fell. Our forefathers certainly came to know as much about elm as they did about other woods. They were quick to discover that cedar split well for siding and shingles, that our oaks equaled the oaks of Europe as dense, strong, durable woods. They were likely amazed by the properties of our hickory and ash, for nowhere else in the world are there better natural materials for tool handles. For beauty and workability, the broad array of hardwoods, nut trees and fruit trees must have excited them. Imagine cutting into American walnut, chestnut and cherry for the first time. They experimented, often using several species in one piece of furniture, and usually with a purpose based on an understanding of the characteristics of each wood *(FWW #2*, Spring '76, p. 50).

What was it, then, that caused the old master cabinetmakers to shun the use of elm? According to the U.S. Department of Agriculture's *Dry Kiln Operator's Manual*, elm would seem to have everything going for it. With an average oven-dry specific gravity of 0.46 it is a moderately dense wood compared to western white pine (0.36), but it is comfortably less dense than other prized cabinet hardwoods such as walnut (0.51) and white oak (0.60). Dried to 6% moisture content, elm's radial shrinkage of 3.4% and tangential shrinkage of 7.6% would indicate a high, but not inordinate susceptibility to warpage and checking. Sugar maple, by comparison, has 3.9% radial and 7.6% tangential shrinkage, while shellbark hickory comes in at 6.1% and 10.1%, respectively. Even the USDA's *Wood Handbook*, which statistically compares woods in virtually every conceivable way, ranks elm well within the extremes in terms of working characteristics. It is listed as superior for boring, steam-bending, gluing and resistance to nail-splitting. Its weakest properties are its planing and shaping characteristics. Yet even here it outperforms aspen, cottonwood and sycamore, all of them widely used in cabinetry as secondary woods.

I recently bought a hundred board feet of elm, and after building several clock cases, a dry-sink top and several knickknacks I feel it deserves more respect than it has traditionally received. Elm is strikingly figured; light latewood pores in continuous wavy bands yield a wild, zigzag pattern on the tangential surface, an identifying characteristic of elm. It does not have the pronounced rays and sharp contrast between earlywood and latewood that make the oaks unpredictable to stain and often flashy in appearance. Yet it is far from bland.

Drawings: Christopher Clapp


U.S.D.A. Forest Service


Bruce Hoadley

In elm, small and numerous latewood pores characteristically appear as wavy bands in end grain (above, 10× magnification) and create zigzag pattern on flatsawn board (top).

It is less porous than other ring-porous woods (ash, hickory, chestnut and the oaks) and seldom requires a filler. Stability is not its long suit, but my work has not warped severely once elm is structurally incorporated into the piece, and I am pleased with its sanding and finishing properties. Among the many domestic hardwoods I have used I would rank elm third, in terms of the end results achieved, behind only walnut and cherry.

However, I have also discovered what may well be the reason elm never made it with the old masters: Attempting to work it with the edged hand tools of the time—chisels and planes—borders on the impossible. Elm grain is interwoven, causing edge tools like a hand plane to either "dig" or "skip," often doing both in the same path. Elm will saw, rasp, sand and drill well, but jointing, channeling and shaping require high-speed power tools.

Also, because of its interwoven grain, elm is virtually impossible to split or shatter. It will pit-check if dried improperly and it will fray under extreme stress, but it maintains its structural integrity under punishment few other woods can survive. Because of this it has been begrudgingly used where this feature is vital, in the ribs of wooden warships, for instance, and in the seats of rocking chairs. Elm was used sometimes because of its superior steam-bending properties and on occasion, especially in mixed wood pieces, simply because the board was handy and the project would be painted. However, it was seldom the primary material for major pieces or quality cabinetry, and it was never referred to as a selling point. Items made of elm were, and often still are, charitably referred to only as "hardwood."

Even after the advent of power machinery overcame the difficulties of tooling elm, tradition seems to have barred its elevation to the status of a popular cabinet wood. For a short time around the turn of the 20th century it came into more common use with furniture factories in the Midwest. However, here again it was often used in cheap, mixed-wood pieces along with oak, ash and hackberry, which it closely resembles, to satisfy the utilitarian needs of a low-income, rural market. Few who bought these articles knew or cared what they were made of, and elm's brief heyday, if you could call it that, was quickly ended by the golden oak era.

Now that its very existence is threatened by the Dutch elm disease, it is a shame that more cabinetmakers have not discovered elm. In the decades to come it is likely that the few examples of custom-made solid elm furniture will become as precious as chestnut pieces are today. When elm goes, its demise may very likely be complete. Its day of recognition must be now.

Unfortunately, elm is not always easy to find. Not all suppliers carry it. Elm is plentiful and cheap, at least here in the Midwest; however, lack of demand seems to be limiting distribution. When you find it, Select grades run around $1 a board foot. By way of comparison, red oak is running $2 or more, and Select walnut, when you can find it, is over $3. Even No. 2 ponderosa pine is more than 50¢ a foot, and there is nothing cheaper.

In a supply/demand economy prices for these "familiar" woods can only go up unless we tailor our demand to what is plentiful rather than using what is "traditional" or currently popular. If we demand elm, perhaps trees that must be cut anyway will go to the mill instead of to the fire pit. Any increase in the demand for this wood will actually help retard the blight by providing incentive to harvest infected trees. It was economically worked by the crude power tools of the late 1800s, and certainly it is workable today. If your confidence and skills have progressed to where you can work with oak or maple, you can surely handle elm. You may want to avoid it on pieces requiring hand carving or in items where the wood's stability is especially critical, but where a beautiful figure is desired, keep elm in mind. □

Chestnut: salvaging a blighted giant

by Victor O. DeMasi

Once the most important timber east of the Mississippi, chestnut is now seldom recognized in the forest, and its lumber is rarely seen at the local yard. Chestnut wood is still around, fairly common, in fact, but it's a treasure revealed only to the careful observer.

I live surrounded by chestnut. I salvage timbers from destruction sites and old farm buildings, saving them from ignominious ruin. I take great pride in giving this wood new life, and I save a buck while I'm at it. A New York supplier recently quoted a price of $7.50 a board foot for wormy chestnut, and clear grades were unavailable.

The chestnuts are members of the beech family. There are more than ten species worldwide, including the chinkapins, Chinese and Spanish chestnuts. All the chestnuts have sweet-tasting nuts but only the American chestnut (*Castanea dentata*), reaching a height of 120 ft. and a diameter of 7 ft. (17 ft. is the record), has ever been valued for its lumber.

Years ago the American chestnut was a highly valued tree. Besides supplying a valuable nut crop, tannin derived from its bark supported the animal-hide processing industry. As a shade tree, only elm was planted more widely. As lumber, it was not the best for

any one thing but versatile enough to be used for everything. Chestnut's rot resistance rivals the heartwood of white oak, and abundant shingles, doorsteps and sills testify to its durability. Easy to work, it found wide service in barns, carriage houses and out-buildings. Chestnut also takes a fine finish, and was popular in the cabinet shop and for items as diverse as barrels and caskets. This tree's fast growth ensured a steady supply of posts and rails as America fenced herself in in the 1880s. When blight-infected trees flooded the market in the 1930s, telephone poles and highway guard rails helped absorb the glut. Boxes, crates, veneer core and railroad ties were also made from chestnut.

Chestnut was available. Usually growing in mixed hardwood forests, it composed from 15% to 50% of the standing timber. Pure stands also occurred. Chestnut trees can put on an inch in diameter in a year during their youth. One 70-year-old specimen was 5 ft. in diameter. With little effort, a farmer could get posts at 15 years, beams at 25, lumber at 50 and feed his hogs on the nut crop every fall in between.

In 1904, trees infected with a fungus, brought into this country on chestnut trees from the Orient, were noticed at the Bronx Zoo in New York City. The chestnut blight, as the fungus came to be known, attacked the bark of the tree, girdling the trunk with cankers. These cankers interrupted the vital flow of water from the roots and killed the tree. The wind-borne blight advanced 25 miles per year. It was first seen in central Connecticut in 1910, and uninfected trees were hard to find by 1915. In Pennsylvania, state foresters cleared large areas of forest, hoping to halt the epidemic's advance. But pockets of infection broke out far in advance of the blight's front and spread, eventually decimating the chestnut throughout its entire natural range. By 1940, loggers were sharpening their saws to drop the last big sticks in the South.

In the wake of the blight was economic disaster. Nuts disappeared as an important source of food for man and animal alike. Dead chestnut hulks inundated the sawmills, depressing lumber prices. In Appalachia, the tanning industry collapsed, adding more hardship to that already impoverished area. Upland soils eroded at an alarming rate with the sudden disappearance of such a dominant forest member. In place of chestnut, less desirable trees grew. Land that gave timber now gives cordwood.

Chestnut persists today, but only as a shrub. It sprouts from the stumps of the former giants and grows several inches in diameter before the blight grabs it again. How long this cycle will last is anybody's guess, but these remaining small trees offer hope. Dr. Richard Jaynes, of the Connecticut Agricultural Experiment Station in New Haven, is working on a disease to infect the disease. In Europe and a few isolated areas in the U.S., chestnut trees with resistance to the blight have been found. In these trees, a virus infects the fungus. Dr. Jaynes is looking for a method to spread this virus to American chestnut sprouts. Success would be an economic miracle for our eastern timberlands.

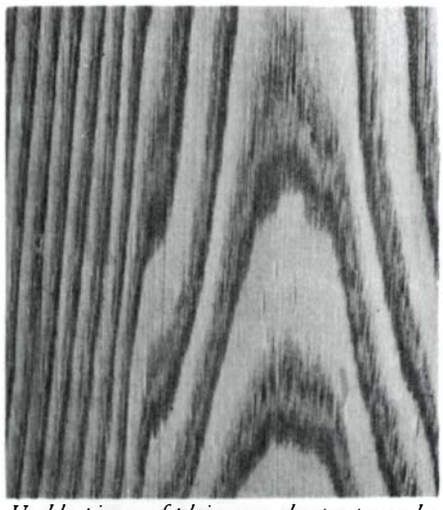
Locating and using chestnut

Chestnut wood is often confused with oak, ash, elm and hickory, all ring-porous woods, but there are ways to distinguish it. I don't stress color because it is unreliable. Fresh cut, the wood is blond, but with aging mellows to a wide variety of reddish browns. The surest way to identify it is by looking at the end grain. The pores that form the earlywood rings, best seen with a hand lens, are oval in chestnut and frequently occluded with tyloses—shiny, bubble-like structures. The transition from these rings to the denser latewood rings is more gradual than in other ring-porous woods. An obvious difference between chestnut and oaks is that the oaks have prominent rays, which on the end grain appear as light lines radiating from the center of the tree and on the face grain (tangential view) appear as dark flecks. Rays are less prominent in elm, hickory and ash, but they are visible; they are not visible in chestnut. Chestnut is the lightest and softest of the ring-porous woods (with a specific gravity of 0.43). Lastly, chestnut because of its high tannin content will stain black in contact with iron salts. Boiling shavings in a ferric chloride solution will not distinguish it from oaks, which are also high in tannin, but elm and ash, low in tannin, will discolor only slightly.

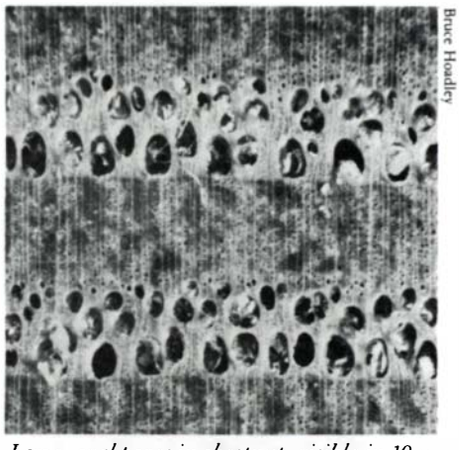
Knowing where chestnut was commonly used is valuable when looking for wood to recycle. I pay close attention to sills, joists and other pieces close to ground level where rot resistance is a must. Fencing also merits close scrutiny. Buildings from early in this century are my favorite haunts. Two structures on my property are dated 1914, just when blighted trees were abundant. Not surprisingly, they are framed completely in chestnut. In general, white oak is the only other ring-porous wood commonly found as a framing member. In furniture, where finishes obscure the wood, identification can be tricky. Chestnut never hides beneath painted millwork and was usually considered too soft for flooring, although I do know of a few examples.

Heavy boots, gloves, a crowbar and a sharp knife are all the would-be chestnut hunter needs to bring along. Time-encrusted roughsawn lumber doesn't display its grain. If the wood cuts like pine to reveal an open grain, I give it a second look. Where an old house or barn is being torn down, the wood is often free for the asking.

When I've amassed a pile of wood, I

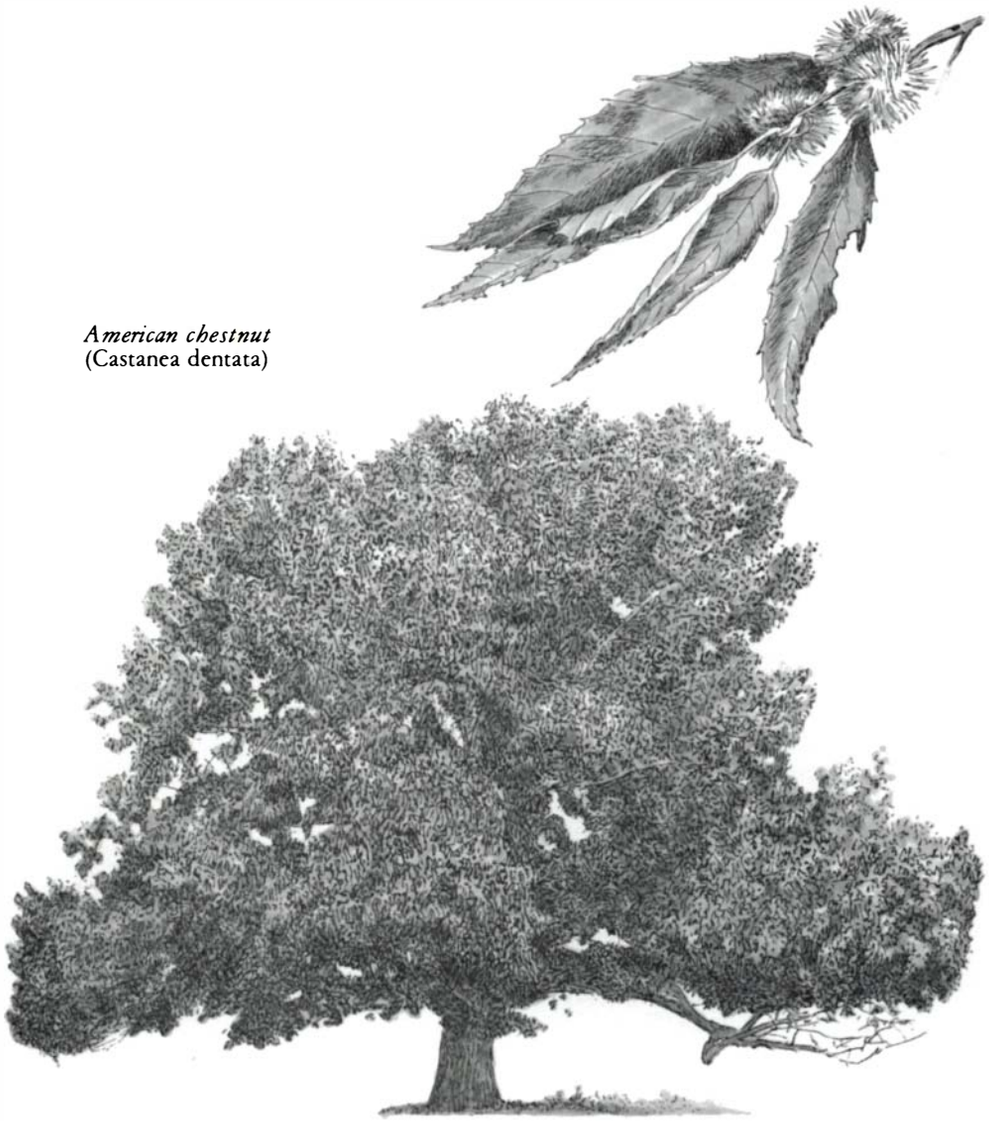


Usable pieces of plainsawn chestnut may be salvaged from framing members of turn-of-the-century buildings.



Bruce Hoadley

Large, oval pores in chestnut, visible in 10 × cross-sectional view, are often occluded with tyloses. Earlywood/latewood transition is gradual. Rays are fine, barely discernible.



American chestnut
(Castanea dentata)

sort the pieces according to destination—the saw or the woodstove. I inspect the good pieces for rot and nails and crosscut these out with a bowsaw. Before pulling out individual nails, I mark the area around each with a red crayon in case the nail breaks off. Black spots should be crayoned too. These are iron stains from nails, pieces of which might still lie buried in the wood.

It helps to have a definite project in mind before you start ripping. You can then saw for the right sizes. I work backward, however, and must always see the wood before I can decide on a project for it. Plainsawn chestnut, which has wavy face grain, is more attractive, I think, than quartersawn stock. Most chestnut was plainsawn to begin with, so I cut parallel to existing edges and usually obtain attractive figures. I use a circular saw with a guide, or a bench saw for wider boards. Cheap blades are best; if I hit a big nail, I change the blade. After a few too many damaged blades I got better at avoiding those nails. When all my stock is ripped I again crosscut to eliminate the few remaining nails that I missed. I don't send any wood that has nails into a planer. When the wood is surfaced and jointed, it is tightly stacked and weighted down to minimize warping.

Working with chestnut is a real pleasure. It rips cleanly with a sharp blade, but on older pieces the end grain always tears during crosscutting. The wood almost leaps together when it is glued. It sands easily, but grits below 100 should be avoided because they scratch the wood and make even more sanding necessary. The finest sanding stages can be frustrating, as a slightly raised grain persists. The problem can be solved by wetting the surface with paint thinner. Tung oil is a suitable finish for chestnut, and brings out the beautiful color on older, salvaged wood.

Small wormholes are common in chestnut—whence the name wormy chestnut. The holes, if not too plentiful, are attractive. These holes are the excavations of the chestnut pole borer, which attacks moist heartwood in standing dead chestnut and oak. The cavities are packed with the borers' excrement, which looks like fine sawdust. It can be packed so tight as to obscure the hole. I use the air pump at a service station to clean the wood. Goggles and a mask must be worn because the dust is extremely irritating. Cleaning the holes with small pins is time-consuming and not very satisfactory.

No two pieces of chestnut are the same. In my haunts I occasionally come across pieces stained black on the outside. Always found in close contact with the soil (iron salts react with the tannin in the wood), these uglies conceal a real treasure. Inside, the wood is mellowed to a soft brown with creamy white streaks running with the grain. It's incomparably beautiful.

When dressing this rough stock, I rip off about ⅛ in. The stain on this surface has the best effect. If I saw too far into the board, I usually get regular-colored chestnut, and if too shallow, black wood. Cutting shallow is preferable though, because the surface can be planed to change the intensity of the stain. In constructing with this wood you must bear in mind that there is only one beautiful face; the other is either black or typical chestnut, and the edge shows the transition.

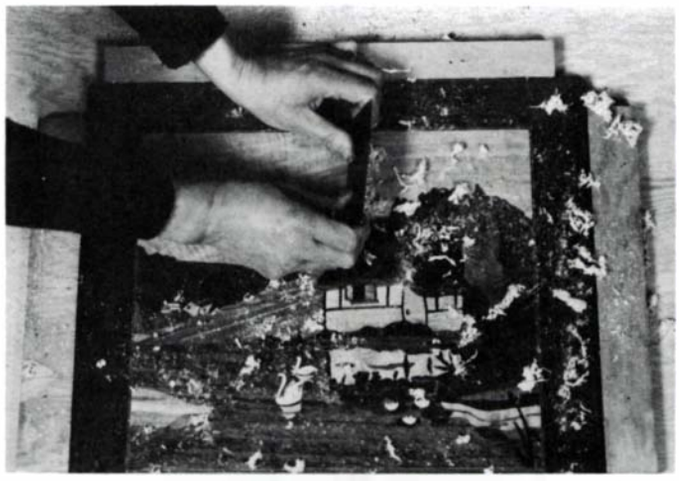
Salvaging from older structures is not the only way to obtain chestnut. One woodturner I know gets wood from old chestnut hulks he finds on the ground in remote forests. He goes as far as Ohio and South Carolina for logs passed over during the post-blight salvage. Often these choice pieces are inaccessible, perched on a steep hill miles from the nearest road. It is remarkable that after 30 or 40 years some hulks remain unrotted. Sometimes the center of the tree rots out, leaving a hard, useless shell. Crotch areas often remain solid, though, and are usually symmetrical with beautiful figure. Turning must proceed cautiously, as the wood splits easily if the tool catches. □

Jon Arno lives in Brookfield, Wis.; Victor DeMasi lives in Redding, Conn. Both are amateur woodworkers. DeMasi's article was prepared with the help of research by Roanna Metowski.

Finishing Marquetry

Polyurethane fills pores and cracks

by Peter L. Rose



Finishing marquetry begins with scraping the picture smooth and flat, then sealing it with shellac and sanding it. Four strips of wood nailed to the workbench hold the picture in place.

Applying a finish to a piece of marquetry differs from finishing a solid piece of wood. A marquetry picture has different types of veneers, with different colors, thicknesses and textures all blended together. There is no single method or finish that works best for all applications. I have tried oil, latex varnish, lacquer, polymer, French polish and polyurethane varnish—my comments on them follow.

Penetrating-oil finish brings out the colors of the wood nicely, but it does not conceal pores, cracks, scratches and indentations. Closed-grain woods become shiny, while open-grain woods remain dull, causing a blotchy look.

French polish, a mixture of shellac and alcohol with a few drops of oil, results in a beautiful, lustrous finish, but applying it takes practice and patience. The surface must be flawless, having no deep scratches, indentations, cracks or gaps between veneers.

Latex varnish has no luster and does not bring out the colors of the wood. I do not recommend its use in marquetry.

Brushing lacquer, if applied correctly, will give a nice smooth finish. It cannot be brushed on like varnish, however, because it dries fast, and back-and-forth strokes will create a tacky mess. Spraying lacquer gives good results, but the equipment is expensive when marquetry is a hobby and not a business. An exhaust fan is a must because the fumes are flammable and toxic. Aerosol-spray lacquer or varnish works well with small pictures and objects.

Polymer finish is a thick, two-part mixture that is self-leveling and covers well. One coat conceals most imperfections and gives a smooth finish with little effort. Some feel it is the ideal coating, but it looks artificial to me.

Polyurethane varnish is synthetic and gives a lustrous finish without an artificial look. White woods tend to yellow slightly. While many think this is a disadvantage, I believe it gives a picture a mellow look. Of all the brands I have tried, Sears Polyurethane Plastic, Flecto Varathane and Constantine's Wood-Glo are my favorites.

After the picture has been mounted and cleaned of glue, I cradle it between four strips of wood the same thickness as the picture. The strips are nailed to the workbench flush against the picture, and keep it from moving. The next step is sharpening a hand scraper (*FWW* #6, Spring '77). A hand scraper can level different thicknesses of veneer in a short time, while sanding blocks tend to follow the contours of the surface. I use a 3-in. by 5-in. No. 0 Stanley scraper.

To flatten and smooth the picture, push the sharpened scraper at about a 75° angle with both thumbs in the center to give it a slight curve. Start at the edge of the picture and push against the predominant grains. Do not go against the grain of the border veneers. Do these separately. Be careful not to scrape through the veneers.

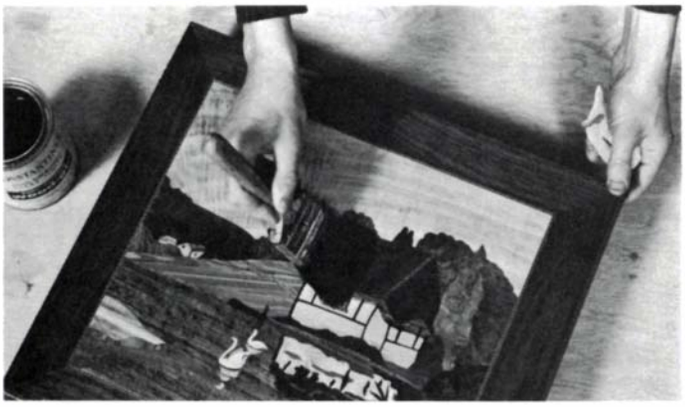
The next step is to apply a couple of coats of shellac. Place the picture on a few pieces of scrap wood, shimming them level if necessary, so shellac will not settle at one of the edges of the picture. Obtain a 3-lb. cut of white shellac that has a date marked on the container—the shelf life of white shellac is about six months to a year. Always buy the smallest can of shellac available—you need only a small amount. Try the shellac on a piece of scrap. It should be dry within two hours—if it isn't, it will remain gummy and should be discarded. Mix the shellac with an equal amount of denatured alcohol and apply to the picture. Let dry and apply another coat. This seals the wood and keeps the lighter woods free of the dust of darker woods when sanding. It also seals in the oil of veneers such as rosewood and teak.

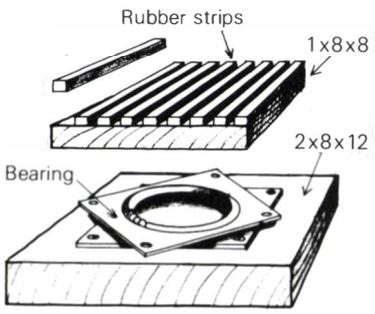
After the second coat of shellac has dried, place the picture back between the four wood strips. Use a sanding block about 1 in. by 2½ in. by 4½ in. Glue a piece of felt to one side, then wrap it with a piece of 180-grit garnet paper. Or use a portable in-line sander as I do. Sand with the grain of the predominant veneers. Follow the grain on borders and edges also. Do not press too hard at the edges because the veneer will wear down quickly there. Veneers are thin so sand with care. When the surface is fairly smooth, vacuum the picture.

Now place the picture on the short pieces of wood that were used when applying shellac, or on a finishing turntable, which is easy to make and lets you see the varnish from all angles. To build one, you'll need two pieces of wood, a lazy-susan bearing and some strips of rubber. The wood for the base should be about 2 in. by 8 in. by 12 in., although size isn't critical. The bearing is sandwiched between the base and the top, which measures about 1 in. by 8 in. by 8 in. A 6-in. bearing should be used for pictures up to 14 in. by 17 in. Rubber strips (or weatherstripping with adhesive on one side) attached to the top will keep the picture from sliding as it is turned. Use strips of masking tape on the bottom of the turntable to level it on your workbench.

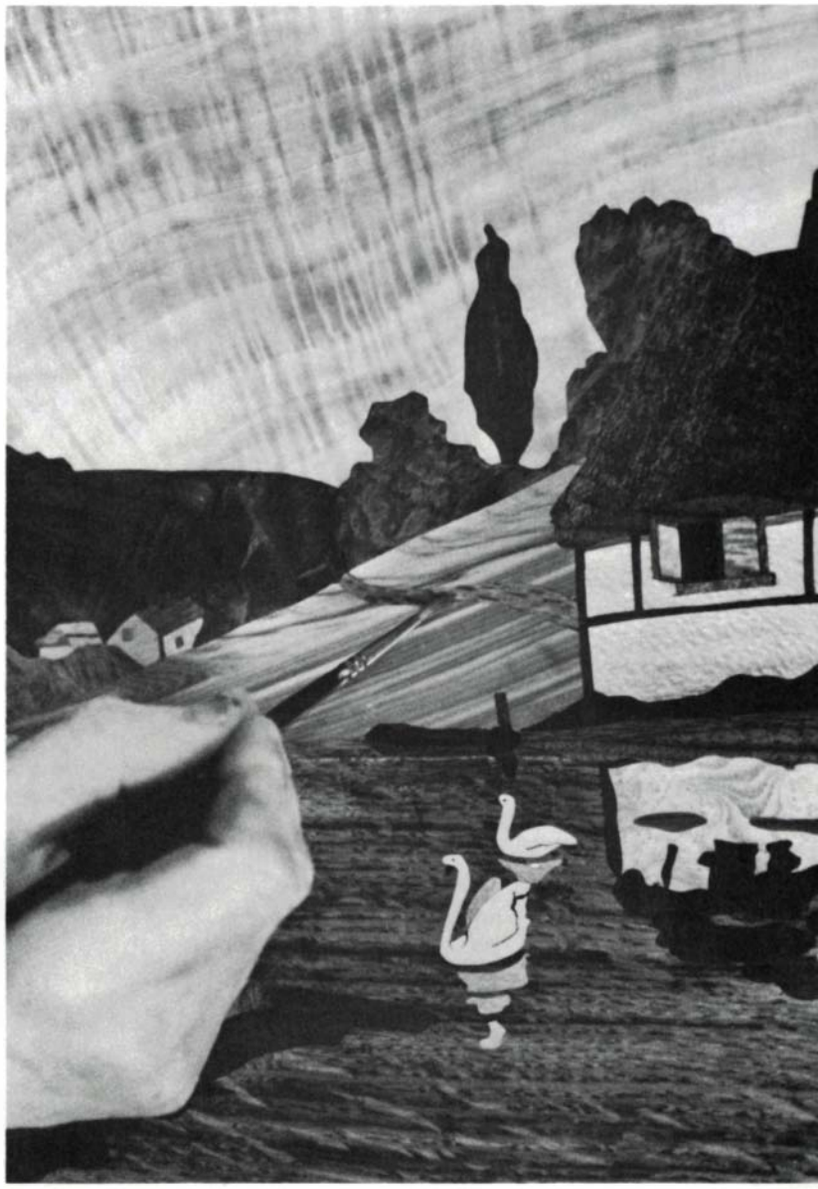
With a 2-in. or 3-in. varnish brush and a can of polyurethane varnish, you are ready to start. For the first several coats, don't be overly concerned about dust. Most of the varnish will be removed by sanding. Brush first with the grain, then against the grain and then again with the grain, brushing the edges last. Don't apply too heavy a coat of varnish, or you will end up with a gummy surface. The next day sand quite a bit of the varnish off the surface with 180-grit paper. The idea here is to fill the pores and cracks without

Photos: James Kent Kittle; drawing: Ric Lopez





Six to twelve coats of polyurethane fill the pores and cracks (above) without varnish buildup if the surface is sanded almost down to the wood (below) with 180-grit between all but the last two coats. Placing the picture on the specially made lazy susan, drawn at left, allows you to turn and inspect the varnished surface from all angles as you work.



Before the top coats are applied, varnish, painted in with a small brush, fills deep scratches and gaps in veneer joints. The 18-in. by 20-in. picture, by the author, includes holly swans in a black beam pond under an aspen sky.

building up too much varnish. It takes about six to twelve coats to achieve this. Lightly sand the last two coats with 240-grit.

Clean the brush after each coat of polyurethane. I swish the brush around in a mixture of part lacquer thinner and part turpentine, followed by a soapy water wash and a final clear rinse. Excess water is wiped off and the brush is hung up over the hot-water heater to dry for the next day's use.

Sometimes deep scratches or gaps in veneer joints are noticed after several coats of varnish have been applied. After the varnish has dried for about four hours, use a toothpick or a fine artist's brush to fill the gaps with more varnish. They'll be sanded down the next day with the entire surface.

Before the last three or four coats, use a tack rag to clean the picture of dust. A tack rag can be made by sprinkling a piece of clean cloth with a mixture of turpentine and varnish. The back of the picture should be sealed with several coats of shellac or varnish.

After the last coat has been applied, wait at least a week for the finish to harden. You will notice dust specks on your picture—these are difficult to avoid no matter how much care you take. Remove the specks by rubbing the picture with 4/0 steel wool. Place a small amount of pumice powder in a dish and dab a damp felt pad into it. Rub the pad on the surface with the grain of the predominant veneers. Experience will tell how much to rub, but remember that too much rubbing could wear away your finish. Wipe off the pumice with a wet sponge and clean cloth, and repeat the procedure with rottenstone. Rottenstone is a fine dark powder that is messy to work with but it polishes and removes fine scratches. Finally, clean the surface and apply wax—I use Pledge.

After several months, fine raised hairlines may appear where the veneers are joined, possibly because moisture has caused the veneers to expand slightly. These lines usually disappear with a rubbing of 4/0 steel wool followed by rottenstone and water. □

Pete Rose, of Saddle Brook, N.J., is a founder of the Marquetry Society of America (Box 224, Lindenhurst, N.Y. 11757) and writes for their newsletter.

The Drawknife

Learning to use this simple tool

by Drew Langsner

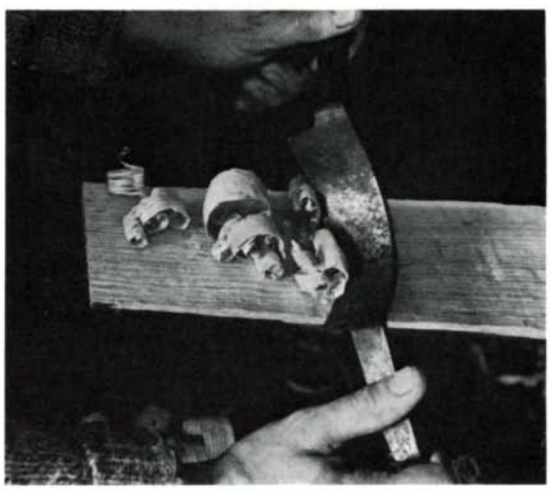
Although many woodworkers own a drawknife, I am continually surprised to learn how seldom these tools are used. Drawknives are among the most versatile handtools available to woodworkers. They are fast and easy to use for roughing out stock and for some kinds of finish work. Traditionally drawknives were needed by a wide range of skilled woodworkers. I first used one during a summer of intensive training with a Swiss cooper. Other craftsmen who once depended on drawknives include furniture makers, carpenters, turners and wheelwrights. Drawknives are perfect for dressing shingles, making tool handles, debarking poles and pointing fence posts and pickets. They're also excellent for quickly making odd-size dowels, pegs and wedges, especially from straight-grained, riven stock. There's no better tool for adding a decorative chamfer to furniture parts and even house parts.

A drawknife is a viable alternative (or addition) to machine tools for various kinds of work, especially for individual pieces or small production situations. Chairmaker John D. Alexander, Jr., for example, used to work with sawn lumber which he turned on a lathe. His book, *Make a Chair from a Tree: An Introduction to Working Green Wood* (The Taunton Press, 1978) gives good reasons for his becoming a drawknife convert. Ring-porous hardwoods can be split out quickly and shaved with a drawknife to graceful dimensions while maintaining the strong, continuous grain structure. There is also the pleasure of working in a shop with quiet tools that run on human energy. And the waste from a drawknife is shavings, not sawdust that can cause various respiratory problems.

Old drawknives were often homemade or produced in small runs at local blacksmith shops. A good source of steel for forging a drawknife (see "Basic Blacksmithing," *FWW* #9, Winter '77) is a worn-out file or rasp. Grind off the file teeth along the drawknife cutting edge before doing any forge work.

Early tool catalogs list a wide variety of drawknives for general and specialized uses. The basic drawknife has a straight blade, 6 in. to 10 in. long, with a handle at either end, usually at right angles and in the same plane as the blade. Most often only one side of the blade is beveled, though some old drawknives have symmetrically shaped blades, beveled like a knife or an ax. Slightly dished drawknives (with a bevel on the concave face) are used for dressing flat surfaces, such as the slats of a ladderback chair. Radically curved drawknives, called inshaves, can be beveled on either side. For hollowing (as for barrel staves) or quickly reducing the thickness of a board, a bevel on the convex surface is best. A bevel on the concave face is used for finer work.

There are also variations in the angle between the handles and the blade. Coopers and wheelwrights sometimes used a drawknife with one of the handles extending straight from



Various drawknives satisfy different needs. Above, from top to bottom, straight blade is for general-purpose work. The second can be used to slice wood with the blade at an angle or, with its straight handle out, to chamfer the inside of a bucket rim. The third has a slightly curved blade with the bevel on the concave face—best for light cuts and finishing work on flat surfaces. At top right, a similar drawknife, but with round, French-style handles, takes a fine shaving. The fourth drawknife has a radically curved blade with the bevel on the convex face. This tool makes fast work of hollowing out barrel staves, removing large shavings (photo, right). Also known as an inshave, it is the drawknife equivalent of the scrub plane.

Photos: Tad Stamm

the blade, so the tool was shaped like an *L*. It could be pulled with the blade at an angle for a slicing action without the handles bumping into the bench or workpiece. Drawknives with both handles extending straight from the blade are used for work where angled handles are in the way, for example when shaving the exterior of a bowl, secured rim down on a workbench. Like spokeshaves, straight-handled drawknives are pulled or pushed, whichever is more convenient. It's harder to control a straight-handled drawknife; standard handles provide leverage for controlling the cutting angle.

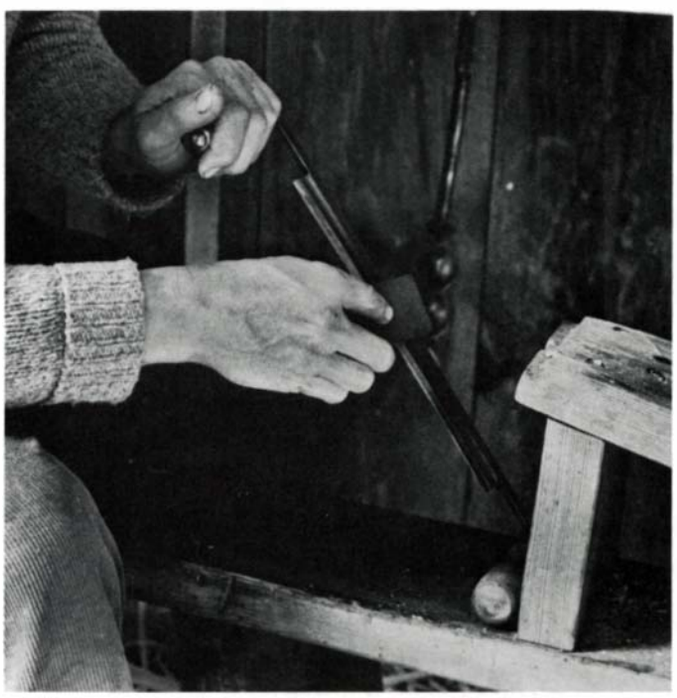
I sometimes use drawknives while standing at a workbench. However, the best workmate of the drawknife, used long before screw vises were invented, is the shaving horse, an ingenious foot-operated hold-down that grips the work fast and sure. Over the centuries various shaving horses were developed. In one style, called a dumbhead, a central arm pivots in slots mortised through the bench. Jaws on either side of the head hold the work against a ledge 8 in. to 10 in. above the bench seat. The treadle can be a cross peg or a board mortised to the tenoned bottom of the swinging arm. An English shaving horse, sometimes called a bodger's bench, uses two lighter arms pivoted at the sides of the bench and connected by a top crossbar that holds the work, and a bottom crossbar that is the treadle (see "Holding the Work," *FWW* #12, Sept. '78). Like Roy Underhill (*FWW* #14, Jan. '79, p. 4) I prefer the single-arm, dumbhead horse pictured at top right.

If you've used a drawknife and been disappointed with its performance, it's probably because it was poorly shaped or dull. Many new drawknives are ground at an angle that makes them practically impossible to use. Like other edge tools, drawknives must be sharpened with care and precision. Sharpening should begin with a check of the blade bevel angle, usually 30° to 35°. Very thin drawknives, such as the Marples, work well with a 25° bevel.

The wide blade and bent handles of a drawknife require adaptations of standard sharpening procedures. Herr Kohler, the Swiss cooper I worked with, uses a small sandstone wheel whenever rough dressing is necessary. For honing, he props one handle against the work-ledge support on the shaving horse while holding the other handle in his left hand about chest height. In his right hand Kohler first lubricates with spit a small natural stone, then rubs it in circles up and down the blade. When a slight wire edge develops, he flips the knife over and whets the flat side, using the same circular motion until the wire edge disappears.

This method is slow and results in a hollow area gradually developing in the handstone. Wille Sundqvist, a Swedish woodworking instructor, teaches a method that works faster and maintains a flat whetstone. Sundqvist mounts his stone in a shallow cavity chiseled into the side of a wood block. The block is secured in a vise or with dogs and wedges on a workbench. The block's thickness keeps the drawknife handles above the bench surface when the blade is bevel down on the stone. Sundqvist begins with a coarse or medium-grit synthetic stone, depending on the condition of the edge. He holds the right end of the blade, bevel down across the far end of the stone and pulls the drawknife diagonally towards his chest and to the right, so that the left end of the blade is whetted by the end of each pass. He repeats this motion until a wire edge develops across the entire bevel. The wire edge on the flat side, Sundqvist says, should be removed using the next harder-grade stone. Usually a new wire edge forms on

Drawknife and shaving horse offer an ideal combination of direct shaping and quick, sure gripping of green stock.



Two methods of sharpening drawknives. A Swiss cooper teaches supporting the drawknife on the shaving horse, center, and rubbing a handstone first over the bevel, then over the flat face, moving it up and down the length in small circles. A Swedish woodworking instructor teaches mounting the stone in a block of wood held in a vise, above. The drawknife is drawn diagonally over the stone, toward you and toward your right, so the entire length of the blade is whetted in each stroke.

Pieces that do not fit under the shaving-horse head can be held between the end of the shaving horse, in a notch or rabbet, and a roughsawn breast bib. Note that cuts do not start on the end grain; the waste at the far end of the stick will be removed after the stick is turned end for end.

the bevel side. He turns the knife and lightly whets across the bevel. The final wire edge on the flat side should be gently removed with a soft Arkansas stone. The bevel can be dressed very lightly once again with this last stone. Throughout the procedure he's sure to maintain a flat bevel at the proper angle. Whetting a microbevel is faster but necessitates frequent regrinding or coarse-dressing. Sundqvist also emphasizes keeping the flat side perfectly flat.

Drawknives are relatively easy and safe tools to use. It's almost impossible to pull the blade into your belly, though I have seen torn pants and cut legs. Skill is a matter of practice; tuning up with this freehand tool takes time. I generally work with the bevel down. The bevel acts as a slide and fulcrum for directing the angle and depth of cut. Some woodworkers use the drawknife bevel up. Drawknives with a slight bevel on the "flat" side will work in either position. The particular job and tool used should dictate the method. Practice different cuts, from shallow plane-like shavings to rougher work, shaving to ½ in. Then try curves, concave dips and other shapes. Drawknife technique is a combination of strength with the careful control necessary for doing accurate work. With practice it's possible to shape elaborate curves, using a narrow blade and pulling slowly, but with maximum muscular exertion and control—like an isometric exercise.

Drawknives work best with straight-grained woods, especially softwoods and ring-porous hardwoods. It's possible to shave dense woods like beech or dogwood, but convoluted figure requires working back and forth from each direction. This is where quick setups with a shaving horse really pay off. Wild grain may work better with an adjustable spokeshave.

A fast technique for roughing straight-grained wood to approximate size is to start a very deep shaving, then raise the handles to split off the waste wood. To drawknife very thin strips, such as basket splits and bucket hoops, place the work on a 1x2 extension stick held under the shaving-horse head. It's even possible to dress across the end grain of softwoods. Dampen the end grain a few minutes before starting. Use a keen drawknife. Work bevel up, from a low area to a high point. Pull the knife diagonally across the grain with a sideways slicing action, cutting only halfway across the section.

Here's a typical procedure for shaving a 1½-in. diameter chair leg from a split piece of wood roughly 2 in. square. If possible use straight and clear-grained green oak. Grip the stick on the shaving horse with the growth rings oriented vertically; radial surfaces are easier to cut than tangential ones. The first cuts will take the stick down to 1½ in. square. Start by tilting the drawknife slightly down on the right and take a shaving off the upper right corner of the stick, so the vertical side of the stick becomes 1½ in. high. Next tilt the drawknife slightly down on the left and do the same. These two cuts will leave a slight apex on the top surface. With the drawknife level, shave this off. Now rotate the stick 90°, and tilting the drawknife first left, then right, take the two shavings that will bring the other two sides of the stick down to 1½ in. Hold the drawknife level and remove the apex on the top surface. The stick is now 1½ in. square for the half of its length close to you. Turn the stick end for end and repeat the procedure to make the whole stick 1½ in. square.

The next step is to shave the square into an octagon. Tilt the drawknife 45° to the right, then 45° to the left, to shave the corners off the square. Try to make the three planes this produces equal in width. Rotate the stick 180° and chamfer the other two corners of the square. When all eight planes are the same size, you should have a regular octagon 1½ in. across. Turn the stick end for end and repeat the procedures to make the whole stick octagonal.

Now to produce a perfectly round chair leg, it's simply a matter of taking thin shavings off the corners of the octagon, rotating it between strokes and checking it occasionally with a go/no-go gauge. It can be finished up with a spokeshave. Alternately shaving and repositioning the stick proves the value of the shaving horse; the hands can concentrate on the work while the feet quickly hold and release it. The dumbhead horse is particularly advantageous because the work can be slipped out the side to turn end for end, instead of drawing out its whole length from under the head, as is necessary with the English-style horse.

Slipping can be a problem with very green wood and hard-to-hold shapes. Check the shaving-horse head for height and jaw-angle adjustment. If slipping continues, place a small block with coarse sandpaper glued to both faces between the work and jaw of the shaving horse. Woodland craftsmen who continually shaved slick wood sometimes inserted a strip of serrated metal into the upper jaw. I've used a small rasp.

Sometimes it's necessary to drawknife a piece of wood that won't fit into the shaving-horse jaws. Or you may want to shape a flare or curve going into the grain at the end of the wood. A method developed before screw vises uses chest pressure to hold the piece against a rabbet or in a notch cut in the end of the shaving-horse work ledge. A breast bib (a small plank hung by a string around one's neck) distributes pressure and protects against accidents. Breast bibs are made from roughsawn wood; a planed surface will slip against the work.

For drawknifing large work use a conventional wood vise or a peg and wedge-holding system. A machinist's vise with wooden jaw-inserts is excellent for drawknifing irregular shapes or small work. The narrow jaws located above the workbench allow drawknifing at a variety of angles. □

Drew Langsner is director/instructor at Country Workshops, a school for traditional woodworking in Marshall, N.C.

by George Frank

THE WAY TO MECCA

The ex-Khedive of a certain North African country had money problems—he had so much that he did not know what to do with it. He cared for his wife, their four children and his mistress in a manner befitting royalty. A *bon vivant,* he was a corpulent and jovial character, well into his seventies in 1939, the time of this story. His latest flame was the 18-year-old Yvonne. Court etiquette required that she be hidden, unknown, discreetly kept. A short time later, the Khedive purchased an estate about 90 miles south of Paris, complete with a 200-year-old manor. Yvonne adapted quickly and effectively to her new role as mistress of Ransonville and helped the Khedive spend money.

Since this is a true story, I have changed the names of some people and places. However, it is a fact that my atelier at the time was at 88 Rue de Charonne in Paris and that my office was a cubbyhole with a desk, three chairs and a filing cabinet. From there I did not see my two visitors alight from a Rolls-Royce. One of them, who introduced himself as Monsieur Boubli, asked whether I would care to do some woodfinishing—removing old paint in a stairwell to expose the natural wood. My affirmative answer was followed by a request for samples. My two visitors then had a conference of which I could understand not a single word, but eventually Boubli pointed to one of the finishes and said: "This is the one his highness would like you to produce."

Soon after, my crew and I started the job at Ransonville. In less than two months, the job was brought to a beautiful conclusion. The Khedive visited the worksite frequently, and many nights we shared a bottle of good wine with him. By the time I presented my bill, I was no longer Monsieur Frank, I was "my friend, George."

"My friend, George," said the Khedive, "I am enchanted with your work, but I have a favor to ask you. I invited some friends here for the month of Ramadan and they will be here in three weeks. Would you please do the same kind of work on the six paneled rooms of the manor?"

"Your highness," answered I with a question, "to do the stairwell took us nearly two months. How can I do six times as much work in three weeks?"

"I'll help you," said the Khedive. "I can rub the wood as well as your men can." There was only one possible answer. "The job will be done," I said.

Before I describe the operations that followed, I must go back about three months to when Boubli gave the contract to refinish the six paneled rooms to one of the leading interior decorators of Paris. He had about 20 men working on the job, not far from my four, busy in the stairwell. There was a great deal of teasing going all the time and some professional jealousy. My men even changed the labels on all our containers: the lime-water became angelmilk, the lye, laxative, and so on. The decorator's men finished first, almost a week ahead of us. The Khedive paid his well-padded bill without batting an eyelash and then asked me to redo the job.

The wood in the stairwell was silvery grey, much like hemp rope, and the shine, or rather the gleam, of it was the dry shine that I developed using emulsified waxes (see box below). We left some of the old paint in the corners here and there, but except for that all the markings of the wood were readable and well emphasized. Not so with the panelings. Their color was a nondescript yellowish brown, with far too much old paint left in the corners. The shine was the greasy glow of fresh beeswax, with which the work was overloaded. While the wood was fairly clean, it had no character.

By the next morning, four more men had arrived from my Paris shop with unusual equipment such as fisherman's hip-boots, swim trunks and scores of brushes, half of them made of wire. Some of the men started to take the panelings from the walls, carefully marking every piece for easy replacement. Others lowered the water level in the brand-new swimming pool to about 2 ft., and I dumped in about 5 lb. of caustic soda (sodium hydroxide). The paneling was lowered unceremoniously into the pool, where the potent solution of caustic soda and my hipbooted men wielding wire brushes made short work of the finish on the wood. Removed from the pool, the panels oozed ugly brown juice, the sap, coming from the guts of the wood.

Men in swim trunks handled the next operation, washing the wood until the water ran clear. More than once the

EDITOR'S NOTE: Contributing editor George Frank's book on woodfinishing, from which this tale is excerpted, will be published in the spring of 1981 by The Taunton Press.

Emulsified wax

I had sought, for many years, to find out how to impart to wood a hard, dry shine such as could be found on objects waxed centuries ago. I made up my mind that the key was emulsifying wax in water. This, however, was not so simple, and from professional chemists I had to learn the techniques. Hundreds of experiments later I arrived at the formula I give you now. It is the best, and the one I have always used.

In a nonmetallic container (enamel-coated is okay) heat a little over 3¾ liters of water (rain water is best). When it boils, add to it a little over 30 grams of triethanolamine, available from chemical supply houses. In another container, melt a little over 120 grams each of carnauba and candelilla waxes—I prefer the unrefined version of both, if available—plus about 190 grams of stearic acid. When melted, slowly add the wax mixture to the hot water. Let it cool, stirring frequently with a wooden stick. When cool, the waxes are emulsified, and will have the consistency of heavy cream. The color will be a pale green-grey-beige.

As I have said, this is the best formula that I know. But am I satisfied with my water-wax? The answer is no. I am far closer to the shine I am seeking, but I would be a liar if I said I was satisfied. The water-wax is far from being perfect. This is but one of the hundreds of woodfinishing problems that is open to research. —*G.F.*

Khedive and Yvonne joined the team. Helpers from the village wiped off the excess water and laid the panels on top of small brick piles, exposing the paneling to the sun (back first, face last). After drying, the panels were ready for the next step, the feeding with angelmilk—quicklime, freshly slaked in water. We painted this solution on the panels without much care because after drying we brushed and wiped off all the lime we could. A fine dusting of lime remained in the wood, however, accentuating its silvery-grey color. We did not use a single piece of sandpaper, yet from the scrubbing and brushing the wood was pleasantly smooth and had the beginning of a glow.

The second day was not yet over when the first panels began their trek back to their original positions. On the eighth day, the swimming pool was drained, cleaned and restored by a caretaker. My men shed their hipboots, donned overalls and entered the manor, where the first room was ready for them. Their immediate task was to repair the damage caused by the work done so far. A number of splits had developed and we glued wedges in them, but not before rubbing their edges with strong tobacco juice or with liquid nightmare, vinegar in which we had soaked all sorts of rusty iron objects. We did this to underline discreetly the fact that repairs had been made—we wanted the repairs to be visible. We used aged wood for wedges, and the fine brown or grey lines around them added credibility to their age. My carpenters used as few nails as possible to reinstall the panels, hiding most of them under the crown molding, the base or the chair-rail. The brads used to secure these were countersunk immediately and the holes filled with soft bread, moistened with saliva and tinted with powdered rottenstone. In two rooms we could not avoid visible nails, so I devised a tricky way to camouflage them. The frames of these panelings were held together with mortise-and-tenon joints, pegged at each corner with two wooden pegs. No one ever noticed that when we finished the job there was a third peg at each corner, a fake that just covered the countersunk nail.

At this point the paneling had a silvery hemp-like color but the general harmony was missing. The wood had not been selected to be exposed, and some boards contrasted sharply with others. To lighten the dark ones, we used a saturated solution of oxalic acid dissolved in alcohol (kept away from any contact with metal). On some pieces we had to repeat this process two or three times. After bleaching, we washed off the residue with vinegar, then with ammonia water. Boards that were too light had to be dyed with various strengths of "liquid nightmare," which added to the anemic boards a greyish hue.

I made up vast supplies of my emulsified wax, and we applied two thin coats of it to the panelings. After it dried, we shined up the first coat with stiff scrub brushes. We rubbed, or burnished, the second coat with chain cloth that originally came from medieval armor. By now the wood was silky smooth with full emphasized markings and a natural shine. Yet the job was not done. My wax had another quality. In a few days it lost its luster and settled down to a low, matte texture. Now my "stone wax" entered the picture. Unrefined carnauba wax looks like green-grey rock and is quite dull until it is rubbed, but then it acquires the most pleasant hard shine. I broke this wax into small pebbles, melted it over high heat in a double-boiler and then, away from all fire hazards, I poured lacquer thinner over it. In a short time the wax gelled and became pastelike. With this wax, which dried to stone-hardness under my fingers, I coated the high points of the moldings, carvings and parts of the woodwork that were exposed to wear. A final buffing, this time with wool, helped us to achieve the finish that I consider the ultimate for this kind of work. The Khedive agreed and confirmed it in a letter that is still part of my treasured memorabilia.

The last day on the job was reserved for cleanup and for touchups. With a tray in my hand filled with stains and brushes, I strolled from room to room and found and corrected faults. One of the rooms was the Khedive's bedroom, furnished with austere simplicity: a huge bed, a few chairs and a single night-table. I walked in the room, stepped on a screwdriver left there by some careless workman, lost my balance and fell. The tray slipped out of my hand and the contents of one of my small jars spilled on the carpet, which was of a quality royalty can afford, woodfinishers never. My foreman, Richard, and I locked ourselves in the room and tried to clean up the spot. Two hours later we had to throw in the sponge: The spot remained. Then Richard had an idea: "Let's turn the bed around, and tell Boubli later about the accident." No sooner said than done.

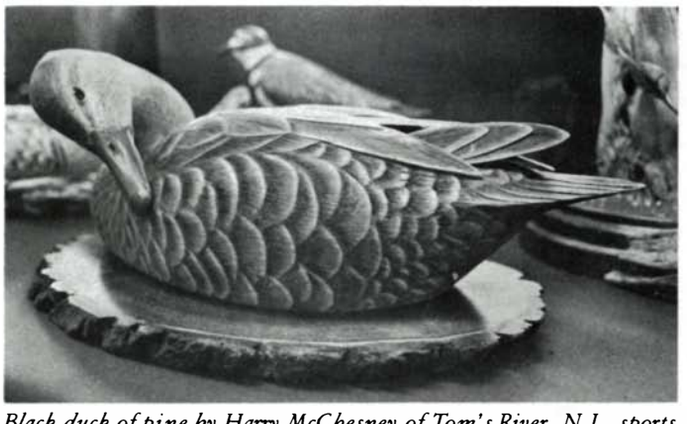
The guests of the Khedive arrived the next day, and the reception dinner was scheduled for 6:00 P.M. Well before that time, I had received a message that the Khedive wanted me to "honor the reception with my presence." Sensing that a simple woodfinisher did not belong in the company of statesmen and political leaders, I tried to excuse myself, but Boubli, the Khedive's secretary, made it clear that the Khedive would resent my absence. Therefore, shortly after 5:00 P.M., I arrived at the manor in a hastily rented tuxedo, and was promptly put at ease by Yvonne and the Khedive. A few aperitifs helped to narrow the gap between diplomats and woodfinisher, and by the time the couscous was served I no longer felt that I was an intruder.

After cognac and cigars, the Khedive took the guests on a tour of the manor. Politely he asked my permission to use his native lanquage and I guess that they spoke about the paintings, furniture and rugs, which represented a small fortune. When the group reached the first paneled room, they looked at and stroked the wood, then looked at me with warmth. As new rooms opened up, the "oohs and ahs" of this appreciative audience increased. Finally, we entered the Khedive's bedroom. The bed was back in its original position, the spot was in full evidence, and my heart felt as if it had stopped beating. This time the Khedive spoke in French, addressing me directly: "George, my friend, under your magic fingers this lifeless wood has become a thing of beauty, like music or poetry. While performing your magic act, by accident you soiled my carpet. My intention is to keep that spot as it is, right where it is, to remind me of my indebtedness to you, who revealed to me the beauty that can be found in a piece of simple wood." The Khedive took me in his arms and kissed both of my cheeks. I had tears in my eyes and could not utter a single word. Then the Khedive spoke again, laughingly, pointing to the bed: "And remember, my friend, that a true believer can sleep only so that the line between his heart and his head points toward Mecca." □

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.*

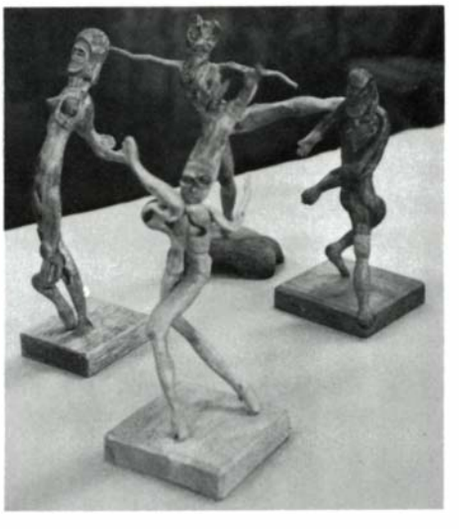
Walt Warren of Oakland, N.J., passed the time at his booth with a knife and a 6-in. length of 1x2, whittling birds.

Whitney Kent, of Leonia, N.J., is a painter and former art teacher who turned to carving laminated sugar pine into figures and animals that are boxes. The lively acrylic colors with which she decorates her pieces take on a porcelain-like glow under the ten coats of varnish she applies while watching television. 'If it weren't for the baseball games,' she says, 'I couldn't do this kind of finish.'



Black duck of pine by Harry McChesney of Tom's River, N.J., sports feathers not painted but marked with an electric burning-pen.

These unusual twisted figures by Helmut Schillings of Brooklyn, N.Y. retain the gnarled shape of the alpine roots from which they were carved.



The Whittle Ones

Woodcarvers convene in Paterson, N.J.

by Rick Mastelli

Local craft fairs do more than help local craftspeople make a living. They serve as showcases for things that took time and care in the making. Fairs are places to receive recognition, to compare achievements and to look for ideas. For those whose work in crafts is a quiet, leisure-time activity, sharing is more important than selling. With this in mind, the first annual Woodcarvers Show in Paterson, N.J., held last June 21 and 22, was organized to bring together people who appreciate woodcarving, not just buyers and sellers.

Craft fairs have not done well in Paterson. This show was energetically promoted by the small woodcarving club, The Whittle Ones, "to prove that woodcarving is not a dying art and that Paterson is not a dying city." The show exceeded all expectations, attracting almost 5,000 people. Prices were not stickered to the work of the 76 juried exhibitors, though many things were for sale. Instead, prize ribbons were deservedly in abundance. Demonstrations and door prizes (many donated by the exhibitors themselves) added to the country-fair atmosphere: People marveled, asked questions, learned a great deal. "There are a surprising number of closet whittlers here," said one exhibitor. "A lot of people underestimate themselves because they've got nothing to compare their work to. This is the sort of show that will attract twice as many entrants next year."

The Whittle Ones (Box 417, Saddle Brook, N.J. 07662) is affiliated with the National Woodcarvers Association (7424 Miami Ave., Cincinnati, Ohio 45243), which publishes the magazine *Chip Chats* ($5 per year dues). □

JOHN FREIMUTH Sixty years a stairbuilder

Above the usual hum of machinery, when you enter the red brick building on Peoria's south side, you can hear the slap, slap, slap of 6-in. leather belts transmitting power from 10-HP and 15-HP induction motors to the building's 1920s-vintage machines. To 80-year-old John Freimuth, those are "real quality machines that aren't made anymore." A tall, white-haired gentleman, Freimuth has been a cabinetmaker since 1921. He started as a sander for a millworks in Peoria, Ill., working on the 16-ft. panel sander that now occupies a place in his own shop and is used daily. The job paid 25¢ an hour for ten-hour days, six days a week. Management saw potential in Freimuth and moved him through the screen, frame, cabinet and finally the stair departments before making him superintendent. It was 1934 and he received $165 a month for managing 60 employees.

In 1959 Freimuth started his own business, and soon Freimuth and Son Architectural Woodwork Inc. moved to the old red brick building it now occupies. Even today the building has practically no exterior identification, but that doesn't seem to be a problem. Word of mouth keeps the shop busy.

A typical business day finds Freimuth answering the phone, waiting on customers at the counter, making plans and drawings, supervising the shop, conferring over bids and methods and often actually building cabinets or stairs. He moves through the shop with the respect accorded a local bishop who on a Sunday enters a small parish church unannounced. Held in awe, certainly respected, Freimuth will peer over a craftsman's shoulder to comment on his methods and offer advice. It may be friendly and welcomed, but the men are not sure if he completely approves of their work. "It's tough," remarks one former employee, "because John is so competent and knowledgeable you know he can do better than you, no matter how hard you try."

Freimuth has apprenticed many, including young people from Germany and Lebanon whom he's helped to become American citizens. Currently, one man, a night foreman at a local trucking company, is not on the payroll, but is interested in cabinetwork as a hobby. He just comes and watches all day to learn. That's okay with Freimuth, who is happy to teach anyone enthused about the craft.

Freimuth's specialty is stairbuilding, one of the most difficult and least understood forms of millwork. In years past, the entry hall, with its elaborate, sweeping stairway, was the focal point of the home. Then, the price of a house was not measured in cost per square foot; quality came standard. Detailed decorations, the order of the day, reflected a pride in stairs built to last. The art was passed on from master stairbuilder to apprentice. Today, with costs exorbitant and ranch houses popular, stairbuilding is a luxury of the past, and craftsmen like Freimuth are rare. No one makes enough stairs to afford to teach an apprentice. Most books on the subject are long out of print. Narrow flights stuck on the walls of modern houses are nailed directly to the rough horses, and if they squeak, they just squeak.

Freimuth is known for executing the impossible. He creates curves that textbooks say can't be done. His first and most notable creation, built in 1929, is a double, self-supporting, curved stairway (facing page, top) for the Centennial Building in Springfield, Ill. "It took us six weeks to build," he says. "It has 3-in. stringers, a 6-in. by 6¼-in. handrail, and the balusters were turned from 3-in. stock. It cost $1,500." Much to his chagrin, most of this beautiful stair is now covered by partitions to make room for additional bureaucrats.

More recently, for a home in Land O Lakes, Wis., he built a two-story, circular stair that cost $30,000. Freimuth had to make several trips to supervise the installation because the carpenters in this small rural community had never assembled anything so complex before. It is 23 ft. tall, 12 ft. in diameter and built like a silo with laminated ash and spruce for wall staves. A structural part of the house, it was assembled first and the floor joists tongue-and-grooved into the sides. It took a flatbed trailer to carry the stair from Peoria to Wisconsin.

One of the fine points of stairbuilding is making a curved easement to connect one straight handrail to another or to a newel post. Freimuth explained how he uses a pitch block to simplify shaping. First he glues up the blank out of ¾-in. stock and slices its bottom face at an angle so the blank corresponds to the pitch of the stair. Then he transfers to the top face of the blank the outline of the curve from a cardboard pattern. To facilitate bandsawing this curve, he glues a pitch block having the same rise and run of the stair to the bottom of the blank. He bandsaws the outside curve first, planes it and squares it with the uncut top face, then does the same for the inside curve.

The next step is to shape the top of the rail using carving chisels and a spokeshave. He starts at the top of the inside curve and eases away the waste to leave a section at the bottom of the curve whose top surface is parallel to the cut bottom surface of the blank. He keeps the top surface, along the whole length, square with the sides, checking frequently with a try square as he shapes. Once the top is smooth, he scribes the bottom with a marking gauge parallel to the top. Because the bottom has a twist, it has to be worked to final shape with a block plane and a spokeshave. With a router he makes cuts that approximate the shape of the straight handrail, but carving tools must be used to bring the curved easement to its final form. Total work time is about 16 hours.

"There is no way to machine this kind of easement," says Freimuth. "Attempting to use a shaper is out of the question because of the small radius and the twist. One slip would destroy the piece, or lose a finger. It's just not worth the risk. It might be possible to make a jig if you were going to mass-produce the same easement, but I've never made two easements the same. Each one is a custom job."

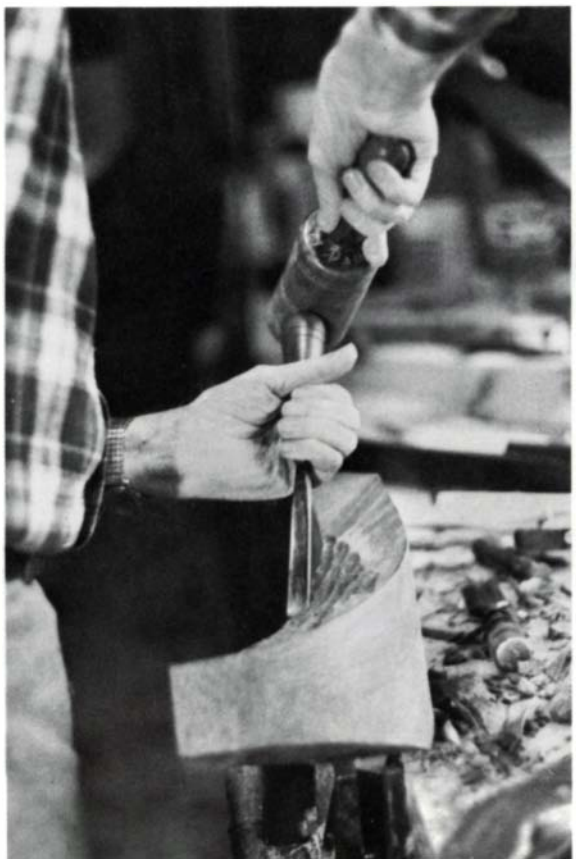
When asked about retiring, Freimuth explains, "Whenever God nods his head at me, that's the time I put down my ruler. I was put here to work six days a week and that is exactly what I do. The seventh day is the Lord's." Devoutly religious, Freimuth has constructed altars, paneling and general millwork for churches throughout central Illinois. He seems to get the most satisfaction from this work. In his lifetime, he has taken only one or two short vacations, choosing instead, he says, "to relax with my work." □

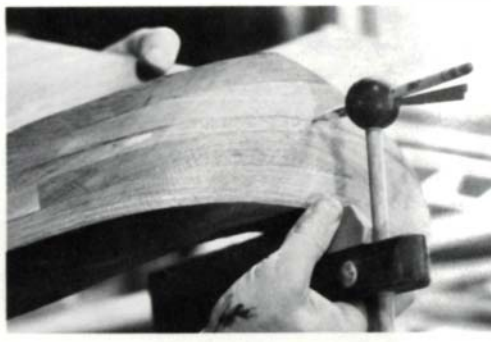
Jon Gullett, a writer and amateur woodworker, lives in Washington, Ill.

Stairway (1929) for the Centennial Building in Springfield, Ill., is one of Freimuth's first. Photo courtesy of the Illinois State Historical Library.

Photos: Ron Ragan

A tricky aspect of stairbuilding is making the compound cur e of a handrail that connects a straight section to a newel post. Freimuth transfers the cur es to the face of a laminated blank and the rise and run of the stairs to a pitch block. Glued to the bottom of the blank, left, this pitch block facilitates bandsawing the outside and inside cur es. Next he shapes the top surface with a carving gouge, below, and a spokeshave until it is smooth, perpendicular to the sides. Then the bottom face is scribed with a marking gauge, below right, and shaped. A router, bottom right, roughs out the shape drawn on the easement end.

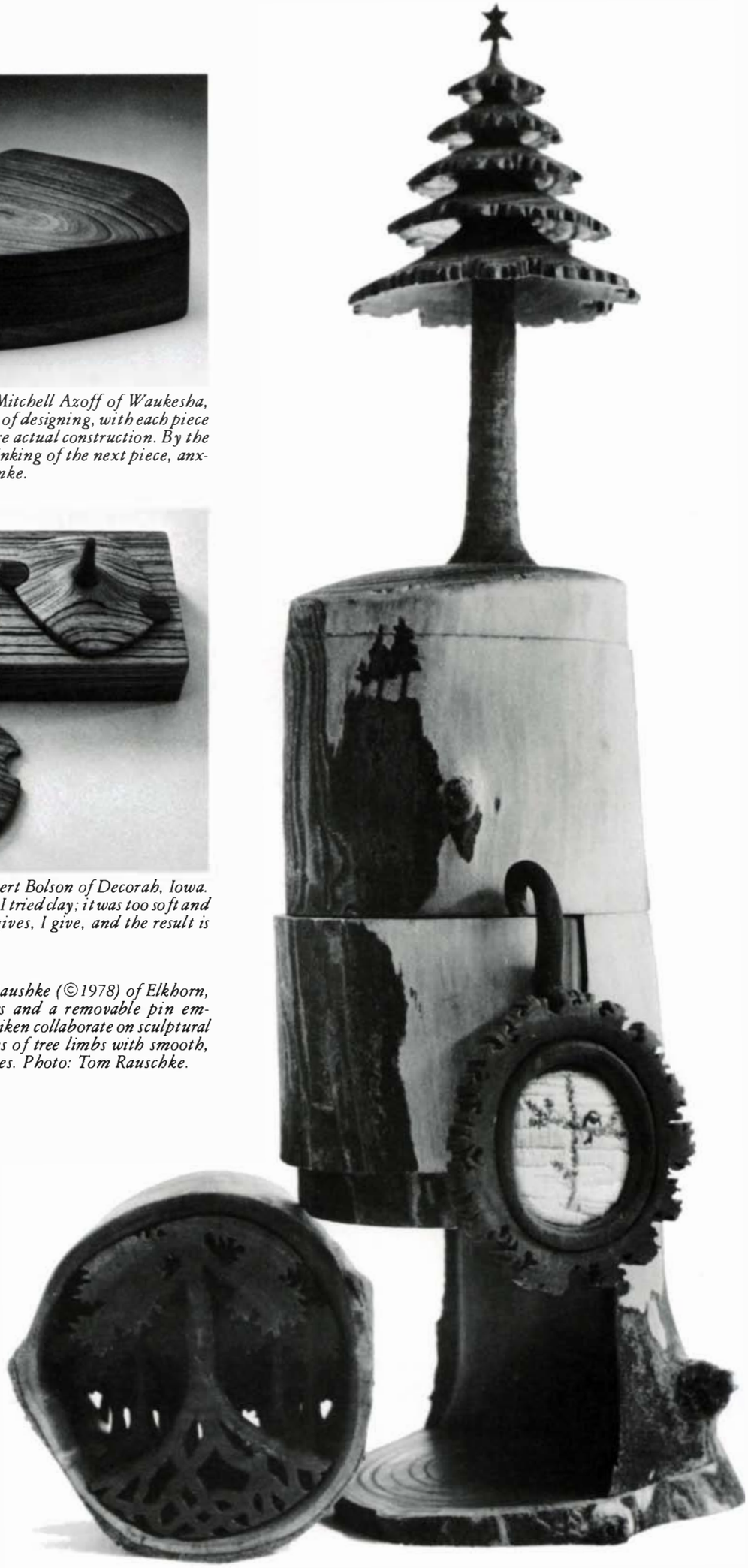




Sculptural box in cherry, 14 in. long, by Mitchell Azoff of Waukesha, Wis. Azoff says he gets most satisfaction out of designing, with each piece going through several stages on paper before actual construction. By the time it's a matter of craftsmanship, he's thinking of the next piece, anxious to start drawing again. Photo: Bill Lemke.

Laminated zebrawood, 12 in. long, by Robert Bolson of Decorah, Iowa. Says Bolson, 'My hands are suited for wood. I tried clay; it was too soft and loose. Metal was too rigid. With wood, it gives, I give, and the result is something good.' Photo: Nancy Bolson.

Music box of cedar, 12 in. high, by Tom Raushke (©1978) of Elkhorn, Wis., is also a puzzle with secret drawers and a removable pin embroidered by Karen Wiken. Raushke and Wiken collaborate on sculptural containers that contrast the natural surfaces of tree limbs with smooth, elaborately worked interiors, full of surprises. Photo: Tom Rauschke.



More Than a Box

We usually think of a box as five or six pieces of wood joined together, the time and care spent on the joints determining the quality of the box. Last June, Mindscape Gallery in Evanston, Ill., featured boxes by twelve artists in various media that showed what more a box can be. Most were sculptural, some incorporating painting, metalwork or stitchery. And most of the wooden ones were not conventionally joined, but bandsawn by variations of the technique described on p. 64. Three of the best boxes are shown here.